EUROPEAN MICROSYSTEM & MICRO-NANO TECHNOLOGY NETWORK

ΣMINENT

EUROPEAN B2B ACCELERATOR FOR M@NT SMES
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Relevant EU initiatives and adjoining branch organizations for micro and nano-technology

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1 Introduction

In this report, an overview is given of existing European Union (EU) initiatives and organizations for the promotion and support of activities in the field of nano and microsystems technologies. The list of initiatives and organizations of the report is not exhaustive. The aim of this study is to present an as broad as possible overview, with focus towards small and medium-sized enterprises (SMEs).

2 Initiatives created in past EC Framework Programs

Since 1984, the European Commission (EC) has launched regularly so-called Framework Programs (FP) for Research and Technological Development (RTD). Through these programs, the EC aims to support the conversion of scientific breakthroughs into commercial successful products and services. This is done by funding high-quality multidisciplinary and transnational research. The different Framework Programs have each a different focus. For example, the fourth framework program (FP4, 1994-1998) targeted the creation of strong consortia of cross-border teams with a multidisciplinary approach, focusing on longer-term pre-competitive research and infrastructure building. The fifth Framework Program (FP5, 1998-2002) focused more on specific application domains (e.g. Quality of life, User-friendly information society, ...).
The Framework Programs gave rise to a number of important initiatives with respect to microsystems technologies, applicable to both large enterprises and SMEs. A number of important initiatives are discussed in the next sections.

2.1 NEXUS

NEXUS (Network of Excellence in Multifunctional Microsystems) is an organization established through European Community funding (currently, under the EC's DG XIII) to promote research, development and commercialization of MEMS, MOEMS, and microsystem technologies (MST). Launched in 1992 under the ESPRIT program, NEXUS activities include roadmapping, market forecasting, technology benchmarking, coordination of standards, and dissemination of information on MEMS and microsystems through workshops, user-supplier clubs, and various MEMS-focused publications, such as MST News (initiated by NEXUS but now a VDI-VDE publication, http://www.vdivde-it.de). NEXUS' goal is to promote microsystem technology acceptance by European industry in order to strengthen Europe's

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competitiveness, stimulate cooperation within the European MST community by providing appropriate infrastructure, and establish a common European MST representation. There has been a recent shift from basic academic research to industry-driven applications. These application domains include: consumer electronics, automotive components, medical and environmental applications, telecommunications, domotics (home control systems), and process control. NEXUS works to promote "take-up" of MST technology, i.e. the development and commercialization of promising MEMS and microsystems technologies by European industry.
The NEXUS community consists of over 93 companies and 158 institutes in 31 countries. NEXUS is particularly strong in Germany, France, The Netherlands, Switzerland, the United Kingdom, Sweden, Finland, Italy, and Spain, as a result of a high number of MST players and activities in these countries. Beginning in 1994, NEXUSEAST extended participation in the NEXUS network to include 13 laboratories and companies in Eastern Europe. NEXUSPAN, initiated in early 1995, extends access further to include Russia and other portions of the former Soviet Union, including Armenia, Belarus, Estonia, Georgia, Lithunia, and Ukraine.
The task and management structure of NEXUS has been arranged with a central NEXUS office responsible for information dissemination, network management, and to serve as a common contact point. The NEXUS office receives its directives from both an Executive Board and a NEXUS Board. These controlling Boards, in turn, provide direction to task forces, and an Academic Working Group. The task forces provide market analysis of MST, benchmarking information, maintain and promote international relations (with the U.S. and Japan, mainly), as well as foster relations with Eastern Europe. The Academic Working Group provides MST training and addresses education issues, develops long term perspectives for MST, and provides a consultancy for the Boards.
The Academic Working Group also provides input to the MEMS User/Supplier Clubs (USC). These Clubs are designed to bring together users, suppliers and developers of microsystems, collect and survey market information, help identify MST needs for specific application areas, define technological interfaces and standardization needs, and define requirements on equipment for MST fabrication. In this way, they allow companies working in the same domain to focus their efforts and avoid duplication of effort by giving them a forum to meet and discuss issues of common interest. The User/Supplier Clubs are divided into Automotive, Medical/Environment, Instrumentation/Process Control, Peripherals/Multimedia, and Aerospace/Geophysics domains.
NEXUS uses the Web for information dissemination, in the form of European MST Online (EMSTO, http://www.emsto.com), as well as by reporting MST news articles and events in various publications.

