

WHITE BOOK

***Reinforce the worldwide position
of the European industries in the
field of Integrated Smart Systems.***

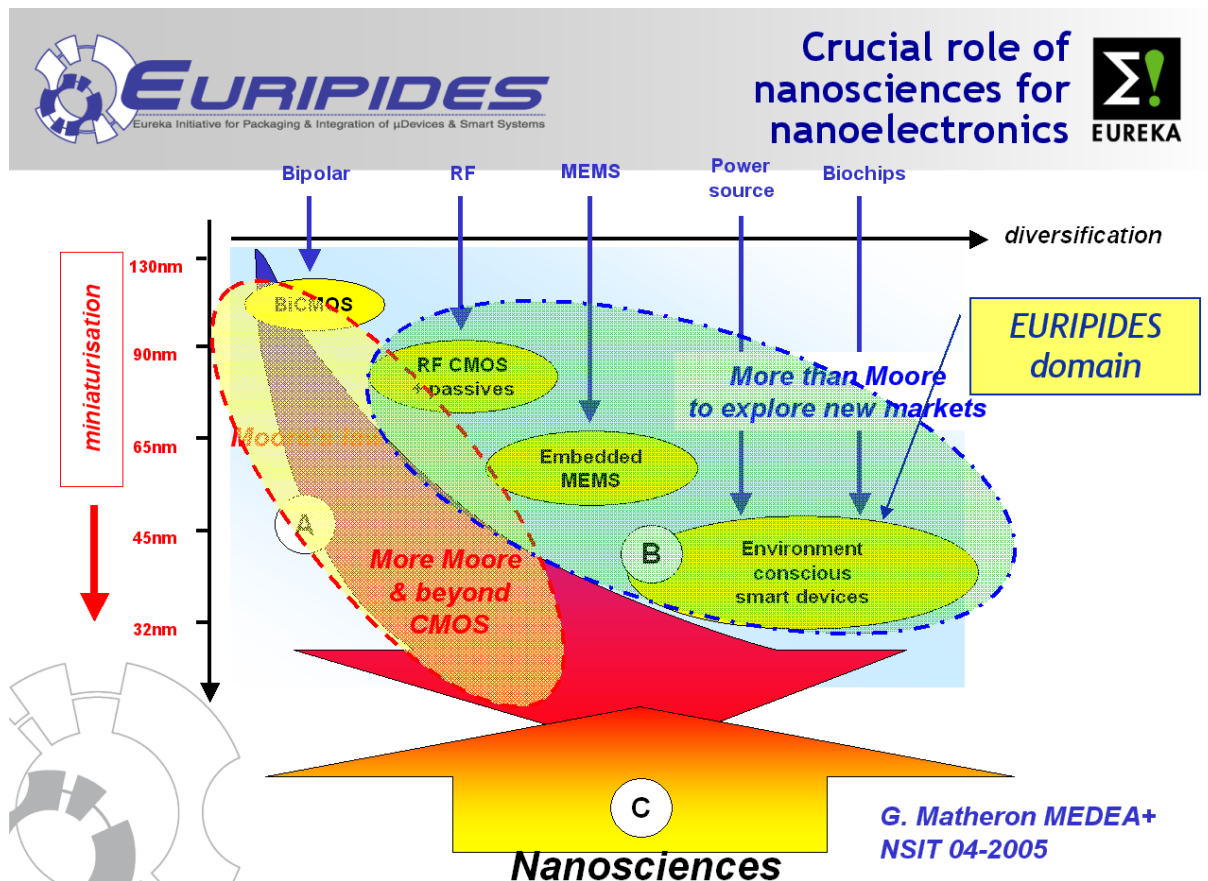




EURIPIDES

WHITE BOOK

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1 Introduction

EURIPIDES is a EUREKA Cluster Project promoting Smart Systems and their relevant technologies. These technologies have rapidly evolved from specialties technologies used in a very narrow set of market to a broad market base.

EURIPIDES will ensure the ongoing competitiveness of European electronics and microelectronics industry. This document outlines EURIPIDES vision, strategy, scope and role.

1.1 About this document.

This document covers the objectives, strategy and organization of the EURIPIDES program. It is intended as a reference for the national authorities supporting EURIPIDES and for future project proposer.

This document will be updated when necessary by the EURIPIDES Board to take into account the changes in the Integrated Smart System market and the evolution of the industrial needs.

1.1.1 Abbreviations and conventions throughout this Yellow Book:

- ✓ ! will mean the EUREKA initiative
- ✓ EURIPIDES (in capital letters) will refer to the program (2006-2013; ! 3830).
- ✓ MNT will mean micro and nano technologies
- ✓ SSI will mean Smart System Integration and can stand also for Integrated Smart Systems

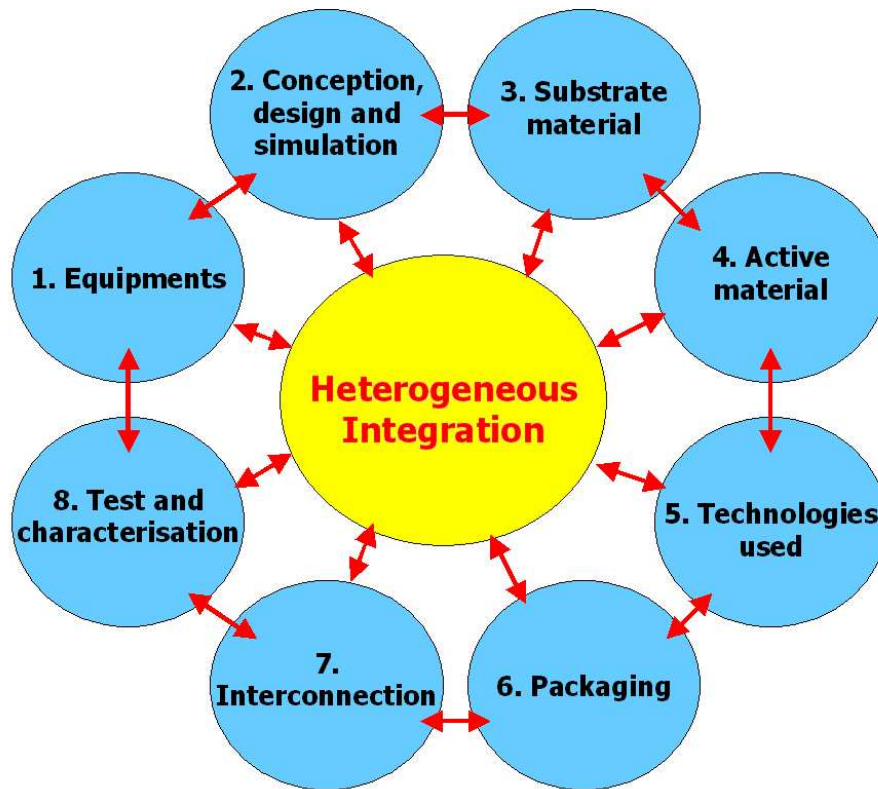
- ✓ NPAs will mean national Public Authorities
- ✓ EC will mean the European Commission
- ✓ EU will mean the European Union
- ✓ SMEs will mean small and medium size enterprises
- ✓ FP7 will mean the 7th Framework Programme of the European Commission

1.1.2 Background and rationale

EURIPIDES was born of EURIMUS II and PIDEA+. It is both a continuation of, and an improvement on these EUREKA Clusters projects. The merger arose from the fact that the technological themes of the two Clusters were largely complementary, yet intimately related. We found that the community would be better served by a single Cluster project than by two involving a distinction that was unclear and somewhat arbitrary. The intention is to make EURIPIDES better than the sum of its parts and to combine to the best of our ability the strong points of each Cluster project.

Since 1998, both EURIMUS II and PIDEA have established working relationships between European industry and R&D institutes; these relationships have allowed these different sectors to share experience and resources in European cooperative projects. During their first phases, both Clusters focussed on specific technologies and components. Major innovations developed in these Clusters have made it possible to lead new industrial markets to develop today.

- ➔ EURIMUS (1998 – 2003), then EURIMUS II (2004 – 2008), is a collaborative industrial R & D programme dedicated to the development of innovative micro and nanotechnologies and products. It is carried out under the umbrella of the EUREKA initiative and it resulted in 45 labelled projects with a total value of 260 million €. Most projects labelled in the frame of EURIMUS were successful and generated products and services over a very large range of interest (e.g. infrared camera for automotive applications, a versatile ultrasound imaging probe, silicon gyroscope, wafer level testing for microsystems, etc.).
- ➔ PIDEA (1998 – 2003), which became PIDEA + (2004 – 2008), is a collaborative R&D programme devoted to the field of Packaging and Interconnection Development and operating under the framework of EUREKA. The objective of PIDEA is to bring European industry to the forefront of technology by increasing the Interconnection and Packaging capabilities within companies. With more than 70 labelled projects with a total value of 425 million €, involving 170 partners in most European countries, PIDEA certainly answered a very crucial strategic requirement. This was to develop European interconnection and packaging technologies to such an extent that developments underway in the semiconductor industry were capable of being supported. Thus enabling both complementary industrial sectors to grow synergistically. In the course of the last few years PIDEA had enabled major technological innovations in relation to predicting and addressing market trends, cost reduction and high performance requirements.



1.1.3 The definitions of Micro and Nano Technologies and SSI in EURIPIDES

Microtechnology cover all technologies to produce and exploit devices with typical physical features is in the micron (10^{-6} m) range. Microtechnology usually lies at the crossroads between electronics, optics, micromechanics and materials.

Nanotechnology encompasses an array of technologies to analyse and shape matter at the manometer scale (10^{-9} m). Whereas microtechnology still usually considers materials as a continuum, nanotechnology often works at the scale of single atoms. Nanotechnology is closer to chemistry, proteomics and even quantum physics.

EURIPIDES considers all the technologies leading to the integration into a single system or SSI. SSI combines by appropriate packaging technology devices based on MNT for sensing and actuating operations with micro nano electronics signal treatment chips plus some embedded software. These should normally exploit two or more physical properties such as electrical, mechanical, optical, chemical, biological, magnetic properties, integrated into a single chip or a multi-chip hybrid. Furthermore micrometer scale systems embedding additional functionalities based on nanotechnology are also considered.

1.1.4 Interconnection and packaging issues

Advanced interconnection and packaging technologies at all levels of system assembly (wafer, chip/package, board) are increasingly asked for. Today already available solutions like wafer level stacking, 3D integration, nano-interconnects, extremely miniaturized or embedded passives and large-scale multifunctional board assemblies represent the basis for new system designs and applications covering for example microelectronic, micro optical, micromechanical or high frequency features. These new structuring and interconnection methods lead to very small system sizes and provide the opportunity of functionality oriented system assemblies. That's a new quality and

challenge for interconnection and packaging: to switch over from technology oriented packaging to system oriented packaging.

Currently numerous and particularly well-investigated technologies can be observed in this field, but most of them are in a research and development status. For the implementation into series and mass production additional knowledge has to be considered. Beside advanced assembly and packaging methods system functionality, interfaces to application environment, design methodologies, properties of all electronic components, power management and of course measurement and reliability demands need to be included.

