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Measurements & Testing Newsletter

THE BULLETIN OF INFORMATION OF THE MEASUREMENTS AND TESTING GENERIC ACTIVITY IN THE COMPETITIVE AND SUSTAINABLE GROWTH PROGRAMME

FOREWORD

The challenges ahead



The start of the new millennium has seen the fastest increase in technology development ever. Never has technology promised so much. At the same time, however, more and more concern is expressed about the function, safety and impact on health of new products, materials and systems. Indeed, the sustainability of our entire development is questioned. We have to support and, simultaneously, monitor our development. To do so, there is a need for measurements, testing and standards more than ever before. Or simply put: there is no research without measurements, no quality without testing and no global market without standards.

One immediate priority for the new framework programme will be the development of new measurement methods to support emerging fields such as nanotechnologies which are set to be the next 'industrial revolution', changing the face of technology as effectively as electronics did in the 20th century. In view of the forthcoming enlargement of the European Union, another priority has to be helping the candidate member state laboratories prepare for their tasks in implementing European directives. In a broader international perspective, support to mutual recognition agreements for measurements between the EU and other world regions will be needed. Other, as yet unknown, priorities will be identified as health and environmental scares and trade disputes emerge that demand new analysis methods and agreed upon testing procedures.

Obviously, the necessary activities to address all these European priorities need to be tackled at the European level. Moreover, in addition to coordination with national programmes in the "European Research Area", there will be a need to work on a world scale in order to remove barriers to world trade, and to address issues such as ISO standardisation and the fight against doping in sport.

Claes Bankvall

Swedish National Testing and Research Institute



COMPETITIVE AND
SUSTAINABLE GROWTH

NOTE FROM THE EDITOR

The past, the present and the future

In this issue, we report on the successful impact that some finished projects in the field of measurements and testing from the fourth framework programme have had on EU policies such as protection of the environment, free circulation of goods, consumer protection, transport and employment.

We give an update on the implementation of the present Measurements and Testing activity in the fifth framework programme which is at an important stage with the closure of both the last periodic call for research project proposals and the call for expressions of interest.

And with a keen eye on the future, we report on the Commission's proposal for the new framework programme (2002-2006) which was published on 21 February 2001 and is part of a wider political initiative aiming at creating a "European Research Area".

The Measurements and Testing Newsletter is the bulletin of information of the Measurements and Testing generic activity in the Competitive and Sustainable Growth programme of the European Union's fifth framework programme for research and technological development.

The Measurements and Testing generic activity is managed by the Measurement and Testing, Infrastructure unit of Directorate H of the Research Directorate General of the European Commission.

For questions or further information about the Competitive and Sustainable Growth programme please contact the Growth infodesk at growth@cec.eu.int or visit the Growth internet web site:
<http://europa.eu.int/comm/research/growth>

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Farewell and welcome

We say farewell to Christos Profilis and Enma Calvet who have joined other units in the Research Directorate General. We thank them both for their contributions to the unit and wish them much success in their new posts. We welcome to the unit Richard Gilmore whose background is primarily in physical chemistry.

How to subscribe to the Measurements and Testing Newsletter

The Measurements and Testing Newsletter is free of charge. If you wish to subscribe please send your name and address to the Growth infodesk: e-mail: growth@cec.eu.int or fax: +32 2 295 80 72

This issue has been published in 4000 copies. It is also accessible on the CORDIS internet web site:
<http://www.cordis.lu/growth/src/library.htm>



NEWS

Commission proposal for the new framework programme

Proposals for a new research and innovation framework programme for the European Union were presented by the Commission on 21 February 2001. Reflecting the increased priority given to research and innovation, the proposed budget for the new programme is €17.5 billion. This budget, covering the four-year period 2003-2006, represents an increase of 17% over the budget of the current research framework programme. The programme is part of a wider political initiative aiming at creating a European Research Area, as endorsed by the Lisbon Summit in March 2000.

Research Commissioner Philippe Busquin said "In this new programme, I am putting forward proposals to help businesses develop the key technologies for the future, and for our universities and research centres to work closer together to strengthen Europe's science base."



© European Commission
Research Commissioner Philippe Busquin

The new programme would:

- concentrate funding on a limited number of key priorities for Europe;
- help research teams work more closely together in networks;
- improve the mobility of researchers and the attractiveness of Europe as a home for world-class research.

Seven key emerging technologies and research priorities are proposed:

- Genomics and biotechnology for health
- Information society technologies
- Nanotechnologies, intelligent materials, new production methods
- Aeronautics and space
- Food safety and health risks
- Sustainable development and global change
- Citizens and governance in European society

A specific part of the budget is proposed for research to help improve the design of public policies at a European level by anticipating the scientific and technological needs of the Union. This includes, for example, research on fisheries, as well as particular aspects of transport and energy policy, environment policy and other matters dealt with by the European Union. It also includes an allocation for research at the very frontiers of science and technology.

In addition to these priorities, special measures are proposed for SMEs, innovation, mobility of researchers and the networking of national initiatives.

The highly successful mobility programme would be doubled in size. The objective would be to improve mobility of researchers within Europe as well as to make Europe more attractive for world-class researchers.

In order to strengthen the base of the European Research Area, new measures are proposed to help national authorities open up their own programmes to researchers from other countries, as well as to pool their own programmes together with those of other Member States to achieve a greater impact. The Commission will also seek to work more closely with a range of international research centres and organisations.

The Commission is proposing to streamline the administration and management of the programme by proposing new methods of funding such as integrated projects, and networks of excellence. The Commission is also proposing to encourage for the first time the use of an instrument (under Article 169 of the Treaty) which would allow participation of the Union in national programmes of Member States carried out jointly. In the new integrated projects and networks, framework programme participants will be encouraged to propose longer-term programmes of activities. These can be tailor-made to cover a range of individual projects of variable size as required. They can also be adjusted during implementation to meet new research opportunities and needs.