More information on NEXUS can be obtained from http://www.nexus-mems.com.

2.2 Europractice

Europractice, the creation of which was advocated by NEXUS, has two main components: the Competence Centers and the Manufacturing Clusters. Additional there is also a significant activity in training (Europractice Coordination and Training).

Europractice Competence Centers

The Competence Centers support design centers that are capable of providing design services and applications support to industry (especially SMEs) and academia within a particular application domain. The Competence Centers do not have their own fabrication capabilities, but rather select the most appropriate fabrication process for a given task. Each of the six European Competence Centers is operated by one or more research institutes. The six are:

- Automotive & Physical Measurement Systems (Fraunhofer ISIT, Germany)
- Bio-analytical and Biomedical Microdevices; Medical and Environmental Applications (Fraunhofer IBMT, Germany; and IMT, Switzerland)
- Process Control, Machine Tools Manufacturing, Microactuators, and Micromachines (RAL, United Kingdom; and Fraunhofer ISIT, Germany)
- Microfluidic Microsystems (Pont-Tech, Italy, C2V, the Netherlands; and RAL, the UK)
- Peripherals, Telecoms, and Micro-optical Microsystems (CEA-LETI, France; and Sintef, Norway)
- Radiation and Imaging Sensors, Aerospace, and Scientific Instruments (Sintef, Norway; and IMEC, Belgium)

In addition to application-specific design work and choice of fabrication technology, the Competence Centers conduct more general feasibility studies and technology assessments.

Europractice Manufacturing Clusters

The Manufacturing Clusters complement the Competence Centers by providing access to microelectronics fabrication capabilities that employ a spectrum of different technologies. The Manufacturing Clusters fabricate ASICs (application-specific integrated circuits) and multichip modules (MCMs) as well as MEMS and microsystems. Each cluster is composed of a group of industry facilities, with both a geographical focus and shared fabrication capability. Currently, there are five Manufacturing Clusters in the Europractice network, as follows:

- *French Cluster:* Concentrates on quartz bulk micromachining, single-crystal silicon bulk micromachining, silicon-on-insulator (SOI) surface micromachining, and sensing elements for smart systems (led by Sextant Avionique, includes TRONICs, CEA-LETI, and CNRS-LAAS).
- *German Cluster:* Specialities include deep-etch polysilicon, LIGA and micromolding for optical and fluidic applications, microstructured thin films, and

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packaging for MST (led by Bosch, includes microParts, HL-Planartechnik, Fraunhofer-IMS, Fraunhofer-ISIT, and GMA).

- *UK Cluster:* Technical capabilities include silicon and silicon nitride for chemical, radiation, pressure, and flow sensors; gas sensors fabricated in metal oxide; diamond-based sensors; microelectrodes; failure analysis; and reliability and environmental testing (led by AEA Technology, includes Applied Microengineering, Graseby Microsystems, and NMRC in Ireland; the University of Hertfordshire provides dissemination services).
- *Swiss/Netherlands Cluster:* Areas of concentration include design of microsensors, actuators, and microsystems; bulk and surface micromachining; bulk quartz etching; electroplating; and a quick-turnaround packaging service (CSEM in Switzerland in the leading role, with C2V and Holland Signaal (NL) also participating).
- *Nordic Cluster:* The newest of the five clusters, the Nordic group specializes in flip-chip bonding; low-cost assembly and packaging; bulk micromachining; high aspect-ratio etching; high-precision membranes; piezoresistor technology; as well as an ASIC service for microsystem applications (includes SensoNor and Sintef in Norway, MIC in Denmark, IMC in Sweden, and VTT in Finland, together with CNM in Spain, which seeks to improve access to the Nordic cluster for industry in southern Europe).