Technologies for integration of more and more functions not only on the chip (SoC) but also in the package (SiP) are a necessary and very important step in the development of future microelectronics and microsystems. New application fields like "Autonomous Sensor Networking" or "Ambient Intelligence" require low cost system solutions that integrate all necessary components. The future will be a combination of "System on Chip"- and "System in Package" solutions called as "Heterogeneous Integration" (see also next chapter).

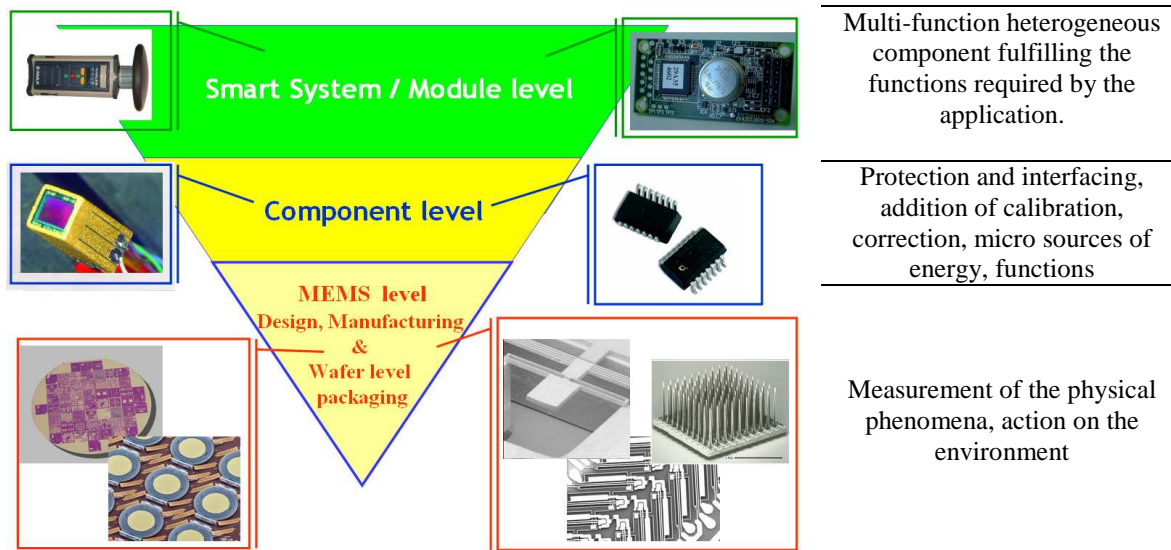
By choosing technical and economical feasible SoC solutions in a wide range, the adoption to various applications and the integration of highly complex systems containing non-electronic functions can be carried out more cost efficiently with a high degree of miniaturization and flexibility in system integration by SiPs. Such types integrate several chips or components in one package and carries out the interface to the application environment.

Currently there are mainly used three versions of SiPs. These are Single and Multichip Modules, Stacked-Die Packages and Stacked-Packages. Taking into account the different functionalities (electrical or non-electrical) pure electrical features are often realized in Standard Packages (e.g. TSOP, QFN, μ BGA). For non-electrical functions or combinations of electrical and non-electrical features mainly specific packages (e.g. pre-molded, non-geometric, chip on board) adapted to the application environment are available (application specified packages).

Following needs have to be in the focus to extend advanced packages in the future:

- low cost interconnection technologies (high density multilevel wire bonding, fine pitch flip chip, thin interconnects)
- interconnects for high temperature and harsh environment
- low temperature assembly technologies
- special functionality oriented mould compounds (e.g. by nanoparticles)
- low cost high speed assembly
- improved materials functionalities, such as new electrical, optical, thermal properties (e.g. by CNTs)
- 3D compatible passives (e.g. nano structured materials for high k capacitors, low k inductors)
- high positioning and self positioning/ assembly technologies of dice/ devices

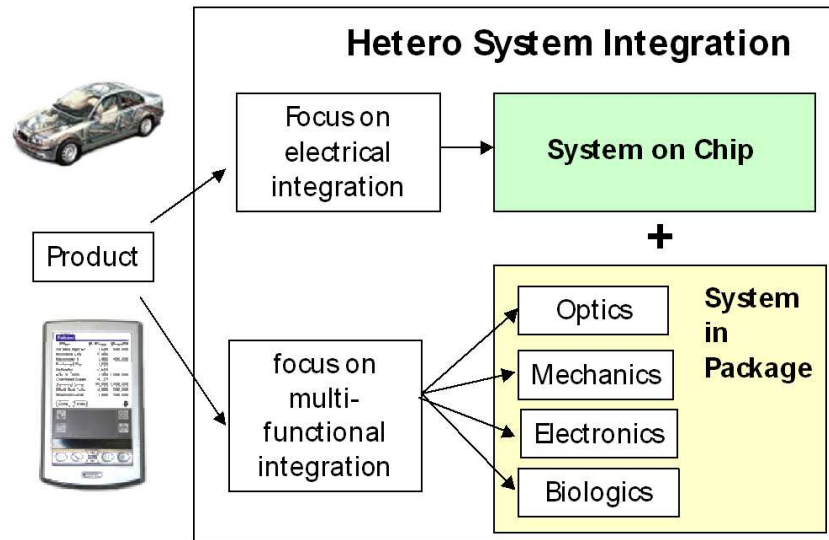
1.1.5 Heterogeneous Integration issues



Hetero systems consider both components and system integration technologies. Therefore also the progresses of nanoelectronics, microsystem technologies as well as sensor and photonic component technologies are important pre-conditions. For manufacturing of hetero systems, new architectures and system integration technologies are necessary. These “Hetero System Integration” technologies have to ensure the realization of reliable hetero systems at minimal sizes and at low production costs. Adequate interfaces for different application environments have to be created. Hetero System Integration technologies provide the interaction of different functions, materials and technologies. “Hetero System Integration” is one of the driving forces to bring nanotechnologies into application.

By using future ultra high density integration technologies, Hetero System Integration will be able to combine different technologies to integrate devices for sensing, electrical signal and data processing, wireless communication as well as power conversion and storage. With respect to non-electric functions Hetero System Integration can achieve higher complexity than System-on-Chip solutions. In Figure 1 this is expressed by its main topics.

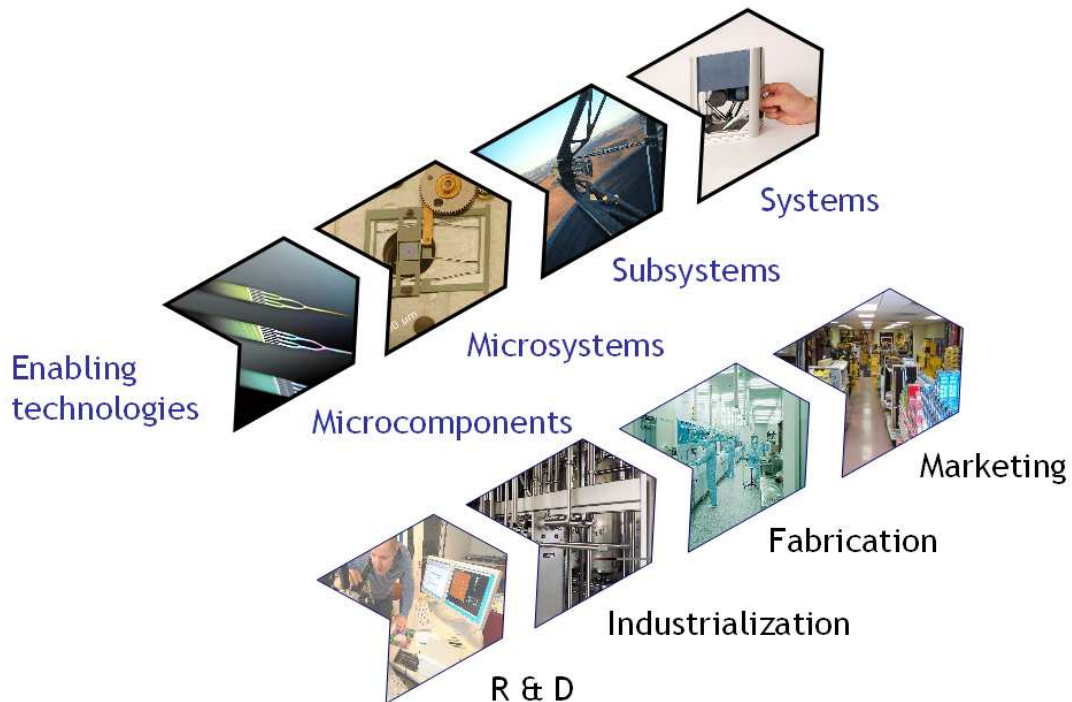
One of the reasons the Hetero System Integration concept is gaining importance is the lower cost and risk assessment compared to “System on Chip” (SoC) solutions. Further advantages of Hetero System Integration solutions include shorter time to market cycle and a high degree of flexibility. This high flexibility of Hetero System Integration certainly offers the possibility to integrate “System on Chip” solutions, for example for subsystems. The quota of “System on Chip” solutions in a Hetero System depends strongly on cost issues. In summary the implementation of Hetero System Integration is a key for innovation. Figure 2 shows in this context main technology and process topics of Hetero System Integration.



2 Objectives

To promote the development of new products, processes and services using or enabling the use of integrated smart systems based on microtechnology by lowering the financial risk related to innovation through the judicious use of public funds available in national (Eureka) programmes.

2.1 Strategic objectives



The mission of EURIPIDES are related to three strategic objectives:

- ✓ **Assist in the expansion of the European heterogeneous systems for large and SME industry through:**
 - increasing the share of European companies in the growing global heterogeneous systems market,
 - creating new products and markets segments using heterogeneous systems

- triggering economy of scale by encouraging the reuse of key heterogeneous systems components across projects in Europe.
- Creating added values or new products by adapting technologies developed for other industrial domains (recycling) (This point is particularly valid for SME's with little development budgets)
- ✓ **Sustain the worldwide competitiveness of the European industry by:**
 - identifying breakthroughs in heterogeneous systems
 - supporting the use of leading edge developments in these areas towards industrial exploitation
- ✓ **Complement existing R&D programmes such as FP7 and national research programmes.**
 - FP7 has dedicated heterogeneous systems activities but limited funding has led the EC to accept very few large integrated projects and some important thematic domains remain uncovered.
 - National MNT R&D programmes exist in some countries and play an important role for national industries but don't allow trans-national co-operation which is necessary to really increase the European competitiveness.
 - Discussions to improve complementarities between EURIPIDES and the European Commission (IST and NMP) are in progress but have to take into account that EURIPIDES is by nature more industry focused and address activities closer to the market. Some FP7 instruments as ERA-NET for the coordination of national programmes or article 169 could also complement "the new cluster's" activities but are not expected to be widely implemented in the short term.



