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TECHNOLOGY PLATFORMS

from Definition to Implementation of a Common Research Agenda

(21 September 2004)

EUR 21265

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TECHNOLOGY PLATFORMS

from Definition to Implementation of a Common Research Agenda

Report compiled by
a Commission Inter-Service Group on Technology Platforms

2004 Directorate-General for Research EUR 21265

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Luxembourg: Office for Official Publications of the European Communities, 2004

ISBN 92-894-8191-9

Printed in Belgium

PRINTED ON WHITE CHLORINE-FREE PAPER

The emergence of technology platforms represents an important development in addressing some of the major economic, technological or societal challenges with which Europe is faced. Given the number and diversity of the topics which are already being or are about to be tackled through this approach, as well as the many different stakeholders involved, the issue requires regular reporting to ensure transparency.

The European Commission services are encouraging this process and are closely co-ordinating their activities in this area, as well as monitoring developments and using, where appropriate, the work of the technology platforms when developing research policy. In this context, a Commission Inter-Service Group has compiled this advanced preparatory report which brings together information available on the key features and objectives of the different technology platforms and on their current state of play.

With a view to facilitating the debate on this particular subject, the Commission services are making this report publicly available. It is stressed however that the report presents a compilation of the current situation and that there are very many issues which will need to be examined in depth by all the concerned parties in the months to come. Subsequent reports will be made available at regular intervals, in line with future developments, and more information on individual technology platforms is available through the following site: http://www.cordis.lu/technology-platforms/.

It should be noted therefore that the report does not represent any official position of the European Commission, nor do its orientations prejudge the form or content of any future Commission proposal or activity in relation to technology platforms.

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1 SUMMARY

Research and Technological Development (RTD) has a primary role to play in boosting competitiveness, economic growth and employment. The development of the European Research Area therefore forms a key pillar of the Lisbon strategy.

Yet, the alarm bells continue to sound:

> *"Latest available figures (2001) show overall R&D investment in the Union to be approaching 2% of GDP, but at an average annual growth rate of 4% (1997-2002) which is wholly insufficient to meet the 3% target by 2010.*[1] *"*

1.1 From definition of research needs - Technology Platforms

There is a pressing need therefore to define RTD priorities, timeframes and budgets on a number of strategically important issues with high societal relevance where achieving Europe's future growth, competitiveness and sustainable development objectives is dependent upon major research and technological advances in the medium to long-term. This is the key objective of **"Technology Platforms"** which are uniting stakeholders around a common vision and approach for the development of the technologies concerned, with specific focus on the **definition of a Strategic Research Agenda** and the mobilisation of the necessary critical mass of research and innovation effort.

1.2 To research implementation

Community support for the implementation of many of the research agendas being defined within these technology platforms should be possible through the use of **existing instruments.** However, it is expected that there will be a limited number of research agendas of such ambition, complexity and scale that they will require the mobilisation and management of very substantial public and private investment and human resources.

In these cases and even with some adaptation, existing instruments are unlikely to provide a suitable response. Rather, a much wider European level response is needed, through the launching of large-scale **"Joint Technological Initiatives".**[2] For this purpose, an appropriate mechanism is available through the structures, especially joint undertakings, which the Community can set up under the provisions of **Treaty Article 171.**

Implementing large-scale applied and industrial based research activities in this way will contribute considerably to raising European, Member State and private R&D investment in the technological fields concerned and to improving its impact through concentrating efforts and resources and avoiding fragmentation. Moreover, the accelerated generation of new knowledge and the uptake of research and technologies which respond to future market needs will improve industrial competitiveness and productivity.

[1] COM (2004) 29 final, Spring Report from the Commission to the European Council - "Delivering Lisbon: reforms for the enlarged Union".
[2] COM (2004) 353 final, Communication from the Commission - "Science and technology, the key to Europe's future - Guidelines for future European Union policy to support research".

2 RATIONALE: Technology Platforms

2.1 Policy Context

The "3% Objective"

The potential for **technology platforms** to address major economic, technological or societal challenges and to stimulate more effective and efficient RTD, especially in the private sector, is highlighted in the Community action plan[3], set up in response to the 2002 Barcelona Council's call to boost research and technological development in Europe.

Indeed, shaping a common vision for research on and development and deployment of key technologies is an integral part of the action plan:

> *"European Technology Platforms will provide a means to foster effective public-private partneships involving as appropriate public research, industry, financial institutions, users, regulatory authorities and policy-makers."*

The "Initiative for Growth"

More recently, the "European Initiative for Growth"[4] noted the urgency to step up public and, especially, private investment in leading-edge technologies with a view to stimulating growth and employment. It pointed out that measures to increase the volume of and improve the environment for research investment remain fragmented:

> *"While most Member States and Acceding countries have adopted targets for increasing research spending, few of them have been able to translate these into budgetary terms and efforts to improve the efficiency of their spending are often needed."*

By way of an immediate response, this initiative saw the launch of the first wave of so-called **"Quick-start" projects** for investment in knowledge, including projects on **nanoelectronics, mobile communications and the hydrogen economy.** It was noted that in relation to research, development and innovation, other mature projects could emerge from the work of the various technology platforms.

Impact on other Community policies

Whilst making their key contribution through a coherent approach to formulating research and industrial priorities, **technology platforms** also interact with and have a **positive impact on a wide range of other Community policies.**

In this context, when addressing both the technical and non-technical barriers to the concentration and improvement of RTD and the market penetration of new technologies, technology platforms should take into account the relevant Community policies and a range of issues, including regulations, norms and standards, safety, economic measures, skills and training needs and the creation of networks and associations at European, national

[3] COM (2003) 226 final, "Investing in Research: an Action Plan for Europe".
[4] COM (2003) 690 final, "A European Initiative for Growth Investing in Networks and Knowledge for Growth and Jobs Final Report to the European Council".

and regional level. Equally, technology platforms provide important forums in which stakeholders can formulate their views and provide policy-makers with advice on ways to develop coherent and effective policies and programmes to tackle the challenges in the technological areas concerned.

Industrial Policy

In a recent Communication on industrial policy[5], the Commission noted the potential for technology platforms to make a major contribution to competitiveness through mobilising research and innovation effort, facilitating the emergence of lead markets in Europe and providing an impulse for Europe's potential in advanced technologies, as well as in traditional sectors which face particular challenges. In this context, the participation of representatives from the private sector will ensure that technology platforms take full account of the needs and expectations of the potential future markets in the fields concerned.

The **participation of SMEs** should be actively encouraged, given their role as indispensable partners of the larger industrial players and their importance as developers of leading-edge technologies and drivers of innovation.

Sustainable development

Technology platforms can contribute to enhancing research efforts towards achieving the European Union's sustainable development objectives. One example is their potential for an effective and efficient development of key environmental technologies. In this respect, the activities of technology platforms are highlighted as an important element of the "Environmental Technologies Action Plan (ETAP)"[6], which was proposed by the Commission in January 2004.

Societal benefits

Since technology platforms address major economic and societal challenges, the societal dimension should be taken into account throughout their development (identification of topics, steps leading to the design and establishment of the platform, monitoring processes and management). Links with policy makers and civil society should be assured in line with Community guidelines[7].

Regional dimension

The regional dimension is of particular importance, since the stakeholders involved will typically be located in many different European regions and the socio-economic changes that new technologies bring impact disproportionately in some regions. Technology platforms can provide a positive contribution to reducing the digital divide between regions and to enhancing networking and the mapping of excellence, as well as to harnessing the strong regional element in the generation of specific knowledge and the market penetration of new technologies.

[5] COM (2004) 274, "Fostering structural change: an industrial policy for an enlarged Europe".
[6] COM(2004) 38 final, "Stimulating Technologies for Sustainable Development: An Environmental Technologies Action Plan for the European Union".
[7] COM (2004) 713 final, "Collection and use of expertise by the Commission: principles and guidelines".
COM (2002) 704 final, "Towards a reinforced culture of consultation and dialogue – General principles and minimum standards for consultation of interested parties by the Commission".

2.2 STAGE 1: Emergence and setting-up of technology platforms: Stakeholders getting together

The first stage in launching a technology platform is to bring all the key stakeholders together. Whilst must play a leading and initiating role, the drive of the Commission, in harness with this industrial commitment, has often proven instrumental, espacially in the start-up phase.

In this context, and in advance of setting up a platform, the main actors have usually been brought together by the Commission services (for example through the organisation of a major conference) in order to develop a **"Vision Document"** for the development in Europe of the technologies concerned. This typically covers a horizon of the next 10-20 years.

Soon after consensus has been reached amongst all stakeholders on the way forward and on the suitable structure for the platform, a launch event for the platform is often held, thus signalling the formal start-up of the platform's operations.

The initial stages of operation of the platforms can be crucial in building up momentum and hence in determining their ultimate success or failure. Whilst recognising that independence is sine qua non, the Commission has therefore been active as a facilitator of the widespread consultation processes, which are needed to mobilise all the key stakeholders concerned. In this respect, a project team has normally been put together for each platform, including representatives from those Commission services directly concerned. The Commission is also ensuring a high level representation in the various advisory bodies overseeing their development.

On a practical level, within the means and procedures available from FP VI, instruments such as Co-ordination and Specific Support Actions can be used to support eligible activities of the various platforms. Moreover, the Community will maintain a sponsoring role through the continued funding, where appropriate, of Integrated Projects and Networks of Excellence etc. in the areas concerned.

Whilst the Commission services are providing various measures to support platforms, it is important to note that the Commission is not in any way bound by the views, results or recommendations arising from the activities of any of the technology platforms.

Equally, it should be made clear that the setting up of a technology platform in a given field is by no means a pre-condition for inclusion of support for that field within the FP VII.

2.3 STAGE 2: Technology platform activities and deliverables: Stakeholders define a Strategic Research Agenda

Upon start up, the key activities of technology platforms centre on producing the following deliverables:

- Elaborating a **Strategic Research Agenda** which sets out RTD priorities for the medium to long-term, including measures for enhancing networking and clustering of the RTD capacity in Europe. This will of course need to take close account of the technological framework (including regulatory issues, intellectual property rights etc.) and the business environment for future market penetration. In harness with the Strategic Research Agenda therefore, a **Deployment Strategy** should also be formulated.

- Mechanisms to **mobilise the private and public investments** required for the implementation of the research and development strategies. In this respect, the potential range of funding sources includes the Community Framework Programmes, the programming documents of the Structural Funds, national, regional and private research funding, the European Investment Bank (EIB), and the intergovernmental EUREKA Initiative. Technology platforms should explore with the financial community and the European and national public authorities ways to enhance the use of guarantee mechanisms in attracting both debt and equity financing for implementing RTD activities.

- Identifying challenges and actions related to **education and training** opportunities with a view to maintaining and enhancing a high-skilled work force which can ensure an effective future implementation of the technologies concerned in the medium to long term.

- Establishment of an ongoing **communication** process, with a view to raising public awareness and enhancing dialogue on the justification for concentration of efforts at a European level in the technological field concerned.

2.4 Stakeholders and structure

Due to their demand driven nature, the **key industrial concerns** with technological competence in the particular field must play a leading and highly visible role in initiating each platform and moving it forward throughout its life-span. Nevertheless, to be effective, platforms need to mobilise and balance in an open and transparent way the efforts of all the other key stakeholders.

Within each platform, the following stakeholders are typically involved:

- **Industry** - large, medium and small, embracing the whole production and supply chain, including component, equipment and sub-system suppliers and user industries. In addition to the research actors, those involved in technology transfer and the commercial deployment of technologies (for example, service providers and operators would also normally participate).

- **Public authorities** - in their role of policy makers and funding agencies, as well as promoters and consumers of technologies. Although, given their strategic dimension, policy measures and related initiatives may be launched at the European level, national, regional and local levels should also be associated, especially when they are important initiators of policy. Some platforms have created

so-called **Member States "Mirror Groups",** with the objective of providing co-ordination and an effective two-way interface between the platform developments and complementary activities at a national level.

- **Research Institutes and the academic community** (especially encouraging the academic / industrial interface);
- **Financial community** (private banks (including the EIB), the European Investment Fund (EIF), the European Bank for Reconstruction and Development (EBRD), venture capital, business incubators etc.);
- **Civil society, including users and consumers** - ensuring that research agendas benefit from a mutual dialogue between the research community and society as a whole and that they involve the future customer base. In some instances, participation from trade unions could also be considered.

Given their scale, complexity and global reach, technology platforms should not close their doors to the potential benefits from building alliances with third countries. **International co-operation** should be considered on a case-by-case basis, taking into account the political motivation, the need for reciprocity and the potential for real added value.

This could be when a technological lead is held by Europe and it is in a position to set standards worldwide, or when preparing global markets, or when aiming to attract the participation of large multinational companies offering the prospects of significant inward investment in RTD. Participation from developing countries could also prove highly beneficial, for example in the case of the platforms covering environmental technologies, or health matters etc.

Flexibility is also the watch word in respect of the appropriate **supporting structure** for a given platform. The structure should ensure a good balance between the interests of all the stakeholders involved, at the same time avoiding bureaucracy. A networked approach should be followed, including mechanisms to facilitate the activities of existing networks and the creation of new ones.

The door should be kept open for new initiatives and entities to enter or leave the platform and, as it moves forward from the vision and strategy stage to the implementation phase, its character and structure may also need to change.

2.5 Key features

Technology platforms have the primary objective of defining a coherent and unified approach to tackling major economic, technological or societal challenges of vital importance for Europe's future competitiveness and economic growth.

> *"The development of effective European Technology Platforms can help ensure European investment in R&D rapidly and effectively: delivers benefits to the European citizen, creates competitiveness for our companies and ends the situation in which high EU R&D investment often produces fewer than expected benefits.*[8] *"*

With a real Community added value, they are being set up in areas whose scale and technical complexity require all relevant stakeholders to pull together around a commonly formulated approach for the technological field concerned, covering the complete chain from research and technological development through to future market penetration. As noted above, elaboration of a **Strategic Research Agenda** for the technology concerned is a central element of this process.

Experience so far from the platforms which are emerging has shown that flexibility and adaptability are necessary to take account of the maturity of the particular technology and the specific needs of the technological challenges at stake, as well as the structure and requirements of industry and the market opportunities concerned.

Nevertheless, there are many similarities in the reasons for setting up the various platforms, as well as in their approach and characteristics. Common features are their scale, complexity and strategic importance and the pan-European nature of the response they provide to addressing the technological fields concerned. It is already clear that an active and committed involvement of all stakeholders (including industry, public authorities, the research community, financial institutions, civil society and consumers) will be vital to the success and credibility of each platform.

There is a need for coherence between the predominant role in the development of the platform that advanced and multi-disciplinary research and technological development must play and the downstream **business framework** in which the technologies concerned will subsequently be brought to the market.

Platforms should assess the **cost/efficiency and market potential** of the technologies they envisage to focus on. They also need to give close attention to financial engineering aspects. In parallel with the preparation of a strategic research agenda therefore, it is important to identify all the potential funding sources and mechanisms which will enable its subsequent implementation. The setting up of a **specific working group** for this purpose is envisaged in many cases.

Moreover, in order to increase public awareness, understanding and acceptance of the technologies concerned and the research policy choices necessary to maximise the benefits for all stakeholders, platforms should give priority to **dissemination and communication** of their objectives, activities and progress.

[8] EURAB Working Group on European Technology Platforms (EURAB 04.010-final, January 2004)
http://europa.eu.int/comm/research/eurab/pdf/recommendations9.pdf

Another similarity in the cases which have emerged so far is that they are in no way starting from scratch. On the contrary, they have tended to arise through the clustering of existing initiatives and through actively seeking to bring together all the relevant European, national, regional and local projects, programmes, networks and initiatives, as well as privately-funded industrial RTD. Such a wide participation is a prerequisite to alleviate the currently fragmented RTD effort in Europe.

The **active involvement of Member States,** for example through the setting up of a Member States Mirror Group, is also essential, especially in the context of their readiness to co-ordinate national research activities in the field concerned around the platform's overall objectives.

Technology Platforms - Summary

- ✓ **Key deliverable: Strategic Research Agenda.**
- ✓ **Challenging issues where Europe's future growth, competitiveness and sustainable development depend on major research and technological advances in the medium to long-term.**
- ✓ **Real Community added value.**
- ✓ **Active involvement of EU Member States.**
- ✓ **High research intensity is a precursor to future commercialisation.**
- ✓ **Scale and technical complexity necessitates building a critical mass of research and innovative effort.**
- ✓ **Identified market potential for the technologies concerned in the medium to long-term.**
- ✓ **Common European approach for the technology concerned, covering the complete chain from research and technological development through to future, large-scale market penetration.**
- ✓ **Shared vision of all stakeholders (industry, public authorities, research community, regulators, civil society, operators, users and consumers).**
- ✓ **Mobilisation of public and private funding sources (Community Framework Programmes, the programming documents of the Structural Funds, national, regional and private research funding, EIB, EUREKA).**
- ✓ **Education, training, communication and dissemination.**

2.6 State of play

In the run up to FP VII, there is a series of diverse **technological challenges** for which the stakeholders concerned have already organised themselves within this type of framework or are planning to do so, and new areas continue to emerge.

The specific, technological challenges have been identified through their potential contributions to a number of key policy objectives, which are vital for Europe's future competitiveness, including:

- New technologies leading to radical change in a sector, if developed and deployed appropriately and in time (examples, **Hydrogen and Fuel Cells, Nanoelectronics**).
- Reconciliation of different policy objectives with a view to sustainable development (examples: **Water Supply and Sanitation, Plant Genomics and Biotechnology**);
- New technology based public goods or services with high entry barriers, uncertain profitability, but high economic and social potential (examples, **Mobile and Wireless Communications, Innovative Medicines for Europe**);
- Ensuring the development of the necessary technology breakthroughs to keep at the leading edge of technologies in high-technology sectors which have significant strategic and economic importance for Europe (examples, **Aeronautics, Embedded Systems**).
- Renewal, revival or restructuring of traditional industrial sectors (example, **Steel**).

It should be noted that most of the technology platforms address several of these key objectives. With a view to taking stock of the situation, summaries of many of the emerging cases are attached in annex to this report. For the technological areas concerned, these set out the overall policy objectives, Europe's technological position in a global context and the technical, economic and political justifications for following the platform approach[9]. Furthermore, they provide a snapshot of the current state of play through highlighting the key existing and planned developments and activities. Contact points within the Commission services and from the platforms concerned are also included, as well as, to the extent available, a web address where more detailed information can be accessed.

The inclusion of a summary on a given topic however does not prejudge its individual merits to be known as a technology platform, nor does it imply any commitment of the Commission services to support the setting up and/or operation of a technology platform in the area concerned.

Rather, in providing this overview, it is expected that initial discussions can be facilitated on the potential suitability and eligibility of the various technological fields to be considered as priorities for further development and support at the Community level. In this context and in the run-up to FP VII, further topics can be expected to be put forward by Member States, Commission services and/or industrial groupings.

[9] Note on biotechnology related platforms: the EU is promoting the development of biotechnology in general through a comprehensive Strategy and Action Plan for the Life Sciences and Biotechnology which was adopted in 2002 (COM(2002)27 final, Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions - "Life sciences and biotechnology – A Strategy for Europe". The biotechnology-related content of several of the emerging technology platforms (Sustainable Chemistry, Plant Genomics and Biotechnology, Nanomedicines, Textiles and Clothing, Global Livestock Development Partnership) is of high relevance to the implementation of many aspects of this Action Plan.

EXAMPLES

Aeronautics

The expected tripling in demand for new aircraft in the next 20 years represents a major challenge for the European aeronautical industry. The challenge for manufacturers is to balance cost-effectiveness with an uncompromising approach to safety and environmental objectives. Partnerships and consolidation of the European research effort in the aeronautics sector are more essential than ever if Europe is to maintain the significant gains it has made over the last few years and secure its global leadership in this strategically important industry.