Europractice Coordination and Training

Some central coordination services for Europractice are provided by Rutherford Appleton Laboratory in the UK; however, individual service providers in the Manufacturing Clusters interact directly with customers and promote their own capabilities. In addition to the design and fabrication of MEMS and MST, Europractice includes a Training and Best Practices Service (TBPS) which prepares users to make informed choices among available technology options.

More information on Europractice can be found on http://www.europractice.com.

2.3 Euspen

Eu**spen** is the "**Eu**ropean **s**ociety for **p**recision **e**ngineering and **n**anotechnology". It was established to provide a coherent and dynamic collaborative thrust for industry, research institutes, universities and leading practitioners to meet, network and mutually benefit from the promotion of the ultra precision technologies that are destined to be one of the dominating aspects of economic and societal development during the next 10 years. Through the organisation of conferences, workshops, training events, efficient network multimedia and international publications, the foremost aims of eu**spen** are to:

- facilitate intensive information exchange between interdisciplinary technologies
- optimise industrial growth
- become an efficient catalyst for the design of innovative products
- create new and transnational industrial and academic R&D collaborations
- promote awareness of nano, micro and ultra precision engineering

Eu**spen,** as a society, was initiated and developed by funding from the European Community under the "Competitive and Sustainable Growth Programme" of FP5 as a "Concerted Action". Membership to this society opened at the first eu**spen** International Conference in May 1999. A further objective of this society was to become financially self-supporting by the end of the 3-year EC project-funding period. To meet this objective, the society council has now legally registered the eu**spen** headquarters as a "non-for-profit" Ltd company of charitable status, with no shareholders, resulting in the formation of eu**spen** Ltd. Promotion of the aims and activities of eu**spen** is through its council (elected annually by its membership), the UK headquarters, and national nodes.
Assistance is also maintained by the EC through the project VISIONONLINE. This initiative primarily aids eu**spen** in providing the community with intensive, high calibre and cost effective training.

More information on eu**spen** can be found on http://www.euspen.com.

2.4 Minatech

Minatech is an innovation and SME program targeting micro and nano technologies and markets. It was created as a Economic and Technological Intelligence (ETI) project in the frame of FP5. The project started in May 2000 and will run till then end of 2002. There are eight countries participating in the project: Italy, Czech Republic, Denmark, Germany, Greece, The Netherlands, Spain and the United Kingdom. The aim of the project is to:

- produce updated, both national and European (with comparison with US and Japan), state of the art and medium term evolution trends of micro and nano technologies and of applications and markets of these technologies in 4 selected areas:
    - information technology and communications (ITC)
    - automotive
    - health and biotech
    - instrumentation
- stimulate selected SMEs and more generally all SMEs, through dissemination seminars, workshop, technological audits, technical and marketing information on web sites, on newsletters, on technical journals, to participate to EU initiatives for R&D (Exploratory Awards, CRAFT and RTD projects).

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More information on Minatech can be found on http://www.airi.it/minatech.

2.5 Minanet

The Minanet project brings information about regional, national and European Commission micro and nanotechnology projects together in one Internet site. Currently, the database contains information from up to almost 700 projects from more than 15 countries. Through a search engine, user can look up project details in a very efficient way. Figure 1 show what useful information can be retrieved from the project information available in the database.

Figure 1. Minanet interaction schematic.

The Minanet database can be accessed at http://www.minanet.com.

2.6 PHANTOMS

In order to avoid European industry and R&D being left behind the United States and Japan in this fast emerging nanoelectronics field, the PHANTOMS Network scheme will promote European science and research through a pluri-national networking action, put together research capacities present in the various European regions and stimulate commercial nanoelectronic applications. The Network (funded by the European Commission through the FP5 IST programme) is of a truly interdisciplinary character (members come from government, universities and industry at the top of their fields in Europe) and involves currently 176 partners from 22 different European

countries, 8 from the US, 1 from Canada, 1 from Japan and 1 from India (see Figure 2).