2.2 Industry and market goals

In terms of market, EURIPIDES aims at:

- ✓ **Foster new products and market segments using SSI by:**
 - Demonstrating industrial potential of microsystems by developing industrial prototypes of SSI-based products, processes, equipment and materials.
 - Help bringing to the market results of upstream projects from the EC Framework Programme (FP7) or national programmes.
- ✓ **Support transition from high cost/low volume to low cost/high volume production of SSI**

With a few exceptions (e.g. read/write hard drive heads, inkjet heads), the current markets for microsystems are mostly niche markets i.e. high cost/low volume. In some application domains, a transition to low cost/high volume may be expected. This was the case for accelerometers originating from the niche market of aeronautics and defence and now widely spread in airbags and other

automotive applications. Eurimus II will support the development of low cost, reliable manufacturing processes.

- ✓ **Trigger economy of scale by encouraging whenever possible the reuse and standardisation of key SSI components in Europe**

2.3 Co-operation objectives

The industrial EURIPIDES co-operation will provide a maximum leverage on the success in terms of products of both the system industry and the component and equipment/materials. Components and products addressed in EURIPIDES are expected to generate market revenue in a time scale of about 3 to 5 years after project completion. Projects with too short-term market goals (“business as usual”) or too long term ones (FP7 domain) are outside the scope of EURIPIDES.

EURIPIDES, an industry-driven market-oriented programme, aims at highly competitive results. The ultimate goal is to gain globally significant market shares for the European SSI based industry. This goal couldn’t be achieved without a strong trans-European co-operation.

Projects in EURIPIDES will make use of design and simulation techniques, libraries, silicon and non-silicon-based technologies, manufacturing processes, dedicated packaging techniques, assembly and testing and customised embedded system software. They thus require a wide range of co-operation including various companies (SMEs or large enterprises) and most often research institutes.

The mainstream of projects will build on small teams of industry/institutes partners teaming-up to achieve advanced industrial results in the scope of EURIPIDES. Very large co-operative projects (with total budgets in the range of 20 to 50 million euros) aiming at achieving major breakthroughs and gathering larger consortia will also be encouraged.

In all cases, the excellence of project proposers and the quality of their co-operation will be major criteria for project selection by the EURIPIDES Council.

3 Strategy

3.1 A vision

Increase competitiveness of European industry through meaningful and sustainable innovation in (micro-technology-based) integrated smart systems for civilian applications.

System integration technologies have increasingly become a vital factor in the economic success of suppliers and users especially in the areas of consumer electronics, telecommunications, and automotive industry. Faced with the rapid development of IC technology the traditional packaging is changing into a complex system integration technique to satisfy the growing demand in terms of increased functionality, performance and miniaturization of electronic systems. Communication and computing are the backbone of the so-called information society. Electronic systems are used in a large variety of applications. New applications are arising in the field of health monitoring, security, lighting etc. These new applications require systems with integrated electrical and non-electrical (sensor-, actuator-) functions. These Heterogeneous Systems or Smart Systems have to create adequate interfaces for the different application environments. The functionality of such systems can be considerably enlarged by the integration of mechanical, optical and / or biological functions. The realization of such Smart Systems is based on new architectures, components and system integration technologies as well.

Therefore the progress in nano and microelectronics, microsystem technologies, bioelectronics and photonics are important factors. So far Smart Systems have become a strategic enabler for the entire economy. It is potentially a high impact area that will make the difference in the market place.

The integration of highly complex Smart Systems has to be carried out more cost efficiently, with a high degree of miniaturization and flexibility in adaptation to different applications. Using new integration techniques, Smart System Integration will be able to use different technologies to integrate devices for sensing, electrical signal and data processing, wireless communication, power conversion and storage. With respect to non-electrical functions Smart System Integration enables to achieve a higher complexity compared to System on Chip solutions.

The heterogeneous integration concept is also particularly gaining importance due to the lower cost and risk assessment compared to System on Chip (SoC) solutions.

Further advantages of Smart System Integration solutions include their shorter time to market cycle and a high degree of flexibility. The high flexibility of Smart System Integration offers certainly the possibility to integrate System on Chip solutions for subsystems.

The key attributes of Smart System Integration can be summarized as for technical aspects:

- ✓ Integration of perception, action and processing devices
- ✓ integration of different functions in one module / package
- ✓ integrated power conversion and storage
- ✓ integrated wireless communication
- ✓ integration of electrical and non-electrical components
- ✓ system partitioning / modularisation
- ✓ chip-package co-design (on-chip, off-chip)
- ✓ high dense component integration
- ✓ application of "add on" technologies to increase system functionality

For Market aspects:

- ✓ short time to market cycles
- ✓ low cost solutions

3.2 Environment and positioning versus stakeholders as platforms, Clusters, EC, National programmes

In the recent years, Europe has taken a strong position in some domains such as:

- ✓ Automotive including pressure sensors, accelerometers and more recently gyrometers. In this area, key players include e.g. Bosch in Germany, SensoNor in Norway, VTI in Finland, BAE Systems in the UK, Fiat Research Centre in Italy.
- ✓ Information Technology: ink jets, hard disk drives. In this area, key players include Olivetti I-Jet and STMicroelectronics in Italy, Logitech in Switzerland.
- ✓ Aeronautics and defence: accelerometers, gyrometers, pressure sensors, magnetometers and actuators. In this area, key players include e.g. BAE Systems in the UK, SAGEM, Thales and Thales Avionics in France, Litel in Germany

Europe has established a stronghold in microtechnology thanks to its research and development capabilities. These have been supported in the past years by national programmes:

- ✓ MINEFI/Technology key in France
- ✓ BMBF/MST 2000+ in Germany
- ✓ OFFT in Switzerland
- ✓ CNR/Madess in Italy

- ✓ CDTI in Spain
- ✓ IKT programme of the Research Council of Norway
- ✓ TEKES/Presto in Finland
- ✓ SENTER in the Netherlands

European programmes also have supported them, mainly:

- ✓ Esprit (DGIII then DG XIII)
- ✓ FP5/IST & FP6/IST (DG INFSO)
- ✓ Brite Euram (DGXII)
- ✓ FP5/GROWTH & FP6/NMP (DG Research)

These programmes, have encouraged demonstration models and prototypes, and provided a good basis for launching trans-national projects in EURIPIDES.

Thanks to the strong positioning of the EUREKA Clusters, EURIPIDES intends to play an active role in partnership with the other stakeholders. First of all, in the framework of EUREKA the weight of EURIPIDES will position it as complementary to MEDEA+, ITEA and CELTIC.

Among these 4 clusters, which are the backbone of EUREKA, EURIPIDES intends to be a “force of proposition” and will suggest some in processes, communication, operating rules, Country policy information on funding. The aim is the reinforcement of the Cluster network, which appears to be a strong necessity for the near future.

Considering the Platforms, if we refer to the ENIAC, ARTEMIS, EPoSS road maps, it is easy to detect some common topics with EURIPIDES core business, especially all the topics of More than Moore and Heterogeneous integration.

Today, EURIPIDES is involved in the ERAPILLOT MINASTSI that has the objective to participate to the Working Groups of the EPOSS platform. EURIPIDES will have strong links with EPOSS due to the potential affinity of the actors and the complementarities of our R&D domains. Our strong willingness is to establish cooperative actions with EPOSS to realize our common visions in the area of Smart Systems.

EURIPIDES will bring the value of Industry and SMEs, which are participating actively at a level of 40 % in EURIPIDES. Being not directly member in the Platforms, we are still active through our members from industry that are in. Never forget that the Platforms are an “inspiration” of the “Clusters”. It is in our strategy to keep close to the Platforms, to participate to their working groups and to position us inside the main executive body. This has to be discussed with each organisation and EU DG INFSO.

Considering the National programmes, EURIPIDES has to match with them, country by country as this programme is concerned by the relevant R&D topics and the funding repartition per country. A good knowledge of the European national programmes’ Map is the first key action of EURIPIDES supported by EUREKA. As examples, we will to consider very soon our cooperative mode versus the “Pole of Excellence” in France and in the Netherlands.

3.3 Smart System Challenges

The introduction of new functionalities in daily life items is an inexorable trend. Worldwide competition has to take this factor into account, together with short product lifecycle and rapid cost reduction.

The integration of Smart Systems in products can give to the European industry a competitive edge with attractive products including highly sophisticated functionalities.

Societal needs conduct to create innovative products, easy to use but misuse tolerant, reliable but highly complex and hidden technology, disseminated and networked but protective of personal data. It can be done by taking up two challenges, the marketing and the technology ones.

The main marketing challenges are the following: increased complexity coupled with severe price erosion, very short response time with limited resources for research and innovation, product flexibility, long term availability and standardisation necessary to produce longer series...

Pooling European resources in research and development, design and manufacturing is an elegant response to this challenge.

Overcome the technology challenges is not simple either. The following technology related problems can be highlighted: extreme miniaturisation, increase of processing power, speed, communication and data storage capabilities, low power consumption.

These problems, in a superficial approach, can be compared to those encountered in the microelectronic business, but need very specific solutions: smart system devices have generally a tight relationship with the non-electronic world by sensing, actuating, interacting in a hostile environment.

Each application domain require often special solutions for instance: biocompatibility in medical applications, mechanical resistance to shocks and vibrations in automotive and transport, EMC resistance in some industrial applications and so packaging and interconnection is one of the key issues in smart system integration.

In addition, applications in daily life items involve use of diverse materials like polymers, glass, metals, and operation in different conditions and on different substrates: clothes, paper...

Heterogeneous integration is hence an absolute necessity, together with a pluridisciplinary approach involving microelectronics, optics, mechanics, fluidics, chemistry, and biology.

Once again pooling European skills and knowledge is the response to the worldwide challenge coming from large countries like USA, China and India.

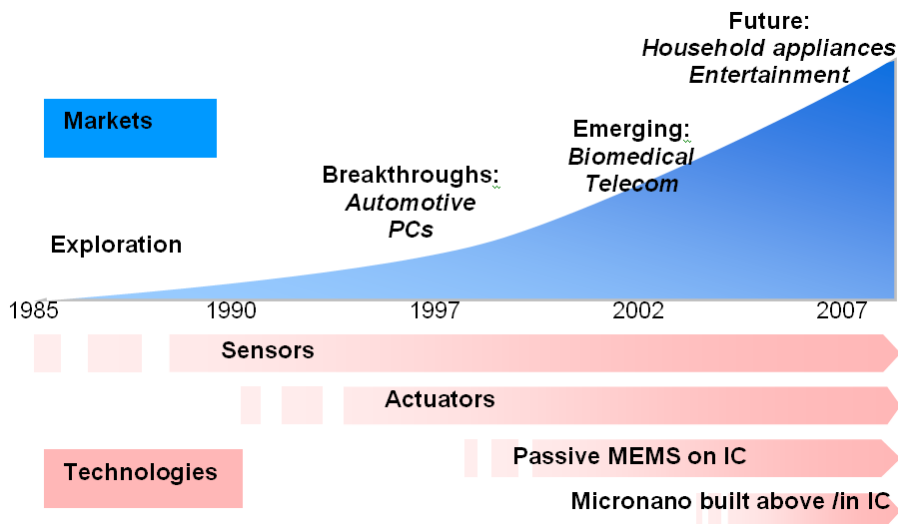
3.4 The markets – SSI applications

EURIPIDES is an enabling-technology cluster project. It does not target specific markets or applications. Some markets such as computers and their peripherals, automotive, aeronautics and medicine have been the most successful users of integrated smart systems to date, and although they continue to show good prospects, they are by no means the only candidates to benefit from applying these systems in the future. Some of these are outlined in the EURIPIDES road map. Military applications are explicitly excluded according to EUREKA rules.