Set up at the Paris Air Show in June 2001, ACARE (the Advisory Council for Aeronautics Research in Europe) published its first Strategic Research Agenda in November 2002 and updates are planned at bi-annual intervals.

The commitment of ACARE's stakeholders is demonstrated through its Secretariat which is provided jointly by AECMA (the Association of European Aerospace Industries) and EREA (the Association of European Aeronautical Research Centres).

Hydrogen and Fuel Cells

With a 20 to 30 year perspective, Hydrogen and Fuel Cells are expected to deliver substantial economic and environmental benefits and result in a paradigm shift in the way that energy and power are produced. Indeed, a future sustainable energy system based on hydrogen, ideally from renewable energy sources, and fuel cells has the potential to make a major contribution to satisfying future energy demand (especially in the transport sector) and to reducing air pollution and greenhouse gas emissions.

Launched in January 2004, the European Hydrogen and Fuel Cell Technology Platform will develop a European Roadmap for these technologies and provide a European-wide framework for structuring socio-economic and technical research in this field.

Nanoelectronics

Within a decade, "chips" and intelligent nanosystems will provide huge improvements to the quality of everyday life through a multitude of potential applications, including safer transportation, enhanced healthcare, knowledge access, security, communications, personal entertainment and a cleaner environment.

For many years now, European programmes have supported efforts to bring micro/nanoelectronics research and manufacturing and the related materials science and equipment research in Europe on a par with its competitors world-wide.

The setting up of ENIAC (the European Nanoelectronics Initiative Advisory Council) brings together the key stakeholders from the research community, industry and financial institutions to enable scientific objectives and funding priorities to be established at a European level.

3 RESEARCH IMPLEMENTATION: STAGE 3: Stakeholders implement the Strategic Research Agenda

Existing instruments suitable in most instances:

The research implementation phase of several technology platforms will coincide broadly with the timeframe of FP VII. During this phase, priority will need to be given to **implementation of the Strategic Research Agendas** which have been defined within these technology platforms. The use of existing instruments for collaborative research, possibly with some adaptation, is expected to be the most appropriate way of providing Community support for the implementation of the majority of these research agendas. In practice therefore, Community support for this implementation would be through open calls for proposals for collaborative research (for example, integrated projects or other collaborative research instruments), research infrastructures etc. The participation of the Community in national research programmes, as provided for by Article 169[10] of the Treaty, could also be envisaged.

But a specific mechanism is needed in a limited number of cases:

Nevertheless, a limited number of research agendas can be expected to be of such an ambitious scale that they will require the mobilisation of very high public and private investments, as well as a large critical mass of researchers throughout Europe and even beyond. In view of establishing and co-ordinating the necessary public-private partnerships to implement such research agendas, it can be anticipated that a mechanism would be needed which could enable coherent, large-scale structures to be set up specifically for this purpose. The structures which the Community may set up under the terms of **Treaty Article 171 may provide such a mechanism.**

> *Article 171*
> *The Community may set up joint undertakings or any other structure necessary for the efficient execution of Community research, technological development and demonstration programmes.*

With a view to identifying the most suitable ways in which Community support could be mobilized for the implementation of the various research agendas, **especially those for which the use of Article 171 could be appropriate,** an examination of the various platforms and the associated research agenda should be undertaken.

[10] Article 169: "In implementing the multi-annual framework programme, the Community may make provision, in agreement with the Member States concerned, for participation in research and development programmes undertaken by several Member States, including participation in the structures created for the execution of these programmes."

3.1 Specific support mechanism under FP VII - Joint Technology Initiatives

The **limited number** of research agendas identified as suitable for implementation in this way are expected to be specifically included in the Commission's proposal for FP VII, to be designated **Joint Technology Initiatives.** Such proposals would then need to be approved by the EU Member States and the European Parliament through the usual political process.

These initiatives would be geared to implementing the large-scale, applied and industrial research programmes concerned with the following objectives:

- Enhancement of the leverage effect of Community and national public funding on private investments by a more effective use and combination of financing instruments (grants, fiscal incentives, guarantee mechanisms and support to risk capital) and considerably strengthened links between private and public research efforts;
- Consistency of European efforts in the technological fields concerned;
- Acceleration of the generation of new knowledge, innovation and the uptake of research and technologies and thus improved industrial competitiveness and productivity;
- Support to the development and networking of regional clusters;
- Identification of obstacles to future market penetration. The technology proving process will be an important element to facilitate the removal of these obstacles;
- Improvement of the European environment for researchers and engineers and encouragement of inward investment; and last but not least,
- Establishment of an early warning system for the changing needs of the industries and technologies concerned and the consequences for society, for example in terms of skill shortages or infrastructure deficiencies.

Overall therefore, the ambitious research efforts to be undertaken will represent invaluable guiding frameworks for strengthening the European science base and optimising the use of research infrastructures for the development of the technologies concerned.

Joint Technology Initiatives will therefore need to build partnerships between the key public and private stakeholders concerned, to mobilise a range of European and national public and private funding sources and mechanisms and to ensure the unity of the administration and the financial control for all the RTD activities to be performed.

Through such a mechanism, legal entities could be set up capable of managing the funds assigned to each Joint Technology Initiative and the large number of players involved in the process. These entities, in accordance with Council decisions, would oversee the combining and use of public and private funding to implement the research programmes concerned.

Their capital would be made up of the assets brought in by its members (typically the Community, the key industrial concerns involved, the European Investment Bank (EIB) and individual Member States).

These assets could be in kind and would be subject to an evaluation of their value and their utility to the implementation of the research programmes concerned. The active participation of SMEs should be facilitated and measures taken to ensure a wide dissemination of results to the industries concerned.

Concerning the **financial engineering** aspects, the following can be noted:

- Within the spirit of the Barcelona 3% objective (see 2.1 above), the partners in the Joint Technology Initiative should demonstrate their **strong financial commitment.** In this context, the orientation of one third public and two thirds private research investment towards this objective could serve as a reference. Indeed, confirmation of a very significant private financing contribution would provide a guarantee of the solidity of the initiative.

- The complementary nature of the different **potential funding sources,** be they at a Community level (Framework Programme, Structural Funds), at a non-Community European level (e.g. EUREKA, COST), or at national/regional level.

- The potential to mobilise loans and other financial instruments from sources such as the EIB and the EIF, as well as private banks. In this context, the Commission services are currently examining the potential multiplying effect that could be provided through the introduction of a European loan guarantee mechanism in the research area.

- These aspects should be studied alongside the reflections on the most appropriate **partnership structure.** Indeed, the capacity of the project partners to exploit the financial instruments of the EIB and other banks will be highly dependent on the structure chosen. For example, it would be very difficult to obtain an EIB loan unless the partners are brought together in a suitable corporate structure.

Case study – The Galileo Joint Undertaking[11]

Satellite radio navigation is an advanced technology. It is based on the emission from satellites of signals indicating the time extremely precisely. GALILEO is based on a constellation of 30 satellites and ground stations providing information concerning the positioning of users in many sectors such as transport (vehicle location, route searching, speed control, guidance systems, etc.), social services (e.g. aid for the disabled or elderly), the justice system and customs services (location of suspects, border controls), public works (geographical information systems), search and rescue systems, or leisure (direction-finding at sea or in the mountains, etc.).

Given the high number of players involved in the development phase, as well as the large financial resources and technical expertise, it was decided to set up the Galileo Joint Undertaking.[12]

This ensures the management of the development phase of Galileo, at the same time preparing the management of the deployment and operational phases.

The founder members of the Joint Undertaking are the European Community (represented by the European Commission) and the European Space Agency. They may be joined by the European Investment Bank and private enterprises subscribing to the initial funding of the Joint Undertaking to a minimum of € 5 million. This sum is reduced to € 250,000 for small and medium sized enterprises. However, in order to avoid conflicts of interests, private enterprises will not be allowed to become members before the finalisation of the tendering procedure with a view to selecting the future holder of the concession to deploy and exploit the system.

The **principal missions** of the Joint Undertaking are:

a) To preside over the implementation of the development phase.

It has been agreed that this implementation of the development phase will be entrusted to the European Space Agency as regards the space and associated terrestrial components.

b) To prepare the subsequent stages of the programme.

The Joint Undertaking will prepare the structures designed to ensure the management of the deployment and operation phases and to determine the conditions for financial participation by the private sector.

Structure

The organs of the Joint Undertaking are the Administrative Board, the Executive Committee and the Director.

The Administrative Board consists of representatives of the members of the Joint Undertaking. It is the organ which takes all decisions of a strategic nature in the programming, financial and budgeting areas. The Executive Committee consists of three persons: a representative of the European Commission, a representative of the European Space Agency and a representative designated by the Administrative Board coming from the private sector (once private companies have become members). The accession of any new members is decided by the Administrative Board by a majority of 75% of votes.

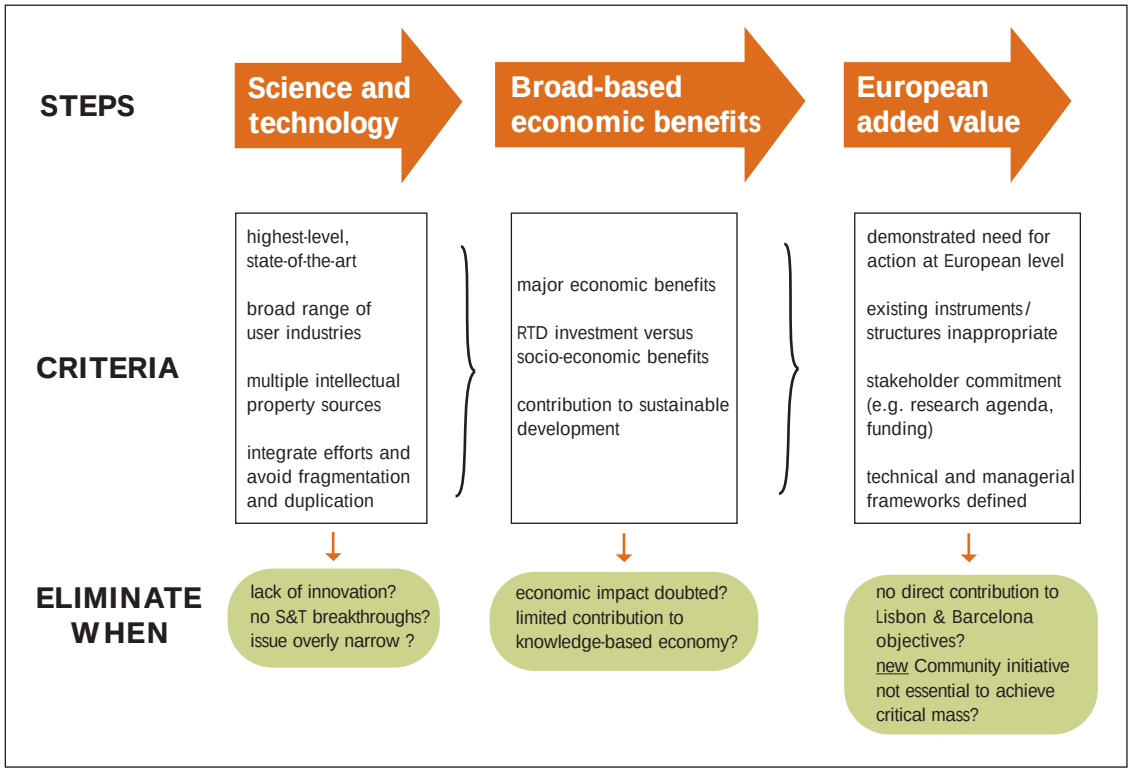
[11] Council Regulation (EC) No. 876/2002 of 21 May 2002.
[12] www.galileoju.com

3.2 Identification process

In order to avoid fragmentation and to create the necessary critical mass of research and development effort in the areas concerned, an objective and transparent identification process will be needed to confirm the most appropriate technological avenues which should be pursued at a European level. In this respect the progress of the various technology platforms will be reviewed and an assessment of their deliverables made. This process should be particularly geared to **identifying those Strategic Research Agenda for which the setting up of Joint Technology Initiatives** would be the most appropriate way forward.

In this respect and in the face of likely global competition, the prospects for European leadership in the fields concerned should be examined, as well as the degree to which alliances will need to be built between many large, medium and small industries and the public research entities in a wide range of EU Member States. Particular attention should be given to the identification of those challenges to be surmounted which will necessitate a massive increase in leading-edge research and technological development effort, as well as the intervention of European and national public authorities to keep open the key technical options until such time as the appropriate regulations and standards have been adopted and the cost benefits and market potential of each alternative have been confirmed.

A three step identification process, expected to commence in early 2005, is currently envisaged. The appropriate methodology however will need to be further refined in the coming months and Commission services are actively seeking the experience of EU Member States in respect of relevant national experience which can be brought into this process. The following aspects would be looked at:



Step 1: Science and technology aspects

- The degree to which the research proposed represents the acquisition of new knowledge (advanced technologies) which can subsequently contribute significantly to competitiveness through new or improved cost-efficient products, processes or services.
- The correspondence between the expected outputs from the research proposed and their response to future market needs. Multiple users with the potential to positively affect major and strategically significant European industries.
- The inclusion in the research agenda of clearly defined roadmaps, each with realistic and measurable milestones and deliverables. The agenda should build upon programmes, projects and networks already underway through actively seeking to integrate efforts and avoid fragmentation and duplication.

Step 2: Broad-based economic benefits

- Innovation aspects (creation of niche markets and development of successful business strategies, creation of new services etc.)
- Expected market, projected employment creation, additional turnover etc. Formulation of a comprehensive, technologically and economically rigorous business plan to identify and quantify these benefits.
- Technological options and the risk of failure.
- The current and projected levels of scientific and technological effort, especially in terms of private research investment. Are these commensurate with the scale of the potential socio-economic benefits? In this respect, account should be taken of the relative level of resources needed for future commercial development, vis-à-vis the necessary RTD effort.
- The contribution to sustainable development goals which represent an added economic value.

Step 3: European added value (potential Joint Technology Initiatives)

A **crucial final step** in identifying those topics for which the setting up of a **Joint Technology Initiative** is being considered would comprise a confirmation of the very high public interest and of the real European added value which will be provided, as well as the need to establish a Joint Technology Initiative as the **only viable mechanism** to tackle the issue concerned.

In this respect, the following key additional aspects should be confirmed:

- Significant contribution to and coherence with relevant European policies.
- The RTD activities can only be realistically carried out at a European level.
- Existing instruments and structures would not be capable of achieving the desired outcome, since they would not allow sufficient co-ordination and synergies between independent calls, as well as guarantee the prior commitment of other funding bodies or partners (particularly industry).
- All the key stakeholders have demonstrated their full and sustained commitment to the long-term vision (research, development and deployment) which is guiding the technology platform in which the research agenda was formulated.
- Public authorities (European, national and regional levels) have been fully associated with the formulation of the proposed research agenda and endorsed its content and objectives.
- The main industrial companies concerned (including industrial federations and groupings of SMEs) have confirmed their commitment to provide high levels of sustained financial and human resources.
- The technical and managerial frameworks (consortia, public-private partnerships) have been broadly identified, as well as any existing research infrastructures which need to be utilised or new ones which need to be created.

It should be stressed again that, in the course of this identification process, it is expected that although found unsuitable for implementation through Joint Technology Initiatives, many of the research agendas or parts of them will be found appropriate for support through other instruments of FP VII and/or under complementary initiatives such as EUREKA.

Moreover, if a given research agenda is considered insufficiently mature to warrant coverage at the start of FP VII or all or part of it is considered more appropriate for implementation outside of FP VII, the technology platform concerned could still apply for some (limited) support from FP VII for its continued activities, where eligible.

4 CONCLUSIONS

Several major technological challenges lie ahead and the **Technology Platforms** which are emerging currently will play a leading role in defining **Strategic Research Agendas** in the fields concerned and in **mobilising substantial public and private funding** sources for their subsequent implementation.

The **implementation** of these research agendas will, in many cases, be carried out with the support of **existing Community RTD instruments.** However, in a limited number of cases requiring the efficient and effective implementation of very large-scale applied and industrial research and the setting up of public-private partnerships for this purpose, the inclusion of **Joint Technology Initiatives** as a mechanism within FP VII is aimed at providing a telling response at Community level to addressing these challenges.

The next steps will be:

- to further develop and support Technology Platforms in the period leading up to the launch of FP VII; and
- in close collaboration with EU Member State authorities, further refine the methodology to identify and decide upon those technological fields being explored within these platforms which most merit to be supported with substantial Community funding under FP VII through use of the new mechanism of Joint Technology Initiatives.

ANNEX
Summaries of several existing or planned 'technology platforms'

New technologies leading to radical change in a sector, if developed and deployed appropriately and in time:

HYDROGEN AND FUEL CELLS (H/FC)
NANOELECTRONICS (ENIAC)
NANOMEDICINE (proposal stage)
GAS COOLED REACTORS (proposal stage)

Reconciliation of different policy objectives with a view to sustainable development:

PLANT GENOMICS AND BIOTECHNOLOGY
WATER SUPPLY AND SANITATION
PHOTOVOLTAICS
SUSTAINABLE CHEMISTRY
SUSTAINABLE BENEFITS FROM RENEWAL FORESTRY RESOURCES (proposal stage)
GLOBAL LIVESTOCK DEVELOPMENT PARTNERSHIP
ROAD TRANSPORT (ERTRAC)
RAIL TRANSPORT (ERRAC)
MARITIME TRANSPORT (ACMARE)

New technology based public goods or services with high entry barriers, uncertain profitability, but high economic and social potential:

MOBILE AND WIRELESS COMMUNICATIONS
INNOVATIVE MEDICINES FOR EUROPE

Ensuring the development of the necessary technology breakthroughs to keep at the leading edge of technologies in high-technology sectors which have significant strategic and economic importance for Europe:

EMBEDDED SYSTEMS (ARTEMIS)
AERONAUTICS (ACARE)
EUROPEAN SPACE TECHNOLOGY (proposal stage)

Renewal, revival or restructuring of traditional industrial sectors:

STEEL
TEXTILES AND CLOTHING (high level group stage)
MANUFACTURING TECHNOLOGIES (high level group stage)
BUILDING FOR A FUTURE EUROPE (proposal stage)

Key Policy Features of Existing and Planned 'Technology Platforms'

Technology area	'Operational' from (indicative)	Primary feature	Other key features
Hydrogen and Fuel Cells	January 2004	radical technological change	sustainability, environment, energy
Nanoelectronics	June 2004	radical technological change	competitiveness, sustainability
Nanomedicine	proposal stage	radical technological change	health, competitiveness
Gas Cooled Reactors	proposal stage	radical technological change	sustainability, environment, energy
Plant Genomics and Biotechnology	June 2004	sustainability	competitiveness, health, environment
Water Supply & Sanitation	May 2004	sustainability	environment, international development
Photovoltaics	September 2004	sustainability	energy, environment
Sustainable Chemistry	July 2004	sustainability	competitiveness, environment
Sustainable benefits from Renewable Forestry Resources	proposal stage	sustainability	competitiveness, environment
Global Livestock Development	October 2004	sustainability	international development, health
Road Transport (ERTRAC)	December 2002	sustainability	safety, competitiveness, environment
Rail Transport (ERRAC)	November 2001	sustainability	safety, competitiveness, environment
Maritime Transport (ACMARE)	Autumn 2004	sustainability	safety, competitiveness, environment
Mobile and Wireless Communications	June 2004	goods & services	competitiveness, cohesion
Innovative Medicines for Europe	April 2004	goods & services	health, sustainability, competitiveness
Embedded Systems	October 2004	strategic, leading-edge technology	goods & services, competitiveness, safety
Aeronautics (ACARE)	June 2001	strategic, leading-edge technology	safety, competitiveness, sustainability
European Space Technology	proposal stage	strategic, leading-edge technology	competitiveness, sustainability, security, information & communiction technologies, services
Steel	March 2004	industrial renewal	sustainability, employment, competitiveness
Textiles and Clothing	March 2004 (High Level Group)	industrial renewal	sustainability, employment, competitiveness
Manufacturing Technologies 'Manufuture'	June 2004 (High Level Group)	industrial renewal	sustainability, employment, competitiveness
Building for a Future Europe	proposal stage	industrial renewal	sustainability, environment, employment, competitiveness

Title The European Hydrogen and Fuel Cell Technology Platform

Detailed information www.europa.eu.int/comm/research/energy/nn/nn_rt_htp1_en.html

Overall Policy Objective

To facilitate and accelerate the development and deployment of cost-competitive, world class European hydrogen and fuel cell based energy systems and component technologies for applications in transport, stationary and portable power.

