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EUROPEAN VIRTUAL INSTITUTE FOR THERMAL METROLOGY

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Abstract – A European Virtual Institute for Thermal Metrology (EVITherM) is being developed by a consortium of 34 European institutes, led by NPL and supported by the EC, to ensure that thermal knowledge and services are made available to industry, for the benefit of industrial processes and the environment, offering low-cost easy access, particularly to SMEs. EVITherM will be a co-ordinated Internet-based infrastructure designed to link together the geographically scattered centres of excellence and other groups and organisations concerned with thermal measurements and technology to provide a focal point for information exchange and knowledge transfer between all these organisations and industry. It will form a website for users, having three levels of access. The first level is free and contains directories of information; the second and third levels are for members only and will allow access to qualified information and member interactions. The first public release of the website is due by early 2004.

Keywords: Thermal metrology; dissemination; industry.

1. INTRODUCTION

A consortium, led by the National Physical Laboratory, has been formed to develop a European Virtual Institute for Thermal Metrology (EVITherM), the primary aim of which is to "**ensure thermal knowledge and services are made available rapidly and easily to users, for the benefit of industrial processes and the environment**." A project, largely funded by the EC Framework Programme 5 *Competitive and Sustainable Growth* (EC contribution € 1.8 M), started in January 2003 and will last 3 years [1]. The consortium has partners from 34 organisations, from 12 European nations, comprising national measurement institutes (NMIs), industrial research organisations, manufacturers, measurement and testing laboratories, centres of learning and consultants, among others.

The EC's definition of a virtual institute (VI) is 'a knowledge-based, market oriented network designed to facilitate rapid transfer and exploitation of R&D results and know-how into application'. As a key step towards achieving this EVITherM will develop a website offering information and services focusing on the needs of European organisations with interests in the thermal metrology field. The website specification is currently being developed but the plan is that it will have three levels of access, described briefly as follows.

EVITherM website Level 1 - free to all, providing directories of information:

- About us; contact us; constitution
- Resource directories
- Conferences and meetings
- Trades and services directories
- Links to related groups and organisations

EVITherM website Level 2 - for members only, providing access to information related to all technical areas by a number of routes, including thermal property, material, industry, application and country. Content will include:

- Validated and specialised thermal property databases searchable by subject, material & industry sector
- Good practice guides; standards; e-training
- Technology areas with data, best practice guides, frequently asked questions, contacts & hot links
- Reports, papers, presentations, meeting reviews etc.
- E-mail based information hotline & feedback
- Directory of member capabilities
- Notice board & news page
- Information on latest science and technology

EVITherM website Level 3 - for members only, where members can interact with each other with the aim of facilitating the following:

- Industrial round-robin comparisons with invitation to participate or see results
- Meetings, conferences, workshops, training events
- Partners for collaborative research & other projects
- Consultancy
- Problem solving
- Publications

The potential scope and content of thermal metrology are vast but the resources of the EVITherM project are limited and so it has been decided to concentrate the effort (for at least the next 3 years) on six key technical areas as follows:

- Thermal conductivity and diffusivity
- Thermal expansivity and density
- Emissivity and other infrared-optical properties
- Thermal analysis and calorimetry
- Contact thermometry
- Non-contact thermometry

The above are also the titles of the six technical work packages in the EVITherM project, concerned with developing the website content. There are three other project work packages concerned with project coordination; developing and promoting EVITherM; and meeting industry and regional needs. The website will be developed for use by engineers, scientists and technicians from a wide range of industries – materials production, chemical engineering, food and medical, automotive, aerospace and so on – to support production, design, testing, and other activities where thermal metrology is a key factor affecting process efficiency, energy saving, health and safety. The website content will be developed and reviewed by experts from science and also from industry to ensure that industry needs, and small and medium enterprises (SMEs) in particular, are catered for. The website will be "market-facing".

2. THE NEED FOR EVITherM

About 60% of industries use thermal processes at some stage, and temperature and thermal measurements are vital in nearly all industries, from heavy, large volume industries, such as steel production, to high value and leading-edge areas such as aerospace and semiconductor processing. In many cases the requirements of regulation and safety laws are important drivers. Regulations such as those governing food transport and storage, combustion and incineration, air quality and global warming, underline the need for industry to validate and use their thermal processes and products properly. In these and many other applications an improved understanding and use of thermal measurement knowledge leads to improved process efficiency, product quality and safer operation, leading in turn to more competitive and less environmentally damaging industries. This requires that organisations have access to appropriate and up-to-date training and measurement good practice advice, traceable measurement standards and reference thermal property data. However, this information and the supporting skills base are currently only available from a small number of institutes and research/industrial organisations and it is not readily or uniformly accessible to all who could benefit from it.

In many countries the teaching of temperature and thermophysics is just a small part of engineering or other science courses and so engineers or researchers in industry often have to rely on knowledge passed on by colleagues, or supplied by equipment manufacturers, or gained through attendance at specially designed training courses. Such variation in the availability and level of information and technical advice across Europe is a concern and an economic issue because of the impact of measurement on industrial efficiency. In particular it represents a barrier to the industrial advancement and competitiveness of many developing countries and SMEs. EVITherM aims to address these shortcomings by pulling together and further developing the existing dissemination and knowledge transfer mechanisms currently available throughout Europe and making them rapidly and easily available to a much wider range of organisations than at present.

Fig.1 Attendees at the EVITherM project kick-off meeting held at the National Physical Laboratory on 27 January 2003.

