

The mission of IRMM is to promote a common and reliable European measurement system in support of EU policies.



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# MiC Newsletter

## **Editorial** **Building bridges**

Some of you might have seen the inauguration of the Millau bridge, located in the Tarn valley in France, at the end of 2004 (see picture and <http://www.leviaducdemillau.com/index.php4?lang=EN>). Apparently, some daunting, ambitious and inspiring projects, involving different European countries, are indeed possible in our old continent, despite what some might want us to believe. From the initial plans to its realisation, it took 17 years of careful design and high level engineering. A fine example of European collaboration at its best at the beginning of the 21st century.

Over the past years, we have been collaborating to improve the measurement infrastructure for chemical measurements in Europe. In this issue, you will find some examples of activities carried out over the past 6 months. A difficult but rewarding enterprise, where a lot of different stakeholders are involved.

May the Millau bridge provide some inspiration to all of us in 2005 on how to build bridges!

Dr. Philip Taylor  
Leader of the IRMM support programme for 'Metrology in Chemistry'



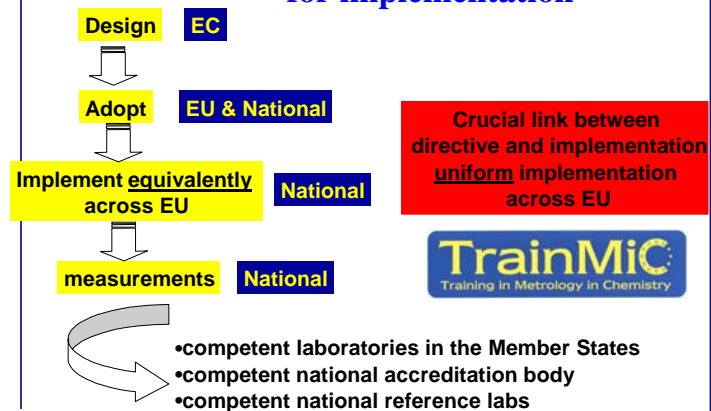
March 2005

## What is TrainMiC ?

- **Vision :**
  - we want TrainMiC to be a European shareware product/process for training in generic issues related to the measurement science in chemistry
- **our purpose :**
  - to facilitate the training about metrology in chemistry to interested parties (e.g. metrology organisations, educators, decision-makers and accreditors) in order to strengthen the measurement infrastructure, so that trustworthy results are produced, which avoids economic or societal waste.

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## Directives requiring measurements for implementation



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Republika Slovenija  
Ministrstvo za šolstvo, znanost in šport  
Urad za meroslovje (MIRS)

**TrainMiC**  
Izobraževanje o meroslovju v kemiji

*Avtorji slovenske izdaje:*  
Nineta MAJČEN, Ljudmila BENEDIK, Andreja DROLČ, Monika INKRET  
in Milenko ROŠ

*Avtorji:*  
P. ROBOUCH, E. BULSKA, S. DUTA, M. LAUWAARS, I. LEITO, N. MAJČEN,  
J. NORGAARD, M. SUCHANEK, E. VASSILEVA, P. TAYLOR (vodja projekta TrainMiC)

**TrainMiC**  
Training in Metrology in Chemistry

Biroul Roman de Metrologie Legală, Bucuresti  
Institutul National de Metrologie, Bucuresti

## TrainMiC - Training in Metrologie in Chimie

Traducere în lb. română realizată de  
S. Duta\*, R. Mihalache\*\*, P. König-Georgescu\*, V. Paun\*  
și revizuită de F. Iacobescu\*\*\* și D. Boiciuc\*

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**TrainMiC**  
Training in Metrology in Chemistry

AUTORI: P. Robouch, E. Bulska, S. Duta, M. Lauwaars, I. Leito,  
N. Majcen, J. Norgaard, M. Suchanek, E. Vassileva,  
P. Taylor (responsabil proiect)

Acest raport a fost elaborat cu sprijinul  
Institutului pentru Materiale și Masurări de Referință din cadrul Centrului  
Reunit de Cercetare al Comisiei Europene (EC-JRC-IRMM)

TrainMiC EUR report in Romanian and Slovenian language.  
Translations were done by the national TrainMiC teams.