Europe's technological position in a global context

The USA and Japan are world leaders in fuel cell research.

Largely driven by defence and aerospace applications, US government support to fuel cell development includes the Freedom Car Programme (€150 million per year), and the €25-30 million SECA (Solid State Energy Conversion Alliance) programme. Japan supports fuel cell and hydrogen research & technology development within a 28-year programme (1993-2020) with a total budget of €2.4 billion.
In contrast, total public funding for fuel cell research in Europe is currently estimated at some €50-60 million per year.

Primary Technical, Economic and Political Justification for action

There is widespread consensus that overall EU policy on sustainable development should include an ambitious strategy on Hydrogen and Fuel Cells. A future sustainable energy system based on hydrogen, ideally from renewable energy sources, and fuel cells would provide an effective response to the pressing challenges of increased energy demand (especially in the transport sector), security of energy supply, greenhouse gas emissions and air pollution.

With a 20 to 30 year perspective, the task is complex and has potentially very great socio-economic and environmental consequences for the developed world. A wide range of European policies are concerned, including research, energy, transport, environment and enterprise.

The mobilisation of all the key stakeholders towards a common goal in this field is expected to deliver substantial benefits, including:

- Structured socio-economic and technical research with the crucially important goal of sustainable and clean energy systems.
- Stimulation and increased effectiveness of public and private investment in R&D.
- Concentration of efforts and avoidance of fragmentation.
- Knowledge generation, innovation, competitiveness and productivity.
- Development and networking of regional clusters.
- Removal of obstacles for deployment and acceleration of market penetration.
- Enhancement of the EU's attractiveness for researchers and industrial investment.
- Increased public awareness and acceptance of the technologies concerned.

More detailed information is available in the keynote report: **"Hydrogen and fuel cells - a vision of our future"**
www.europa.eu.int/comm/research/energy/pdf/hlg_vision_report_en.pdf

Development of the Technology Platform (State of play)

- October 2002: Establishment of a High Level Group on hydrogen and fuel cells, which produced a vision report "Hydrogen and fuel cells – a vision of our future".
- June 2003: Major international conference **"The Hydrogen Economy - a Bridge to Sustainable Energy"** held in Brussels (proceedings can be consulted at: www.cordis.lu/sustdev/energy/h2.htm).
- September 2003: Following up the key recommendation of this conference, the Commission endorsed orientations for the creation of a European Partnership for the Sustainable Hydrogen Economy (document: SEC(2003) 957/1 of 2/9/2003).

- December 2003: First meeting of the **H/FC TP Advisory Council** - comprising 35 high level representatives from industry, academia, civil society, EC.
- January 2004: **First General Assembly** of the technology platform - comprising some 400 persons from the Advisory Council, Member States Mirror Group, civil society, financial institutions and EU Institutions, as well as co-ordinators of EU, national and regional projects and initiatives.
- April 2004: Steering panels on the Strategic Research Agenda and Deployment Strategy set up.
- May 2004: New Platform Secretariat starts operation.
- June 2004: 3rd Advisory Council meeting.

Activities (existing and planned in short term)

- **Some 65 projects** on Hydrogen and Fuel Cells funded under EU FP5 - all of which will automatically be included in H/FC.
- **All new relevant projects under FP6** - also to be automatically included.
  Active efforts to bring relevant national, regional and local projects and initiatives, as well as privately funded industrial R&D within the H/FC.
- **European Commission Services Project Team** - already operational.
- **Secretariat** (Commission services initially, then EU FP6 Specific Support Action).
- **Member States' Mirror Group** to help structure hydrogen and fuel cell RTD and to develop appropriate links with policy.

Specific Deliverables (short to medium term)

- **Strategic Research Agenda** - including ways to leverage private and public R&D investment.
- **Deployment strategy** - including recommended policy measures.
- **European Roadmap for Hydrogen and Fuel Cells,** including an analysis of transition strategies.
- **Recommendations on business development,** financing and public-private partnerships.
- **Policy Interface/Framework** - for interaction with political institutions.
- **International co-operation strategy.**
- **Progress monitoring system.**

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Title European Nanoelectronics Initiative Advisory Council (ENIAC)

Detailed information www.cordis.lu/ist/eniac/home.html

Overall Policy Objective

To strengthen the competitiveness of the European electronics industry by further developing the high-tech know-how required to master own technology solutions in strategic areas and to stay in the race with the US and Asia. It is particularly important to strengthen the European Research Area as a pillar of the Lisbon strategy for the nanoelectronics sector as it has to face extremely rapid technological development and strong global competition. The levels of investments needed to stay in the race in research and development are strongly increasing. The sector is of very high strategic importance for European industry since its products are key enablers for innovation in other sectors (multimedia sector, telecommunications, transport, health, environment, industrial processing, etc.). This requires that R&D and innovation efforts be better structured, optimised and integrated into a larger process involving all actors crucial to achieving a successful outcome in the domain.

In addition, the objective of achieving a global competitive industry in Europe implies that a wide range of European policies may interact with the Technology Platform, such as competition, trade, industry (IPR's), environment, education. Similarly, the Technology Platform may provide inputs to information society and research policy development. Whilst the interactions with different EU policies will vary according to the challenges to be addressed, effective mechanisms will need to be developed to ensure adequate co-ordination between the relevant stakeholders.

Europe's technological position in a global context

The US and Asia are world competitors in nanoelectronics. In 2002, the total capital spending in investments for micro-electronics by the Asia/Pacific and China region amounts to 62%, the US 20% and Japan 10%, while Europe counted for 8%.

Public funding for R&D in micro-/nanoelectronics reaches more than 1 billion € per year in the US and Japan. Asia is providing tax incentives, loans and direct support of similar orders of magnitude. In Europe, the amount of yearly public funding has been around 600 million €.

In the last 10 years, European research programmes and EUREKA have supported large efforts to help bring micro/nano-electronics research and manufacturing and the related materials science and equipment research in Europe on a par with the competitors world wide. Given the high costs involved and the scarcity of resources available, a co-ordinated approach among the various actors will enable European industries to remain at the forefront.

Primary Technical, Economic and Political Justification for action

The market size of the nanoelectronics business chain (that is the manufacturers, but also a large set of related industries such as the equipment and material suppliers, the designers, etc.) represents currently nearly 1% of the world wide GDP with a strong annual average growth rate (around 15%). However, the industries it affects (such as telecom operators, consumer products, internet services, automotive, defence, space, etc.) count for an overall weight that is several times higher (estimated at ~5000 billion €). An effective initiative at EU level will have therefore an impact of significant size due to the leveraging effect of this enabling technology. The nanoelectronics sector is also a significant generator of highly qualified jobs, given its manufacturing dimension. At a wider scale, the IT and services sectors employ around a million people in Europe.

Europe has world leading capabilities here, but is under threat from Japan, China, Korea, Taiwan and the USA if production expansion to develop future generations of integrated circuits is not addressed with significant investment.

It can be expected that in 10 years, each individual will have "chips" and intelligent nanosystems in hundreds of his/her objects, that will seamlessly enhance life experience. There will be clear benefits to European citizens through applications delivering safer transportation, enhanced healthcare, access to knowledge, communications, personal entertainment, and environmental benefits, including closer emissions control, efficient and accessible e-government, safety, security etc.

Nanoelectronics also fosters sustainable development in the domain of energy and resource savings. Even if already modern production plants are environmentally acceptable, the move to nanoelectronics will ensure less use of resources and noxious substances.

For Europe to gain world wide leadership there must be:

- A research infrastructure capable of delivering the means by which the planned research can be completed to world leading standards.
- A competitive supply chain, from strong primes to the smallest suppliers, capable of exploiting all of the expertise in Europe, contributing to the necessary research and turning new technologies into competitive products.
- A favourable environment for the huge and ever increasing investments required for the most advanced manufacturing facilities.
- Qualification processes that facilitate the rapid introduction of new and innovative technologies into production systems.
- An educational system capable of delivering the required diverse and multi-disciplinary skilled research and production workforces.
- Strategic partnerships with strong user industries to make best use of the research effort being applied.

It is important that the best synergies in terms of scientific objectives and funding priorities be established at European R&D level to meet effectively the future goals of industrial exploitation and greatest benefit for the citizens. An effective action plan must be developed and agreed upon between the European Research Community, funding bodies and industrial stakeholders.

Development of the Technology Platform (State of play)

- June 2003: Establishment of a High Level Group supporting the need for a major initiative on nanoelectronics in Europe and advising the setting-up of a Technology Platform
- February 2004: High-Level Group produced a vision report **"2020 Nanoelectronics at the centre of change".**
- May 2004: Official launch of the Technology Platform - first meeting to establish the Terms of Reference and future roadmap.
- 29 June 2004: Adoption and presentation of the Vision 2020 Report ftp://ftp.cordis.lu/pub/nanotechnology/docs/e-vision-2020.pdf
- Winter 2004/5: First conference/seminar of the **European Nanoelectronics Initiative Advisory Council.**

The principle mission of the Technology Platform will be to:

- Define a Strategic Research Agenda for the nanoelectronics sector, with respect to R&D;
- Set out strategies and roadmaps to achieve the 2020 vision through the Strategic Research Agenda and other associated documents;
- Stimulate increased and more effective and coherent public and private investment in R&D in the nanoelectronics sector;
- Contribute to improving convergence between EC, national, regional and private R&D actions on nanoelectronics within the European Research Area;
- Enhance networking and clustering of the R&D capacity in Europe;
- Promote European commitment to RTD thus ensuring Europe as an attractive location for researchers;

Interact with other policies and actors at all levels that influence the competitiveness of the sector such as education and training, competition, IPR, finance and investment, etc

Activities (existing and planned in short term)

- The overall R&D effort required to develop nanoelectronics technologies over the next 5 years is estimated to require a doubling of the financial resources from the current level of 15 billion € (5 year base) to about 30 billion €, composed of 10 billion € to support upstream research and infrastructures and 20 billion € of downstream industrial R&D investments. The vast majority of the research funding will come from private companies (semiconductor manufacturers, suppliers of manufacturing equipment, services and materials) that invest about 15% of their turnover in research and development.
- The European Commission funds nanoelectronics research with about 200 million € annually through its IST and NMP programmes in FP6.
- The Member States through EUREKA (MEDEA+, PIDEA) fund nanoelectronics research with about 150 million € annually.

- The Commission with the support of the European Investment Bank has included nanoelectronics as one of the large-scale "Quick-start Initiative for Growth" projects so that the nanoelectronics sector can make better use of attractive loan schemes.

Specific Deliverables (short to medium term)

- **Strategic Research Agenda** - including ways to leverage private and public R&D investment
- **Public-private partnerships**
- **Policy Interface / Framework** - for interaction with other Community policies
- **International co-operation strategy**
- **Progress monitoring system**

Commission services contacts

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Technology Platform Leader

Mr Pasquale Pistorio
President and CEO, STMicroelectronics

Title

The European NANOMEDICINE Technology Platform Nanobiotechnologies for Medical Applications*

*** note: proposal stage**

Overall Policy Objective

- *To establish a clear strategic vision in the area.*
- *To alleviate fragmentation in nano-medical research.*
- *To mobilise additional public and private investment*
- *To identify priority areas.*
- *To strengthen innovation in nano-biotechnologies for medical use.*
- *To enhance international co-operation.*

Europe's technological position in a global context

Europe has a strong position in the very young area of nano-biotechnologies for medical applications which is at the moment similar to the position of the US. About 1800 biotechnology companies are situated in Europe (of which about 500 in Germany) compared to about 1200 in the US. The US biotechnology industry however is generally considered to be more mature than in Europe, being some three times larger in terms of employment and even more powerful by measures such as revenue. The situation in Asia is more difficult to judge but the industry is estimated as to be considerably smaller than in Europe and the US.

Nano-biotechnolgy for medical applications is such a young discipline that only a limited number of large industries are representing this sector in Europe, covering mainly drug delivery. The field is mainly dominated by dynamic SMEs. The area of tissue engineering (TE) shows well the distribution between large and small to medium size enterprises. 80 % of all TE companies are SMEs, and 75 % of all TE companies have less than 50 employees. The research part is covered in Europe by top groups in a number of universities with excellent academic credentials. Several research institutions are also important players in the field. European universities and research centres are in this area an important seed for promising spin-off companies.The most promising areas in nano-biotechnological research for medical applications are at the moment nano-scale targeted drug delivery, regenerative medicine and nano-diagnostics.

The drug delivery world market will reach an annual turnover of € 70 billion by 2007.
The world market for tissue regeneration is actually € 5 billion and is expected to reach € 80 - 100 billion by 2010. The US have invested $ 3 billion in tissue regeneration over the last years allowing for a large number of spin-off companies to be created, whilst the investment in Europe in this area can not be estimated due to a strong fragmentation. Nano-diagnostics will have also an important role in health care. Molecular medical imaging will have a significant growth potential over the next decade with an expected yearly average growth rate of 11%. In ten years from now, the market size for molecular imaging will be comparable to the one for structural imaging (€ 22 billion). Biosensors for medical applications are expected to reach a world market of € 250 million by 2006

Development of the Technology Platform (State of play)

- May 2004: FP6 joint call NMP/IST on biosensors for diagnosis in May 2004.
- 2005: FP6 possible joint call on drug delivery, regenerative medicine and diagnostics (priority 1).
- 2005: FP6 possible joint call on 'ethics and social implications in nanotechnology'.
  Preparation of a nanotechnology Communication.
- October 2004: Next Nanomedicine workshop (Berlin, Germany).

Activities (existing and planned in short term)

Venture capital plays a crucial role for SMEs in this field. Another important source of funding is of governmental origin, mainly through universities and research centres that create spin-off companies or through national funding programmes. Owners of young companies invest their own funds; large industry is self-financing their activities.
The European Community FP6 NMP programme is running projects for a total budget of approx. € 20 million with a funding budget of approx. € 12 million in regenerative medicine. Priority 1 of FP6 selected one Integrated Project (8.6 million €) and one Network of Excellence (€ 7.2 million) in tissue engineering under the first call. NMP selected three nanomedical-related Networks of Excellence (21 million €), two Integrated Projects (€ 30.7 million) and four STREPS (€ 10.2 million) leading to a total of about € 90 million Community funding for this area.

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Title The Gas Cooled Reactors Technology Platform*

Detailed information www.jrc.nl/htr-tn/

*** note: proposal stage**

Overall Policy Objective

In the present situation of high energy costs and dependence from external energy supply, and with the increasing risks and threats on mid and long-term perspectives, the development of innovative reactors will be an essential contribution to improve the future European energy balance. These reactors will on the one hand meet both economic constraints and public concerns (CO2 free, inherent safety, limited amount of wastes, proliferation resistance) and on the other hand allow the large-scale production of hydrogen in addition to fuel and cost efficient electricity supply and industrial high temperature applications.

To maintain and strengthen the competitiveness of the European nuclear industry and its present leadership against competition from abroad, requires to master technology solutions in all key areas.

In addition, the objective of achieving a global competitive industry in Europe implies the reduction of energy costs and the reliability of the energy supply. A wide range of European policies may thus interact with the Technology Platform, such as energy, competition, trade, industry, environment and education. Whilst the interactions with different EU policies will vary according to the challenges to be addressed, effective mechanisms will need to be developed to ensure adequate co-ordination between the relevant stakeholders.

Europe's technological position in a global context

The European industry has presently the leadership on the development and construction of new nuclear power plants. However, since the late 90's, the US administration has announced its political willingness to recover its dominance in this area. To this end, either by supporting directly US national labs or through bilateral co-operations or by launching the multilateral initiative "Generation IV International Forum", the US Department of Energy has taken appropriate steps.

In East Asia, the Japanese industry remains very active and should soon become a real competitor, whilst the Chinese and the Korean industries are emerging rapidly.

The situation is much more sensitive in R&D. While budget reductions and an undeniable loss of competence become critical in Europe, its competitors are providing significant efforts and public supports to develop answers to the future industrial needs, having in mind that nuclear R&D needs to be deployed on long-term scales before reaching its final results and emerging into industrial applications.

Primary Technical, Economic and Political Justification for action

In its Green Paper, issued in 2002, the European Commission has evaluated the European strategy for energy supply, with attention to priority aspects as growth of demand, supply dependence and meeting international commitments on Climate Change. It concluded that nuclear power should remain among these options. These principal assumptions are used to extrapolate the current trend up to 2030. The conclusions drawn from this scenario are an energy dependence of around 70% and the impossibility of meeting the Kyoto objectives.

In addition, there is widespread consensus that overall EU policy on sustainable development should include an ambitious strategy on Hydrogen. A future sustainable energy system based on hydrogen production and e.g. fuel cells would provide an effective response to the pressing challenges of increased energy demand (especially in the transport sector), security of energy supply, greenhouse gas emissions and air pollution.

As for the hydrogen production technology without CO2 emission, two practical approaches are available. The first is to use electricity to separate water into hydrogen and oxygen by a range of electrolysis technologies. The second approach is to use heat directly to drive a thermochemical water-splitting cycle. Nuclear power could be the basic source of energy for both methods. Both methods still have a high development potential and feature specific advantages.

There are good prospects for an early deployment (by the end of the present decade) of a renewed generation of thermal neutron high temperature gas cooled reactors (HTRs) with modular design. Moreover, in the longer term, the gas cooled reactor technology has a high potential for further developments (performance and cost optimisations, use of thorium cycle, deep actinide burning, hardening of the neutron spectrum, etc.), which can improve the competitiveness, open new market areas (hydrogen production, potable water through sea water desalination, industrial process heat and district heating) and lead, step by step, to an improved satisfaction of the goals of sustainable development.

The Very High Temperature Reactor (VHTR) is the system under development to meet these objectives. Demonstrating the viability of the VHTR requires meeting a number of significant technical challenges. Novel fuels and materials must be developed and a high-performance power conversion system for electricity production and hydrogen generation. For the latter, three major subjects needs to be addressed, system analysis and evaluation, component technology, and proving tests.

Gas Cooled Fast Reactors (GFR) are currently seen as the ultimate target for gas-cooled reactor technology which shall attain the improved sustainability which is the ultimate goal of the development strategy. High sustainability is achieved through a more efficient utilisation of the fissile resources and minimisation of long-lived radioactive wastes.

Development of the Technology Platform (State of play)

- Since FP5 preparatory work done within MICANET (Michelangelo Network).
- Opinion of the MICANET Policy Board composed of representatives of the most significant R&D and industrial partners (including new Member States) advising the Commission to focus its R&D efforts in innovative gas cooled reactors.
- Since then, many activities at European and international levels, including European co-operation within the Generation IV International Forum (France, UK and Euratom are Members).