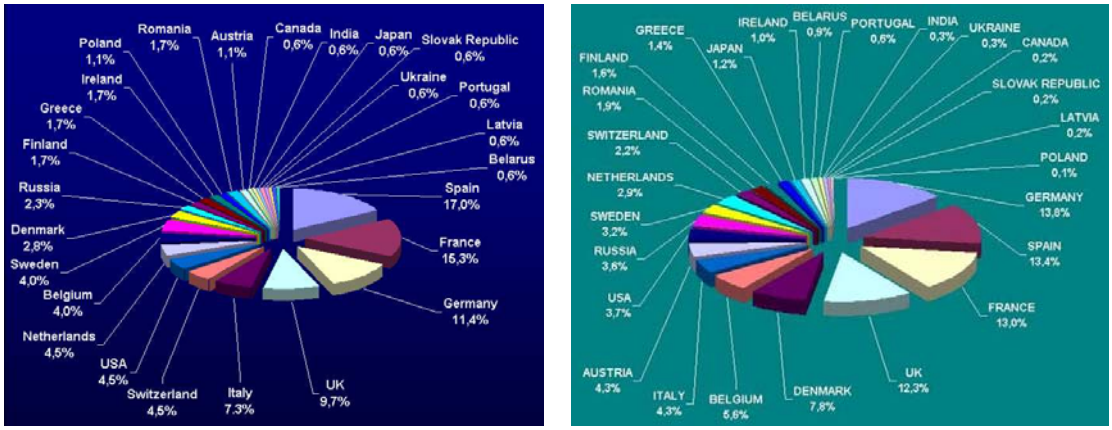

Figure 2. Left: percentage of group members per country involved in Phantoms (total number of groups is176). Right: percentage of people working at Phantoms groups per country (total number of people is 1458).

Thus linking research strategies in a consortium of participants coming from different fields and promoting exchange of researchers fosters the understanding between the groups coming from different directions. This is a crucial point that helps ensuring the competitiveness of Europe in this fast emerging field. Defining the right objectives that need to be addressed in the research and development projects can be a key to developing European competitiveness in future generations of electronics.

Research areas and key aspects

The research areas addressed by the PHANTOMS Network are the following:

- Modeling
- Lithography
- Nanoimprint/Micro contact Printing
- Architecture
- Nanoprobes
- Silicon/Industry
- Superconductors
- Magnetoelectronics
- Molecular and Bioelectronics (Fullerenes, biomolecules, etc.)
- Nanoscale Optics
- Self-assembly/combination of Silicon technology and molecular based electronics

An important objective is mainge industry aware of the strategic importance of nanoelectronic research for the future of information technology (IT) in general and of microelectronics in particular. For this purpose, the network promotes intensively

industrial participation in the Network activities (13% of the members belong to industry), informing the industry about relevant progresses in nanoelectronics and providing a feedback loop for industrial mid and long-term interests.
The key aspect of an emerging technology network is interaction, and this is achieved in the following ways:

- Exchange of information during workshops organised within the network.
- Scientific exchange between partners by short research visits of scientists and students (PHANTOMS grants)
- A web based source of information (http://www.phantomsnet.com) related to nanoelectronics based for example on:
    - A list of all active research groups and companies presently involved in Nanoelectronics (Key personnel, skills, infrastructure, etc.).
    - Dissemination of basic research results (publications, abstracts, references per group and/or topic, conference proceedings, etc.), EU reports, EU projects' results (NID, FET Open, etc.), patents, etc.
    - Dissemination of information and news related to nanoelectronics such as conferences, workshops, job opportunities (from companies and Universities), grants (EU, University groups, etc.), etc.

By the provision of the above, a thriving multidisciplinary network of European universities, companies and laboratories is working together to establish access to world-class nanoelectronic applications for all European citizens. The network represents a "single entry point" for those seeking information in Nanotechnology and especially Nanoelectronics.