**TrainMiC event in Czech Republic**  
*Miloslav Suchanek*

The second Czech TrainMiC was held in **Prague on 13th and 14th December 2004**. Three trainers, Prof. Suchanek, Dr. Vyslouzil (CMI) and Mr. Kohl (ICT Prague) presented all lectures in Czech language.

The course was inaugurated by Dr. Jelinek, vice-director of the Czech Metrology Institute. He welcomed the participants and informed them about structure of the CMI and about its activities related to metrology in chemistry. Another welcome was presented by Prof. Zima, head of the Institute of Clinical Biochemistry and Laboratory Diagnostics and chair of the Department of Biochemistry, Medical School of Charles University. There were 73 participants on the TrainMiC courses, mainly from clinical area. This TrainMiC consisted of the traditional modules (Traceability, Uncertainty, Statistics, Inter-laboratory comparisons) with new module Interpretation. The uncertainty and validation exercises were modified to cover clinical area mainly.



*Participants of the Czech TrainMiC event 2004*

The final discussion dealt with the role of metrology in chemistry in laboratories accredited according to ISO 15189 and with difficulties of inter-laboratory comparisons in clinical area. Participants stated the course was excellent and very useful for the work in clinical laboratories.

They were also satisfied with the organization done by staff of the CMI and the Institute of Clinical Biochemistry and Laboratory Diagnostics.

**First Balkan Workshop**  
**Building an appropriate metrology infrastructure**  
**in South Eastern European Countries**  
*Nineta Majcen*

The Institute for Reference Materials and Measurements (IRMM) hosted the workshop "Building an Appropriate Metrology Infrastructure in South Eastern European Countries" on the **28 and 29 June 2004**. The two main goals of the workshop were

- to establish links between the participants from SE European Countries and representatives of the European or international organisations, as well as to strengthen contacts amongst the participants themselves in order to foster inter-regional collaborations;
- to learn about the status of each country concerning metrology infrastructure and to gather information about existing best practices in this field which successfully support the implementation of EU requirements concerning free trade and quality of citizens' life.

A total of 32 participants attended the event, representing national metrology institutes, national accreditation bodies and/or universities of the five South Eastern European countries (Croatia, Bosnia and Herzegovina, Serbia and Montenegro, Former Yugoslav Republic of Macedonia and Albania, later referred as CARDS), together with experts from international organisations, such as the BIPM (Bureau International des Poids et Mesures) and the European Commission departments.

During the two intensive days chaired by P. Taylor (Leader of the project Metrology in Chemistry, IRMM) the oral presentations by renown speakers representing well-established organisations in the field of metrology, triggered many lively discussions and served as introduction for the working group sessions. The speakers were A. Herrero (IRMM, Director), R. Wielgosz (BIPM), R. Filon (EC DG-AIDCO), A. Todorova (SAMTS, President), G. Lindholm (EC Enterprise DG), P. Hetherington (EUROMET), M. Bednarova (Czech Accreditation Institute), E. Bulska (Warsaw University), N. Majcen (IRMM, seconded from MIRS) and Y. Aregbe and P. Robouch (both from IRMM). The lectures focussed on key issues related to global metrology scene such as:

- technical infrastructure to support economical development;
- drafting metrology legislation conform to EU best practice,
- "New and Global Approach";
- the role of IRMM in supporting EU Policies;
- distributed national metrology systems;
- EUROMET and European Accreditation (EA) perspectives;
- the International Measurement Evaluation Programme (IMEP)
- training and education.