Activities (existing and planned in short term)

- The European High Temperature Reactor Technology Network HTR-TN.
- FP5 projects on HTRs and GFRs.
- Proposal for an FP6 Integrated project on V/HTR and a STREP on GFR.
- European participation to the development of VHTR and GFR systems in the context of the Generation IV International Forum.
- Active efforts to bring European and national projects and initiatives together (regular co-ordination meetings in Brussels, workshop in Rez (Czech Republic).
- MICANET final report on European efforts to ensure the capacity to develop future reactors.

Specific Deliverables (short to medium term)

- **Strategic Research Agenda** - including R&D plans for VHTR and GFR, as well as for hydrogen production.
- **Deployment Strategy** - including dissemination actions, demonstration projects.
- **Public-private partnership:** already existing in MICANET. Increasing involvement of industry.
- **Policy Interface/Framework:** interaction with political institutions and relevant national authorities.
- **International co-operation strategy:** adhesion of Euratom, France and UK to the Generation IV International Forum, Euratom representing and co-ordinating contributions from non-GIF Member States and CCs. Participation of Euratom to INPRO initiative launched by the IAEA.
- **Progress monitoring system.**

Commission services contacts

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Title The European Plant Genomics and Biotechnology Technology Platform

Detailed information www.epsoweb.org/Catalog/TP/Web_TP.htm

Overall Policy Objective

To facilitate and accelerate the development and deployment of plant genomics and biotechnology to ensure European and global supply of healthy food and the competitiveness of European agricultural, food and biotech industry and to advance towards a zero waste, emission neutral bio-based economy.

Europe's technological position in a global context

The USA and increasingly China, Japan and other countries are world leaders in plant genomics research and technology. North American based large agro-biotech companies are annually investing each in excess of $0.8 billion, further boosted by US government support through the National Plant Genome Initiative (NPGI), which amounts to a total of $1.3 billion over the 2003-2008 period.
EU companies altogether have invested only $0.5 billion and the largest European plant genomics initiative (Génoplante) is spending approximately $40 million annually. Plant genomics research is largely absent from the current 6th Framework Programme.

Primary Technical, Economic and Political Justification for action

There is a need of more productive agricultural system to secure the world food supply, in view of an increasing world population, the limit in the size of arable land and the possible effects of climate change. Environmental concerns will lead to a decrease or more efficient use of inputs, such as energy, pesticides, fertiliser and water, while increasing food, feed and/or other outputs such as biomaterials or bio-energy. A policy of sustainable development, together with future shortages in the supply of fossil resources, will demand a bio-based economy where biomaterials such as fine chemicals, pharmaceuticals, etc. will be produced from renewable, plant based materials, reducing greenhouse emissions and waste. Plant genomics and biotechnology has the potential of providing specific traits to agricultural, food and bio processing industry to respond to these challenges.

The socio-economic and environmental stakes are considerable both for the developed as well as for the developing world. Coherency among the wide range of European policies concerned, such as research, agriculture, environment, food security, consumer health, development, trade, energy and enterprise is crucial to addressing these challenges.

The potentials of a modern, knowledge-based agricultural and food industry building on plant genomics and biotechnology can only be realised if, at the same time, justified environmental and health concerns are taken into account in a balanced manner. Therefore, the mobilisation of all key stakeholders from research, industry, farmers, regulators and consumers towards a common goal and vision in this field is expected, including:

- Structured socio-economic and technical research with the important goal of delivering substantial socio-economic and environmental benefits while balancing justified concerns;
- Stimulation and increased effectiveness of public and private investment in R&D.
- Concentration of efforts and avoidance of fragmentation, in particular in the research area through the ERA-NET project on plant genomics.
- Knowledge generation, innovation, competitiveness and productivity.
- Setting a regulatory framework for acceleration of technology development and deployment.
- Enhancement of the EU's attractiveness for researchers and industrial investment.
- Increased public awareness and information on the benefits and risks of plant genomics and biotechnology.

Development of the Platform (State of play)

- March 2003: The 2003 Spring European Council Presidency conclusions called for a strengthening of the European Research Area in the area of plant genomics by the creation of a European technology platform bringing together technological know-how, industry, regulators and financial institutions.
- July 2003: Commission Workshop "Towards the establishment of a European technology platform in plant genomics and biotechnology" in Brussels.
- December 2003- April 2004: Following up the key recommendation of the July 2003 workshop, EuropaBio and the

European Plant Science Organisation (EPSO), together with the Commission and other stakeholders, established a high-level expert group to draft a vision paper for European plant genomics and biotechnology, to be endorsed by a group of personalities by the end of April 2004.

- 24 June 2004: Official publication of the vision paper **"Plants for the Future"** and launch of the Plant Genomics and Biotechnology Technology Platform (PGBTP).
- From Summer 2004 onwards: Establishment of an advisory council and working groups representing research, industry, Member States, civil society, financial institutions and EU Institutions, as well as co-ordinators of EU, national and regional projects and initiatives.

Activities (existing and planned in short term)

- **A few hundred relevant projects under FP5 and FP6.**
- Coordination of relevant national and regional projects and programmes, through the ERA-NET project "Plan Genomics", launched in January 2004.
- **Secretariat** (EuropaBio, EPSO supported through a specific support action by the Commission).

Specific Deliverables (short to medium term)

- **Strategic Research Agenda** - including ways to leverage private and public R&D investment.
- **Deployment strategy** - including recommended policy measures.
- **Public-private partnerships.**
- **Policy Interface / Framework** - for interaction with regulators and political institutions.
- **Consumer interface** – for increased dialogue with consumers and public awareness, and for communicating benefits and risk of the technology.
- **International co-operation strategy** – to increase technology transfer and links with developing countries.
- **Progress monitoring system**

Commission services contacts

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Mr Indridi Benediktsson
DG Research

Title Water Supply and Sanitation Technology Platform

Detailed information http://forum.europa.eu.int/Public/irc/rtd/eesdwatkeact/library

Overall Policy Objective

To meet the global challenge of ensuring safe and secure water supply for different uses and sanitation services through the development of sustainable technologies and of appropriate institutional frameworks.
To promote step changes in the technological capacity of the European Water industry, consolidating and strengthening its position in the world market.

Europe's technological position in a global context

European Water enterprises are world leaders in delivering water services. However, European technology providers and engineering companies have to face a very strong competition.
European research on water technologies is of very good quality, but the sector's expenditure in research still remains low in comparison to the dimension of the Water market.

The challenges posed by the world need to provide water and sanitation to billions of people and to economic activities and the connected growth of the world water market need the development of long-term visionary research activities to produce step changes in the water system towards sustainable solutions. Climate change is further threatening the availability of clean freshwater resources in many parts of the world. These challenges can only be tackled through a wide and concerted public-private effort.

Research activities, at European, national and local level, in the water field have been publicly and privately supported, particularly in more industrialised countries, for many years. More convergence and efficiency is definitely necessary, mobilising critical resources to competitively deliver valuable tools and solutions to the European water industry and to consumers.

Research and development activities in FP5 invested a budget of about 100 M€ in water technology areas. FP6 showed a spread of water technology related topics among few priorities with an initial overall allocation of financial resources lower than FP5. After the approval of the Environmental Technology Action Plan, new more substantial actions on Water Technologies have been introduced in the FP6 Work Programme of Priority 6.3 "Global change and ecosystems".

The fragmentation, and likely unavoidable duplication, of research activities considered simultaneously with national, regional and locally dispersed initiatives, public or private sector funded, needs to be efficiently addressed through a common vision and the establishment and adoption of a strategic research agenda and an action plan, with due attention to addressing the existing barriers for the diffusion of new technologies.

Many international and European Water associations and networks currently exist but specific driving forces are diverse, varying from research to industrial interest. A shared platform bringing together all the key actors will be an excellent opportunity to overcome such obstacles.

Primary Technical, Economic and Political Justification for action

The today's water system, infrastructure-intensive and capital-demanding, was conceived centuries ago and grew slowly as result of a low technological adaptation capacity. The growth of the world population, the economic development and the growing degradation of clean freshwater resources make this system unsustainable for the world of tomorrow. Competing water users and sectors are more and more becoming potential sources of conflicts with wide political and socio-economical consequences. Climate change impact is dramatically worsening the future scenarios, either because water availability is expected to become critical in many parts of the world – particularly in large metropolitan areas – or because of the increasing flood risks. New security needs are growing, requiring new technologies and new system management.

Worldwide market for water and waste water amounted more than € 250 billion in 2002, and analysts foresee an anticipated overall growth rate of 18% by 2005 and of 60% by 2010. The World Bank has ongoing commitments of about € 17 billion in water projects. The EIB loans for water and sanitation projects, more than 300, totalled about € 8.3 billion over the last 5 years.

The European water sector is a major economic player (1 % of the EU15 GDP) that generates many positive impacts from a social, economic and environmental perspective. In the recent years, the turnover of this sector (about € 80 billion in the EU) grew by an average of 5% per year compared to 2.5% for the average growth of the economy. Also employment in this sector grew faster than the turnover, at a rate between 6 and 7% per year.

Water policy is a large part of European environmental legislation. Regulation is still today a major driver for investments. In particular the requirements of the Drinking Water Directive, the Urban Waste Water Directive – particularly for the new

member states - and the implementation of the Water Framework Directive will necessitate massive investments in the water sectors of the EU 25, representing a considerable fraction of the Regional Funds, to upgrade and to extend water supply and sanitation systems and to bring water ecosystems to a good ecological and chemical status.

Demand for water services on the international markets have been covered successfully by some of the major European water service providers, a position that should be strengthened and consolidated. It is expected that if the trend of concentration and globalisation in this sector will continue, less than 20 large undertakings may control 50% of the private participation of the world water market by 2015.

The European water industry is working in a worldwide competing market where the major criteria for success are finance, technology portfolio, internationalisation and attention to users needs. However, to face future challenges, additional efforts and investments in research are required to foster international competitiveness. Developments of new and cost-effective technologies are primordial in the water market, which is increasingly considering and integrating environmental externalities and energy aspects.

At global level, the objectives set in Johannesburg – to halve by 2015 the number of people not having access to safe drinking water and adequate sanitation – have to be achieved. There is a growing awareness that the water-related Johannesburg objectives are of fundamental importance for the success of poverty reduction strategies. For this, the EU has launched the EU Water Initiative and a 1 billion € EU Water Facility for Africa and ACP countries has been established. However, the simple transfer of existing consolidated "western" technologies would be too expensive with respect to the possibility to mobilise public and private financial resources, and would lead to unsustainable consumption of water resources. The establishment of partnerships should not only help wider financial fluxes, but should lead – through better access to knowledge - to a wider access to appropriate technologies and technological services. The promotion of technological ingenuity and public awareness worldwide will help to remove barriers that limit the potential diffusion of new sustainable technologies.

The Technology Platform will address both problems of Europe and of other regions of the world, knowing that any research result in the broad field of water technologies that may allow to reduce the costs and to improve quality, safety and long-term sustainability allows reducing the time needed for achieving the MDGs and makes financial resources available for broader objectives. Only a very broad public-private partnership may put together the critical mass of willingness and resources to face with one of the most critical challenges of the new Millennium.

Development of the Technology Platform (State of play)

- November 2002: Constitution of the Water Issue Group in the framework of the development of the Environmental Technology Action Plan (ETAP);
- March 2003: Wide multi-stakeholders consultation within the Water Issue Group; first proposals of a Water Technology Platform;
- August 2003: Publication of the Water Issue Group report;
- January 2004: Adoption of the Communication "Stimulating Technologies for Sustainable Development: An Environmental Technologies Action Plan for the EU*"
- May 2004: First stakeholders meeting.
- June 2004: call for proposals including an SSA as support for the water supply and sanitation technology platform (deadline October 2004)

(*COM(2004) 38 final (http://europa.eu.int/comm/environment/etap/etap.htm)

Activities (existing and planned in short term)

More than 180 funded projects under the FP5 key action "Sustainable Management and Quality of Water", of which about 40% are dealing with technologies that may be linked to the Water Supply and Sanitation Technology Platform; Some Clusters of projects, such as CITY NET on integrated urban water management and related technologies, CLUED'EAU on drinking water research, will support the Technology Platform.

- **February 2004 onwards:**
  - elaboration of a more detailed implementation planning, discussion and contacts with key players;
  - **new FP6 projects** (Integrated Projects on Integrated Urban Water Management and on Technologies for Drinking Water Systems and STREPs on various technological subjects) under the area "Water cycle and Soil related aspects" will be included as elements of the Technology Platform;
  - actions to strengthen the link to the EU Water Initiative and to other FP6 water related activities, in particular dealing with International Cooperation (INCO), programme coordination and joint activities conducted at national or regional level (ERA-NET) and European Organisations (DG JRC);

- reinforcement of links with European and International water research and industry associations;
- feasibility analysis and road map definition, including an inventory of national and local water related programmes and activities;

- **May-July 2004:** expected constitution of the **Technology Platform Board, the Member States Mirror Group** and launch of the Technology Platform
- **Secretariat** (Commission services initially, then EU FP6 Specific Support Action).

Commission services contact

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DG Research

Title The European Photovoltaics Technology Platform

Detailed information http://forum.europa.eu.int/Public/irc/rtd/pvtrac/library

Overall Policy Objective

To contribute to a rapid development of world-class, competitive European Photovoltaic (PV) solutions for sustainable electricity production.

Europe's technological position in a global context

The support for PV research and development in Japan has a total budget of around € 250 million per year. In contrast, total public funding for PV research in the US and Europe was around € 100 million in 2002. The European Community has actively supported research and development in this field since the 1980's with contributions totalling over € 250 million up to the Sixth Framework Programme (2002-2006) where Photovoltaics Research is one the priority topic in the Sustainable Energy Systems programme.

Primary Technical, Economic and Political Justification for action

Political justification:
The implementation of EU policies related to Sustainable Development:

a) *Energy Directive on "Electricity produced from Renewable Energy Sources (RES)"* with a target of a 22% share of *Renewable EU electricity production by 2010*, including *3GW of solar Photovoltaics electricity*, i.e. a tenfold increase from 2001. In the long term Photovoltaics could be deployed on a wider scale.

b) *Environmental Technology Action Plan,* communicated to the Council and the European Parliament by the Commission on 28 January 2004, mentions Photovoltaics as a "promising environmental technology" involving all stakeholders and mobilising all available financial instruments.

Social justification:
European citizens are favourable to issues related to global warming and clean energy. Solar energy is attractive among renewable energies especially because it is easy to install and practical to fit customer needs. Solar photovoltaic electricity does not require thermal conversion processes, unlike most power plants. The simplicity of the production process avoids the additional costs exploration, extraction or transport of fuels. Solar Photovoltaics is also well adapted to integration in buildings and therefore close to the consumer and can either be connected to the existing electricity grid or used directly as stand-alone.

Economic justification:
The production of electricity from solar Photovoltaics (PV) is well proven and PV systems have been in use for several decades, first for space applications then in specific terrestrial applications where other electricity sources were not easily available. Only recently has the solar market for terrestrial applications started to grow to reach 740 MW worldwide in 2003, thanks to strong financial incentives.

In 2003 European PV manufacturers were second with more than 28% of the world PV market behind Japan (45%). However, despite all its advantages and sustained industrial growth, PV electricity is not competitive today. Due to continuous technical improvements, costs have been reduced considerably over the past 25 years down to a level of 3 €/Watt for modules and 6 to 8 €/Watt for system costs. This explains the very modest contribution of photovoltaics to the EU electricity supply (even if the target of the RES Directive for PV is achieved in 2010 less than 0.2% of the EU electricity demand will be covered by PV). The potential is estimated at more than 10% by several studies. The realisation of the full economic potential requires further technical developments and non-technical measures in order to achieve a breakthrough to reduce costs for efficient PV systems by at least a factor 5.

Development of the Technology Platform (State of play)

- December 2003: Inaugural meeting in Brussels of the Photovoltaics Technology Research Advisory Council (PV-TRAC), in support of the European Photovoltaic Technology Platform to produce a foresight report: "A vision for Photovoltaics up to 2030 and beyond".
- February 2004: Second meeting of PV-TRAC: discussion of the outlines of the vision report.
- April 2004: Third meeting of PV-TRAC: Discussion of the first draft of the report.

- June 2004: PV-TRAC meets in Paris to discuss second draft – during the 19th European PV Solar Energy Conference.
- September 2004: "PV Vision 2030" Conference in Brussels for discussion of the report.

Activities (existing and planned in short term)

- **FP5:** approximately half of 100 Photovoltaics projects are still ongoing (~50M€).
- **FP6:** Two PV Integrated Projects and three STREP's started in 2003.
- **PV Coordinating Action** (1.7 M€) to start in 2004 - input to PV-TRAC.
- **European Commission Inter-Service Team** - already operational between DG Research and DG TREN, is to be extended to all relevant DG's.
- **Secretariat:** Commission services in the first 9 months, then FP6 Specific Support Action.

Specific Deliverables (short to medium term)

- **Strategic Research Agenda** - including ways to leverage private and public R&D investment.
- **European Roadmap for Photovoltaics,** including an analysis of transition strategies.
- **Public-private partnerships.**
- **Deployment strategy** - including recommended policy measures.
- **Policy Interface/Framework** - for interaction with political institutions.
- **International co-operation strategy**
- **Progress monitoring system**

Commission services contact

Mr Georges Deschamps,
DG Research

Title Technology Platform on Sustainable Chemistry

Detailed information www.cefic.org

Overall Policy Objective

To foster the development of innovative chemistry and technologies that contribute to sustainability and ongoing competitiveness of the European chemical industry, through:

- the development of leading-edge advances in environmentally respectful, energy efficient, resource efficient processes and product technologies in three main technology innovation areas:
  - Industrial (white) biotechnology
  - Materials technology
  - Reaction and process design
- research activities that address key aspects of health-safety-environment impacts
- actions that may allow identifying and addressing major barriers to innovation

Accelerating the step change from a perceived "smoke stack" to a modern eco-efficient industry, the "Sustainable Chemistry" technology platform contributes to the implementation of some actions of the Environmental Technology Action Plan.

The main goal of the Technology Platform will be to support the long-term success of the European Chemistry supply chain as a whole, by providing a major incentive for renewed chemical innovation in Europe both across the supply chain and across disciplines.

Europe's technological position in a global context

Europe's research is competitive in the global context. Europe is in the lead in many key technology areas. This is represented by a very high share of European scientific publications in the main journals of this science field, and by the higher number of patents deposited by European Companies and researchers in the US (23%).

While the sector's private R&D investments of 1.9% of sales (pharmaceutical sector excluded) in 2002 are in the range aimed at by the Barcelona strategy, they are significantly less than the 2.5% in the US and 3.0% in Japan, and showed even a decreasing trend.

The lack of financial resources and the less-favourable environment for high-tech enterprises is forcing some European chemical companies to move their R&D activities outside the EU following and investments in production capacity are also moving out of the EU as a consequence. This is particularly felt by some pharmaceutical companies, which have a close relationship with the biotechnology ones, 80% of which are located in the US.

Data show that Europe is losing position with respect to US and Japan. In fact, the average capital spending for technological investments in Europe is lower and shows a declining trend, while other regions, and particularly Asia, show higher investments and stable trends.

Contrary to the EU, our major competitors, the US and Japan, have clear technology roadmaps in prioritised areas of relevance for the chemical industry, and connected multi-annual collaborative research and demonstration programmes.

Primary Technical, Economic and Political Justification for action

The chemical industry represents a very broad economic sector that produces intermediate (40 % of chemicals products are used by the Chemical industry itself) and end-products for most of other industrial sectors and for the final consumers. It is the broadest industrial sector in Europe. The European chemical industry is the world's major producer of chemicals, accounting for about one third of the world production. However, this share fell from 32 to 28% in the last decade.
In the EU, about 1.7 million people are directly employed in the chemical industry (again with a declining trend), in more than 25,000 companies. This sector contributes to the employment in a number of upstream and downstream connected industrial sectors (plastics, paints, textile, Pulp and Paper, Construction, etc…) to which chemical innovations are transferred.