Nearly all-economic sectors are candidate to benefit from smart system related technologies.

European industry leads today many economic sectors using micro and nanotechnologies and smart systems: automotive, aeronautics, telecommunications, e-commerce and logistics.

In these domains Smart Systems are in a mature stage but there is a need to continue the innovation effort to maintain and improve the European position.



New application domains are emerging as Smart Systems users and promise to expand rapidly in the next 10 years:

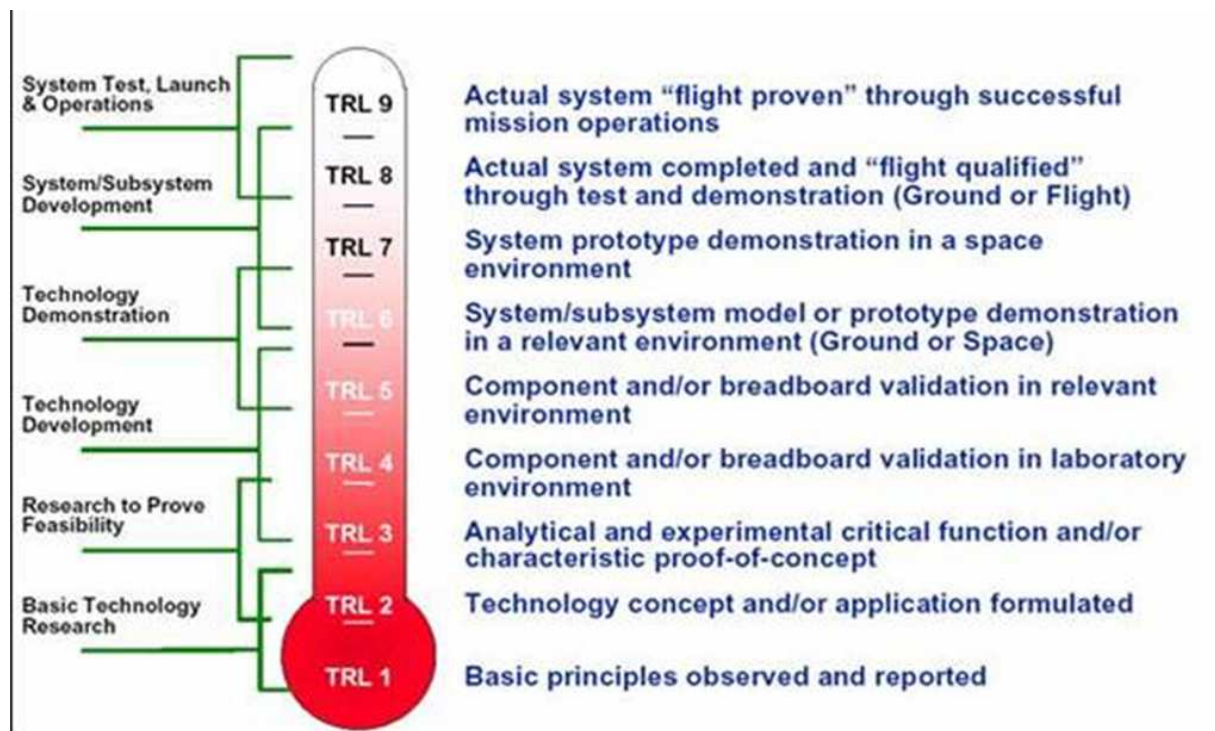
- ✓ Medical systems for personalised healthcare, medical assistance and monitoring, ambulatory, point of care diagnosis, at patient bedside and home diagnostic, providing improvement in speed, quality of life and lower cost.
- ✓ Environment monitoring for better and safer daily life of the European citizen: water, air, food, and clothing providing early warning information.
- ✓ Security checks via biometry and detection devices providing a secure environment in using collective transport, or accessing sensitive locations.
- ✓ Navigation, localisation and tracking for vehicle, persons (Alzheimer disease, children...), products...
- ✓ Comfort an energy saving
- ✓ Digital home
- ✓ Secure home and protection against crime and terrorism
- ✓ Imaging technology in visible light (DLP) and thermal (I.R.)
- ✓ Printing technology (inkjet)

4 Content of the EURIPIDES program

4.1 Focus

The activities supported encompass the part of the development chain ranging from design to prototype fabrication, in other words: they do not include commercial or production activities. Upstream research, where the principle on which the development would be based is unproven, is deemed immature in terms of this programme and will be considered out of scope. In terms of Technology Readiness Levels (TRLs) as defined by NASA (see figure), this would mean a minimum TRL of 3 would be acceptable under certain circumstances, but TRL from 5 to 7 are preferred. TRL 5 means validation on component or demonstrator system level in a relevant environment completed. This could be in a laboratory if it is possible to recreate relevant and critical conditions in the lab. A TRL of 7 (System prototype demonstrated in the real application environment) would typically be final objective of the project

Technical risk must be considerable as otherwise private rather than public funding would be more appropriate. However, reasonable steps must be undertaken to manage (recognise - analyse - contain - reduce) the technical risk from the early beginning of the development. Also, beneficial socio-economic impact beyond the project partners must be demonstrable for public funding to be justified.



4.2 EURIPIDES relationship

This strategy will involve activities in two directions:

- ✓ Assisting proposers of development projects, deemed to be of sufficient quality, to be eligible for subsidies in forming a consortium and presenting a winning proposal to their national funding agencies in order to obtain public funding for the execution of the project,
- ✓ Assisting national funding agencies by providing a high-standard and consistent technical evaluation service for project proposals, which fall within the scope of the cluster project's core activities.

It is understood that the allocation of public funding is a difficult task and needs to be performed in a judicious and responsible manner. Funds for supporting R&D and innovation activities are limited and demand almost always exceeds availability; hence the need for critical evaluation and selection. It is our aim that this evaluation and selection process be as painless, smooth, quick and fair as possible for all parties involved, so that the most deserving proposals are awarded subsidies. Clear and impartial criteria for evaluation by peer review are defined, keeping in mind objectives necessary to realise the vision of the EURIPIDES cluster project. It is recognised that, providing financial hand-outs to projects without clear technical objectives, with insufficient preparation or without the potential of providing return on investment would not only constitute an irresponsible waste of public money, but would also be counterproductive to our efforts of making our industry stronger and more competitive.

A perceived lack of consistency is a recurring complaint mentioned by project proposers to the European Commission's R&D Framework programmes. We intend to offer transparency and consistency within the peer-review process in order to gain the confidence of both proposers and national funding authorities. It is our aim that the funding authorities regard our evaluation as authoritative and dependable, and that the EURIPIDES label be necessary and sufficient for demonstrating the technical quality of an integrated smart systems project proposal.

4.2.1 The role of SMEs in EURIPIDES

SMEs represent the overwhelming majority of the 110 or so European companies now involved in MNT and so far SSI. Beyond this numeric superiority, SMEs deserve special attention as they have largely proven their ability to innovate and achieve breakthroughs. On the employment side, to a large extent, new jobs are likely to be created by successful SMEs.

For all these reasons, EURIPIDES will pay special attention to the support of SMEs. However, since the programme is driven by industry needs and markets, no special fund, call or instrument within EURIPIDES will be dedicated to SMEs. It is felt that implementing SME-specific funding policies should remain the role of national Public Authorities or the EC.

EURIPIDES will mainly express its concern of SMEs through:

- ✓ Operating efficient and non-bureaucratic selection procedures thus not asking too much from the limited human resources of SMEs
- ✓ Providing easy access to funding for projects with a size limited enough to allow a SME to be the project leader
- ✓ Delivering fast answers in the selection process, with a two-step procedure to prevent any unnecessary work from proposers
- ✓ Actively promoting the opportunities in EURIPIDES towards SMEs through targeted mailings or events
- ✓ Operating an efficient help-desk to answer all proposers' interrogations about the programme
- ✓ Encouraging and helping interactions between SMEs and their funding authorities (NPAs)

Moreover, EURIPIDES will maintain and promote an adequate representation of SMEs in its Board.

4.2.2 Role of EURIPIDES and European Industry

- ✓ Assist in finding consortium partners and in setting up projects
- ✓ Provide information on the various national funding programmes available
- ✓ Provide a framework for good proposal preparation and its eventual evaluation
- ✓ Lend dissemination opportunities for project and developments
- ✓ Give access to a network of technology providers and users
- ✓ Provide efficient and fast project evaluation (from the start to the end of the projects)
- ✓ Award a label of quality which is highly valued by the funding authorities
- ✓ Follow up projects and assesses their results
- ✓ Strive toward harmonisation of different national funding programmes (Particular reference to SMEs: the EC wants to put special emphasis on SMEs in FP7)

4.2.3 Role of EURIPIDES and European R&D Organisations

(Various of the above apply here too, plus some additional ones)

- ✓ Give access to a network of integrated smart systems users and providers
- ✓ Provide a platform for presenting, demonstrating and disseminating their capabilities
- ✓ Establish a common discussion forum with industrial partners
- ✓ Increase the likelihood of funding for the most deserving proposal

4.2.4 Role of EURIPIDES and the National Public Funding Authorities

- ✓ Provide a high-standard service for technical evaluation of project proposals with transparency and consistency on a European level
- ✓ Enhance a strong network of relations between NPAs
- ✓ EURIPIDES is a discussion partner representing the most important European stakeholders in integrated smart systems for helping to define policies, recognise necessities, opportunities and challenges.

4.2.5 EURIPIDES in the ERA

EURIPIDES position with respect to European Framework programmes, to other Eureka cluster projects, to EPOSS and other European technology platforms, to ERA-NETs :

European cooperation projects are seen as a way of pooling resources and making available the knowledge present to in a scheme which puts European-wide interests above national or regional objectives.

Eureka projects are typically closer to the market and more technologically mature than FWP projects. Whereas IST and NMP projects typically span the TRL3 to 6 ranges, (FET and NEST may even start at TRL 1 or 2), Eureka projects usually start at TRL5 and end at TRL7. They should have a strong industrial core and clear market prospects.

Projects within a Eureka cluster have a lot of freedom in the choice of topics addressed, as long as they target a civilian process, product or service. They can choose the time of presenting the proposal as they see fit and in accordance with market demand and technological maturity. FWP projects, on the contrary, must address a clearly defined theme or topic set out in the Work Programme linked to a fixed call deadline. Eureka proposals must fit within the national programmes to which they apply for funding.