During the working group sessions, topics on organising metrology at the national level, training and education in metrology in chemistry and distributed metrology systems were discussed in detail. The outcome of discussions of the three working groups were presented during the plenary session of the second day.

**Conclusion**

The very active participation during the two days clearly demonstrated the need for establishing, maintaining and strengthening contacts between the CARDS countries themselves and with the European Union. The same conclusion was made also from intensive discussions between the participants as well as from the official evaluation done by the participants. As a consequence, a strong need for organising similar events in the future was emphasised by several participants.

Detailed description of the discussion and conclusions of this workshop will be published in Accreditation and Quality Assurance.

## Examples of ISO GUM uncertainty budgets for chemical analysis on the web

Ivo Leito

Examples are a very efficient way to learn almost anything and uncertainty estimation of chemical measurement results using the ISO GUM method [1] is no exception. Although chemical ISO GUM uncertainty examples are publicly available [2], the variety at the moment is by far not sufficient. With this situation in mind, the web page "Examples of ISO GUM Uncertainty Budgets for Chemical Analysis" was opened in collaboration by University of Tartu and EC JRC IRMM in the beginning of 2004. The web page can be accessed at [http://www.ut.ee/katsekoda/GUM\\_examples/](http://www.ut.ee/katsekoda/GUM_examples/).

The page currently contains 11 different examples ranging from simple operations, such as using volumetric glassware to complex analytical procedures (HPLC, AAS, ...). The budgets are available as GUM Workbench and MS Excel files. For the GUM Workbench files PDF printouts have been added, because not all people have the GUM Workbench software. The printout contains all the essential information about the uncertainty example.

The examples are graded by complexity, elaboration level and extent of comments. The "complexity of measurement" refers to the intrinsic complexity of the measurement itself (the more there are operations and measurements, the higher the complexity). The "elaboration level" refers to the extent to which various uncertainty sources have been identified and taken into account. Low elaboration level does not necessarily mean that there are many uncertainty sources that have not been taken into account: instead it usually means that here and there several different uncertainty sources have been grouped. For example, instead of identifying all the repeatability contributions, they may have been grouped to give the general repeatability of the method that can be estimated from overall repeatability studies. The "extent of comments" indicates how much comment is added to the file to increase the readability by users.

Generally the uncertainty components have been estimated according to the particular equipment and working practices used in our lab. In some cases reasonable estimates, based on experience or literature data, are used. However, these uncertainty values are not directly applicable to results obtained in other laboratories using different instrumentation and working practices, even if exactly the same measurement procedures are used, because they are dependent on the conditions. These values should thus be used for guidance only. The users of the examples are strongly recommended to do their own estimation of uncertainty components based on their own equipment and working practices and then insert the uncertainty data into the files from the page.

Contributions to the site are most welcome! The examples will be examined and then decision will be made, whether they are suitable. Preference will be given to detailed and commented examples.

[1] ISO BIPM IEC IFCC IUPAC IUPAP OIML Guide to the Expression of Uncertainty in Measurement, International Organization for Standardization, 1993, Geneva.

[2] Quantifying Uncertainty in Analytical Measurement 2nd ed., Ellison S.L.R., Rösslein M., Williams A., Eds, EURACHEM/CITAC, 2000. The Eurachem Measurement Uncertainty website: <http://www.measurementuncertainty.org/>

## TrainMiC seminars in Romania

Steluta Duta

A TrainMiC seminar took place on **3 June 2004 in Bucharest, Romania** organised by IRMM in collaboration with National Institute of Metrology (INM) and Politehnica University, Bucharest (UPB). The main goal of this training course was to provide the students in chemical field with the modern ideas of Metrology in Chemistry. For the first time, students and post-graduate participants (a total of 18 participants) attended the course. The complete TrainMiC textbook (in English) was distributed to all participants and to the INM and UPB representatives. Comments of these specific participants showed that the course and the training material were highly appreciated as well as their interest on this new topic.