The final decision on the new framework programme lies jointly with the Council and the European Parliament. Proposals for the specific programmes that will make up the new framework programme are currently being prepared by the Commission and should be adopted by the end of May. A target date of June 2002 has been set for the adoption of the programme.

Proposal for a Decision of the European Parliament and of the Council concerning the multiannual Framework Programme 2002-2006 - COM (2001) 94 Final - 21.02.2001.

*The document is available on EUROPA:
http://europa.eu.int/comm/research/index_en.html*

*For full up to date information on important developments in the formulation of future EU priorities for RTD see the following CORDIS web site:
<http://www.cordis.lu/rtd2002/>*



UPDATE

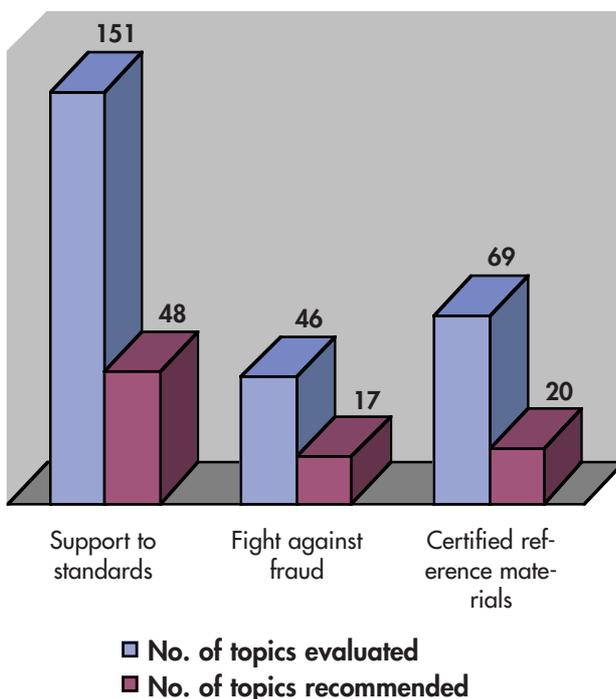
Evaluation of expressions of interest

The call for expressions of interest for the Competitive and Sustainable Growth programme closed on 30 April 2001. The purpose of the call was to enable any interested parties to suggest needs for projects in areas of the Measurements and Testing generic activity covered by the dedicated calls, as well as for all activities under Support for Research Infrastructures.

For Measurements and Testing, almost 200 expressions of interest were received before the deadline. They will be evaluated in Brussels in June 2001 by independent experts. The topics that are subsequently selected by the Commission on the basis of the experts' recommendations will be included in the last dedicated call for proposals that is expected to be published on 15 October 2001.

The results to date of the evaluation of expressions of interest for Measurements and Testing, taking into account all the previous evaluations held during the lifetime of the call, are shown in the figure.

Results to date of the evaluations of expressions of interest



How does the expression of interest / dedicated call mechanism work?

The expression of interest / dedicated call mechanism enables the Competitive and Sustainable Growth programme to focus on well identified research or infrastructure needs in Europe, providing a flexible and efficient approach both for targeting resources and for assisting proposers in directing their efforts.

The call for expressions of interest gives all interested parties the opportunity to suggest ideas for topics in areas of the work programme covered by the dedicated calls. The topics submitted are evaluated by independent experts at periodic intervals.

On the basis of the results of the evaluation of the expressions of interest, the Commission then publishes a dedicated call for proposals that is restricted to a number of specific topics. For each of the topics, supporting documents are made available to specify in depth the objectives of the required activities.

Evaluation of proposals from the fourth dedicated call

The fourth dedicated call for proposals for the Measurements and Testing generic activity and for Support for Research Infrastructures closed on 15 March 2001.

For Measurements and Testing, 24 eligible proposals were received covering all but one of the 21 topics for which proposals were invited. They were evaluated in Brussels at the end of April 2001 by independent experts. On the basis of the results of the evaluation, 15 proposals are expected to be recommended for funding, covering all but one of the topics, with a total estimated EC contribution of about €16 million. Contract negotiations will take place shortly and the first projects are expected to start by the end of the year.

The topics for which proposals were invited can be found on CORDIS at:
<http://www.cordis.lu/growth/calls/topics-200003.htm>

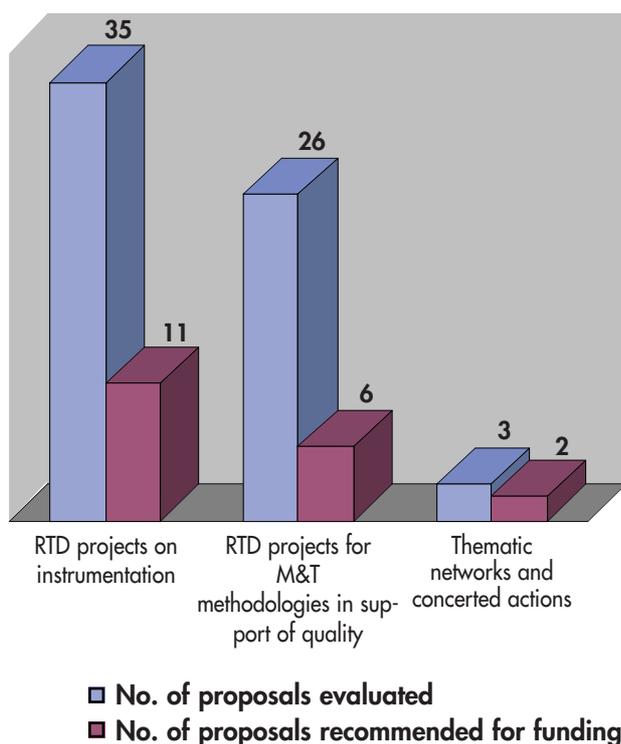


Evaluation of proposals from the December 2000 periodic call

The periodic call for proposals for the Measurements and Testing generic activity that was published on 14 December 2000 closed on 15 March 2001. This was the last periodic call for RTD, demonstration and combined project proposals for Measurements and Testing since the June 2001 periodic call will only be open for thematic networks and concerted actions.