Competitive research is already a basic component of the business plan of most chemical companies, whose success on the market relies on their innovation capacity. However, there are a number of short, medium and long-term challenges that deal with strategic research issues on which a single company cannot invest alone, but where a large public-private partnership may lead to the creation of the necessary critical mass of resources and of willingness to explore visionary objectives.

The Technology Platform has the objective of making the chemical industry a more sustainable, hence environmentally friendly and economically powerful industrial sector. Relevant stakeholders will develop a strategic research agenda and roadmap for each of its three major pillars (industrial biotechnology, materials technology and reaction and process design) and for the horizontal issues (health-safety-environment, education and skills, barriers to innovation) that will be explored. The advisory council will gather representatives of all the groups to guide the overall development.

A series of issues will be explored in the development of the strategic vision of the Platform and then in the definition of its work and research agenda. In the area of chemical processes, this includes the application of white biotechnology, new frontiers of catalysis, advances in process sciences and engineering, and the development of new synthetic methodologies such as the ones offered by a chemistry based on natural renewable (non-fossil) feedstock, etc…
These advances cross with a number of other industrial sectors where product or process developments depend on chemistry, for example for nanomaterials, electronics, energy generation, storage and transport, medicine, etc.

The pivotal role of chemistry makes this platform a bridge amongst other technology platforms. Moreover, a public/private partnership of this kind may deploy the resources needed to obtain crucial advancements in the health-safety-environment field, catching the challenge introduced by the advancement of the regulatory framework (in particular the REACH proposal), addressing aspects such as the alternative to animal testing, the development of advanced modelling tools for screening the potential risks (for example, QSAR), the improvement of risk-assessment methodologies, particularly for biologically active compounds. Finally, the Platform should address the main barriers that today slow down the innovation process, defining strategies for making the European environment of innovation more fertile and rapidly responsive.

The Technology Platform will also take into account other Commission policies, like the one expressed in the Communication on Productivity "The Key to Competitiveness of European Economies and Enterprises" (COM(2002)262).

Subjects for the Platform

Three technology pillars:

Industrial Biotechnology is proving its worth as a technology that can contribute to sustainable industrial development delivering eco-efficiency through:

- Reduced usage of water and traditional chemicals
- Reduced use of energy, and thus lower levels of fossil fuel CO2 emissions. Conversion of a number of chemical processes could make a significant contribution towards meeting the targets set by the Kyoto treaty.
- Increased use of renewable resources, whether as chemical feed stocks or fuels. Growing rather than extracting will reduce the use of fossil fuels and is carbon-neutral.
- Production of new materials. Cell cultures are unique in their capacity to make new pharmaceuticals and vaccines which could not otherwise be made.
- Processing of biomass for bulk chemical applications.

Materials Technology. Discovery of new materials with tailored properties and the ability to process them are rate-limiting to new business development in many industries. The demands of tomorrow's technology translate directly into increasing, stringent demands on the chemicals and materials involved: their intrinsic properties, their cost, their processing and fabrication, and their recyclability. Application areas of interest are:

- Functional Materials and bio-(compatible) materials with tailored properties which includes thin films and surface coatings using nanotechnological and bio mimetic materials concepts.
- Intelligent Materials with tailored electrical (e.g. superconducting), optical and magnetic properties for applications in electronic devices such as displays or sensors.
- Energy and environment, which includes catalysts and renewable energy sources such as solar and fuel cell technologies.
- New methods of polymerization including catalysis.

Reaction and process design is of vital importance for the chemical industry. Product life cycles are becoming shorter and specialty chemicals can rapidly become higher volume commodity products. The only way to remain profitable under these high cost pressure conditions is to keep a high level of excellence in the area of process intensification. It is of paramount importance to have the best, fastest, cheapest and cleanest production processes.

One horizontal area

There are many cross-cutting factors that need to be addressed including:

- Research and innovation on horizontal environment-health and safety issues needed to reduce the costs for industry to face the regulatory framework, in particular on risk-assessment methodologies, on alternatives to animal testing, etc.
- Education and skills.
- Knowledge and technology transfer mechanisms.
- Research infrastructures and engagement in EU research funding programmes including researchers' mobility.

- Engagement and alignment with relevant other (EU) initiatives, for example the European Research Council (in preparation); related European action plans and initiatives; other European Technology Platforms.
- Access to risk capital.
- Building confidence in new technologies and promoting their acceptance by the general public.

Development of the Technology Platform (State of play)

- Dec. 2002: first meeting CEFIC-Commission to review the perspectives of chemistry research.
- October 2003: EuropaBio workshop "White Biotechnology: Current developments in research, innovation and policies".
- Nov. 2003: meeting of Commissioner Busquin with CEFIC; discussion on first ideas for a Technology Platform.
- Dec. 2003 - Jan. 2004: presentation by CEFIC to the Commission of a proposal for a Technology Platform.
- 6 July 2004: Announcement of the Technology Platform and publication of the Vision Document: **"Chemistry and the EU chemicals sector's role in sustainable development".**
- Jan. - May 2004: drafting and finalisation of the sustainable chemistry platform document.
- March & June 2004: Round Table meeting of white biotechnology stakeholders and Commission Services.
- July 2004: pre-launching of the Sustainable Chemistry Platform, announcement with Commissioner Busquin.
- Jul. - Sept 2004: wider consultation of the stakeholders.
- September 2004: first draft of industrial biotechnology roadmap expected.

Activities (existing and planned in short term)

Large number of projects funded under EU FP5
- Growth programme: dealing with catalysis, green chemistry, clean and safe chemical processes, separation technologies, human factors in process safety, etc.
- Quality of Life Programme: dealing with biotechnolgy processes and with environment and health issues, like endocrine disrupters;
- Environment and Sustainable Development programme: dealing with wastewater treatment of chemical effluents, with soil remediation of contaminated sites and with environment and health problems – examples: residues of pharmaceuticals and endocrine disruptors, with the monetary valuation of impact on environment and health;
- All of which will contribute to the Technology Platform.

All new relevant projects under FP6
- Particularly those on chemical processes (in priority 3) and those on risk assessment of chemicals in priority 6 and 5, that will contribute to the Technology Platform.
- The ERA-Chemistry ERA-NET.

The Commission's REACH proposal

The IMPEL networking activities

Relevant links to EUREKA
- e.g. the strategy for Computer Aided Process Engineering to be followed up.

Activities of the DG JRC
- Particularly those on Health-Safety-Environment issues carried out by the European Chemicals Bureau (ECB) and those on alternatives to animal testing carried out through ECVAM and those on industrial risks.

Activities supported by CEFIC (www.cefic.org)
- The Long Range Research Initiative (LRI)
- The SUStainable TECHnologies programme (SUSTECH)
- Responsible Care
- The Alliance for Chemical Sciences, Technologies and Engineering (AllChemE)

Active efforts to bring relevant national, regional and local projects and initiatives, as well as privately funded industrial R&D within the platform.

Secretariat (Commission services initially), **Member States' Mirror Group** (to be established).

The Platform Deliverables

- A long term vision for sustainable chemical technologies in Europe.
- A vision for a competitive and sustainable industry.
- Strategic research agenda's (SRA's) and respective implementation plans for key technology areas identified that catalyse the alignment of EU and national initiatives and boost research excellence, and for research aspects dealing with horizontal health-safety-environment issues.
- Mobilisation of financial support for R&D from public EU and national funds and from private sources, thus providing a European dimension to research in chemical sciences in order to focus and avoid duplication of activities.
- Identification and initiating action for the elimination of barriers and constraints to chemical innovation, including skills, innovation transfer, public awareness and societal acceptance aspects.
- Consensus among stakeholders on methods for and interpretation of chemicals' risk assessments.
- Determination of the socio-economic impacts of SRAs and proposed related actions, including establishing a balance between expected benefits and potentially undesirable consequences of the prioritised new technologies.

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Title Sustainable benefits from Renewable Forestry Resources*

*** note: proposal stage**

Overall Policy Objective

To ensure the perpetuity of renewable forest resources as the basis for meeting the multi-functional needs of society, including a range of sustainable processes, products, services and other benefits for individual consumers and other users. The overall vision is that by 2020, products, services and energy derived from renewable, wood-based and composite materials should be amongst the preferred choice of the consumers.

To contribute strongly to the fulfilment of the objectives of the European Research Area in respect of integration, co-operation and focusing of research concerning utilisation of renewable forest-based resources.

Europe's technological position in a global context

In the global context, the European forestry-based and related industries are the technological and related core research leaders, particularly as far as pulp and paper are concerned. This is shown by the steady productivity growth of this industry (around 1.5% per annum), which is higher than that of USA. Also, concerning solid-wood technology and forest management, Europe is in a strong position. The European forest-based industries are also a major applier of emerging technologies, in particular concerning ICT, automation and biotechnology.

Primary Technical, Economic and Political Justification for action

Even though the technological level of the European forestry-based and related industries is currently high, in a global context there are needs for further technological development. It is of major importance to fully utilise the opportunities offered by the scientific and technological development in sectors such as: materials technology, information technology, biotechnology and nanotechnology. This is absolutely necessary in order to secure the long term competitiveness of this sector.

Many forestry-based and related industries in general, and the pulp and paper industries in particular, are very capital intensive, requiring heavy investments with long pay back times of typically 15-20 years. This also implies that technological and competitive developments in the sector are often the result of many innovations and processes, products, logistics chains etc., rather than of individual major breakthroughs. The importance of the innovation chain therefore has to be emphasised.

Within Europe, the forestry-based and related industries, including forest owners and down-stream stakeholders, comprises **one of the major manufacturing industrial clusters with an annual turnover of some 500 billion Euros and employs some 3.5 million people,** of which a very large part in rural areas. Forests occupy about one third of the European land surface. Maintaining the competitiveness of this sector is therefore of vital importance for the well-being of large parts of Europe. Indeed, in many regions this bio-based economy often represents the main, if not the only, source of livelihood.

Around two-thirds of the European forest growth is utilised for the production of both wood-based products and energy purposes. There is thus potential for increasing the use of forestry-based resources for bio-based energy. Developing the use of renewable forestry-based resources for energy production offers great possibilities not only for an increased economical use, but also for the increase of carbon dioxide neutral energy production. At the same time, the production and use of wood-based products promotes carbon storage.

The forestry-based and related industries are also to a very large extent recovering, re-using and recycling its materials and products both for the manufacturing of new products, as well as for energy production.

A major part of the raw materials used by this sector are renewable and renewability is a prime characteristic of the sector. Overall therefore, the sector has high potential for contributing significantly to sustainable development in Europe.
The research to be defined within this platform will strongly aim at reaching this goal.

Securing the long-term availability of natural resources for all the purposes mentioned above, at the same time developing the multi-functional use of the forests, including recreation etc., will also require a considerable amount of research and development on forestry and forest management and related policies.

Due to its nature, the sector is and will continue to be influenced by a number of directives and policies, which need to be taken into account in its future development.

To reach the vision of this technology platform requires investments in research, partnerships and other activities that go far beyond what is offered by the existing instruments of Community RTD Framework Programmes.

Development of the Technology Platform (State of play)

The main proponents of this technology platform are the stakeholders behind the three European associations CEPF (forest-owners), CEI-Bois (solid-wood and panels) and CEPI (paper and paper board). A broad spectrum of other stakeholders need to be engaged and are being approached.

- Autumn 2003: work initiated
- June 2004: Development of the Vision and content of the platform as well as the organisational structure
- July 2004: Presentation of a Vision Document
- June – Dec 2004: Engagement and final comitment by stakeholders
- Dec 2004: Presentation of a full proposal

Activities (existing and planned in short term)

- A number of projects of FP5 completed or still on-going
- Within FP6 two Integrated Projects approved and in a starting up phase (ECOTARGET and SUSTAINPACK)
- A large portfolio of some 45 COST Actions ongoing or recently completed

Specific Deliverables (short to medium term)

- Full proposal for the technology platform, including a Road Map
- Setting up a web site
- Strategic Research Agenda

Commission services contact

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Title The Global Livestock Development Partnership

Overall Policy Objective

To facilitate and accelerate the development and deployment of new vaccines and diagnostic tests against tropical livestock diseases which currently threaten the competitiveness of European agriculture.

Europe's technological position in a global context

The pharmaceutical industry is the largest investor in research, spending over € 1 Billion per annum in livestock related research. US companies dominate the field. The majority of private sector investments are directed towards the companion animal market. Less than 3 % of investments are targeted towards tropical livestock diseases.

International public support to tropical disease research is channelled through the International Livestock Research Institute (€ 10 million per annum).
US government support to tropical disease research is relatively modest at just € 6 million.
Australia supports tropical disease research with a total of € 6 million.
Total funding for tropical livestock research in Europe is currently estimated at some € 25 million per year, of which € 7 million is attributed to The Wellcome Trust, a private charitable foundation.

Primary Technical, Economic and Political Justification for action

There is widespread agreement that overall EU policy on agriculture should include a strategy on Exotic Disease Control and Prevention. The likelihood of importing tropical diseases into Europe is increasing with globalisation and trade liberalisation. If introduced, tropical livestock diseases would have a devastating impact on European agriculture: these diseases are extremely infectious, cause widespread livestock deaths and prevent international trade. Vaccines do not exist for many tropical diseases, including, for e.g. African Swine Fever, a highly infectious, fatal disease of pigs. The development of vaccines and diagnostics tests against tropical livestock diseases would greatly reduce the risks to European agriculture posed by globalisation and the liberalisation of trade.

Although Europe supports tropical disease research, these investments are channelled through a large number of diverse, un-coordinated small projects which do not create the critical mass of effort required to produce a new vaccine.
With a 10 to 15 year perspective, the task is complex and has potentially great socio-economic consequences for the developed and developing world. A wide range of European policies are concerned, including research, agriculture, trade and enterprise.

The mobilisation of all the key stakeholders towards a common goal in this field is expected to deliver substantial benefits, including:

- Focussed socio-economic and technical research that delivers new vaccines and diagnostic tests against some of the most devastating livestock diseases in the world.
- Stimulation and increased effectiveness of public and private investment in R&D.
- Greater synergy of effort that overcomes problems of fragmentation and duplication of research efforts.
- Increased competitiveness and productivity of agriculture R&D sectors.
- Removal of risks associated with legal and illegal livestock movements.
- Increased industrial investment in research.
- Enhanced career opportunities for scientists.
- Increased consumer confidence in the quality and safety of livestock products.

Development of the Technology Platform (State of play)

- December 2000: First meeting of an inter-agency group of livestock research donors - comprising 14 high level representatives from industry, academia and EC member countries.
- August 2001: Following up the key recommendation of this meeting, the inter-agency group commissioned a study to identify the technology gaps in the control of tropical livestock diseases.
- April 2002: Interagency group commissioned study to explore the potential for the private pharmaceutical industry to contribute to the development of new vaccines and diagnostics tests against tropical diseases. The study identified substantial interest within the private sector to participate and contribute towards a global effort to provide new technologies against tropical livestock diseases.

- March 2003: Interagency group agreed to explore options for designing a new platform that would bring together research expertise within the EU, developing countries and the private sector.
- October 2003: Establishment of a Design Advisory Group for the Global Livestock Development Partnership (GLDP), comprising of Industry, OIE, EC, and other international agencies.
- February 2004: Production of a Business plan for the GLDP.

Activities (existing and planned in short term)

- **Design Advisory Group** advising on the establishment and membership of the GLDP.
- The partnership will seek to incorporate relevant national, regional and local projects and initiatives, as well as privately funded industrial R&D within the GLDP.
- **Several large companies and the Wellcome Trust** are considering participating.
- **The UK Government** (DFID and DEFRA) are considering providing support.
- Mechanism now needed to structure European research contributions and to develop appropriate links with policy.

Specific Deliverables (short to medium term)

- **New management entity to manage public-private partnerships.**
- **Strategic Research Agenda** – identifying best-best technologies and a road map for bringing new technologies to market.
- **Deployment strategy** - including proposals for product registration, licensing and deployment.
- **Policy Interface / Framework** - for interaction with political institutions.
- **European co-operation strategy.**
- **Progress monitoring system.**

Specific Deliverables (within 10 years)

- The Business Plan estimates that **within ten years** the partnership would produce **three new vaccines** and **two new diagnostic tests** at a total cost of € 70 million.

Commission services contacts

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Title ERTRAC European Road Transport Research Advisory Council

Detailed information www.ertrac.org

Overall Policy Objective

A framework for supporting a common vision and strategic research objectives. Road transport presents Europe with a number of challenges and opportunities that have to be met and exploited for the benefit of all citizens. To reflect the importance of research expenditure for industry and governments, a high level consensus for research has been developed. It is aligned with the European Council conclusions of Lisbon 2000 "The Union has the strategic goal to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" and that of Gothenburg "The European Council invites industry to take part in the development and wider use of environmentally friendly technologies in sectors such as energy and transport".

Increased investment in road transport research is a key element for the realisation of the Lisbon and Gothenburg objectives and in line with the Council decision of Barcelona in 2002 to promote R&D and innovation by increasing funding up to 3% of GDP by 2010. In this context, future research should promote areas which would give high potential benefit to European economies.

Harnessing the full potential of this political initiative to the benefit of all road transport users requires a new form of cooperation. This has already commenced through the creation of an Advisory Council for road transport research, to better coordinate research for more targeted, efficient and effective use of research funds.

Towards a new form of cooperation for road transport research

The European Road Transport Research Advisory Council (ERTRAC) was launched in June 2003 in order to develop a shared vision to mobilise all stakeholders and prevent unnecessary fragmentation and duplication of research efforts.
ERTRAC members are high level representatives from all road transport sectors including consumers, vehicle manufacturers, component suppliers, road infrastructure operators and developers, service providers, energy suppliers, research organisations, cities and regions as well as public authorities at both European Union and national level.
For its operation, ERTRAC relies on a support group assisted by experts and working teams and more generally on the contributions and support from its various stakeholders.

The main ERTRAC mission is to:

- Provide a strategic vision for the road transport sector, with respect to research and development;
- Define strategies and roadmaps to achieve this vision through the formulation and maintenance of a Strategic Research Agenda and technical annexes;
- Stimulate increased effective public and private investment in road transport research and development;
- Contribute to improving co-operation between the European, national, regional and private research and development actions on road transport;
- Enhance the networking and clustering of Europe's research and development capacity, particularly in areas with the most potential benefit to European economies;
- Promote European commitment to research and technological development ensuring Europe as an attractive region for researchers;
- Develop links between research policies and policies on innovation and competitiveness.

ERTRAC PROPOSES A TECHNOLOGY PLATFORM FOR THE PURPOSE OF DEFINING ITS RESEARCH OBJECTIVES AND ESTABLISHING APPROPRIATE LINKS WITH OTHER INITIATIVES FOR FUTURE ROAD TRANSPORT (E.G. HIGH LEVEL GROUP ON HYDROGEN, "THE ESAFETY FORUM", THE EU ENVIRONMENTAL TECHNOLOGIES ACTION PLAN, AMONGST OTHERS).

Europe's technological position in a global context

Future trends and challenges for 2020 and beyond
In the future, road transport will remain an essential component of economic sustainability and social cohesion. To be more effective, road transport must be seen as part of an integrated system, with seamless links and better balance with respect to other non road-based transport modes.

The necessary reconciliation of growth in a competitive economy and the preservation of quality of life, environment, resources and rational use of space will require efforts in the design, maintenance and operation of the road networks, environmentally friendly vehicles and inter-modal solutions.
Research is crucial for the competitiveness of the road transport industries and services. Growing economic activity resulting from enlargement will require sustainable responses, as well as reliable and flexible solutions.