3. AIMS AND BENEFITS

The overall aim of EVITherM is to ensure that up-to-date and appropriate temperature and thermophysical properties information and expertise is readily available and easily accessible to European industrial and research organisations. In particular the institute aims to:

- Be a thermal information point for European industry
- Raise awareness of thermal knowledge transfer mechanisms
- Disseminate new measurement techniques and measurement best practice to industry
- Identify the thermal needs and capabilities of members
- Provide a forum for the interchange of ideas and technology know-how between members
- Facilitate collaborative R&D projects between members
- Enable feedback on the needs of industry to assist governments and other funding bodies in formulating their measurements and standards programmes.

EVITherM will help users to access organisations currently providing knowledge transfer activities, focusing specifically on the needs of European industry. Countries that already have knowledge transfer mechanisms in place will benefit from the increased pool of expertise and support material, and opportunities to collaborate and share knowledge with their counterparts in other countries. Countries that do not have such dissemination mechanisms will benefit from the wealth of information and expertise that is made available. Members will also have access to local national contacts for advice and training on how to interact with the virtual institute to gain most from it. The VI will therefore provide a readily accessible mechanism that will significantly improve dissemination of thermal information and measurement good practice across European industry and thereby improve its industrial competitiveness and associated skills base.

One of the wider benefits of EVITherM will be a much closer linkage between the NMIs, universities and industrial organisations participating as members in its development. Among the benefits of this will be (i) stronger and more industrially relevant collaborative research projects between member organisations and industry and (ii) a higher percentage of research outputs transferred to industry in a shorter time because of the increased industrial participation brought about by EVITherM.

Fig.2 Members of the EVITherM project Steering Group. Left to right: J-R Filtz (LNE), G Bonnier (CNAM-INM), J Seidel (PTB), F Pavese (CNR-IMGC), B Sidhu (NPL, participant), J Redgrove (NPL), R Angus (NPL), W Hohenauer (ARCS), V LeSant (LNE, participant), P LeParlouër (TC), G Neuer (IKE), P Giles (TTC), J Fischer (PTB).

A key requirement for EC funding support is that a VI should become a self-financing legal entity (a viable business) to ensure that the services it provides can be sustained beyond the 3-year period of EC funding. So it is vital, and the key challenge for EVITherM, that it is attractive to industry users from the outset and that they recognise it as offering a unique or high value service that could not otherwise be obtained so easily or economically.

4. RECENT PROGRESS

Project kick-off (KO) and Steering Group meetings were held at NPL on 27/28 January 2003. The KO meeting was open to all members and featured presentations by the EVITherM leaders of the project aims and objectives, and by the contract officer, Peter Breger, who gave the EC's perspective on what EVITherM should be aiming for, and there were a number of opportunities for questions and comments. Copies of the overhead presentations have been put in the members'-only section of the EVITherM website (http://www.evitherm.org), though the aim is to soon make the presentations and other introductory material available to everyone, not just EVITherM project members.

The Steering Group (SG) is responsible for the direction and content of the EVITherM project and comprises project (work package) leaders and people from industry or their representatives – the aim is to appoint 3 new industry members this year. At the first SG meeting there was discussion of issues such as communication; the kind of legal entity EVITherM should be; languages for website content; policies for selection of new members, data entry, scope of website content; and much else. Following the SG meeting work package leaders are to hold separate first meetings of their respective teams to formulate proposals for preparation of website content. The project team has also begun to issue questionnaires and establish other industry contacts to ensure that the website content meets the most urgent and important needs from the industry point of view.

REFERENCES

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EVItherM work package leaders
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3. CNR - Istituto di Metrologia di "G. Colonnetti "- Torino, I
4. University of Stuttgart Institut für Kernenergetik und Energiesysteme, D
5. Laboratoire National d'Essais, Paris, F
6. Thermal Technology Consulting, UK
7. Physikalisch-Technische Bundesanstalt, Berlin, D
8. Thermal Consulting, F
EVITherM members
9. Robert Gordon University, UK
10. Air Products plc, Basingstoke, UK
11. Technical University Budapest, H
12. Pyrocontrole Chauvin Arnoux, F
13. Centro Español de Metrologia, E
14. Ceram Research, UK
15. Conservatoire National des Arts et Metiers (CNAM-INM), F
16. CNR Istituto per i Processi Chimico-Fisici, University of Pisa, I
17. DSM, Geleen (Nederland), NL
18. Institut für Keramische Technologien und Sinterwerkstoffe, D
19. Institut National des Sciences Appliquees de Lyon, F
20. Institute of Physiscs, Slovak Academy of Sciences, SK
21. Chemical Engineering Dept, Institut Quimic de Saria, Barcelona, E
22. University of Ljubljana, Laboratory of Metrology and Quality, Slovenia, SI
23. Nutrifreeze Ltd York, UK
24. Österreichisches Giesserei-Institut, A
25. NMi - Van Swinden Laboratorium, Delft, NL
26. Raytek GmbH, D
27. Risø National Laboratory, Denmark, DK
28. Slovak Metrologicky Ustav, SK
29. Swedish National Testing and Research Institute, S
30. Netherlands Organisation for Applied Scientific Research (TNO), NL
31. TU Graz, Institut für Experimentalphysik, Austria, A
32. Italian Department of Food Science and Technology, University of Milan, I
33. Chemistry Department, University of Turin, I
34. Bavarian Centre for Applied Energy Research (ZAE), D

Fig.3 EVITherM project member organisations.