For RTD, demonstration and combined projects, the call was open for "Instrumentation" (research objectives 6.1.2 and 6.1.3) and for "Measurement and testing methodologies in support of quality" (research objective 6.2.3). For thematic network and concerted action proposals, the call was open for all Measurements and Testing research objectives.

Results of the evaluation of proposals from the periodic call



In total, 64 eligible proposals were received. They were evaluated in Brussels at the end of April 2001 by independent experts. On the basis of the results of the evaluation, 19 proposals are expected to be recommended for funding with a total estimated EC contribution of about €24 million. Contract negotiations will take place shortly and the first projects are expected to start by the end of the year.

CRAFT

Two evaluations of proposals for SME specific measures (CRAFT) took place in Brussels in February and May. In total, 15 exploratory awards and 8 co-operative research projects in the area of Measurements and Testing were recommended for funding.

For more information about CRAFT see:
<http://www.cordis.lu/sme>

New certified reference materials

The BCR certified reference material review panel had its second meeting on 13/15 December 2000 and agreed on the certification of 9 new materials (see box). The new materials will be available from the Institute for Reference Materials and Measurements (IRMM) or its authorised distributors in due course.



Materials that are currently available are listed in the BCR Reference Materials Catalogue which is available from IRMM.

The catalogue for existing BCR certified reference materials can be found on the IRMM web site: <http://www.irmm.jrc.be>

Forthcoming certified reference materials

- BCR 693 and 694: the catalytic concentration of human pancreatic lipase (EC 3.1.1.3)
- BCR 194, 195 and 196: re-certification of the Cd mass-concentration in bovine blood
- BCR 667: the contents (mass fractions) of Ce, Dy, Er, Gd, Ho, La, Lu, Nd, Pr, Sc, Sm, Tb, Tm, Yb, Th and U in estuarine sediment.
- BCR 668: the contents (mass fractions) of Ce, Dy, Er, Gd, La, Lu, Nd, Pr, Sm, Tb, Tm, Yb, Th and U in mussel tissue.
- BCR 690: the contents (mass fractions) of Ce, Dy, Er, EU, Gd, La, Nd, Sc, Sm, Tb, Tm, Yb, Th and U in calcareous soil.
- BCR 670: the contents (mass fractions) of Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sc, Sm, Tb, Tm, Y, Yb, Th and U in aquatic plants.
- BCR 474 and 475: 17 α -trenbolone mass concentration in lyophilised bovine liver.
- BCR 648 and 649: the clenbuterol mass concentration in lyophilised bovine liver with indicative information on the salbutamol and terbutaline mass concentrations.
- BCR 673 and 674: clenbuterol mass concentration in reconstituted bovine eye.

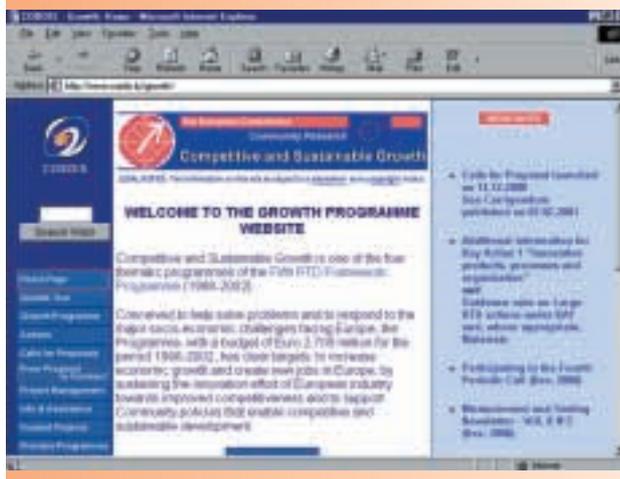


Measurements and Testing on CORDIS



CORDIS is the European Commission's online Community Research & Development Information Service. The CORDIS web site contains all the official information concerning the fifth Framework programme. It is the key site for existing and potential participants in the fifth framework programme and provides users with comprehensive up-to-date information on the various possibilities offered by the different programmes and how to apply.

The Competitive and Sustainable Growth programme is on CORDIS at:
<http://www.cordis.lu/growth/>



Summary of the Measurements and Testing work programme

The Measurements and Testing generic activity of the Competitive and Sustainable Growth programme has three socio-economic objectives:

- Pre-normative research and technical support to standardisation
- The fight against fraud
- Improvement of quality

The three main research objectives addressing these socio-economic objectives are:

- Development of instrumentation
- Development of methodologies for measurements and testing
- Development of the know-how needed to produce and certify reference materials

RTD activities (excluding CRAFT) covering these objectives are implemented either by periodic calls or by the expression of interest / dedicated call mechanism depending on the research objective (see table below).

Network projects and concerted actions are implemented by periodic calls and cover all the research objectives.

CRAFT projects and accompanying measures are implemented by permanently open calls and cover all the research objectives.

The Growth work programme 2001-2002 (version December 2000) is on CORDIS at:
<http://www.cordis.lu/growth/src/library.htm>

Modalities for RDT activities (excluding CRAFT) for the Measurements and Testing generic activity

Main research objective	Socio-economic objective	Pre-normative research and technical support to standardisation	The fight against fraud	Improvement of quality
Instrumentation		Not covered	Objective 6.1.2 Periodic call	Objective 6.1.3 Periodic call
Methodologies for measurements and testing		Objective 6.2.1 Expression of interest +dedicated call	Objective 6.2.2 Expression of interest +dedicated call	Objective 6.2.3 Periodic call
Support to the development of certified reference materials (CRMs)		Objective 6.3.1 Expression of interest +dedicated call	Objective 6.3.2 Expression of interest +dedicated call	Objective 6.3.3 Expression of interest +dedicated call



SUMMARY OF CALLS

Current and future calls for the Measurements and Testing generic activity in the Competitive and Sustainable Growth programme are summarised below. For calls that are not yet published, the information given is only indicative and may change. Potential proposers should always consult the full text of the relevant call when it is published.