Membership and funding

The membership is restricted to research groups (belonging to legal entities such as universities, research institutes, industry, etc.) active in the field of "Nanotechnology for Information Processing and Storage. Membership is open worldwide (including for example USA or Japan). Note that the general EC rules for funding apply and that priority will be given to funding requests submitted by PHANTOMS members.
Funding opportunities within the network are:

- Grants to cover partially expenses in order to assist to events and PHANTOMS Workshops organised within the network.
- Financial support to conference organisation.
- Financial support to short scientific exchanges (priority will be given to exchanges involving industry). Network funding will follow European Commission rules.

PHANTOMS members should be active and provide their support to the network activities: participate to PHANTOMS workshops, provide periodically material for the PHANTOMS website or related initiatives such as the PHANTOMS Newsletter, etc... The Network aims to become a reference point on Nanotechnology and especially Nanoelectronics.

All information on PHANTOMS can be found at http://www.phantomsnet.com.

3 Eureka Programs

EUREKA (http://www.eureka.be) was established in 1985 by 17 countries and the European Union to encourage a bottom-up approach to technological development and to strengthen the competitive position of European companies on the world market. This transnational program supports consortial R&D in electronics and information technology, among other fields. Unlike the EC-funded programs, however, financial support for Eureka projects comes from national governments and private sector participants. Proposed projects are evaluated for inclusion in the Eureka framework by a panel of National Contact Points (NCP).
Until recently, while Eureka included microsystems work in its overall scope of work, it did not include a component focused on MST in particular. The Eurimus project fulfils that role. The Pidea program relates to high density interconnection and packaging projects.

3.1 Eurimus

Eurimus (Eureka Industrial Initiative for Microsystems) is a strategic initiative promoted by NEXUS within the framework of Eureka. The objective of Eurimus is to accelerate the commercialization and increase the market share of European industries in products and systems that employ key components that derive from microsystems technologies. Eurimus addresses both product and process technologies for MST, and seeks to counteract, in the microsystems realm, the general perception that European industrial R&D programs have supported good scientific and technological work without substantial commercial impact.
Eurimus has been structured as a five-year program which began in 1998. An Industrial Core Group composed of major players in electronics and microsystems in Europe — including Bosch, Daimler Benz, Sextant Avionique, Philips, Schlumberger, Siemens, SGS Thomson, CSEM, CEA-LETI, Fraunhofer ISIT, and Sintef — constitutes the Eurimus Board. The total budget of Eurimus is estimated at 400 million ECU over five years, with 50 percent of funding coming from private industry and 50 percent from national government organizations in Europe. Over the five-year span of the program, 100-150 individual R&D projects will be selected for funding.

More information on Eurimus can be found on http://www.eurimus.com.

3.2 Pidea

Pidea is a Eureka Cluster Program for interconnection and packaging enhancement. The program aims to bring European electronic industry at the forefront of development and production of electronic miniaturized systems. To achieve this goal, mastering of high density interconnection and packaging technologies is of prime importance. Therefore, Pidea wants to stimulated R&D projects between component manufactures, electronic systems providers and laboratories in this field. Applications lie in the field of high speed networks, high speed data processors, consumer electronics, smart cards, automotive, aerospace, railways, etc ... The Pidea label allows a proposer from an Eureka country to receive funding from its national public authorities according to the national policy of this country. In order to get a Pidea label, a project proposal has to be sent to the Pidea office. Details on how to do this can be found on http://www.pidea.com.fr/submit.htm.

More information on Pidea can be found on http://www.pidea.com.fr.

4 Sixth Framework Program

The next RTD Framework Program will span the period 2002-2006 and will replace the current FP5. This Sixth Framework Program (FP6) will be one of the most important instruments to implement the "European Research Area". The budget of FP6 will be 17,5 billion euro. This represents an increase in absolute terms of 17% compared to the Fifth Framework Program. Such significant increasing of budget is necessary for the creation of European Research Area. More than 3 billion euro are intended to be spent for building the European scientific environment program, 3,6 billion euro - for development of the technologies for building the European scientific environment. All actions within the Sixth Framework Program will work for business, academic and research support, they also will be focused on removing obstacles for EU scientists mobility. As the previous program, the FP6 comprises two distinct parts: the Sixth Framework Program of the European Community for RTD activities and the Sixth Framework Program of the European Atomic Energy Community for research and training activities in nuclear sector.
The seven priority orientations of the Sixth Framework Program are:

- Working out technologies for the purpose of European Research Area creation.
- Assistance in politics of sustainable development based on consolidation of scientific potential.
- Development of bio-technologies, permitting men's health strengthening, control of illnesses and revival of European bio-technological industry.