EC projects require a broad European dimension, both in partnership and in impact. Eureka projects needs only a minimum participation of two members states, with the added condition of innovation and potential socio-economic return in each participating country.

4.3 Lessons learned from EURIMUS and PIDEA+

EURIPIDES builds on the ten-year experience gained in EURIMUS and PIDEA+. Based on this experience and the EURIMUS assessment by Yole Development (cf. introduction of 3 Strategy), four main lessons have been identified and will be addressed in EURIPIDES by invoking appropriate corrective actions:

Lesson 1: a satisfactory project portfolio requires a quite significant additional marketing and communication effort.

Action: significant resources including new manpower will be allocated to new marketing and communication actions. The support of the Yole Assessment will be largely used in the definition of these actions.

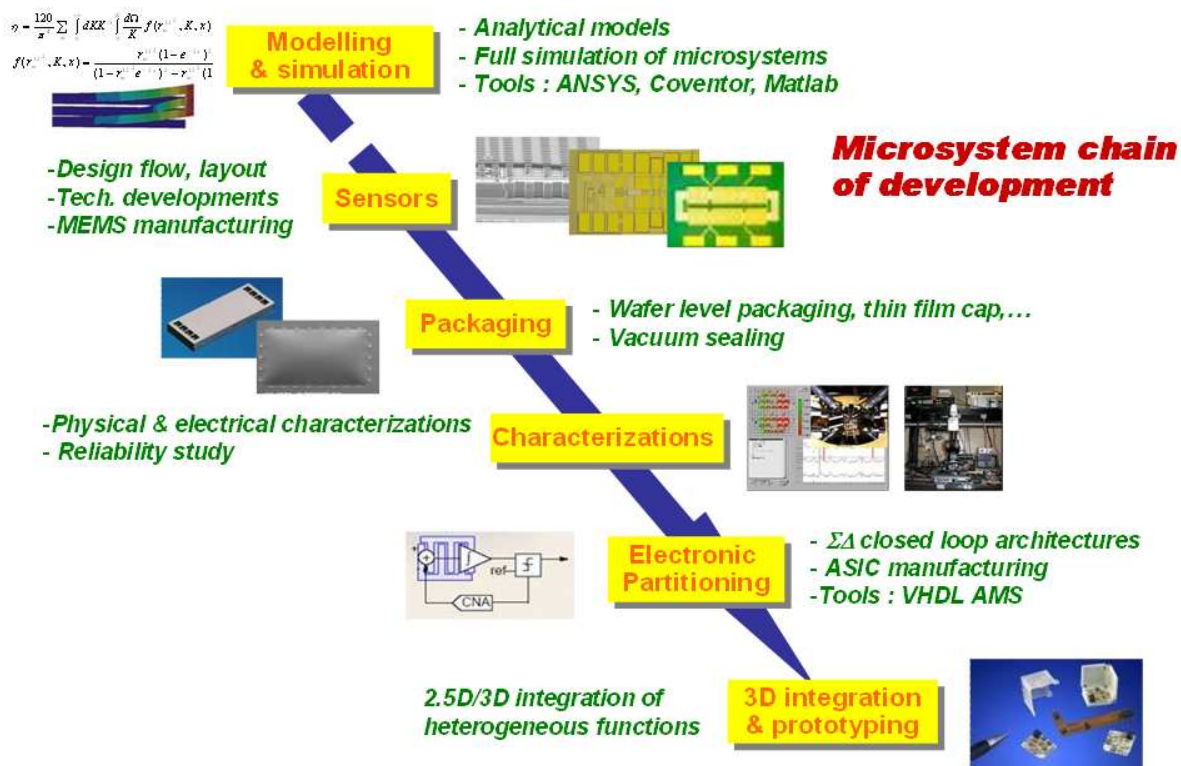
Lesson 2: launching successful projects requires a significant and systematic work throughout the chain from the project idea to the labelling and then the funding.

Action: from the early stages of the projects, EURIPIDES will interact closely with the project proposers and their NPAs. In parallel, proposers will also be encouraged to promote their project by themselves towards their NPAs.

Lesson 3: many projects are hampered by a too long time lapse between the initial application for label and the final starting date of the project with a secured funding.

Action: EURIPIDES will attempt to run in parallel its evaluation procedure and the contacts with the involved NPAs. Not only can this be expected to reduce the delays but also unnecessary effort on non-fundable projects will thus be prevented.

5 Prospects for the themes addressed by EURIPIDES



5.1 Technologies

System integration and packaging technologies are primarily driven by two different motivations. One part is represented by the rapid development of integrated circuit components and the other by the growth of different and divergent markets that all have specific needs and product functionalities. The increase in component packaging density “More More” and new systems functionality “More Than More” require the establishment of new concepts for systems integration and packaging. The principle evolutions are concerned with system architectures and the design of new components that can fit into them as well as the use of new materials and the development of technologies, which are adapted to perform well in different environments with very specific performance specifications and exhibit extremely high reliability. Figure 4 shows a product development flow, which is representative for various Microsystems.

5.1.1 Design, Modeling and Simulation

It is very important to consider architecture and design holistically and to take an overview of the entire system requirements with respect to the need for functional die, as well as for different levels of interconnection and packaging. The provision of tools for mechanical, electrical, thermal, environmental and optical co-design from the device to the system level will also facilitate the introduction of innovative new systems assembly technologies and previously unimagined products. The equipment and tools that facilitate co-design will permit the optimisation of each component in its own environment as well as aiding in the more ‘high level’ requirement for the optimisation of the interactions between all of the components in a system. This will include the possibility of evaluating functional system parameters as a function of new materials properties as well as being able to evaluate the impact of dimensional constraints. It is equally essential to look at the simulation of the

whole micro-system functionality over its entire life cycle. In order to achieve this long term goal it is necessary to implement the computer aided simulation tools which facilitate this at the individual technology level and the tools which can interface between them and link them together to perform very high level system simulations. Modeling tools need to be developed/enhanced to develop an understanding of the trade offs involved in:

- ✓ Conventional circuit and TCAD applications such as thermo-mechanical thermo-electrical thermo mechanical, thermo chemical and electromagnetic interference. Etc...
- ✓ The influence of each component in the entire system
- ✓ The integration of passive components
- ✓ Materials aging (in particular new polymers, resists as well as high and low k dielectrics)
- ✓ Metal /metal and metal/insulator interfaces their reliability and thermal management
- ✓ Functionality at higher and higher frequencies
- ✓ Functionality in hostile environments
- ✓ Thermomechanical models for nanoscale level technology
- ✓ Design of substrates and 3D electromagnetic simulation tools for crosstalk noise. Minimization

5.1.2 New materials

Packaging materials are undergoing rapid changes at present driven by both low-k devices and the need for ROHS compliance. In the micro-system domain the following are considered to be important

- ✓ Handling and packaging of electronic components which have low k dielectrics and Cu in place
- ✓ Interconnection metals (including UBM, solder bumps, under fill, etc..) as well as the impact of new legislation concerning such constraints as 'lead free', 'halogen free' etc
- ✓ Molding compounds to reduce stress and improve heat dissipation
- ✓ Improved adhesion and thermal conductivity of materials interfaces

The diversity of Microsystems the functionality and the integration of new components (micro-energy sources, coils, getters etc) or their compatibility with the surrounding environment (e.g. implantable devices) equally require extensive materials studies across an immensely broad spectrum of activity (optics, magnetics, piezoelectrics, resistive devices, photovoltaic devices....) Their compatibility and the impact of each of these on system performance must be studied

Finally, the use of nano technologies such as nanoparticles, carbon nanotubes, nanowires etc for modifying conventional material properties in such applications as nano thermal interfaces or in the use of CNTs for cooling systems and for improving technological processes through the creation of nano lead free solders and other high performance materials. All of these require detailed evaluation, system level impact analysis and long term testing.

5.1.3 New technologies

The arrival of new components of the market « smaller, thinner, cheaper and faster » has imposed new constraints and resulted in the development of new type of packaging. In fact, the « system on chip » is principally concerned with fabrication technologies « Above IC » and it would appear that this type of technology is not really suitable for many Microsystems applications. On the other hand wafer level packaging (WLP) and system in a package (SiP) are the two principal concepts that have found large-scale acceptance in the micro-systems domain. However, these technologies require the acquisition of complex fabrication technologies and large investments in terms of infrastructure. WLP (wafer level packaging where the packaging of the system is made at the level of the substrate) reduces the cost of fabrication and enables a better packaging technology for simple chips. The

system in package (SIP where the integration of the system is performed at chip level) enables the improvement of performance a reduction in cost, size and time to market for consumer electronic systems. These two concepts are the best examples of the new technologies that are presently on the market but other advanced technologies (including the SoC) will, in the near future, provide solutions for new generations of components and enable new levels of systems integration (inc. auto assembly, 3D integration, nanopackaging etc)

New generations of packaging technology will need to interface with the interconnect structures of new nano devices and provide the required thermal cooling and electrical performance that is needed to achieve optimum system level performance; In addition it must be compatible with several different types of devices and applications including RF, optical, MEMS and biological sensors.

5.1.4 Reliability

The Microelectronics industry faces different drivers (challenges, needs) that require appropriate developments and actions in the field of diagnostics and analysis. In particular, reliability is a critical issue for new packaging technology and advanced micro-systems. Technological reliability and functional reliability should be considered to be separate items because they require specific steps.

From the component point of view, the analysis must include:

- ✓ Application-specific reliability testing in relation to the envisaged application and environment that the component needs to operate in.
- ✓ Correlation between field results and laboratory testing
- ✓ Improved failure detection and in-situ analysis
- ✓ Lifetime prediction modelling

For the system, the main drivers in reliability analysis concern the field of innovative methods/tools for failure localization and measurement (including deformation, topography, cracking, etc...) and specific tests that can identify faults in relation with the new designs (3D, thin packaging), specific parameters (hermetic, vacuum, bio compatibility....) and with the application (specific environmental measurement, life time, number of cycles, etc...).

5.2 Applications

5.2.1 Medical & Life science

Europe's medical technology industry is worldwide in a strong market position. To keep in business in severe competition microsystem technologies will provide Europe's industry with key technologies for innovations. Developments in leading system application fields makes integrated electronic modules more and more interesting for the medical and life science industry. Nowadays Microsystems assume vital functions in the following areas:

- ✓ Tele-medicine/ monitoring
- ✓ (Predictive) Diagnostics (in/ex vivo)
- ✓ Innovative operation techniques (automation as well as minimal invasive techniques)
- ✓ Therapy (in vivo)
- ✓ Prosthetic (in/ex vivo)

Lasers are used as universal tools for diagnosis and therapy. Minimal- invasive therapy- and surgery procedures treat patients with care and allow significant cost reductions due to highly focused

interventions. Innovative vision systems create highly focused images of the human body for improved diagnosis. Once digitalised, this image can be transferred easily worldwide via internet to ensure the involvement of experts abroad.