*Full, up-to-date information on all calls that have been published can be found on CORDIS at:
<http://www.cordis.lu/growth/src/callmain.htm>*

Periodic calls for proposals

Publication Date	Scope	Deadline
1 June 2001	Limited to thematic networks and concerted actions	17 September 2001

Dedicated calls for proposals

Publication Date	Scope	Deadline
16 October 2001 (to be confirmed)	RTD projects: restricted to specified topics for areas of Measurements and Testing that are implemented by the expression of interest / dedicated call mechanism Thematic networks: restricted to specified topics for Support to Research Infrastructures	15 March 2002 (to be confirmed)

Call for expressions of interest

The call for expressions of interest, which enabled interested parties to suggest needs for research in areas of Measurements and Testing covered by the dedicated calls, closed on 30 April 2001.

Calls for proposals for SME specific measures (CRAFT)

Publication Date	Scope	Deadline
Continuously open until the final deadline	Co-operative research	17 April 2002

The call for proposals for exploratory awards for CRAFT closed on 18 April 2001.

Calls for accompanying measures and Marie Curie fellowships

Publication Date	Scope	Deadline
Continuously open until the final deadlines	Accompanying Measures Marie Curie fellowships	15 March 2002 20 March 2002



NEW PROJECTS

The titles of all new Measurements and Testing projects are listed below together with the contract number and the name and the e-mail address of the co-ordinator. More detailed information on all the projects listed below can be found on the CORDIS projects database: http://dbs.cordis.lu/EN_PROJ_search.html

Support to standardisation

Pressure equipment, reduction of leak rate: gasket parameters measurement (PERL)

G6RD-CT-2000-00258
Mrs. Hildegard ZERRES
Advanced Solution Engineering Ltd
hzerres@sealeng.com

Design of GRP flanges and tests to verify the design and to determine long-term properties of GRP pipes

G6RD-CT-2000-00259
Mr. Hubert SCHNEIDER
ComTec Forschungs- und
Entwicklungs-Gesellschaft für
Verbundwerkstoffe mbH
h.schneider@comtec-ac.com

Determination of liquid water transfer properties of porous building materials and development of numerical assessment methods (HAMSTAD)

G6RD-CT-2000-00260
Dr. Olaf ADAN
Netherlands Organization for
Applied Scientific Research
o.adan@bouw.tno.nl

Definition of a standard for footwear protecting against chemicals and micro organisms (CHEM-SAFE-FOOTWEAR)

G6RD-CT-2000-00262
Dr. Jean-Claude CANNOT
Centre Technique Cuir Chaussure
Maroquinerie
jccannot@ctc.fr

Effects of the weathering on stone materials: assesement of their mechanical durability (McDUR)

G6RD-CT-2000-00266
Dr. Piero TIANO
Consiglio Nazionale delle Ricerche
tiano@cscoa.fi.cnr.it

Examination of the measurement and control of ozone emissions during welding and allied processes (WELD-OZONE)

G6RD-CT-2000-00270
Mr. Erik Beck HANSEN
Force Institute
ekh@force.dk

Calibration and testing for the evaluation of plywood glue bond performance in accordance with EN 314-1 and EN 314-2

G6RD-CT-2000-00273
Mr. John ADELHOJ
Dansk Teknologisk Institut
john.adelhoj@teknologisk.dk

Thermal insulation measurement of cold protective clothing using thermal manikins

G6RD-CT-2000-00274
Dr. Harriet MEINANDER
Technical Research Centre of
Finland
harriet.meinander@vtt.fi

Routine performance control of radiological installations

G6RD-CT-2000-00384
Prof. Paul SIFFERT
Centre National de la Recherche
Scientifique
meyer@phase.c-strasbourg.fr

Computer controlled tensile testing machines: validation of European standard EN10002 part 1

G6RD-CT-2000-00412
Mr. Malcolm LOVEDAY
NPL Management Ltd.
malcolm.loveday@npl.co.uk

Abrasion and wear testing of coatings by ball cratering

G6RD-CT-2000-00415
Dr. Mark GEE
NPL Management Ltd.
mark.gee@npl.co.uk

Remote optical sensing evaluation (ROSE)

G6RD-CT-2000-00434
Dr. Andrew CROOKELL
Sira Ltd
andrew.crookell@sira.co.uk

Fight against fraud

Screening and identification methods for official control of banned use of antibiotics and growth promoters in feedingstuffs

G6RD-CT-2000-00413
Dr. Jacob DE JONG
State Institute for Quality Control of
Agricultural Products (Rikilt)
j.dejong@rikilt.wag-ur.nl

Strategies and methods to detect and quantify mammalian tissues in feedingstuffs

G6RD-CT-2000-00414
Dr. Pierre DARDENNE
Centre de Recherches
Agronomiques de l'Etat
dardenne@cragx.fgov.be

New technology in food sciences facing the multiplicity of new released GMO

G6RD-CT-2000-00419
Prof. Jose REMACLE
Facultés Universitaires Notre-Dame
de la Paix de Namur
jose.remacle@fundp.ac.be

Anti-fraud milk - Electrical impedimetric and ultrasonic control system to detect fraud (adulterations) of milk (AFRAMILK)

G6RD-CT-2000-00420
Prof. Dieter FRENSE
Institute for Bioprocess and
Analytical Measurement Techniques
e.V.
dieter.frense@iba-heiligenstadt.de



Mapping environment for tracking applications (META)

G6RD-CT-2000-00428
Mr. Jean-Pierre CAUZAC
Collecte Localisation Satellites SA
Jean-Pierre.Cauzac@cls.fr

Development and assessment of methods for the detection of adulteration of olive oil with hazelnut oil

G6RD-CT-2000-00440
Dr. Ramon APARICIO
Consejo Superior de Investigaciones Científicas
aparicio@cica.es

Sputtering matter onto storage plates for delayed quantitative investigations, against fraud, of organic and inorganic samples

G6RD-CT-2000-00452
Dr. Henri-Noël MIGEON
Centre de Recherche Public Gabriel Lippmann
migeon@crppl.lu