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- Support of nanotechnologies, creation of artificial materials and new production methods.
- Assistance of research in aeronautics and space emphasizing the problems of environment protection and human life safety.
- Guaranty of foodstuff and removal of human health threat resulted by food production technologies.
- Mobilization of economics, sociology, political and humanitarian science in the interests of European society including management development.

Continuing FP5s traditions', the Sixth Framework Program focuses attention on small and medium- sized enterprises (the participation of SMEs will be increased up to at least 15%). Education is another important sphere, which will be in focus of FP6. Educational system should be renovated to inveigle young people into science. Besides favorable conditions should be created for young scientists activity, based on guaranty of their interests. These changes should give young people strong motivation to prefer working in Europe, not in the USA. It will lead to overcome an existent deficit of researchers in European countries. Another important note is that every EU state while working on national programs based on FP6 can interpret freely priority themes according to prior interests. Combination of flexible nation policy and European Commission's plans - to modernize administration structure and improve programs managing - will permit cut spends on realization of the programs.

More information on FP6 can be obtained from http://www.cordis.lu/fp6. Information directly targeted to SMEs can he found at: http://www.cordis.lu/fp6/sme.htm.

5 Initiatives with special focus on SMEs

A number of EU initiatives have a special focus on SMEs. Within the context of FP5, a special website was set-up for technology-oriented SMEs - especially those wishing to innovate and internationalize: **SME-Techweb** (http://sme.cordis.lu). The information on this site is of particular value to those who have applied for research funding through the SME Specific Measures of FP5, and for those who are interested in applying. The information site comprises a lot of elements that will be running beyond FP5.
A guide to promote entrepreneurship and SME interest is available at: http://europa.eu.int/comm/enterprise/library/lib-entrepreneurship/libr-entrepreneurship.html - Guides,%20études.

5.1 European Research Area

The world may be shrinking, but opportunities for SMEs are growing. Information technology not only brings world markets to your doorstep, it demands that companies innovate or die. Even small companies can no longer ignore the international dimension of their business. Building the **European Research Area** (ERA) is a way of bringing all resources to bear on boosting Europe's research effort, and hence the innovation potential of its companies.

Synergy and simplicity

Partnerships have been the mainstay of European research throughout the first five RTD Framework Programs. But the next Framework Program, which runs from 2002 till 2006, leaps into another dimension. It aims to bring the European Research Area into being. The aim of ERA is to break down the remaining barriers that hinder scientific collaboration within Europe. It aims to squeeze the best possible results out of the resources we have at our disposal - whether human, material or financial. Without constructing a monolith, it aims to prevent duplication and create synergy between national and European research programs. It aims to enable researchers to travel more easily to join the research teams where their skills will be put to best use. And crucially, it aims to help SMEs, those engines of innovation, to benefit from research to solve their problems.

Status

The Commission set out its ideas in its Communication "Towards a European Research Area" (http://europa.eu.int/comm/research/area/com2000-6-en.pdf) in January 2000. This was wholeheartedly endorsed by the Heads of State and Government at the Lisbon Summit, and later on by the European Parliament. It was also supported by the Economic and Social Committee, the Committee of Regions, and by hundreds of interested parties who sent in responses during the period of open consultation. In October, a second key document, "Making a Reality of the European Research Area: Guidelines for EU research activities (2002-2006)" (ftp://ftp.cordis.lu/pub/documents_r5/natdir0000001/s_1554005_20010125_143553_C001373en.pdf) put the flesh on the bones.
ERA is not an institution and does not mean the creation of a new bureaucracy. There will be no new hoops which SMEs have to jump through to qualify for help with their research projects. On the contrary, ERA means that priorities will become clearer, the choice of partners will become broader, and the means of finding them simpler.