Mobile electronic systems will also revolutionize future diagnosis procedures. With the help of complex electronic test sticks the clear recognition of diseases will be made possible in the shortest period of time on the spot. The use of fluidic components (Lab on a Chip) and bio sensors will furthermore stimulate the extensive use of electronics in the field of life science.

Non-invasive health checks will gain more acceptance within the private area, as microsystems allow intelligent health control that significantly increase the patient's quality of life while using highly miniaturized devices. More extensive and improved prosthetics will be facilitated by implantable electronic systems.

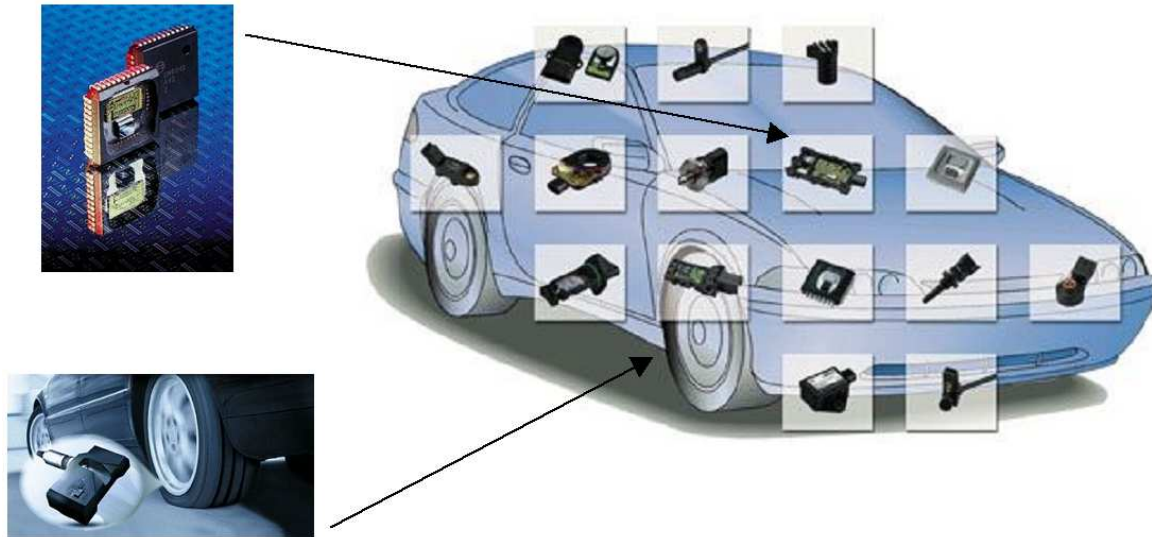
Besides miniaturization aspects, for medical devices stringent reliability requirements are demanded, as premature failure will affect the health or even life of the person under care. Also biocompatibility needs, which are not part of a typical consumer application, drive the development of materials suitable for system integration in the medical field.

System integration technologies needs in Medical & Life Sciences

- ⇒ Special packaging environments, such as
 - Bio-compatibility
 - Humidity/luids
 - Max. thermal load (implants/body)
- ⇒ High degree of miniaturisation and/ or high integration density
- ⇒ Integration of additional functions
 - Physical and bio sensors
 - Bio – electronics interfaces
 - Actuators such as fluidics
 - NEMS/mechatronics
 - Opto-electronics
 - Energy supply / energy harvesting
 - RF interfaces
- ⇒ High Reliability and stability
 - EMC
 - Ultra low failure rates

5.2.2 Automotive & transport

High performance automotive electronic systems are indispensable in the design of next generation automobiles. Automotive systems require high level performance in environmental impact, safety, and security and in car entertainment. Continuing trends of increasing amounts of electronics in vehicles will require high precision load management, reduction of wiring harness complexity and greater energy efficiency. Using state of the art IC packaging technologies, these electronics systems reduce in size and weight, with low-power loss, and have multi-functions. Future cars will exhibit high performance, low fuel consumption and the clean exhaust gas.



Automotive control systems are required to provide more functions and perform to higher specifications. Control systems are required for:

- ✓ engine and power train systems (electronic fuel injection, knock control system, electronically controlled transmission, etc...)
- ✓ chassis and safety systems (active suspension control, active 4 wheel steering, anti-lock brake system, etc ...)
- ✓ comfort and convenience systems (climate control, power seat, preset steering wheel position, power windows, etc...)
- ✓ display and audio systems (electronic multi-vision, navigation systems, television, and super live sound system, etc...)
- ✓ signal communication systems (multiplexed communication system diagnosis, starter, alternator, battery, ...)

The night vision systems, pre-crash safety systems or hybrid vehicle systems that have been developed by the main automotive companies are probably the best example of advanced technologies from the packaging point of view.

The most difficult factor in this development has been the production of small sized electronic systems at reasonable cost. Both hardware and software are important. BGA and CSP package will be needed to replace conventional QFP. To make very small electronics control units, it is necessary to use semiconductor packaging technologies, printed circuit board technologies and small size electronic components. Furthermore, for most automotive applications, high reliability under severe operational conditions such as strong vibration and high temperature is also required.

5.2.3 Energy

Heterogeneous systems often require independent energy sources, storage and management. This topic was in the escaped in the past because little good solutions were available. With the reduction of the general power consumption of the systems new solution become usable.

The most important markets for such a technology are:

- ✓ Wireless communication
- ✓ Environment
- ✓ Industrial control

- ✓ Safety and security
- ✓ Medicine
- ✓ ...

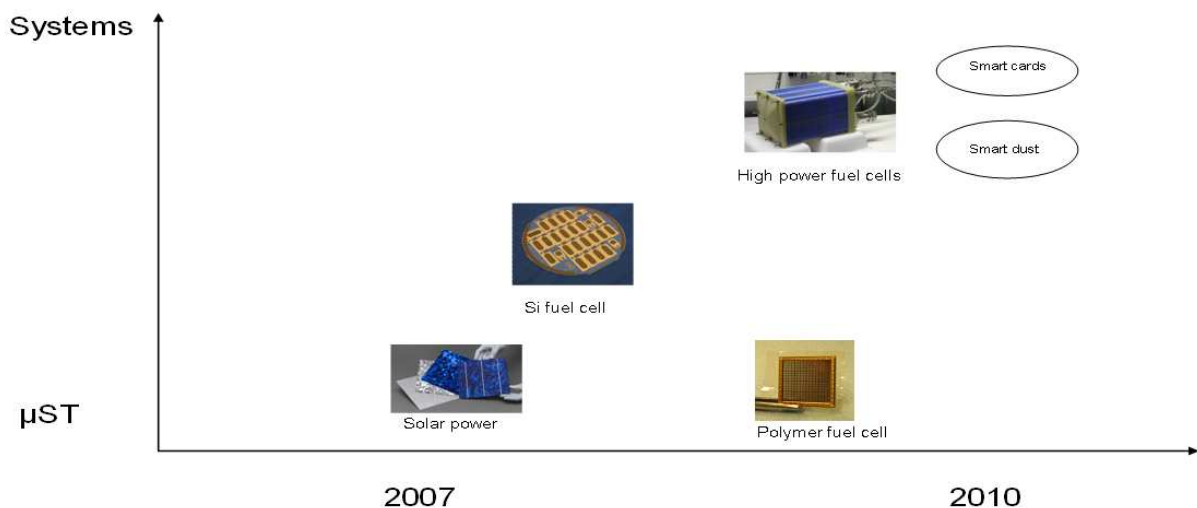
The products related to these markets are:

- ✓ Stand-alone sensors for environment monitoring with al low data rate transmission such as specific vision sensors, physical measurements, meteo...
- ✓ Stand-alone sensors for machinery, production data....
- ✓ Smart cards, active RFID's, ...
- ✓ Smart pills, implants...

All these products need different types of devices such as

- ✓ Energy storage
 - Embedded miniaturized power sources
 - Batteries with different properties
 - High speed charging
 - Very low leakage current
 - Flex-batteries
- ✓ Energy scavenging
 - Piezo
 - Mechanical devices
 - Solar cells
 - Fuel cells
- ✓ Power management
 - Very low power electronics
 - Power electronics

Depending on the power generated by such devices, the number of applications will increase and, as an example allow the manufacturing of systems with strong actuation capabilities.



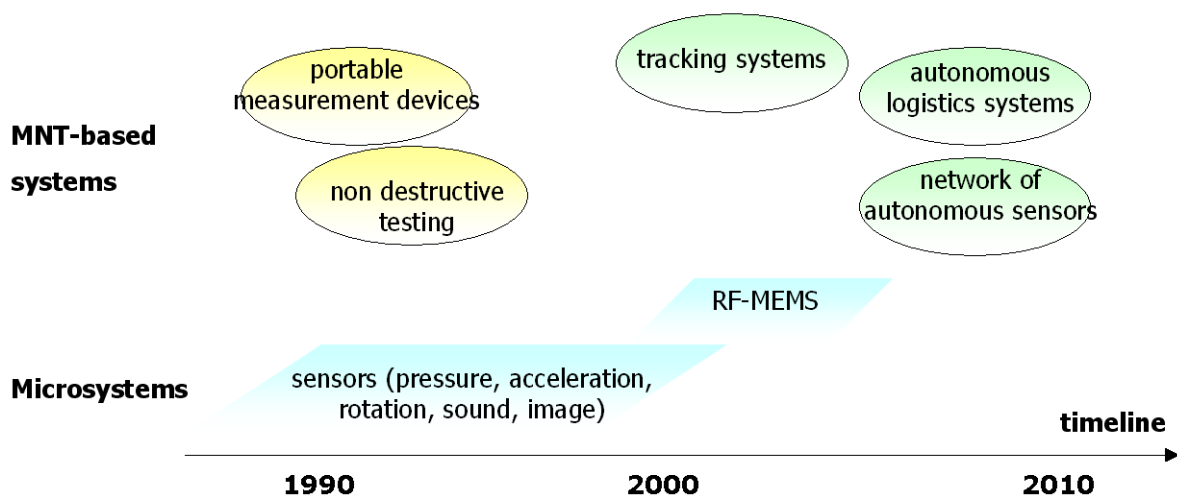
5.2.4 Machinery

Machinery is one of Europe's strongest industries. Especially Italian, German, French and Swiss producers are worldwide leading both in machinery and production technology. Beside progress in mechanics electronics are the driving force behind the global leadership. Nowadays nearly all-major innovations are somehow related to Microsystems. Some of the major forces, which are driving the

demand for machinery electronics, are higher accuracy and dynamics, greater process stability and enlarged throughput, more flexibility in automation as well as telematics and maintenance on demand

Tomorrow's Microsystems will combine advanced CNC and sensor technologies with wireless approaches for enhanced in-house logistics. Information about work pieces and work progress is available at any time at every place of a factory. The centralized factory control will be endorsed by a self-control and self-steering of work pieces. Therefore work pieces and/ or work pieces holder will become smarter by using wireless sensor nodes with enhanced data storage and processing capabilities.

At the machine tool level Microsystems will make available advanced devices for instrumentation, measurement and control. Typical devices are proximity switches, pressure sensors, magnetic field sensors, optical sensors, camera devices and actuators. Important development fields are also miniaturized and effective power supplies, robust electronics as well as smart power devices.