Thematic network for enforcement practitioners regarding the enforcement of the QUID directive by chemical testing

G6RT-CT-2000-05013
Dr. Philip Thomas SLACK
LGC - Laboratory of the Government Chemist (Teddington) Ltd.
ps1@lgc.co.uk

Global information system for the fight against counterfeiting

G7RT-CT-2000-05014
Dr. Raphaël ROCHER
Syseca
thierry.delacroiw@syseca-sei.thomson-csf.com

Analytical laboratories for antidoping control: international network for external quality assessment

G7RT-CT-2000-05022
Dr. Rafaël DE LA TORRE
Fundacio IMIM
rtorre@imim.es

Determination of glycerol in wine - comparison and validation of existing methods

G6RD-CT-2000-00416
Dr. Michèle LEES
Eurofins Scientific
Michele.Lees@Eurofins.com

Instrumentation

Improved chemical analysis and UV spectroscopy using improved deuterium lamps

G6RD-CT-2000-00325
Dr. Karl ANDERT
Institut für Niedertemperatur Plasmaphysik eV an der Ernst Moritz Arndt Universität Griefswald
kandert@mdc-berlin.de

Synchrotron microanalysis: accurate elemental analysis on the microscopic level (MICRO-XRF)

G6RD-CT-2000-00345
Prof. Freddy ADAMS
University of Antwerp
adams@uia.ua.ac.be

Certified reference materials

Microbiological certified reference materials in support of EU water legislation, performance testing and laboratory quality control

G6RD-CT-2000-00264
Mr. Tristan SIMONART
Institut Pasteur de Lille
tristan.simonart@pasteur-lille.fr

Certified reference materials for specific migration testing of plastics for food packaging needed by industry and enforcement laboratories

G6RD-CT-2000-00411
Dr. Angela STOERMER
Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung e.V.
stoermer@ivv.fhg.de

Certified reference materials for depth sensing indentation instruments

G6RD-CT-2000-00418
Dr. Nigel JENNETT
NPL Management Ltd.
nigel.jennett@npl.co.uk

Feasibility studies for speciated CRMs for arsenic in chicken, rice, fish and soil and selenium in yeast and cereal

G6RD-CT-2000-00473
Prof. Les EBDON
University of Plymouth
pep@pep-research.ac.uk

SME specific measures (CRAFT)

Development of a high temperature contact-less viscometer

G6ST-CT-2000-50048
Mr. Jean-Théodore BUSSON
GBX Instrumentation scientifique
gbx.instru@wanadoo.fr

Large area sub-wavelength surface analysis and reconstruction

G6ST-CT-2001-50081
Mr. John TYRER
Laser Optical Engineering Ltd
jtyrer@ndirect.co.uk

Injection moulded OVDs reduce counterfeiting and production copied drug deaths

G6ST-CT-2001-50080
Mr. Torben RISGAARD
Knudsen Plast A/S
tr@knudsen-plast.com

Research infrastructure

Metrological support to international trade

G7RT-CT-2000-05004
Dr. Harald SIMONSEN
Danish Institute of Fundamental Metrology
hs@dfm.dtu.dk

Improving dialogue between EU regulatory bodies and national metrology institutes

G7RT-CT-2000-05005
Dr. David BACON
NPL Management Ltd.
david.bacon@npl.co.uk

Interpretation and implementation of the new standard ISO 17025 by national metrology institutes in Europe

G7RT-CT-2000-05006
Dr. Hugo ENT
Nederlands Meetinstituut B.V.
hent@nmi.nl



METROLOGY IN CHEMISTRY

High Level Expert Group for Measurements and Testing

The High Level Expert Group for the Measurements and Testing generic activity consists of experts that are invited in an individual capacity to advise the Commission. The group has sixteen members from twelve Member States and two Associated States and is chaired by Mr. Claes Bankvall of the Swedish National Testing and Research Institute. This short paper from the group looks at metrology in chemistry. It will be followed by further short papers that the group are currently preparing on research needs related to the fight against fraud, support to standardisation, and emerging technologies (nanotechnologies). The views presented in all these papers are entirely those of the group and do not reflect any official position of the Commission.



© Astrid Vaes

Metrology is defined¹ as "the science of measurement". Over the past ten years or so much work has been undertaken in the generic and sectorial areas of chemical measurement and testing in order to develop quality systems and to put in place a measurement and testing infrastructure. The development of an overall system for metrology in chemistry will necessitate building on past achievements, developing synergy and exchanging expertise between the various categories of laboratories in the sectorial areas.

"The ability to make accurate measurements is one of the essential foundations of an advanced industrial society"². This ability is the pivot around which trade, commerce and society revolve. Every year many millions of chemical measurements are made for a wide variety of purposes within the EU and important decisions are based on those measurements. Examples of these purposes include:

- safeguarding the quality of food and the purity of air,
- developing new products and materials, such as pharmaceuticals or ceramics,
- monitoring conformity assessment and product specification,
- protecting the consumer against fraud and counterfeit products,
- assisting a hospital physician with a medical diagnosis,
- supporting the justice system in the fight against drugs and organised crime,
- providing forensic evidence for litigation including EU policies,
- gathering revenue for Governments (Customs and Excise),
- underpinning the free movement of goods within the Single Market and trade agreements with third countries such as the USA.



Swedish National Testing and Research Institute

Thus chemical analysis spans a wide variety of activities and has important social and economic consequences. Undertaking reliable chemical analysis is, however, complicated by the dependence of the chemical measurement process on the sample matrix and in many instances the necessity to separate the analyte from the sample matrix. The instrumental measurements used for virtually all applications

do not usually take place directly on the original sample; they are often the final step of a complex analytical method involving chemical pre-treatment (destruction of the sample matrix) or separation of the analyte from the sample matrix. Hence, in most applications calibration of the instrument is insufficient in-order to achieve reliable and comparable analytical results.

The sample matrix problem has given rise to the development of two approaches to achieving reliable and comparable chemical measurements: (a) matrix reference materials and (b) inter-laboratory comparisons.