New tools for SMEs in the context of FP6

The Sixth Framework Program will be a key instrument for implementing the European Research Area (http://www.cordis.lu/rtd2002). SMEs will be prized partners in the **integrated projects** and **networks of excellence** that will be set up. Besides

this, SME specific research actions will be set up. These consist of **co-operative research** (CRAFT) and collective research. Collective research (http://sme.cordis.lu/collective/infobrochure.cfm) projects enable associations and similar organizations to lead research projects for the collective benefit of their SME participants. A pilot phase is already under way, and early in 2002 a handful of pilot projects will be chosen. These will be projects which address the needs - in such areas as standards, global competition or environment regulation - of large numbers of small businesses, or even entire industrial sectors.
Other SME oriented measures are those in the field of Economic and Technological Intelligence (ETI) (http://sme.cordis.lu/economic/eti_projects.cfm). Fifty-three ETI actions are under way to open up the information and skills that SMEs need if they are to choose wisely what research they should undertake.
Not only that, but ERA will mean that access to national research programs, as well as intergovernmental schemes such as Eureka, will be simplified. Finance for research (http://sme.cordis.lu/other/financing.cfm) such as venture capital funds - and ease of movement for researchers are also priorities for reform (see http://www.cordis.lu/improving/fellowships/home.htm).

Budget

The European Research Area is not just for large companies and research institutes. The target is to allocate 25% (with a minimum of 15%) of the budget of the main part of the Sixth Framework Program – so at least €1.8 billion - for SMEs to use in order to get them involved in micro and nano technology. Remember: the European Research Area is about getting the best results from our research effort. Opportunities for SMEs are going to increase.

Find out more about ERA at its own webpage:
http://europa.eu.int/comm/research/era/index_en.html.

5.2 First User Action

The First User Action (FUSE, http://www.fuse-network.com) is an EU initiative with the aim of improving the competitiveness of European industry, particularly SMEs, by stimulating greater use of electronics. Several companies have received funding to incorporate new electronic technologies ranging from microcontrollers, ASICs, microsystem components and advanced, low cost assembly technologies. FUSE "application experiments" normally last 6-18 months and involve the entire cycle of design, manufacture and testing of a prototype device. FUSE experiments may involve development of:

- Application Specific Integrated Circuits (ASICs)
- Multi-Chip Modules (MCMs)
- Printed Circuit Boards (PCBs)

- Microsystems (containing sensors and/or actuators)

The funding available for FUSE experiments depends upon the complexities of the technologies required. The main eligibility criteria for companies wishing to participate in a FUSE application experiment are:

- Small or medium sized enterprise (SME)
- Adopting technology that is 'new to the company'.
- Represents a significant advance in expertise gained and improved competitiveness.

A European network of 26 Technology Transfer Nodes (TTNs, http://www.fuse-network.com/fuse/contacts/ttns.html) provides technical assistance to companies and helps participants overcome any problems.

5.3 Europractice

Europractice is a EU initiative to improve the competitiveness of European industry by the adoption of advanced electronics technologies. Europractice is open to industrial companies (especially SMEs), research institutes and academic users. The Europractice program is now recognized as one of the industry's most successful commercialisation projects. More details on Europactice have already been given in section 2.2 of this report.

5.4 Minatech

One of the tasks of Minatech is to stimulate and assist SMEs to participate in EU Fra mework Program initiatives for R&D in the field of micro and nano technologies and their applications. In complete confidentiality, the Minatech offers the SMEs:

- information on micro and nano technologies and their applications/markets.
- information on EC financing of R&D projects.
- technological evaluation (no cost audits) through visits by trained experts
- assistance in finding partners and in the definition and formulation of R&D projects.
- specific workshops and information dissemination.

More details on Minatech have already been given in section 2.4 of this report.

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6 Other initiatives and information sites

A number of other useful initiatives and information sites are listed in this section.

