Internet Training and Networking Micro-Nanotechnology

It is now accepted that a world, both industrial and societal, is evolving that expects more for less. Referred to by many as the emerging 'Nanoworld', nanotechnology and nano engineering are implicit in its creation.

The technologies span a whole range of industries and are becoming of importance to the international community over a large range of technical levels. Related industries span from medical and biomedical, to communications and infotainment, to aerospace and automotive.

Associated technical levels span from novice to expert.

Project audience

The VISION ONLINE project is a knowledge based, market driven network, with a potential to become a continuing self-supporting activity at the end of public funding. It brings education at a whole range of levels and novel formats. Many users already working in a field related to micro or nano engineering require relatively advanced training. To develop their professional network, high quality specialized training weeks are coordinated over Europe. Commercial speakers are chosen along side highly acknowledged academics. This ensures that the technology limitations are understood from the angle of industrial capabilities, and simultaneously the natural scientific law limitations.

Many opportunities in the creation of this nanoworld are being reaped by SMEs (Small to Medium Enterprises). This is due to the fact that the highly technical staff required are frequently 'spun-off' from universities with continued provision of academic support facilities. SMEs are also frequently more capable of adapting very quickly to new markets. However, it is the SMEs that find it the most difficult to fund employees through conventional training programmes. To target this audience sector, the cost advantage of the Internet is utilised to offer part-time tuition. With reduced delegate fees and the absence of associated travel/subsistence costs, equivalent training over the web can be less than 15% of the cost of conventional training. On-line training is also more adaptable to the 'novice' who may spend extra time over assignments.

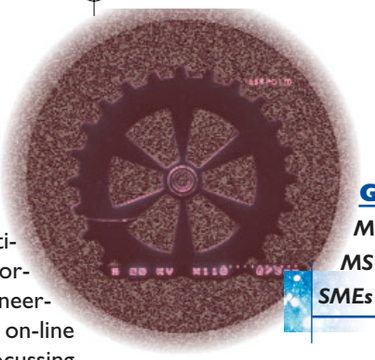
A further audience is generated by the sudden overlapping of industrial markets. Previously unaware of each others fabrication processes, different industries can waste valuable time and funds in repeating research and development. An example is the world of nanopowder fabrication. Here the physical properties of the material, for instance its colour or conductivity, will be dependent on powder grain size. Nanopowders have found application in the domestic, aerospace, defence, textile, medical and the telecommunications industries. The opportunities for these industries to meet and learn from each other are presently limited. The project addresses this by specifically targeting and inviting a broad range of industries to VISION ONLINE seminars to discuss general nano and micro engineering advances and more importantly, the challenges facing them.

Contributions to the ERA

Key contributions to the ERA are:

- ***to provide*** effective technology transfer mechanisms using state of the art electronic media - preventing duplication of work, new technology capabilities and improving international performance.
- ***to promote*** the advancement and needs of related industries through seminars.
- ***to produce*** high quality multidisciplinary technologists - aiding innovation.
- ***introduce*** remote MEMs design and development using the Internet again increasing SME capabilities and reducing the time from concept to manufacturing line.
- ***to above all,*** be approachable and to maximise access of reliable leading edge information.

Picture: Micro injection molded plastics, courtesy of Freiburg University



The Project Team

The consortium consists of 12 multi-disciplinary institutes, SMEs, universities and networks. The project is co-ordinated by eu**spen**, a European network for nano engineering. This partner is also responsible for the delivery of on-line versions of the training. The **Europractice** network, focussing on microelectronics, is represented by **TFI**. One of TFI's main priorities within the project is quality auditing and control. Most of the other partners then provide the core expertise in the delivery of the conventional training weeks – which provide the raw material for the on-line versions. Nanometrology expertise is demonstrated by **DFM & the Technical University of Eindhoven**. General MST and related materials expertise is found with **LETI** and **Cranfield University**. Further specialised partners include the **University of Calgary**, providing latest developments in Internet controlled MEMs, whilst nanotechnology private funding expertise is given by **NanoVentures**. A particular emphasis on medical MEMs is provided by **SSSA and KU Leuven**.

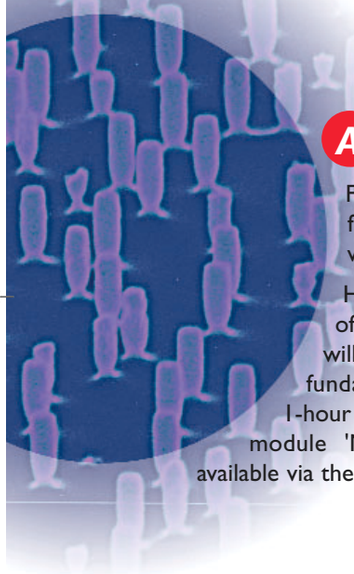
Glossary

MEMs *: Micro electro mechanical systems*

MST *: Microsystems technology*

SMEs *: Small to Medium Enterprises*

Picture: Nano-precision, courtesy of NPL and RAL, UK



A training example

Free on-line training examples can be found at the project website www.VisionOnline.tv.

Here Professor Roger Whatmore, Head of Department at Cranfield University, will take you through the history and fundamentals of nanotechnology. This 1-hour lecture is a preview of the full on-line module 'Microsystems and Nanotechnology', available via the project website in December 2002.

Picture: Quantum dots, courtesy of Imperial College, UK

A virtual institute supporting industry on-line in the precision engineering, microsystems and nanotechnologies

Vision Online

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http://www.eng.ucalgary.ca/Mechanical/

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http://www.mech.kuleuven.ac.be

NanoVentures Ltd *(UK)*
*contact via eu**spen** headquarters*

LETI *(F)*
http://www.cea.fr

Useful links

http://www.cordis.lu/nanotechnology/home.html
http://europa.eu.int/comm/research/industrial_technologies/index_en.html
http://www.cordis.lu/fp6/nmp.htm

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