The matrix-matched, certified reference material (CRM) is a unique type of chemical standard commonly used to validate complete measurement methods and is sometimes used for instrumental calibration (e.g. in XRF, NIR). Such standards are prepared to correspond to each required analyte/matrix combination and while there are thousands of CRMs in use, there are still many strategic areas where reference materials are required particularly in relation to manufacturing industry, trade, health and the environment. The production of CRMs is both costly and time consuming and many organisations are involved in their certification. It is necessary to ensure that their role in the traceability chain is fully recognised and utilised and that a synergy is developed between the various certification bodies.



Institute for Reference Materials and Measurements

Similarly, inter-laboratory comparisons are undertaken for each relevant analyte/matrix combination in order to establish comparability of their measurement data. These comparisons range from 'round robin' studies, which collaboratively test a new method, to formal proficiency testing (PT) schemes which assess agreement between laboratories on an on-going basis. It is impracticable to organise comparisons for every routine application or to organise a worldwide comparison involving all the laboratories requiring comparability for each measurement application. Mechanisms are required which will permit interlinking (overlapping) of regional and national PT schemes.

These problems have long been recognised as a significant technical and economic limitation in delivering sound chemical analytical data. The situation is continually being exacerbated with increasing demand from purchasers of data and by regulators for proven comparability of measurements. Global expansion of trade, means more countries and more laboratories need to be brought into each inter-laboratory comparison. In addition, increasing numbers of measurements are used in support of regulations, for which there is an expanding requirement for rigorously proven reliability and comparability. Finally, increasing use of sub-contracted measurements, due to commercial pressures on laboratories, requires not only conformity of contractors to quality systems but also demonstration of the comparability of data from different contractors.



To ensure reliable and comparable chemical measurements in the 21st century, it is necessary to have unified national/regional/international systems in place which will enable analysts to attain and demonstrate the comparability and traceability of their measurements. In order to achieve this requires a measurement and testing infrastructure, the building blocks of which are:

- validated methods
- procedures for determining measurement uncertainty
- procedures and tools for establishing traceability
- pure substance reference materials and calibration standards
- matrix reference materials
- proficiency testing
- third party accreditation to an international standard

"Metrology in Chemistry is concerned with the development of a structured support system based on traceable standards and analogous to the systems that have been used to underpin physical measurements for over 100 years."³ Chemical measurements have developed more or less on a sectorial basis and in a different



culture, so that in very many cases the laboratory support systems developed for physical measurements by National Measurement Institutes (NMIs) cannot easily be applied to the field of chemical or indeed biological measurement.

However, common areas do exist and there are measurement problems in chemistry which are similar to those experienced with physical measurements. These include the difficulty of obtaining reliable estimations of measurement uncertainty and the frequent disparity between calibration standards and the "real" samples or artefacts on which measurements are made. Some of the problems are being addressed at the highest level through the CCQM (Consultative Committee on Amount of Substance), EUROMET and EURACHEM. Others are being addressed in sectorial areas where a "bottom up" approach is being adopted. This approach is based on quality systems, CRMs, PT and laboratory accreditation (EN45001) coupled to a laboratory networking system. This approach is widely adopted in the food and agricultural fields and in certain instances is underpinned by legislation.

A recent survey conducted under the SMT programme³ showed that for generic metrology three countries had systems in place and were in a position to claim traceability to SI (Système International) for a small number of measurements. A lesser number claimed traceability to other standards. In some of the sectors surveyed the activities at a metrological level were almost nil whereas the activities at the comparability level (working level) were quite high. The environmental and industrial sectors were the most advanced in claiming traceability to SI (numbers being about 6).



It was clear from both this survey and from a series of workshops⁴ held between 1997-1999 that the development of system(s) for metrology in chemistry are at varying stages of evolution. The developments that are underway in the Member States are also taking place practically in isolation from one another although the above interactive workshops have led to positive outcomes.

There is a need for a co-ordinating role by the Commission supported by the Framework programme, to facilitate and harmonise those developments. A two-pronged approach is required:

- 1) The development of a harmonised European chemical measurement infrastructure for all sectors of chemical measurement, which will contribute to and be compatible with systems being developed around the world. This work should be carried out in close co-operation with CCQM, EUROMET and EURACHEM.
- 2) Disseminating traceability and the principle of metrology in chemistry from the top level to the working level by developing, demonstrating and evaluating concepts, systems, strategies and tools.

Some work areas requiring attention in both 1 and 2 above are:

- evaluation and development of measurement uncertainty strategies and procedures;
- development of traceability strategies and initiation of demonstrator projects showing how traceability could be achieved from high level international standards to working level measurements;
- development of high level (primary) reference materials;
- development of reference values for proficiency testing schemes;
- evaluation of EU legislation with regard to limits based on chemical measurements and development of relevant European and international "key comparisons" to assist trade and other cross border issues;
- education and training for metrology in chemistry;
- development and validation of methods including primary methods;
- development and validation of pre-treatment techniques as a means of managing matrix effects in analytical methods;
- technology transfer and networking between primary and reference measurement laboratories;
- development of metrological standards and tools for biotechnology applications (analytical molecular biology and microbiological measurements).

In order to make progress it is recommended that priority be given to the following project areas:

- the development of a blue-print for metrology in chemistry in Europe;
- dissemination of traceability from metrology institutions to laboratories;
- development of the metrological tools necessary to attain the above.