Keyword for technologies requirements in Machinery:

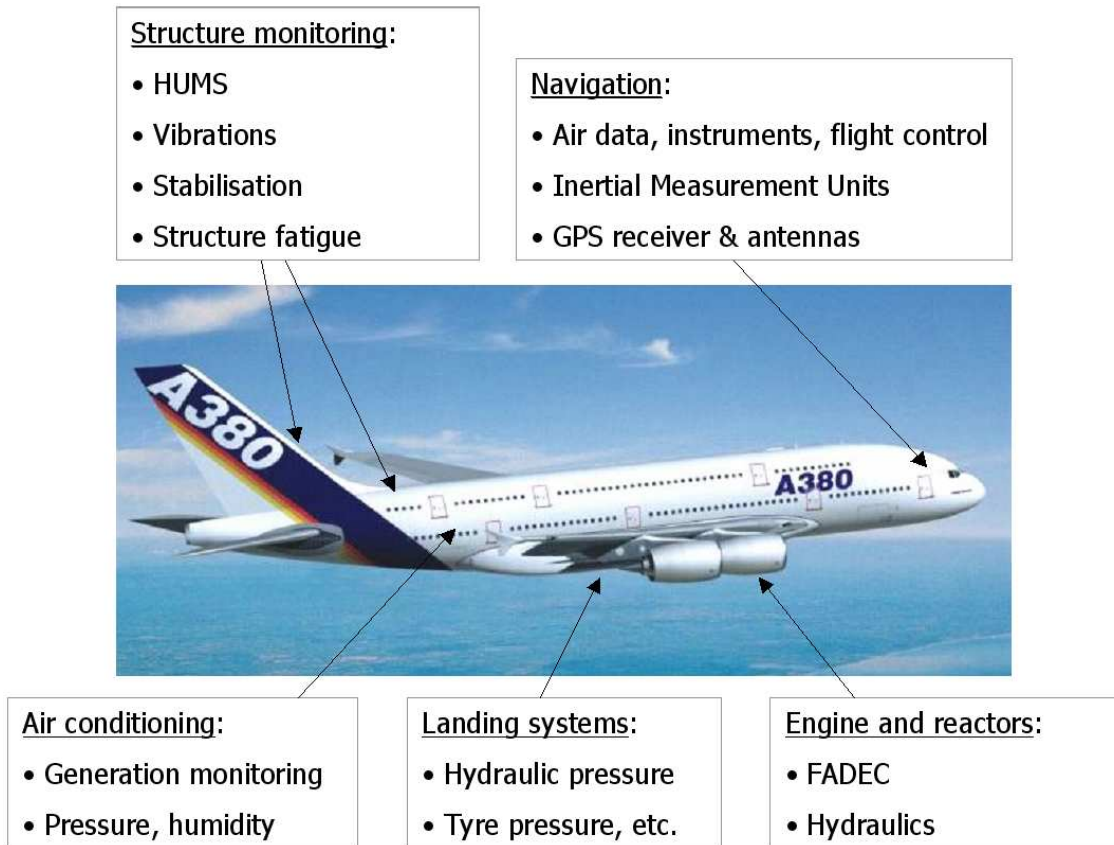
- ⇒ Special packaging environments, such as
 - Bio-compatibility
 - Humidity/luids
 - Max. thermal load (implants/body)
- ⇒ High degree of miniaturisation and/ or high integration density
- ⇒ Integration of additional functions
 - Physical and bio sensors
 - Bio – electronics interfaces
 - Actuators such as fluidics
 - NEMS/mechatronics
 - Opto-electronics
 - Energy supply / energy harvesting
 - RF interfaces
- ⇒ High Reliability and stability
 - EMC
 - Ultra low failure rates
- ⇒ Harsh environment, such as
 - High temperature / Humidity / Fluids / EMC
- ⇒ Integration non-electronic functions
 - Sensor / actuator / mechatronics
 - Power electronics
 - Opto electronics

- ⇒ Special (extreme) requirements
 - High frequency (e.g. radar sensing)
 - Power & Advanced Thermal Management
- ⇒ High Reliability
- ⇒ Cost efficient solutions for low production volumes
- ⇒ Parts warranty for app. 20 years

5.2.5 Aeronautics & Aerospace

Keyword for technology requirements:

- ✓ High density and functionality
- ✓ High compactness, high conformability and low weight
- ✓ Packages contain increasingly large part of overall cost
- ✓ High power packages
- ✓ High reliability for long operational life time
- ✓ Modularisation and cost reduction
- ✓ Mechatronics
- ✓ New Materials



5.2.6 Environment monitoring

Environment becomes one of the major issues for this century including

1. the global warming
2. the water shortage
3. the increase of population

The human pressure on the nature need control networks using many types of sensors, wireless connection and also energy sources to predict the weather, to monitor agricultural conditions, water and air quality.

With some biosensors it may be possible to follow the development of diseases in the vegetal or animal world.

Basically one of the most important improvements from the sensing area for environmental applications is the realization of reliable, cost effective chemical sensors.

Attached to the environment topic we can add all the demands concerning the geosciences.

Some examples of products are given below:

Air quality

- ✓ Chemical sensors (gas, vapors, odors)
- ✓ Toxicity alarms
- ✓ Biochemical sensors (allergy, diseases, toxins)

Water quality

- ✓ Chemical sensors (ions, organic compounds like pesticides, solvents...)
- ✓ Toxicity alarms
- ✓ Biochemical sensors (bacteriological quality, virus)

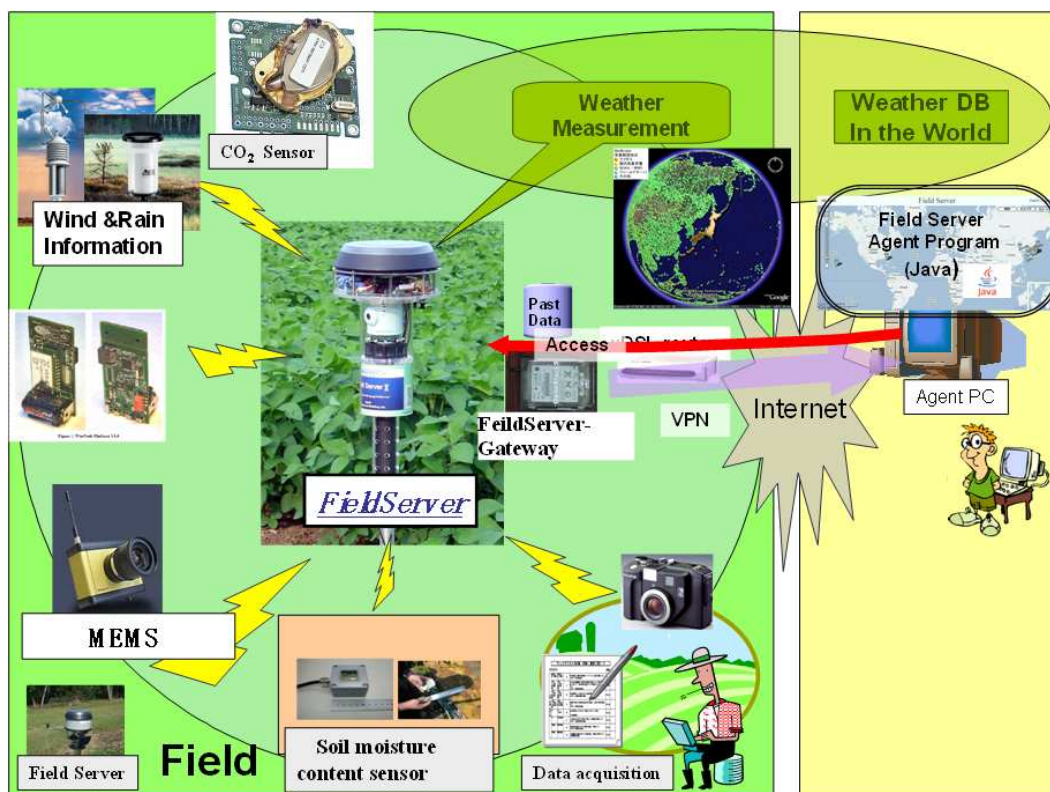
Specific sensors for specific environments like agriculture, forests,...

Measurement of the biodiversity

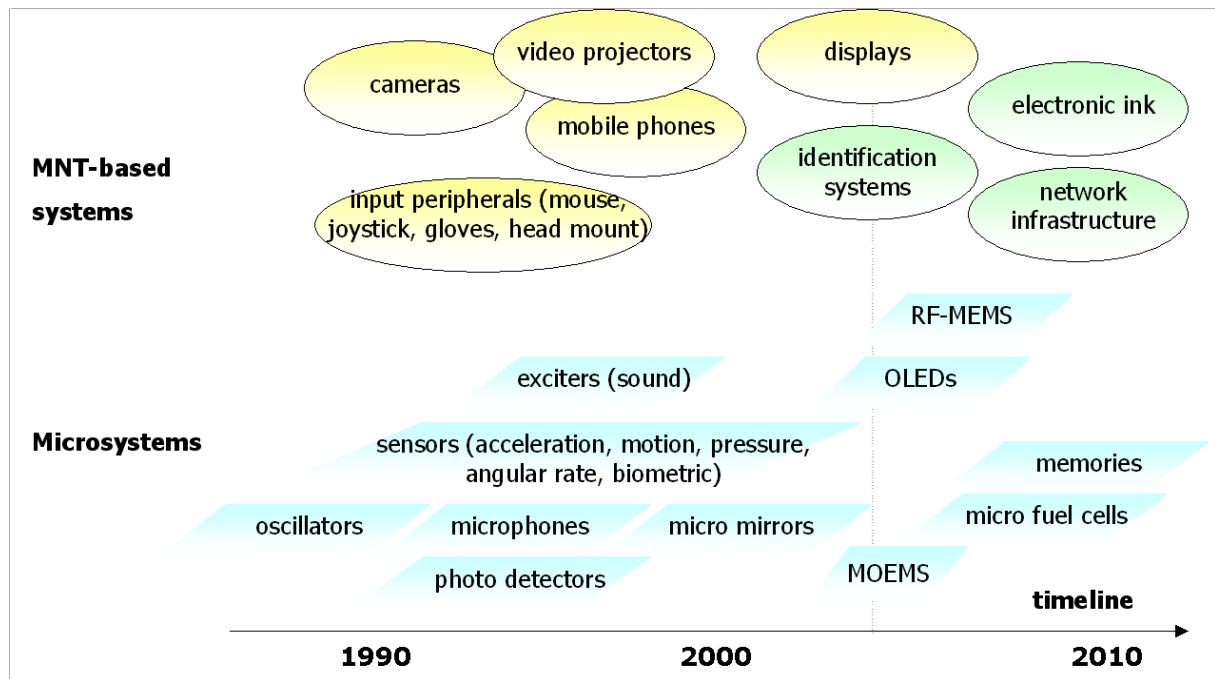
And the related technologies like : physical sensors, vision sensors, wireless communication, energy sources....