6.1 Cordis

Cordis, or "Community Research and Development Information Service", is the Internet information center for European Union research and development initiatives. The Cordis website, http://www.cordis.lu, contains all official information on past, present and future EU initiatives.

6.2 Nanoforum

This thematic network provides a comprehensive source of information on all areas of Nanotechnology to the business, the scientific and social communities. The main vehicle for the thematic network is its dedicated website, http://www.nanoforum.org. Nanoforum encompasses partners from different disciplines, brings together existing national and regional networks, shares best practice on dissemination national, EU-wide and Venture Capital funding to boost SME creation, provides a means for the EU to interface with networks, stimulates Nanotechnology initiatives in European underdeveloped countries, stimulates young scientists, publicises good research and forms a network of knowledge and expertise.

6.3 Space incubator initiatives

Some specific initiatives related to space technologies and applications are listed in this section.

T4TECH

The mission of T4TECH is to support the implementation of new technologies and know-how through the active involvement of a group of experts, covering all major technological and scientific sectors. The main objective of T4TECH is to fill the gap between technologies and users industrial needs by providing highly qualified consultancy. More information on T4TECH is available at http://www.t4tech.com.

ESINET

SMEs have an enormous and often un-exploited potential to convert worthwhile research ideas into successful commercial products. The new European Space Incubator Network, ESINET, has as its mission to foster their competitiveness at the

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European level. ESINET (established by four founding partners - WSL, ESI, EBN and T4TECH – based on EC and ESA directives) will bring together initiatives from all over Europe with a view to sharing experiences, knowledge and resources. To date, ESINET can count on over 20 partners from Belgium, Bulgaria, Finland, France, Germany, Holland, Italy, Portugal, Spain, Sweden, UK and Ukraine; each of them is deeply involved in space incubation activities. Note that recognising the importance of space, the EU 6th Framework Programme has included space for the first time as one of its key areas for advancement of knowledge and technological progress. More information ESINET on the following websites:
http://www.t4tech.com/Andrea Barbagelata.pdf and
http://www.t4tech.com/Bruno Naulais.pdf.

ESA Technology Transfer

ESA provides a number of documents on space technologies that may be transferred to the industry. The general website is: http://www.esa.int/technology. The following dedicated information is also available:

- Outlook for Space Technology and Typical Tasks for High-Tech SME:
  http://esapub.esrin.esa.it/sp/sp.htm
- Technology transfer newsletter:
  http://esapub.esrin.esa.it/spacelink/spacelink.pdf and
  http://esapub.esrin.esa.it/br/br152/technology-e.pdf

6.5 Biotechnology initiatives

In the previous EU FP4 and FP5, a considerable number of projects on biotechnology have be set-up. Some of them have links with nano and microtechnology. Information of biotechnological projects and initiatives is available at http://europa.eu.int/comm/research/biot1.html. The results of the FP4 BIOTECH2 program can be found at http://www.cordis.lu/biotech/home.html, and those of the FP5 Quality of Life program at http://www.cordis.lu/life/home.html.

New biotechnology related initiatives in FP6 are bundled in the **"**Life sciences, genomics and biotechnology for health" Thematic Area. The main objectives are integrating post-genomic research into the more established biomedical and biotechnological approaches. This includes involvement of key stakeholders e.g. industry, healthcare providers and physicians, policy makers, regulatory authorities, patient associations and experts on ethical matters. See also
http://www.cordis.lu/fp6/lifescihealth.htm.

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7 Conclusion

Within the EU, there is a whole range of initiatives available relevant for micro and nano technology development at SMEs. Which initiative to select in order to get support or funding for the development of your MST product, depends on the combination of a number of parameters such as e.g. product type, development time-frame, commerciality, trans-nationality, ... This is because all these initiatives focus on different aspects or development stages of the final product to be realized. It's therefore important that a company uses all available information to select the initiative that suits best its proper product or development. This report may be a starting point in this search, but obviously a lot more information is available on the internet and can be found through dedicated searches.

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