References

1. International Vocabulary of Basic and General Terms in Metrology, ISO, Geneva, 2nd edition 1993
2. Quinn Report on BCR Programme (1988-1992)
3. Metrology in Chemistry EUR 19074 en
4. TRAC, Special Issue, Metrology in Chemistry, Sept/Oct 1999, 18, 569-655

The full version of this position paper, including two annexes which detail work areas and priority projects, is on EUROPA: <http://europa.eu.int/comm/research/fp5/eag.html>



SUCCESS STORIES

Some examples are given below of the successful impact that some finished projects in the field of measurements and testing from the fourth framework programme have had on EU policies such as protection of the environment, free circulation of goods, consumer protection, transport, and employment. More detailed information on all the projects can be found on the CORDIS projects database: http://dbs.cordis.lu/EN_PROJL_search.html

Harmonising DNA testing for law enforcement across the EU



DNA profiling has become an important tool in criminal investigations because it enables offenders to be linked to the smallest samples of biological material - such as a single hair or a drop of blood. However, laboratories involved in forensic DNA profiling across Europe have developed a range of different techniques over recent years, the results of which are often incomparable. In order to make them more comparable, this project brought together the principal forensic laboratories involved in DNA profiling from all over Europe. A series of intercomparison exercises was carried out and a database of commonly used DNA markers for the European population was established. As a result it is now easier to exchange profiling data between countries and to identify offenders across national borders.

Project SMT4-CT97-7506 "Network on Standardisation of DNA profiling techniques in the EU".
Co-ordinator: Prof. Angel Carracedo, Universidade de Santiago de Compostela, e-mail: apimlang@usc.es

Testing cosmetics without using animals



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Three cosmetic manufacturers and a research laboratory joined forces in this project to successfully implement harmonised methods for testing the safety of cosmetic products without using animals. The tests are based upon the use of commercial or in-house reconstructed skin kits and enable skin absorption, metabolism and skin irritancy of applied formulations to be measured.

Guidelines for carrying out the tests have been produced that will be the basis of standards that will be used by all skin kit users.

Project SMT4-CT97-2174 "Testing and improvement of reconstructed skin kits in order to elaborate European standards".
Co-ordinator: Mr. Roland Roguet, L'Oréal, e-mail: rroguet@recherche.loreal.com

Improving the accuracy of timber grading machines



When timber is produced it has to be graded according to its quality before it can be sold. Machines are used to do this which measure the properties of the planks using X-rays, microwaves, vibration or optical techniques. Procedures are needed, however, to make sure that the different kinds of machines do the grading consistently and accurately. In this project, appropriate procedures were developed based upon the use of calibration planks with known properties. The new procedures will be the basis of the revised European standard EN519 and will facilitate trade and improve the quality of timber produced in Europe.

Project SMT4-CT97-2207 "Control and calibration of timber grading machines (CONGRAD)".
Co-ordinator: Dr. Lars Boström, SP, e-mail: lars.bostrom@sp.se

Measuring pesticides in our drinking water



European directives on drinking water do not allow pesticide residues in our drinking water to exceed certain levels. To support the implementation of these directives, this project has developed and validated appropriate methods for a list of pesticides currently encountered in the EU waters. The results have been passed to the relevant CEN technical committee and will be the basis of a European standard for measuring pesticides in drinking water.

Project SMT4-CT96-2142 "Optimisation and evaluation of multiresidue methods for priority pesticides in drinking and related waters".
Co-ordinator: Dr. A. Bruchet, Suez-Lyonnaise des Eaux, telefax: +33-134800901



Increasing the safety of children in cars



Child restraint systems for cars, such as child car seats, are intended to protect children in the event of an accident. Unfortunately, they are not as effective as they should be.

With the aim of increasing their effectiveness, this project, involving several leading car manufacturers, carried out an in-depth investigation of more than 400 car accidents that involved children using child restraint systems. About 50 of the accidents were subsequently reconstructed using instrumented child dummies. A comparison of the real-life accidents and the results of the re-constructions has enabled new child dummies to be developed that simulate more closely the dynamic characteristics of children. The new dummies are the basis of new standard test procedures for child restraint systems for cars.

Project SMT4-CT95-2019 "New standard and measurement devices for improved child protection systems (CREST)".

Co-ordinator: Mr. Xavier Trosseille, Renault, e-mail: xavier.trosseille@lab-france.com

Measuring the efficiency of sunscreens



With increasing skin cancer rates, people are becoming increasingly aware of the importance of protecting their skin from the sun. When buying sunscreens, however, people need to know the degree of protection that the different products on the market provide. This project developed a new non-invasive method for assessing the

performance of sunscreens covering the complete range of potentially harmful UV-effects. The results will be the basis of a written test standard that will be used by sunscreen manufacturers across the European Union to improve the quality of their products.

Project SMT4-CT97-2152 "Measurements to assess sunscreen efficacy in industrial research".

Co-ordinator: Dr. Jürgen Lademann, Humboldt-Universität zu Berlin, e-mail: juergen.lademann@charite.de

Identifying genetically modified foods



In the near future, genetically modified (GM) foods will be increasingly available commercially. European directives on novel foods only permit certain of them to be used and require that they be labelled. However, in order to be able to implement these directives, validated methods for identifying GM foods and food ingredients must be available to the food control laboratories.

In this project, a variety of DNA extraction methods for identifying GM organisms in raw and processed food were successfully developed and validated. A database was also set up to collect information on GM foods which are marketed worldwide. The results of the project will be the basis of European standards.

Project SMT4-CT96-2072 "Development of methods to identify foods produced by means of genetic engineering".

Co-ordinator: Dr. Jutta Zagon, BgVV, e-mail: j.zagon@bgvv.de

Ensuring the traceability of nanoscale surface measurements



Components with very low surface roughness are to be found in a wide range of manufactured goods, such as video recorders, micro-electronic devices, car engines, and artificial hip joints. For quality

assurance and process control for the most demanding applications, a range of instruments are used that can measure the topography of surfaces very accurately down to the nanometric range. These instruments need to be calibrated, however. To meet this need, this project successfully developed a range of standard artefacts with precisely known surface topography that can be easily and cheaply reproduced. The resulting traceability of surface topography measurements will facilitate trade within the EU and between the EU and the rest of the world.

Project SMT4-CT97-2176 "Calibration standards for surface topography measuring systems down to nanometric range".