5.2.7 Geosciences

- ✓ Earthquake (accelerometers, geophones, vision...)
- ✓ Volcanology (accelerometers, chemical sensors, ...)
- ✓ Deep oil-gas-water resources (special temperature, pressure sensors, accelerometers, vision...)
- ✓ Positioning (gyros, sun tracking,)



5.2.8 Multimedia & Entertainment

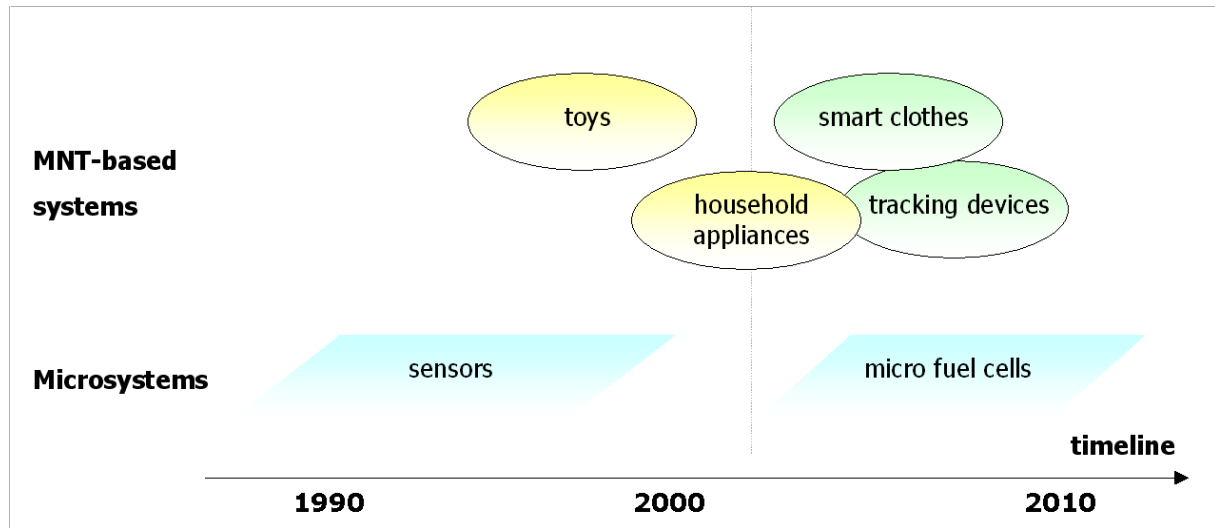


5.2.9 Smart Consumer Products

Distance, different languages or complex products will not play a decisive role in global economy any longer. People will move around the world and feel home, where they are at the moment. The technology behind that are smart consumer products.

Information about the user is available at any time at every place and will meet at smarter products. The following example of an intelligent apartment shall demonstrate the developments: The heating will switch automatically to the preferred temperature of the user. The refrigerator will order the “basic” content and keep the refrigerator filled during the residence. And the jacket will tell the washing machine how it will be handled. All data are stored in a wireless personal data cube, with interact with the living environment elsewhere on the world. This data cube may be integrated in a ring or a jacket. Operation manuals become redundant. Man-machine-interface will be displays in combination with voice control.

But there is no fire without dust. Security issues are gaining more importance. Biometric access control will ease protection of buildings. Banknotes with integrated chips will hamper duplication. Intelligent fraud resistance passports will make securer personal identifications and fasten up passport controls. Wireless (electromagnetic) connected systems like transponders and chip cards will have a broad use in the area of security technology in the future. These mass products require the development of package- integrated antenna structures and “Ultra Low Cost Chip Assembly” – processes for medium frequency levels. Here the realization of components by means of polymers, the so-called polytronic, will be an essential prerequisite so that future electronic systems can be used in almost all areas of our daily life.



5.2.9.1 Keywords for technology requirements in smart Consumer Products

- ✓ Future packages for smart consumer products become much more complex concerning necessary variations of materials and interconnect technologies
- ✓ Packages contain increasingly large part of overall cost
- ✓ Packages need high competence and generating competitive advantage
- ✓ Innovative packages for smart consumer products need to be based on new standard mainstream packages to reach cost targets
- ✓ Different approaches for different applications (Low cost for personal systems, high performance and high efficiency for centralized systems)
- ✓ Miniaturisation
- ✓ Complex multi functionality
 - Physical and bio sensors
 - MEMS/ mechatronics such as microphones
 - Opto-electronics
 - RF interfaces
- ✓ Security Protection
 - Tamper resistant
 - High Reliability
 - Resistance against radiation, chemicals, shocks etc.

5.2.10 Information Technology & Telecommunication

5.2.10.1 Keywords for technology requirements in portable electronics

- ✓ Future packages for portable electronics become much more complex concerning necessary variations of materials and interconnect technologies
- ✓ Packages contain increasingly large part of overall cost
- ✓ Packages need high competence and generating competitive advantage (high power packages / modules; system packages)
- ✓ Innovative packages for portables need to be based on new standard mainstream packages to reach cost targets
- ✓ Advanced simulation and modelling methodologies are needed to handle EMC and other parasitic effects (thermal, ...)
- ✓ Improve development of heterogeneous systems in terms of IC and microsystem integration in the frame of package co-design and system architecture co-design

5.2.10.2 Keywords for technology requirements in professional communication equipment

In addition to the a.m. technologies requested for standard portable equipments, future professional communication equipment technologies have to deal with:

- ✓ Adaptation or modification of standard solutions to the relevant reliability level
- ✓ Standardisation of professional communication equipment compatible modules
- ✓ Reliability screening and test of components and modules
- ✓ Advanced simulation and modelling methodologies for high reliability
- ✓ Advanced substrates for integration of high performance RF passive components
- ✓ Power dissipation combined with chip scale packaging and system-on chip integration
- ✓ RF capability and mechanical behaviour improvement of HDI substrates
- ✓ Power consumption reduction combined with high frequency components
- ✓ Interconnection of multi-technologies with high level of manufacturing reliability.

5.2.10.3 Keywords for technology requirements in Smart Cards

- ✓ Reliability improvement at low cost
- ✓ Reduction of component costs
- ✓ Higher integration density and smaller ICs
- ✓ Flexible silicon thinned below 100µm
- ✓ Fine pitch <50 µm flexible chip interconnections
- ✓ Fine pitch flat flip chip interconnections
- ✓ Reduction of component thickness
- ✓ Ultra flat interconnection and assembly technology
- ✓ Low resistive anisotropic and isotropic conductive adhesives
- ✓ Chip scale packages
- ✓ Hot melt anisotropic adhesives
- ✓ Adhesive bump interconnections
- ✓ Low gap under-filling
- ✓ Pressure sensitive adhesives
- ✓ UV Curing
- ✓ Card and coating polymers for improved reliability
- ✓ Certified environmental compatibility and improved durability
- ✓ RF capability
- ✓ Low cost antenna integration
- ✓ Capability for wireless communication
- ✓ Fine pitch test capability
- ✓ Direct Micro-Chip Coatings

5.2.11 Security

In the security domain, the following applications are under strong discussions:

- ✓ Civilian mini-engines (e.g. mini-drones, detection of explosives)
- ✓ Biometry
- ✓ Automotive & transport
- ✓ Industrial process control / traceability
- ✓ People care / home care / elderly monitoring
- ✓ Environment
- ✓ Telecommunication
- ✓ Smart cards / smart tag
- ✓ Antiterrorism (chemical traces monitoring, biodetection, personal recognition...)

Security is a major focus of “the new cluster” (MEMS based), in terms of micro-sensors, micro-actuators and micro-sources of energy.

Examples:

- ✓ Imaging devices (IR, Ultra Sound, μ X Ray)
- ✓ Chemical sensors (lab-on-chips, μ chemical labs)
- ✓ Inertial and Motion sensors (accelerometers, gyrometers, inclinometers...)
- ✓ Physical sensors (pressure)
- ✓ Bio sensors / bio analysers
- ✓ Biometry sensors
- ✓ Autonomous and distributed systems

5.3 Further trends and actions for Euripides

Euripides evolution should be in phase with its basic mission: promoting micro-nanotechnology by supporting projects between the industries, the research institutes and the academic teams. The number of Euripides member should increase especially for the SME's. For this purpose some actions have to be taken:

- ✓ Special forum SME (or special committee)
- ✓ Information in specific papers specific to SME's

Another mission for Euripides is to uniform the financing rules around Europe or at least with the most active countries

The relations with EpoSS must be strengthening in order to have a common view to defend efficiently the European position.

5.3.1 Relationship with platforms

Euripides sees its role in Europe a catalyst for R&D projects mainly with smart systems or heterogeneous system integration background. Because this topics are core purposes of platforms ENIAC and EPOSS Euripides is in permanent discussions with them. In this context platforms are in charge of setting up strategic research agendas and creating of new application areas. Euripides takes care for bringing partners together and for generating R&D projects.

5.3.2 Euripides roadmap works

EURIPIDES Facilitates interactions between major industrial partners, SMEs and the largest research institutes in the field of packaging, Microsystems and heterogeneous integration. This give a role to EURIPIDES in the coordination of roadmaps on theses main area of activities. EURIPIDES experts can also collaborate with the main European Platforms (such as ENIAC, EPOSS...) and international organizations in the field of microelectronics (ITRS), systems (JISSO) and materials (INEMI).

5.3.3 Dissemination of success stories

In order to convince partner to make projects together, one of the best solution is to show what was the benefit for some partners to participate to projects.

All the good results will be collected by the Euripides office with the permission of the project members to be regularly published in large diffusion newspapers.

5.3.4 Project evaluation and management for national and European authorities

Previous excellent experiences in project and research program management enables Euripides to be a successful coordinator for transnational research and development cooperation. Inside Euripides are available alive evaluation structures for different scientific areas as well as efficient procedures for project handling.

5.3.5 Discussion and training forum

Since Euripides is a multi competencies platform, which includes electronics manufacturers, Microsystem SME's, tool suppliers as well as research and academic institutes, this "constitutes a real advantage and permits the organisation of internal and public technical forums, workshop and international conferences. Thematic and specific training could also be organised.

5.3.6 Emerging technology and their assessment

Euripides project developments are focussed on emerging technologies, new generation equipment and advanced processes. Research or academic institutes manage the basic activities and the next step consists of the transfer of project results to industrial partners or SME's to support their main development. This organisation constitutes a real platform of competencies for testing and validation of these emerging technologies

5.3.7 Cluster and network support

Existing structure of Euripides approves an efficient initiating and management of national and international research clusters and networks. Further Euripides offers tools for promoting running networks by organisation of expert meetings, technical days, open workshop, etc.

6 Conclusion

In the complex European context for R&D funding in the field of SSI, EURIPIDES has to be a major federator actor.

EURIPIDES is a key tool to serve the European Industry and increase its worldwide leadership.

In that way EURIPIDES will serve the European Society by the development of high technology employments over Europe.