On **25-26 November 2004**, the TrainMiC seminar dedicated to practitioners was organised by IRMM and National Institute of Metrology (INM) in collaboration with Romanian Bureau of Legal Metrology (BRML) and Association of Romanian Laboratories (ROLAB). In a snow covered **Sinaia**, a total of 29 participants attended the course: 27% from governmental bodies, 24% from INM and 49% from research institutes, industry and field laboratories. The TrainMiC modules were presented by IRMM trainers (P. Robouch, S. Duta) as well as by the local trainers (R. Mihalache, V. Paun). It is interesting to mention that, for the first time, the national TrainMiC team presented some training modules in local language. Animated and interesting discussions between participants, showed, not for the first time in Romania, that IRMM - Training in Metrology in Chemistry activity is very much appreciated by experts from governmental bodies, research institutes and chemical laboratories.

**3 June 2004**  
**No. of participants: 18**  
**Participants: students and post-graduate people**  
**Timing: one day**

**25-26 November 2004**  
**No. of participants: 29**  
**Participants: experts from governmental bodies, research institutes and chemical laboratories**  
**Timing: 2 days**



### TrainMiC in Bulgaria Emilia Vassileva

Two days training course on metrology in chemistry – TrainMiC was organised by the Institute for Reference Materials and Measurements (IRMM) and the Bulgarian State Agency of Metrology and Technical Surveillance in **Sofia, Bulgaria on 6-7 October 2004**.

Metrology in chemistry is an important topic for all those dealing with the chemical measurements. Therefore the initiative of IRMM to provide the series of training under the TrainMiC programme is highly appreciated in Bulgaria.

In total, more than 50 participants attended this training course - 42 representatives from analytical laboratories, national regulatory and accreditation bodies, universities and other parties interested in measurements in chemistry in Bulgaria and 6 participants from Macedonia, Albania and Croatia.

The main contributor to the scientific program was Dr. Piotr Robouch, who presented the topics of traceability and uncertainty of measurement results, validation of measurement procedures, statistics for uncertainty evaluation and interlaboratory comparisons. The whole Bulgarian TrainMiC team participated very actively during the training course and the discussion session.

Case studies on measurement uncertainty evaluation of chemical measurement results and method validation were offered to the participants and the possibility to present and discuss their conclusions was given. Training materials and a set of publications dealing with the discussed topic were welcomed by all attendees.

The analysis of the evaluation forms showed that the course and training materials were highly appreciated. Knowing that more than 100 participants are already on the waiting list, three additional courses are planned for 2005.

### Second Balkan Conference National Reference Measurement Infrastructure for Environmental and Food Chemical Measurements Emilia Vassileva

A two-day workshop dedicated to the national reference measurement infrastructure for environmental and food chemical measurements was organised by IRMM in co-operation with State Agency for Metrology and Technical Surveillance, Executive Environment Agency and National Centre of Hygiene Medical Ecology and Nutrition in **Plovdiv in Bulgaria on 2-3 September 2004**.

From each Balkan Country two national delegates were invited - executive staff of NMIs or reference laboratories, who are involved in the above activities or persons acting as advisors in these areas. A total of 26 experts from 8 Balkan countries (Bulgaria, Romania, Slovenia, Albania, Croatia, Bosnia and Herzegovina, Serbia and Montenegro, Macedonia) joined the conference.

On the basis of the discussions with the participants and their presentations it's obvious that there is a mutual interest in developing further cooperation between Balkan countries in the area of environmental and food chemical measurements.