Co-ordinator: Prof. Harry Trumpold, TU Chemnitz, e-mail: h.trumpold@mb2.tu-chemnitz.de



DOPING IN SPORT

Concerted action launched to fight doping in sport



After the outcry over the 1998 Tour de France, the EU intensified its efforts to tackle the problem of drug abuse in sport. The Measurements and Testing generic activity is playing a key role by supporting the development of effective and reliable methods for detecting the use of illegal and prohibited drugs by athletes.

The one-year HARDOP project "Harmonisation of methods and measurements in the fight against doping" (SMT4-CT98-6530) was a first response that showed the way forward. The results were presented to Research Commissioner Mr. Philippe Busquin by Prince Alexandre de Mérode, Chairman of the Medical Commission of the International Olympic Committee (IOC), at a ceremony in Brussels on 15 November 1999.

Now, the Medical Commission of the IOC and European national Olympic committees have joined forces with various international sports federations to set up the CAFDIS project. The aim of the project is to increase the co-ordination of efforts to improve testing methods. All available information on matters related to testing will be gathered and pooled on a web site where it will be available to all parties engaged in the fight against doping: testing laboratories, sports administrators, doctors, pharmaceutical companies, law enforcement bodies and, not least, athletes themselves.

The project started on 1 March 2001. After the three year funding from the European Commission, it is expected that it will become self-supporting.

Project G6AC-2000-0001 "Concerted action in the fight against doping in sport (CAFDIS)".
Co-ordinator: Dr. Joseph Cummiskey,
Olympic Council of Ireland,
e-mail: joecummiskey@hotmail.com

Detecting hormone abuse

An area where subtlety is needed to detect doping is hormone use. Athletes started by injecting synthetic hormones to increase muscle mass. When this practice was discovered, they turned to using hormones with the same chemical structure as the natural ones in an attempt to prevent detection. However, a breakthrough has been made with isotope ratio mass spectroscopy (IRMS). The basis of the technique is that the molecules of the injected hormones, not coming from the body, have a slightly different isotopic composition compared to the molecules of the natural hormones.

The ISOTRACE project, which started on 1 April 2000, has been set up to further develop the technique and brings together leading research groups with an instrument manufacturer. It is led by Professor Jordi Segura, of the department of pharmacology and toxicology at the Institut Municipal d'Investigació Medica in Barcelona. "We believe IRMS has the potential to develop even more sensitivity, and we hope to develop new tests for detecting illegal substances in biological material, ready for the Athens Olympic Games in 2004."

Project G6RD-CT1999-00149 "Detection of illegal drugs by isotope ratio mass spectrometry".
Co-ordinator: Prof. Jordi Segura, Institut Municipal d'Assistència Sanitària, Barcelona,
e-mail: postmaster@imim.es

Proficiency testing of anti-doping laboratories

The ALADIN project, which started on 1 May 2001, has been set up in order to ensure the quality and reliability of doping tests. Its main task will be to implement a proficiency testing programme among all the International Olympic Committee accredited laboratories in Europe according to the ISO guide 43. This will include the setting up a network of accredited suppliers of reference materials for intercomparisons .

The project will be a cornerstone of the recently set up World Anti-Doping Agency (WADA) which is charged with combating doping at an international level. Once testing is carried out with the same rigour and according to the same rules world-wide, it will be harder for an athlete to claim a test was invalid and discredit its results.

Project G7RD-CT-2000-05022 "Analytical laboratories for antidoping control: international network for external quality assessment".
Co-ordinator: Dr. Rafael De la Torre, Fundació IMIM, e-mail: rtorre@imim.es



PAST EVENTS

Environment, health and safety: a challenge for measurements, Paris, France, 14-15 June 2001



An international conference on metrology in support of environmental policies was held 14-15 June 2001 in Paris with the support of the Measurements and Testing generic activity. It was organised by the Institut National de l'Environnement Industriel et des Risques (INERIS). The main objective of the conference was to highlight the importance of measurement sciences for the monitoring of the environment and policy making in the domains of air, water and soil pollution. A full report on the results of the conference will appear in the next issue of the newsletter.

For more information about the conference see:
<http://www.env-conference.net/eng/frame.html>

FUTURE EVENTS

10th International Metrology Congress, Saint-Louis, France, 22-25 October 2001

The 10th International Metrology Congress, METROLOGIE 2001, will be held in Saint-Louis, France, 22-25 October 2001. It is being organised by the Collège



Métrologie of the Mouvement Français pour la Qualité under the aegis of the Bureau National de Métrologie (BNM) in France and with the scientific support of the National Physical Laboratory (NPL) in the UK.

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The congress, which is organised every two years, aims to highlight new techniques of measurement and calibration, and to present the evolution of metrology and the implications for industry, the environment, and the economy. It is expected to attract more than 600 people, from 30 different countries and from every circle concerned with metrology and measurement.

A special session on European Union funded research, partly funded by the Measurements and Testing generic activity, will be held during the congress. It will look at past and present research activities in support of industrial and legal metrology and standardisation and identify future research needs.

For more information on the conference see:
<http://www.metrologie2001.com/>

Workshop on the implementation of quality systems for national metrology institutes, Vlaardingen, The Netherlands, 13-14 December 2001

The aim of this workshop is to support the implementation of the International Committee for Weights and Measures' recently signed mutual recognition arrangement "Mutual recognition of national measurement standards and of calibration and measurement certificates issued by national metrology institutes". The workshop is an activity within the INITIATION project which is partly funded by the Measurements and Testing generic activity.

The mutual recognition arrangement means that national metrology institutes (NMIs) need to have an operational quality system for their calibration services. In Europe, NMIs have adopted the new ISO/IEC 17025 as a standard for their quality systems. However, it is vital that NMIs interpret the new standard in a uniform manner if any adverse impact is to be avoided on all the calibration and testing carried out in the EU, the accession countries and beyond.

An enquiry is currently being carried out to identify and prioritise the various practical problems that NMIs are facing when implementing quality systems according to the standard and need to be addressed at the workshop.

For more information about the workshop and to register your interest see: <http://www.initiation.nl>

If you would like to announce an event of interest to the measurements and testing community, please send the relevant details to the editor, e-mail: thomas.fairley@cec.eu.int



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