The provision of global industry leadership through co-ordinated R&D is a key challenge. The European industry should be able to attract the best skills, offer jobs and training as well as attractive career opportunities. Co-ordination between research, education and training is therefore necessary.

The future trends and challenges to achieve the vision for year 2020 and beyond are presented under the four following themes, "Mobility of persons and goods, Safety and security, Environment, energy and resources and Competitiveness of the road transport industries and services".
For each of those themes, people's perceptions, preferences and social driving forces should be a key element of transport research just as much as new technologies. Standardisation in various areas such as infrastructure, road design, road signalling and equipment should be further developed.

Primary Technical, Economic and Political Justification for action

The road transport sector, a major contributor to the economy with an important societal mission
Road transport fulfils a major role in the European economy and society, involving a wide range of industries and services from vehicle manufacturers and suppliers to infrastructure builders, services, energy and research providers, public authorities, insurance and rental companies and many others. Road transport together with the other modes of transport provides indispensable mobility for all categories of citizens and goods and contributes to European integration and to the economic prosperity in Europe.

It has a major impact on our daily lives, providing a source of employment, a carrier for economic activities, inter-urban mobility and links between urban functions. Transport infrastructure considerably reduces the geographical isolation of peripheral regions. It is a key factor to social, regional and economic cohesion, including the development of scarcely populated areas. However, the impact of road transport on the environment and health remains a major challenge, notably in view of its growing emissions of greenhouse gases, its continuing impact on air quality and its major role as regards noise, land use and nature protection amongst others.

Overall, road transport related industries and services provide employment to more than 14 million people in Europe and contribute 11% to the European gross national product. In addition road transport industries invest heavily on research and product development. For instance, the automotive supply industry on its own invests annually €19 billion (figures for 1998:Eurostat, ACEA,CLEPA).

Road transport plays a key role in ensuring sustainable development in Europe in economic, social and environmental terms. To satisfy this role, continuous progress is needed in an integrated system approach of all related areas. To be effective, this requires an appropriate coordination framework to pull together public and private resources in support of the necessary research and development activities.

Development of the Technology Platform (State of play)

In March 2002 the European automotive representatives called for the establishment of a European Road Transport Research Advisory Council comprising of senior experts from car manufacturing companies, component suppliers, energy and fuel suppliers, research institutes and other relevant stakeholders. Since then, the following milestones took place:

- 26 March 2002: Agreed scope and membership.
- April/May 2002: Prepare public communication.
- May 2002: Operational start of Council.
- May 2002: Facilitate the process of Expression of Interest of FP6 Integrated Projects.
- June 2002: Announcement at the Sustainable Transport Research Conference in Valencia.
- September 2002: Second Road Transport Council meeting: Outline of a 2020 Vision document for a Sustainable Road Transport System.
- December 2002: End of the preparation phase.
- January 2003: Meeting with European Commission: Update and discussion on ERTRAC progress.
- January/March 2003: Workgroup meetings on the Vision and SRA.
- February 2003: Workshop: ERTRAC and other relevant stakeholders.
- May 2003: ERTRAC meeting with public authorities: Presentation of the Terms of Reference, and review of the Vision and SRA.
- June 2003: First official plenary meeting - official launch of ERTRAC.
- June 2003 onwards: ERTRAC fully operational.

Activities (existing and planned in short term)

A coordination contract for ERTRAC commenced in October 2003 for a duration of 24 months.

Specific Deliverables (short to medium term)

In summary, the ERTRAC initiative should lead to the release of several important documents which would contribute in an iterative process, namely:

- The Terms of Reference defining the scope of action of ERTRAC (completed).
- 2020 Vision document for a Sustainable Road Transport System.
- Strategic Research Agenda for the Road Transport Sector (target end of 2004).
- A Public Relations summary document.

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Title ERRAC – European Rail Research Advisory Council

Detailed information www.errac.org

Overall Policy Objective

Improve synergy between EU, national and private rail research, to better serve society's needs, to lead to sustainable transport as highlighted by the Gothenburg Summit and the White Paper on Transport Policy and, finally, to strengthen the competitive leadership of the European rail industry. Rail organisations recommend developing a long standing commitment by all stakeholders - rail industry, rail operators, infrastructure managers, public authorities and regulators, research institutes and academia– to work in closer partnership and on the basis of consensus, with the aim of strengthening and reorganising research and development efforts in Europe. This would optimise the rail research potential within the Union, materialising the concept of a "European Research Area" in this industrial sector.

The scope and extent of ERRAC should be focussed and limited to the development as well as the promotion of the implementation of a common strategy for European rail research to support the creation of a single European railway system. In particular, ERRAC should aim at promoting:

- *the development of an efficient European railway system, including interoperability,*
- *the increase of competitiveness of the global railway system,*
- *the increase of the utilisation of infrastructures capacity and of rail safety,*
- *the limitation of noise and emission of pollutants.*

Development of the Technology Platform (State of play)

ERRAC is composed of a maximum of 40 members. They are drawn from the stakeholders listed below. Each stakeholder appointed the members representing it. Stakeholders reached consensus to facilitate a balanced composition of ERRAC with regard to members nationalities:
Member States (15), European Commission (4), Manufacturing industry (6), Research establishments and academia (2), Operators (5), Infrastructure managers (3), Environmental (1), Urban planning (1)Organisations and transport users groups: freight (2), rail safety (1) and passengers (1)
Members listed as "academia" are independent experts appointed by the Group.

In May 2001, European rail organisations presented to Commissioner Busquin a document entitled 'A Joint Strategy for European Rail Research 2020 – Towards a Single European Railway System'. Further to this presentation, Commissioner Busquin proposed that the rail organisations continue to elaborate the document, together with the Member States and the European Commission. This has led to the constitution of ERRAC.
ERRAC achieved its primary mission when it published its business scenario and strategic rail research agenda (SRRA). This was officially presented to the Commission in December 2003.
Since then, ERRAC has prepared three further reports:

- Identifying the ongoing EU, national and industrial research in the context of the SRRA;
- A comparative analysis of innovations versus investments in the rail systems;
- Investigation of future research needs for the transition process to a harmonised European railway market.

In relation to FP 6, notably the 'Sustainable Surface Transport' Programme, ERRAC - SRRA has already made a positive impact: There is clearly a more focused common approach by rail operators and industry towards innovation promoting interoperability, intelligent mobility, safety and security, environment, innovative materials and production methods.
A key deliverable / objective of ERRAC's Strategic Rail Research Agenda will be to "capture twice the freight and passenger market share and three times the freight and passenger market volume in 2020 compared with 2000."

Activities (existing and planned in short term)

The Commission contributes to the funding of ERRAC by means of the ERRAC accompanying measure, which started in December 2002 and has a budget of 0.8 M€.

Commission services contact

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ERRAC Secretariat

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Title

ACMARE: Advisory Council on Maritime R&D; Moving Towards a European Technology Platform within The Maritime Sector.

Overall Policy Objective

Key stake holders within the waterborne transport sector (Industry, national authorities, infrastructure, Commission, regulatory bodies, research centres and universities) will work together to formulate and maintain a strategic vision for the waterborne R&D so as to strengthen the industrial base of the sector in Europe and to also meet the wider expectations from society towards safety and the environment.
This vision and road map will be embodied through the creation and maintenance of a Strategic Research Agenda, road map and other associated documents. ACMARE seeks to stimulate more effective public and private investment in waterborne transport R&D and to improve co-operation between EC, national, regional and private R&D actions the sector.
As a result, networking and clustering of the R&D capacity in Europe will be enhanced. Consequently Europe's leading role as an environmental responsible, safe & advanced manufacturer and operator within the waterborne transport field will be maintained despite a fiercely competitive world market.

Europe's technological position in a global context

The maritime sector is an important business: 90% of the EU's external trade and 40% of the EU's internal trade is transported by sea. In 1997 the total annual turnover within the maritime sector for the EU(15) was € 137 billion and in 2003 may reach 2.4% of the EU's GDP.

Korea, China and Japan are focusing on high volume ship production. Europe has a recognised world lead in the design, manufacture and production of specialist, complex high technology vessels, for example; cruise liners and liquefied natural gas tankers. This lead has been driven by continuous R&D.

Europe accounts for almost all ship innovations. The latest include; the world's largest cruise liner (the Queen Mary II) and the example of podded electric drives for marine propulsion. Europe's research leads the world within fields such a computational fluid dynamics, risk based safety and production techniques. European research such as European Projects HARDER and FIREEXIT routinely underlies the basis for world regulation via the IMO.
Europe's competitors in the far east are increasingly advanced. Consequently, to survive Europe must continuously innovate. Industry has recognised this and increasingly collaborates within European research programmes.

Research is also driven by society which demands a cleaner coastal environment and by evolving regulations such as double hull tankers initiated as a result of incidents such as the sinking of the Prestige. Consequent issues are condition assessment of double hull tankers, green scrapping of ships, ship operations, stability and structure.

Primary Technical, Economic and Political Justification for action

Waterborne transport fulfils a vital role within the European economy accounting for the transport of more than 90% of the EU's external trade. The maritime transport industry is unique in terms of the high capital value and long life of each product, the single unit of production and the trade practices applied by Europe's competitors. To protect its interests, Europe has taken a number of initiatives. These were expressed within the "Leadership 2015" initiative which has received widespread political support. Initiatives that have been implemented include encouraging innovation through revised rules for state aid to the shipbuilding sector.

Furthermore, the leadership initiative recognised the major role played by research and the need for increased collaboration and coordination within the industry. ACMARE has the potential to contribute to this objective. Europe's competitive advantage within the maritime sector is founded on its ability to innovate and to maintain a technological lead. As the position of our competitors advances, Europe's lead can only be maintained if limited research resources are planned and applied efficiently and strategically, bodies such as technology platforms seek to meet these needs. Research addressing issues concerning waterborne transport and climate change, protection of the costal environment and safety are high priorities within society.

Events such as the Prestige disaster, safe scrapping of old ships (ghost ships) receive front page headlines. Marine accidents continue to occur and the potential for further major disaster remains.

Research that improves understanding and supports regulation within this field requires the coordination of a wide range of stakeholders (governments, classification societies, shipbuilders, operators, universities) in order to work towards common goals.

This mobilisation of all the key stakeholders towards a common goal is expected to deliver substantial benefits, including:

- Structured socio-economic and technical research with the crucially important goal of sustainable and clean energy systems.
- Stimulation and increased effectiveness of public and private investment in R&D.
- Concentration of efforts and avoidance of fragmentation.
- Knowledge generation, innovation, competitiveness and productivity.
- Development and networking of regional clusters.
- Removal of obstacles for deployment and acceleration of market penetration.
- Enhancement of the EU's attractiveness for researchers and industrial investment.
- Increased public awareness and acceptance of the technologies concerned.

Development of the Technology Platform (State of play)

- January 2004: The European Maritime Industry Forum (MIF) endorsed establishment of a coordinating council for maritime R&D. The R&D strategic planning group (RDSPG) of the MIF in cooperation with other stake holders began work towards the creation of such a body, to be called ACMARE.
- February 2004: The RDSPG invited expressions of support for ACMARE from Member States and other stakeholders. Initial responses were favourable.
- March 2004: Continued collaboration between stakeholders in order to submit an application for a coordination action under FP 6 to support ACMARE.
- Autumn 2004: Depending on results of evaluation, launch of ACMARE.

Stakeholders

- EU Member and Associated States
- European Maritime Industry forum (MIF)
- Committee of European Ship builders Associations (CESA)
- European Community Ship Owners Association (ECSA)
- European Maritime Equipment Council (EMEC)
- European Sea Ports Organisation (EPSO)
- European Association for Classification Societies (EACS)
- European Transport Workers' Federation(ETF)
- European Co-operation in Maritime Research
- European Commission
- Secretariat Drawn from the Maritime Industry forum (depending on evaluation results initially supported through an EU FP6 coordination action).

Specific Deliverables (short to medium term)

- **Strategic Research Agenda -** including ways to increase and prioritise private and public R&D investment.
- **Deployment strategy -** including recommended policy measures.
- **European Roadmap for Waterborne Transport sector.**
- **Public-private partnerships.**
- **Policy/Framework -** for interaction with political institutions.
- **International co-operation strategy.**

Commission services contact

Mr Peter Crawley
DG Research

Title

The Mobile and Wireless Communications Technology Platform

Overall Policy Objective

To reinforce Europe's leadership in mobile and wireless communications and services and to master the future development of this technology, so that it best serves Europe's citizens and the European economy.

Europe's technological position in a global context

EU-funded research was fundamental for the success of GSM and GPRS technology in the past and has been essential for the development of 3G technologies.

The European industry has managed to establish a clear global industrial and technology leadership in the field of mobile communications. However, it is still necessary to reinforce European strengths in the development of advanced and innovative mobile services and applications and to face the difficult challenge of guaranteeing interoperability at the services and applications level, without which the uptake of mobile broadband services may be jeopardised.

The future is shaping as a wireless environment that will accommodate several kinds of wireless applications - be it mobile communications, W-LAN (Wireless Local Area Network), broadcasting. This trend is driven by the convergence of technologies leading to different operators providing similar services but via different means. In order to maintain Europe's position in the global market for mobile and wireless systems in the 2010-2015 time horizon, it will be necessary to develop large-scale European approaches to system research and development, and to mobile services and applications.

In this context, the Platform will define and implement a comprehensive research agenda in the mobile and wireless sector to be conducted in Europe, on the basis of a strong co-ordination of the national research efforts as well as seeking the collaboration of key research programmes from other regions of the world. Peer-to-peer relations with Asian and American research programs should be established, inter alia, as a facilitator towards early consensus building paving the way for successful global standards.

Primary Technical, Economic and Political Justification for action

The importance of mobile communications to society at large, citizens and business, cannot be underestimated. The European economy has benefited from the take-up of GSM over the past decade and the evolution towards broadband services over mobile networks will continue over the next years. The Platform has so far outlined both regulatory and research policy issues that need to be addressed in order to provide for a continued growth and take-up of mobile broadband services in Europe and beyond.

The Internet has been unprecedented in its impact on the world community of industries, institutions and individuals. No technology or media adoption S-curve has been faster than the Internet's. In the US, it took almost 40 years for 50 million people to use radio and 15 years for 50 million people to use TV. Internet users reached the 50 million mark in just 5 years!

The mobile communications industry is now grasping the opportunity to add mobility to Internet accessibility, effectively allowing citizens to carry the power of the Internet with them anywhere at any time.

The convergence of wireless and Internet usage is already underway. The potential is unlimited. There are today more mobile handsets than PCs connected to the Internet. Global wireless subscribers are expected to increase from 1.3 billion* (Dec 2003) to over 1.8 billion in 2007. On average, 80% of the European population currently have access and use mobile handsets. Since the growth in the mobile communications sector is likely to be driven by the offering of innovative and advanced mobile broadband services, the challenge now is to foster the offering of services that bring a real value-added to individual citizens and to business in general.

* out of these 1.3 billion, nearly one billion are GSM subscribers

Development of the Technology Platform (State of play)

- October 2003: Establishment of a High-Level Group on Mobile Communications, which set the parameters for developing a vision for a sustainable development of the mobile communications sector in Europe and beyond.
- October 2003: The Communication "Initiative for Growth", COM(2003)690 final, sets out a number of "Quick start" projects, including the Mobile Communication & Technologies Platform with a continued focus on research activities in the sector.

- January 2004: Report delivered by the High-Level Group to the Commission, setting out the vision for a sustainable development of the sector and the main regulatory issues to be addressed in order to achieve that vision.
- February 2004: The Communication "Connecting Europe at High Speed", COM(2004)61 final, addressed the state of the mobile communications sector including broadband and 3G deployment in Europe. It refered to the recommendations from the Platform.
- February-June 2004: initial proposals for a large-scale research programme were developed by the High-Level Group.
- 9 June 2004: Final Report delivered by the High-Level Group to Commissioner Liikanen.
- June 2004: A Commission Communication on Mobile Broadband Services is expected to be adopted by the end of June 2004, where the Commission will reaffirm the view that the complexity and magnitude of the technological challenges ahead requires a major cooperative R&D effort involving a critical mass of resources, strengthening excellence, exercising a catalytic effect on national initiatives and improving the coordination of the activities of the Member States in the sector. An increased effort at EU level will have a powerful and specific leverage effect on private investment in research and respond to the competitive challenges presented by similar large-scale R&D initiatives in other regions of the world.

Activities (existing and planned in short term)

- Relevant projects (STREPS and IPs) under FP6 - to be brought under the scope of the Technology Platform.
- Active efforts to bring together national and local authorities to promote an environment conducive to the development of the mobile and wireless communications sector.
- Fine-tune the roadmap for research and development in mobile and wireless systems beyond 3G.

Specific Deliverables (short to medium term)

- Platform to sponsor a proposal for a Specific Support Action still under the FP6 IST programme as a bridge towards FP7.
- Establish peer-to-peer relations with Asian & American research programmes.

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Title Innovative Medicines for Europe

Detailed information www.cordis.lu/lifescihealth/innovativemedicines.htm

Overall Policy Objective

Enhance and accelerate the development process of medicines to ensure rapid translation of scientific breakthroughs to approved medicines. This is to be achieved by stimulating integrated forms of cooperation for R&D, in particular reinforced public-private partnerships in view of providing the European population with early access to new, more targeted medicines, while strengthening the European Science base and fostering economic growth in the pharma/biotechnology industry.

Europe's technological position in a global context

In the early 90's, Europe was spending 50% more on pharmaceutical R&D than the US. In 2002 the situation had almost reversed and the trend is increasing. In the last 15 years a drastic shift of pharmaceutical R&D investments and industry location from the EU to the US took place and it is expected by 2012 to lead to a situation where 90% of all new medicinal products launched will come from the US. Between 1975 and 1994, of the 152 medicines approved for human use, 45% were of US origin and 40% of European (incl. Switzerland). In 2002, only 8 out of the 29 new medicines (chemical and biological molecular entities) launched on the market worldwide were of European origin, as compared to 13 from the US and 7 from Japan.

These facts clearly demonstrate that there is a strong need for action in order to ensure the availability of novel medicines to the European patients.

Contributing factors have been: the higher growth rate of the US public and private healthcare markets; a European public market that disfavours innovative products and favours cheaper generics; unfavourable framework conditions and lack of capital for a still immature European small biotech industry, which is unable to respond to the global demand of new drug leads and a global pharmaceutical industry that relocates to where the larger markets are, where innovations are born and where public research spending is highest (Europe spends 30% less on R&D than the US, while only 20% of top-selling drugs are sold in Europe, and this figure is decreasing).

Primary Technical, Economic and Political Justification for action

This shift of pharmaceutical R&D has major social and economic consequences:

- A delayed access to innovative drugs for the European population, which may be particularly serious in view of the ageing population;
- A deterioration of the European research base, now unable to respond to European and global demands;
- An increased "brain drain" of researchers from Europe to the US and elsewhere;
- A further relocation of development centres of pharma industry to the US bio-clusters;
- A decline of the biotech industry in Europe, which is a major source of innovations in new biomedicines and bio-based therapies, and an important partner of large industry.

Europe therefore needs a strategic EU agenda for enhancing and accelerating research into and the development of innovative medicines, in order to guarantee access to well targeted medicines to the European citizen at a reasonable cost. The major socio-economic benefits expected to arise from this are:

- More efficacious medicines,
- Less severe and reduced adverse drug reactions,
- Reduced treatment periods for patients,
- Lower number of medicines' withdrawals from market (and reduced attrition rate in clinical stages),
- Shorter drug development times (faster availability to patients),
- Overall reduced healthcare costs (higher cost-effectiveness).