### Romanian training system for Metrology in Chemistry based on IRMM-TrainMiC platform Steluta Duta

The main steps to build up the national training system for Metrology in Chemistry, based on the collaboration between EC-JRC-IRMM (European Commission - Joint Research Centre - Institute for Reference Materials and Measurements) and BRML – INM (Romanian Bureau of Legal Metrology - National Institute of Metrology), Romania:

- **Focus on the national needs:** interested participants are experts from governmental bodies, research institutes, universities and chemical laboratories
- **Set up the national TrainMiC team:**  
Steluta Duta, National Institute of Metrology  
Romina Mihalache, Politehnica University Bucharest  
Peter-König-Georgescu, National Institute of Metrology  
Victorita Paun, Romanian Bureau of Legal Metrology
- **Translate the European report EUR 20841 EN:** Training in Metrology in Chemistry - into local language by national TrainMiC team.
- **Disseminate TrainMiC concepts:** more Training Metrology in Chemistry seminars, in English as well as in Romanian, will be organise.



D. Ivanova from National Centre of Metrology, presenting reference materials module

### Joint Estonian–Latvian–Lithuanian TrainMiC event

*Ivo Leito*

On **15.-16.09.2004** a two-day TrainMiC training course took place at **University of Tartu (Tartu, Estonia)**. The event was jointly organised by the EC-JRC IRMM and University of Tartu. It was planned as a joint Baltic course, following the traditions of the similar event held in Vilnius (Lithuania) in June of 2002. There were 30 participants from Estonia, 10 from Latvia and one from Lithuania.

Because of the internationality, the working language was English. The course was presented by Dr. Piotr Robouch (IRMM) and Prof. Miloslav Suchanek (Institute of Chemical Technology, Prague).

The lectures followed the general TrainMiC scheme (Day 1: validation, uncertainty, applied statistics; Day 2: Traceability, Interlaboratory comparisons, Reference Materials). Both days ended with exercise sessions: "hands-on" uncertainty exercise session in computer class on day 1 and demonstration exercise session on validation on day 2. By many of the participants these sessions (in particular, the hands-on session) were regarded as the most interesting part of the course.

During the get-together party in the evening of the first day Ivo Leito made a short presentation about the current metrology in chemistry (MiC) activities at University of Tartu (among other topics: teaching/training of MiC at UT, inter-Baltic collaboration). The next similar event is planned to take place in Riga (Latvia).

On 17.09.2004 Piotr Robouch and Miloslav Suchanek met with the Estonian TrainMiC team and visited the department of chemistry of University of Tartu. Their particular interest was devoted to teaching analytical chemistry and MiC at UT.

The exercises used during the course, the photos and some other materials relevant to the event are available for downloading at <http://www.ut.ee/katsekoda/presentations/presentations.html>



Participants of the Baltic TrainMiC event 2004

### Third Balkan Conference on Reference Infrastructure for Gas Measurements in Balkan Countries

*Emilia Vassileva*

A proper measurement infrastructure in gas measurements is vital to develop measurement and calibration capability in the Balkan. As resources are limited, it is important to address current and future needs.

A two-day conference 'Reference Infrastructure for Gas Measurements in Balkan Countries' was organised by EC-JRC-IRMM and EC-JRC-IES on **4-5 October 2004, Sofia, Bulgaria** in collaboration with the Bulgarian State Agency for Metrology and Technical Surveillance.

The conference was funded by the European Commission to foster advanced professional training on generic issues related to the quality of gas measurements. It is also part of the JRC-IRMM support programme, aiming at improving the quality of chemical measurements in EU Candidate and the Western Balkan Countries.

26 experts from Albania, Bosnia and Herzegovina, Bulgaria, Macedonia, Romania, Slovenia and Serbia and Montenegro, involved in the development and implementation of policies relying on gas measurements took part in this event.

The aim of the conference was to provide a forum for propagation of good practices and for discussions of problems between partners from national reference measurement infrastructures and representatives from various European Commission services, such as JRC DG and Environment DG.

Most important output from the two days intensive discussions was the obtained background information, the identification of common needs and the possible regional collaboration between Balkan countries. Many participants expressed high interest in a follow-up event in the future.



Participants of the third Balkan conference in Sofia in 2004