To achieve these goals, the mobilisation and involvement of all stakeholders (research, biotech industry, large pharma industry, regulators, patients' organisations, healthcare representatives and policy makers) is essential, thus ensuring that all aspects are well considered.
Among the technological areas that are thought to contribute from a research perspective to further advancement towards these goals are the following:
Personalized and preventive medicines (incl. pharmacogenomics and pharmacogenetics),

Predictive toxicology and efficacy (in silico, in vitro and in vivo),
Monitoring of disease progression and medication effects (biomarkers).

Through addressing those technological areas, the environment for generating a supportive regulatory framework will be stimulated and will hence fuel European innovations that fulfil global demand and attract investment (synergy effect). With a 15 - 20 year perspective, the challenge is complex and has potentially very great socio-economic consequences not only for the developed world.

A wide range of European policies are concerned, including research, enterprise, health and consumer protection.

The need for action is also emphasized by the report of the G10 High-level group on Medicines, which has been put in place by the EC, and the resulting Communication "A stronger European-based pharmaceutical industry for the benefit of the patient" (COM (2003) 383 final).

Development of the Technology Platform (State of play)

- March 2000: Workshop "New Safe Medicines Faster", organised by EUFEPS and EFPIA, supported by the European Commission.
- June 2000: Workshop "From Medical Biotechnology to Clinical Practice", organised by the European Commission under the aegis of the External Advisory Group of the Cell Factory Key Action of the QoL Programme. (http://europa.eu.int/comm/research/fp5/eag-medical.html)
- October 2001: Workshop organised by the European Centre of Pharmaceutical Medicine on "Biotech – Pharma Industries interactions".
- October 2002: Congress of the European Federation for Pharmaceutical Sciences (EUFEPS), co-funded by the EC (Accompanying Measure QLAM-2002-00227).
- June 2003: Joint meeting between the European Medicines Evaluation Agency (EMEA) and DG RTD on "Fostering Pharmaceuticals Innovation" emphasising the regulatory steps and the possibilities of involving EMEA for regulatory advice.
- November 2003: Meeting organised by the European Commission with the key stakeholders: European Federation of Pharmaceutical Industries and Associations (EFPIA), EuropaBio, EUFEPS, EMEA and EUREKA, highlighting the different challenges involved in the Platform.
- May 2004: Presentation of TP on Innovative medicines at EFPIA Annual Meeting, Dublin.
- June 2004: Meeting with the EFPIA Research Directors Group on setting up the strategic research agenda, Brussels.
- October 2004: High-level meeting planned with all stakeholders (EFPIA, EBE, EMEA, EuropaBio, Clinicians, Contract Research Organisations, Patients' associations, Ethical experts, EUREKA).

Activities (existing and planned in short term)

- **14 Industrial Groups were created -** self-supporting networks established in FP4 and FP5 by gathering industries around particular biotechnology-fields (e.g. Animal Cell technology, In-vitro, Neuroscience, etc).
- **Some 100 projects addressing "Improvement of the diagnostic and therapeutic arsenal for healthcare" -** funded in FP5 within the Cell Factory Key Action of the Quality of Life (QoL) Programme with strong industrial participation (close to 80% industry penetration) (http://europa.eu.int/comm/research/quality-of-life/cell-factory/volume2/intro-area31_en.html).
- **Specific sub-area in FP6: "Rational and accelerated development of new, safer, more effective drugs including pharmacogenomics approaches"** within Priority 1 (Life Sciences, Genomics and Biotechnology for Health) with app. budget of € 125 million (IP: GENDEP); other sub-areas in FP6 of high relevance with similar budgets:
  "Development of new diagnostics"
  "Development of new in vitro tests to replace animal experimentation" (IP: ReProTect, STREP: Predictomics)
  "Development and testing of new preventive and therapeutic tools"(STREP: Theravac)
  "Innovative research in post-genomics with high potential for application" (STREP: Combigtop);
- Contribution of other parts of Priority 1 (Combating cardiovascular diseases, diabetes and rare diseases; Combating resistance to antibiotics and other drugs; Combating cancer; Confronting the major communicable diseases liked to poverty).

- **Workshop** aimed at reinforcing the involvement of Biopharmaceutical SMEs in the Platform (Specific Support Action under negotiation).

- **Take-off / launch of Platform:** Commitment and integration of main stakeholders via Integrated Projects in 3rd Call under FP6 (sub-area 1.2.1).

Specific Deliverables (short to medium term)

- **Strategic Research Agenda and Roadmap -** definition of and priority setting for the scientific research activities to be addressed.
- **Financial Plan / Budgetary Roadmap -** focussing on leverage of private and public R&D investment.
- **Public-private partnerships -** creation of virtual research institutes connecting competence centres.
- **Patients' involvement -** information / communication system linking patients' associations with researchers (public, private) and policy makers.
- **Innovation -** creation of technology transfer offices allowing for rapid exploitation of scientific results.
- **Involvement of regulators -** establishment of a structure allowing for early involvement of regulatory authorities.
- **Policy Interface / Interaction -** Establishment of a framework for providing input to policies regarding healthcare system, ethical dimension, socio-economic parameters.
- **Public information campaign -** Improvement of public understanding and perception of value of pharmaceutical and biotechnology R&D in ensuring future healthcare.
- **Progress monitoring system**

Commission services contact

Mr Bernd Rainer
DG Research

Title ARTEMIS: The European Technology Platform for Intelligent Embedded Systems

Detailed information www.cordis.lu/ist/artemis

Overall Policy Objective

To achieve world leadership in products and systems relying on embedded intelligence, from mobile devices and consumer electronics to automotive and avionic systems. To enable the emergence of new markets for ambient intelligent applications that improve life quality, safety and security. In order to realise this ambitious objective there is a need to mobilise private and public resources on a large scale in order to support an industry-led strategic agenda.

Europe's technological position in a global context

Largely driven by defence and recently also by homeland security as well as applications with a societal interest, the USA are funding substantial research in embedded systems through the main government agencies (DARPA, NSF, ARO, etc.) and a series of large, newly established embedded systems centres. In parallel, companies such as Intel and Microsoft carry through large research programmes aimed at the embedded systems market as this is where high future growth rates are expected. US public funding level is estimated at € 500 million/year.
Korea and Singapore also have large programmes aiming at their own consumer electronics and transport industries, while Japan carries out research under its next generation computer initiative.

The European landscape of publicly funded research in this domain is fragmented, including IST, several national programmes, part of the Eureka cluster projects ITEA and MEDEA+ and some regional programmes. The total public funding in Europe is estimated at around € 250 million/year.

In 2003, there was an average of 8 billion embedded components worldwide. Conservative estimates foresee a doubling of this figure to 16 billion by 2010. The growth of embedded devices until 2011 is estimated to be 10% per year – higher than comparable market sectors. Over half of the productivity gains in our economies today are attributed to Information and Communications Technologies in the EU, 0.71% from an overall 1.4% productivity growth per annum between 1995 and 2000). In the automotive industry, for instance, the share of electronics in a vehicle's value is rising; from 22% in 1997 to a projected 33 - 40% in 2010. An estimated 20% of car innovations over the past 20 years are due to embedded technologies.

Development of the Technology Platform (State of play)

- January 2004: First High Level Meeting of 14 leading industry stakeholders with Commissioner Liikanen; agreed to work together to establish a technology platform.
- March 2004: Steering Group meeting to debate the strategic orientation of the embedded systems platform and to establish a timetable of future activities.
- April/May 2004: Working Group meetings, including Member States, to elaborate the technological priorities, application drivers and the structure and governance of the Platform.
- June 2004: Core Group meeting.
- 28 June 2004: Conference and High Level meeting with Commissioner Liikanen) declaration and CEO signature of the "Building ARTEMIS" report. Consultation with the broader research and industrial community.
- September/October 2004: Public announcement of the Platform.
- 17 November 2004: Presentation of the Platform at the IST 2004 Conference in the Hague.

Activities (existing and planned in short term)

- Some 70 projects funded under IST in the 5th FP Programme; FP6 Embedded Systems projects funded through the 2nd IST Call (six IP's and NoE's and 10 STREPS)
- Relevant EUREKA, national and regional projects and initiatives, as well as privately funded industrial R&D
- Private support from companies to organising and participating in Platform meetings
- European Commission team - already operational
- Secretariat (Commission services initially)
- A Member States' "Mirror Group" is planned to develop and co-ordinate the links to national and regional programmes and policy

Specific Deliverables (short to medium term)

- Report by the High Level Group **"Building ARTEMIS"** - Advanced Research and Technology for Embedded Intelligence & Systems.
- **Strategic Research Agenda**
- Report on the **Governance** of the Platform
- **European Technology Roadmap for Embedded Systems**
- **International co-operation strategy**
- **Progress monitoring and reporting system**

Commission services contact

Mr Konstantinos Glinos
DG Information Society

Platform contact

Mr Yrjö Meuvo
NOKIA

Title ACARE - Advisory Council for Aeronautics Research in Europe

Detailed information www.acare4europe.com

Overall Policy Objective

There are two top-level objectives: (1) To ensure a world-class European air transport system that meets society's needs for quality and affordability, environment, reliability, safety and security and (2) to secure the global leadership of Europe in the aeronautics world-market as a sector of strategic importance.

Europe's technological position in a global context

The USA and Europe are world leaders in civil aeronautics. In the last few years, Europe has succeeded in obtaining 50% of the market for large commercial aircraft with Airbus Industrie. Regarding aero engines and aircraft equipment, European companies compete successfully on global markets. Nevertheless, the European aerospace industry faces global competition, particularly from the USA. There is also a growing interest and effort in Japan and Canada, as well as other countries in Asia and South America for this market. The military market is largely dominated by the USA.

The European aeronautical industry dedicates 14% of its turnover to RTD, which represents about € 10 billion per year, including both civil and defence RTD. The public funding in civil aeronautics research amounts to about € 1 billion. This is in contrast with the public funding in the USA, which is twice as much in civil research and 14 times as much in military research, which in turn has a strong influence also in the development of civil products. A major shareholder of the European public expenditure in civil aeronautics research is the Framework Programme; FP6 will dedicate € 840 million to this sector for the years 2003-2006, which represents about 30% of the total public expenditure in Europe.

Despite this great unbalance in funding aeronautics research with respect to USA, Europe has succeeded in introducing remarkable technical achievements in the civil market. The first supersonic airliner (Concorde), the most extensive use of composite materials in airframe structures and the first double-deck airliner (Airbus 380) can be cited as examples.

Primary Technical, Economic and Political Justification for action

Based upon constant progress in aircraft manufacturing, air transport has significantly grown and provides immense socio-economic benefits. Experts predict growth rates for global air transport of 5% per annum. At this rate of growth, air traffic will be tripled in 20 years and some 14.000 new aircraft worth € 1 trillion will have to be produced to satisfy the travel demands. This represents a major challenge for the European aeronautical industry, but at the same time a great opportunity for business. The sector has to find an acceptable balance between public expectations and requirements, and the constant, fierce competitive pressures upon it. A generation ago, "Higher, Further, Faster" were the imperatives for any vision of the future for air transport. Now they are "More Affordable, Safer, Cleaner and Quieter", reflecting the need to combine cost-effectiveness with an uncompromising attachment to safety and environmental objectives. The key to securing these objectives is investment in Research and Technology according to a strategy that can meet the demands of the market as well as the needs of the community.

Partnerships and consolidation of the European research effort are essential to respond to the challenge. In fact, the European aeronautical industry has gone through a process of consolidation in the last years, which has not been accompanied by a similar process of rationalisation and consolidation of the European research effort.

In its report "European Aeronautics - A Vision for 2020", a Group of Personalities chaired by the European Commission set ambitious goals and objectives in a 20 year horizon. Important keys to the successful achievement of the vision that justify a pan-European action are:

- Maintaining consensus among key aeronautics stakeholders.
- Encouraging better coordination and distribution between research funded at EU, national and private levels, thus creating new synergies and minimising unnecessary duplication.
- Optimisation of research facilities with a framework of European collaboration.
- Fostering synergies between defence and civil sectors.
- Giving education a high priority to ensure long-term supply of first-class qualified people.
- Overall investment (public and private) of € 100 billion over the next 20 years in research.

Development of the Technology Platform (State of play)

- July 2000: Establishment of a Group of Personalities chaired by Commissioner Busquin, which produced the Report "European Aeronautics - A Vision for 2020".
- June 2001: ACARE was launched, following up the recommendation of the Group of Personalities.
  The mission of ACARE includes:
  - To develop, approve and update regularly a Strategic Research Agenda (SRA).
  - To make strategic and operational recommendations for implementing the SRA.
  - To broaden understanding of aerospace-related issues in Europe.
  - To promote awareness of the role of research and to recommend measures for attracting scientists and optimising the use of research infrastructures.

  ACARE is comprised of 35 members representing the 15 EU Member States, the Commission, the manufacturing industry, Eurocontrol, research centres and academia, airlines, airports and regulators.

- November 2002: The first version of the SRA is published.
- October 2004: Tentative date for the publication of the 2nd version of the SRA.
- On-going or completed: Performance of studies such as:
  - Monitoring and analysis of the implementation of the SRA by all the stakeholders.
  - Analysis of the capabilities in the Member States with less developed aeronautical industry.
  - The economic impact of air transportation in the European economy.
  - A common European taxonomy for aeronautical RTD.
  - Analysis of possible air transport scenarios.
  - Analysis of aeronautical education schemes in European universities and possibilities for improvement.

Activities (existing and planned in short term)

- Some 130 projects funded under FP 5 with € 700 million under the Key Action "New Perspectives in Aeronautics".
- € 850 million dedicated in FP6 to the Thematic Priority Aeronautics, with a work programme that has been aligned with the SRA of ACARE.
- Accompanying Measure in FP5 and Specific Support Action in FP6 support the activities of ACARE and its working teams.
- More than 500 person-months have been devoted by the experts of the ACARE stakeholders in preparing the first version of the SRA. This level of commitment continues in the preparation of the 2nd version of the SRA.
- The Secretariat of ACARE is provided by the Association of European Aerospace Industries (AECMA) and the Association of European Aeronautical Research Centres (EREA) as a proof of the commitment of the stakeholders.
- Initiatives are being taken in some Members States to align their national aeronautics research programmes to the SRA, although this is progressing slowly. The possibility of launching an ERA-Net pilot project to improve co-ordination between Member States programmes is under discussion.

Specific Deliverables (short to medium term)

- **Strategic Research Agenda -** First version in 2002; second version planned for October 2004. Regular update planned every 2 years.
- **Dissemination workshops** organised in the majority of EU Member States and in some NAS countries.
- **Strategic studies in support of the SRA** (see list above).
- **Think-paper as a contribution to the '3% strategy' of the Commission.**
- **2 workshops on USA-EU collaboration planned for 2004.**
- **"Observation Platform"** launched for monitoring the implementation of the SRA in all stakeholders.

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Title The European Space Technology Platform*

Detailed information http://europa.eu.int/comm/space/index_en.html

*** note: proposal stage**

Overall Policy Objective

To reinforce, improve and enlarge the coordination and planning of the European efforts to establish a sound and non-dependent space technology and space-enabled technology base through:

- *securing Europe's capability to fully exploit the possibilities that space-based infrastructures and space-enabled services offer in direct support of key Union policies (see e.g. GALILEO and GMES supporting the Union's sustainable development and growth policy, common transport policy, information society policy and Common and Foreign and Security Policy etc.).*
- *securing Europe's capability to participate in future space exploration efforts.*
- *reinforcing the competitiveness of the European space sector, while avoiding fragmentation and maintaining and further developing European key competencies in strategic areas.*
- *building up the technology-related part of the European Space Programme.*

Europe's technological position in a global context

The European civil space budget (5.4b€ for 2003) amounts to about one third of the equivalent US budget. For military space applications there is an abyssal difference between the US budget, set at 14b$, and the European modest spending of 0.6b€. Considering that space technology can, in the vast majority of cases, serve both civil and military domains, the resources in the US for performing research on generic, dual-use or enabling technologies, are many times those available to European researchers.

New competitors such as China, Brazil and India have also been reinforcing their space programmes in recent years, with a consequent increase of their budget for space technology research.

Taking into account Europe's relatively modest overall engagement and its lack of capability to profit from dual-use synergies due to its low commitments in the security and defence area, Europe is still in a good position compared to most of the other space powers.

This is largely due to the European approach which has been taken towards space activities early on, highlighted by the founding of the European Space Agency (ESA) in 1975 as an intergovernmental organisation. With roughly half of the European space budget pooled in and managed by ESA, the degree of coordination and harmonisation of the European effort is substantially higher than in other R&D related areas.

Definition of technology/Funding sources/Overall situation

Note: in the following, the term technology is used in the narrower sense of pre-competitive next-generation related Research and Technology Development (RTD) concerning both activities on space systems and subsystems (e.g. satellite bus and payload RTD, future space transportation RTD) and space-enabled applications (e.g. terrestrial navigation signal receivers, satellite-based terrestrial broadband user equipment, evaluation software for earth observation satellite data, etc.).

In 2003, European public funding for Space Technology RTD amounted to approximately 400 m€, supported roughly equally by National Programmes and the European Space Agency. As already indicated, this public support is imperative because of the high costs and risks involved, and the comparatively low returns from relatively small commercial and institutional markets. The main funding source for technologies regarding space-enabled applications is presently the European Union's Framework Programme which provides about 50m€ per year for such activities.

However, despite these efforts Europe still depends on others for some critical space-related components (e.g. radiation-hardened components, etc.). As a result, it does depend to a substantial degree on export-control regulations of other space powers.

This technology dependence currently limits the capabilities of European industry to respond quickly to the challenge of key EU policies, which need for their support in particular fully developed and operational space-enabled services. Europe therefore needs to secure a broad technological base if it is to be capable of acting independently in space and sustain a space industry that is competitive in global markets.

Primary Technical, Economic and Political Justification for action

Technical

In recent years, new and important space-enabled applications have been developed or are on the verge of being developed such as navigation and timing, remote sensing and broadband communications. Hence, space activities are undergoing a pronounced transition from being research and technology-push oriented towards becoming demand-pull and application oriented.

This transition is most prominently reflected by the Union initiatives GALILEO and GMES and on-going work on space-based broadband communication (e-society).

In order to ensure that the Union has the capability to use space and space-enabled applications independently or non-dependently, a reinforced and coordinated technology effort is needed in Europe, which embraces the whole value-chain: namely space technology and the technologies related to the terrestrial space-enabled applications.

The primary justifications to organise such an effort in the form of an EU technology platform are:

- Next-generation space and space-enabled technology activities would be for the first time organised in such a way that the whole value-chain would be covered, integrating from the beginning future users and the needs deriving from Union policies.
- Starting from joint technology foresight, the platform could be used for comprehensive harmonisation, minimising duplication and fragmentation in the European effort.
- Such an approach would also facilitate more easily the filling of gaps with respect to critical technologies and thereby reduce dependence.
- A horizontal technology pooling over the whole space value-chain would increase not only efficiency via harmonisation but also via the sharing of key technologies within vertical initiatives such as GALILEO and GMES.
- The platform's next-generation R&D would also embrace multiple-use technologies, exploit the possible synergies and reinforce the sharing of efforts.
- With the comprehensive overview provided by such a platform, technology transfer and innovation processes could be substantially improved (as to the latter: e.g. via early presence of users).
- The platform would result in an increase in competitiveness of European industry, increasing its capability to successfully participate in non-European procurements.
- The synopsis of the EU priorities would alleviate and reinforce investment decisions in the private sector.
- With regard to next-generation R&D activities the platform would represent in principle the technology part of a European Space Programme.

Economic

Space technologies are enabling technologies representing the first and strategic element of an important economic value chain. Already today, each € spent for launcher or spacecraft development/deployment generates roughly follow-on revenues of 10 €, deriving from operations, ground segment developments (satellite dishes, navigation signal receivers etc.) and services.

With, for example, the navigation market and the satellite-based Digital TV market being only in their infancies, this already favourable economic return ratio may be expected to further increase substantially over the next decade.

It is therefore imperative, that Europe commands the relevant technologies also because of their positive impact on the sustainable growth of the European economy.

Due to the relatively low public engagement in Europe, European space industry's revenues stem to only 50% from public contracts compared to more than 80% for US industry, making European companies much more vulnerable and dependent on the global space market's fluctuations and the successful operating in that market. The proposed platform therefore represents also a strong tool to improve the competitiveness of European industry.

Political

As already indicated earlier, the space sector can give vital support to key Union polices, including sustainable development and growth, transport, information society and Common Foreign and Security Policy.

Against this background and the political consensus that the Union shall become in the future also a global political actor, the proposed Constitution for Europe foresees space as a shared competence of the Union.

It is therefore appropriate that a space technology platform, aiming at reinforcing and coordinating the European next-generation technology effort will be introduced at European Union level. This would also take into account that e.g. GALILEO and GMES are long-term initiatives, necessitating a continuous R&D effort.

Based on the above considerations, also the Commission's White Paper on Space recommends a stronger engagement of the European Union in the space and space-enabled technology sector.

The Framework Agreement between the European Community and the European Space Agency allows the Union to cooperate and coordinate its activities more closely with ESA and to benefit from ESA's established coordination processes and technical competence.

The Framework Agreement will also establish a joint cooperative structure, in particular a so-called "Space Council".

Development of the Technology Platform (State of play)

In order to address the challenges and to ensure the coherence of continued investment made both through Member States, ESA Programmes and EU related activities, Europe has recently established a technology foresight and harmonisation processes for co-ordinating all players - ESA, the EU and national agencies and research organisations as well as industry.

These activities are organised in the framework of the European Space Technology Master Plan (ESTMP). They identify next-generation space technology requirements, corresponding gaps and unwanted overlaps in current assets, establish priorities for the actions and achieve commitments of the players committed to developing these technologies.

ESA is the key actor in this process, facilitating (through preparation, coordination, documentation, recommendations and synthesis) a fruitful dialogue between ESA, the European Commission, Member States, national agencies and research organisations as well as industry.

The methodology followed is based on two consultation meetings per technology topic, open to all actors (Industry, National Agencies and Delegations, Operators, EC, ESA's programme and support Directorates); its objective is to achieve a mapping as complete as possible of the corresponding technology.

The second phase is restricted to the funding parties (ESA-Member States, European Commission, ESA); it aims at establishing roadmaps for future R&D activities, covering all programmatic aspects. (identification of milestones, financing sources, possibilities for sharing skills, expertise, capacities and resources with potential partners).

A first edition of the European Space Technology Master Plan is already available.

This first ESTMP release by ESA does not yet embrace the EU funded application and service-driven R&D activities nor dual-use technologies. Furthermore, the direct involvement of end-users and a comprehensive technology transfer have not yet been established.

Through the proposed technology platform, which should be based on the existing and proven processes established in the context of the ESTMP, the process shall be revised in order to reflect the EU dimension.

Main events

- 1999: Issuing of the 1st release of the Space Technology Requirements document by ESA;
- 2000: beginning of the space technology harmonisation process (on-going);
- November 2000: Adoption of the European Strategy for Space (COM (2000) 597) by EU and ESA Council, which stresses the importance of the new upcoming space-enabled applications and services;
- 2001: Start of active harmonisation efforts to bring together National, ESA and EU activities to promote a coherent space technology planning;
- November 2002/June 2003: Issuing of the 1st release of the European Space Technology Master Plan by ESA;
- November 2003: Commission's White Paper on European Space Policy (COM (200) 673) - Recommendation to enlarge the ESTMP process.

Activities (existing and planned in short term)

- 200 m€ spent per year on space technology RTD activities through ESA.
- 200 m€ spent per year on space technology RTD activities through Member States.
- 80 m€ spent per year for R&D on space-enabled applications through EU FP 6.
- 31 m€ allocated in supported to critical electronic components for the next two years (ESA).
- Technology transfer through programmes on national ESA and EU level.
- On-going identification of critical technologies jeopardising EU independence.

Specific Deliverables (short to medium term)

- Space and space-enabled Technology RTD Requirements document updated every year.
- Thematic Technology harmonisation roadmaps issued twice a year.
- A yearly updated assessment of critical technologies for European non-dependence.
- A yearly updated enlarged Master Plan for research and development in space and space-enabled technology R&D.
- An extended consultation mechanism to identify early technology RTD needs stemming from EU policies.
- Awareness Initiatives to support the participation of new Member States.
- A European non-depending Technology portfolio enabling European independence in space and direct support to EU policies through space and space-enabled solutions
- Yearly updated Inventory of on-going European institutional space technology RTD activities (over 1400).

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Title The European Steel Technology Platform

Detailed information www.cordis.lu/coal-steel-rtd/home.html

Overall Policy Objective

The creation of a technology platform for steel as part of the European Research Area will enable to implement a strategic research agenda which is a key part of a sustainable development policy aimed at maintaining the leadership of the European steel industry.
Objectives are to define a vision up to 2030 in view of:

- *Achieving the ambitions of the European Steel industry (to meet society's needs and to consolidate a global, sustainable and competitive partnership)*
- *Contributing to the European Research Area's objectives: integration, co-operation.*

Europe's technological position in a global context

The European steel industry produces approximately 160 million tonnes of crude steel per year, which represents about 20% of world steel production. China produces around 19% of world steel production, Japan 12% and USA 10%.

The estimated turnover of the European steel industry is € 80-90 billion among which 1% is allocated to R&D.
The R&D in Europe represents € 800 million/year among which € 100 million for medium term projects implemented at European level. The Research Fund for Coal and Steel co-finances these actions with € 50 million/year.
Its labour force represents about 260,000 people.

Primary Technical, Economic and Political Justification for action

The European steel industry exploits the most modern and efficient facilities. This leadership has been achieved after a long process of restructuring and consolidation and now, facing up to globalisation, the industry's ambition is to maintain this position through the implementation of a sustainable development policy that will meet society's need while remaining competitive.

It will face some important challenges such as competitiveness with emerging countries, the necessity to respond to more demanding markets, and the need to make a clear commitment to saving natural resources to meet exacting environmental regulations, in particular, to significantly reduce CO2 emissions. These challenges will require determined long-term structured action supported by a coordinated system and the participation of all stakeholders.

In particular, environmental issues and the development of new steel solutions for many applications will necessitate the implementation of new production routes. In this respect, breakthrough technologies will be particularly important and, as a consequence, a large effort in R&D and innovation will be required. The issues of security and competence of human resources must also be developed in parallel with these activities.

The expected impacts:

- Improved ability to compete with third countries.
- Improved working environment (risk management, safety, working conditions) and ensuring skills development.
- Continuing progress on environmental protection, conservation of raw materials (recycling, use of by-products, reduction of emissions), greater energy efficiency and in particular the massive reduction of CO2 emissions through the development of new revolutionary technologies to meet post Kyoto commitments.

Development of the Technology Platform (State of play)

- July 2003: Informal meeting between Commissioner Busquin and the European steel industry (the group of personalities) - decision to produce a report on the objectives and needs of the sector.
- March 2004: Official launch of the steel technology platform in Brussels. Presentation of the report of the Group of personalities **"European steel technology platform - Vision 2030".**
- July 2004: First meeting of the support group.
- End 2004: First meeting of the steering committee.

Activities (existing and planned in short term)

- **Projects co-financed in the framework of the Research Fund for Coal and Steel and of the Framework Programme.**
- Active efforts to bring relevant **national, regional and local projects and initiatives, as well as privately funded industrial R&D.**
- **Secretariat** (Commission services initially).

Specific Deliverables (short to medium term)

- **Strategic Research Agenda.**
- **European Roadmap for Steel.**
- **Public-private partnerships.**
- **Policy Interface / Framework -** for interaction with political institutions.
- **International co-operation strategy.**
- **Progress monitoring system.**

Commission services contact

Mr Philippe Vannson,
DG Research

Platform Contact

Mr Jean-Claude Charbonnier
Director of International Scientific Affairs
ARCELOR Innovation

Title The European Technology Platform: Textiles and Clothing

Overall Policy Objective

To facilitate and accelerate the development and adaptation of the textiles and clothing industries to the major changes taking place, to the challenges arising from the rapid creation of new products and to the new forms of organisation, as well as to face increasing global competition in this industrial sector

Europe's technological position in a global context

The European textiles and clothing sector accounts for 4% of total EU manufacturing and 7% of manufacturing employment. It represents an important part of the EU manufacturing with a turnover of € 200 billion and with roughly 177.000 enterprises. It employs more than 2 million people, a figure set to increase to 2.7 million after enlargement.

The years 2001 and 2002 were very difficult for the textiles and clothing industry with significant declines in production and employment. The trade deficit amounted to some € 26 billion in 2002, the trade in textiles reaching a surplus of € 8 billion and the deficit in clothing € 34 billion.

However, a comparison of trade performance with the US and Japan reveals that in both the textiles and clothing areas, the EU has improved its competitive position. The industry is nevertheless under increasing competitive pressure from other major textile and clothing producing countries, such as China, India or Pakistan.

Primary Technical, Economic and Political Justification for action

In view of the challenges that the sector is facing and will continue to face in the coming years and in particular the elimination of import quotas on 1 January 2005, the European Commission adopted a Communication on the future of the textiles and clothing sector in the enlarged European Union in October 2003. The Ministers of the EU-15 welcomed the Communication at the meeting of the Competitiveness Council in November 2003. The Commission has carried out a review of its policies and instruments, with the objective of identifying measures or lines of action that can improve the competitive position of the textile and clothing sector. The mobilisation of all key stakeholders in a Technology Platform towards a common goal in this field is expected to deliver substantial benefits, including:

- Development of a long term vision for the sector in Europe.
- Concentration of efforts and avoidance of fragmentation.
- Radical technological and organisational transformation of the sector and modernisation with an important goal of sustainable and clean technologies.
- Structured socio economic and technological research.
- Stimulation and increased effectiveness of public and private investment in R&D with the objective of 3% of GDP.
- Knowledge generation, innovation competitiveness and productivity.
- Removal of obstacles for deployment and acceleration of market penetration.
- Last but not least, changing its image.

Development of the Technology Platform (State of play)

A European High Level Group (HLG) has been set up comprising the European Commission, Member States (Ministers from France, Italy, Germany, Portugal), MEPs, Industry (including manufacturing fibres, machine tool enterprises for textiles), Trade Unions, Retailers, Importers, Distributors and the Research Community to stimulate debate on possible initiatives to facilitate the sector's adjustment to the major future challenges. In order to ensure continuity, the members of the Group have been requested to indicate "sherpas" who could work with the involved Commission services between the plenary session meetings of the HLG. Among the subjects covered by the Group, Innovation and Research and Development will be a major issue and a specific working group was created to discuss R&D matters.

- February, April, May and June 2004: Meetings of the Group of Sherpas.
- March, May and June 2004: Meetings of the High Level Group.
- Throughout 2004: Identification of the barriers and the technological needs of the sector and collection of research needs in the context of the long term vision.

› June 2004: Adoption by the High Level Group of an interim report and recommendations, including, specific policy actions to address technological needs of the sector.

Activities (existing and planned in short term)

- **Some 47 projects on Textile related Research under EU FP5.**
- **All new relevant projects under FP6.**
- Active efforts to bring relevant national, regional and local projects and initiatives, as well as privately funded industrial R&D.
- **European Commission Services Project Team.**
- **Secretariat** (Commission Services initially).

Specific Deliverables (short to medium term)

- **Strategic Research Agenda.**
- **Deployment Strategy** including recommended policy measures (industrial, environmental).
- **European Roadmap for textiles and clothing.**
- **Public-private partnerships.**
- **International co-operation strategy.**
- **Progress monitoring system.**

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Title The Technology Platform on Future Manufacturing Technologies: "Manufuture"

Detailed information europa.eu.int/comm/research/industrial_technologies/articles/article_1179_en.html

Overall Policy Objective

- *To develop a 'research and innovation' strategy based on a long term vision for a field where there are many technological and economic variables and in consequence to assist the transformation of the European manufacturing industry towards a knowledge-based economy and the achievement of a world leadership in manufacturing.*
- *To identify aspects of technological research and innovation with high potential for breakthroughs that could be only achieved at a European level.*
- *To co-ordinate EU and national, regional and local R&D Programmes to reach a critical mass, to avoid overlaps and to develop a long term strategy where RTD activities will be a core element, but also where education and training will be priorities.*

Europe's technological position in a global context

Europe is home to more than 20 million enterprises, providing employment for 122 million people. The number of manufacturing businesses (classified as NACE D*) is about 10% of this total. Manufacturing activity today represents approximately 22 % of EU GNP. It must be stressed however that the conventional distinction between primary, secondary and tertiary sectors is less meaningful today than in the past. The importance of services as intermediate inputs is increasing in every sector and in particular in manufacturing. Moreover, to better satisfy consumer needs, many goods can achieve a competitive edge in the market place only by incorporating a rising share of services to the customer. In other words, the trend today is towards increased importance of the so-called product-services (or 'extended products') necessitating industry to develop networks and extended enterprise partnerships.

Statistics show that the share of manufacturing in GDP has been falling in the nineties (from 22 to 20% in high income countries), with the significant exception of East Asia and Pacific where the manufacturing share of GDP rose from 28% in 1990 to 32% in 2001. Similar trends appear in the data on employment where the share of industry fell from 33% to 28% in the EU. This does however mean that manufacturing will disappear. On the contrary, manufacturing is a key element of any economy and increased research and innovation efforts are being devoted to this sector.

Considering business expenditure related to added value, the share for manufacturing R&D in Europe (5.7%) is nevertheless below that of the US (7.8%) and Japan (8.4%). If high-tech patenting is used as an indicator of technological competitiveness however, the EU has a substantial lead over the US and Japan in materials technologies and is today quite strong in the field of manufacturing. Moreover, based on the patent situation, Europe's areas of technological specialisation are mechanics and processes.

** Manufacturing sectors are classified according to sub-sectors, ranging from clothing and textiles to machinery, from wood-related products to leather and footwear, from electronics to aeronautics, from instruments and control systems to motor vehicles.*

Primary Technical, Economic and Political Justification for action

European traditional manufacturing industry is faced today with many challenges to remain competitive in an increasingly complex environment. The speed of innovation, pushed by the consolidation of the Information and Communication Technologies, and the rapid uptake of new technologies, such as nanotechnology, is counterbalanced by the growing cost of high level research and the disparities in framework and employment conditions between different regions of the world. On the other hand, the societal role of manufacturing industry is becoming more important, in particular regarding sustainable development and the societal consequences of economic and technological evolution.

In this context and in line with the Lisbon objectives, European industries must evolve, modernise their manufacturing approaches and adapt their structure, strengthen the links between research and innovation, and increase the added value of products, production and services. This can be characterised by a transition from resource-based to knowledge-based organisations. However such a transformation for the traditional EU industry, in a global context, is far from easy, especially given that many actors are small and medium sized companies).

In view of the challenges that the European industry is facing and will continue to face in the coming years, the European Commission adopted a Communication on an integrated approach and the key challenges of competitiveness in Europe on November 2003. In December 2003, the Manufuture 2003 conference was organised in Milan to identify more specific challenges related to the manufacturing industry.

Development of the Technology Platform (State of play)

2001-2002: An in-depth reflection was carried out by a group of leading EU experts.

2002: A comprehensive foresight study was carried out on the future of manufacturing, under the growth programme.

February 2003: A workshop organised by DG Research confirmed the need to develop a long-term vision for EU manufacturing.

December 2003: The Manufuture 2003 Conference was held in Milan.

At the Manufuture 2003 conference, Commissioner Busquin proposed to create a High Level Group (HLG) on Manufacturing. It should aim at developing Long Term visions for research and innovation actions at EU level as well as to stimulate awareness and discussion about the future of the manufacturing industry at the horizon 2015-2020. It should help in identifying the main barriers and technological needs of the sector and setting-up a strategic agenda to maintain European leadership in manufacturing through the development of a possible manufacturing technology action plan. This plan would cover in particular targeted research initiatives, including the development of Joint European Technology Initiatives, as appropriate.

The HLG has a balanced representation covering Industry, Research and Education, Trade Associations and Other stake-holders. The membership may still be extended, as needed. In order to ensure adequate support and continuity to the work of the HLG, an expert "Sherpa" working group has been set up.

March 2004: First meeting of the Sherpa Group.

- June 2004: First meeting of the High Level Group
- Up to end 2004: Collection of research needs in the context of a long term vision.
- October 2004: presentation of the "2020 HLG report".
- Autumn 2004: Inputs for the preparation of the Manufacture 2004 conference.
- December 2004: Manufuture 2004 Conference and recommendations for possible priorities under FP 7 (6-7 December, Enschede, The Netherlands).
- 2005: Elaboration of a Strategic Research Agenda; launching of targeted initiatives, as appropriate.

Activities (existing and planned in short term)

- **Some 300 projects on Manufacturing related Research under EU FP5.**
- **All new relevant projects under FP6.**
- Active efforts to bring together relevant national, regional and local projects and initiatives, as well as privately funded industrial R&D.
- **European Commission Services Project Team.**
- **Secretariat** (Commission Services initially).

Specific Deliverables (short to medium term)

- **Strategic Research Agenda** including ways to leverage private and public R&D investment.
- **Deployment Strategy**
- **European Technology Roadmaps** including an analysis of transition strategies.
- **Public-private partnerships.**
- **International co-operation strategy.**
- **Progress monitoring system.**

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Title The Technology Platform: "Building for a Future Europe"*

*** note: proposal stage**

Overall Policy Objective

- *To develop a research & innovation strategy in line with a long term vision for meeting the challenges of large scale infrastructure programmes for roads, railways, ports, bridges, tunnels as well as urban cities, cultural heritage,… that link European regions in order to achieve a real European integration*
- *Helping cities to collaborate more effectively and to implement new multidisciplinary approaches and solutions to urban design, cultural heritage, renovation, re-use and refurbishment of existing stock and integration of transport and service infrastructures*
- *To support the European construction industry in its transition, to become a more knowledge-based industry and to maintain its world leadership*
- *To contribute to construction related priority actions identified in ETAP (environmental technology action plan) such as greening procurement methods and the importance of awareness-raising and training*
- *To enhance the contribution of the construction sector to the achievement of the goals identified by the Heads of State and Government at the European Councils held in Lisbon, Gothenburg and Barcelona in terms of competitiveness, sustainability and an increased level of RTD up to the Barcelona 3% target*

Europe's technological position in a global context

The construction sector is a strategically important sector for Europe, providing the buildings and infrastructure on which all other industries, and public bodies, depend. The construction sector employs more people than any other industrial sector. However, because most firms in the sector are small or medium-sized enterprises (SME's), its contribution to European GDP and its importance for overall economic performance is often not fully recognised.
Some key statistics from 2003 illustrate the significance of the construction sector to Europe:

- € 910 billion was invested in construction, representing about 10% of the GDP of the EU-15 and 51 % of Gross Fixed Capital Formation.
- 11.8 million people were directly employed in the sector, being 7% of the total workforce of the EU and 28% of industrial employment.
- 2.5 million enterprises make up the sector of which 97% are SME's with fewer than 20 operatives and 93% of which have fewer than 10 operatives.

In all, it has been estimated that 26 million workers in the EU-15 depend, directly or indirectly, on the construction sector.

In the new Member States of Poland, Hungary, Czech Republic and Hungary alone, the estimated market size for construction activity in 2003 was 38 billion Euro, growing strongly at an average rate of 4.2%. Clearly there are very large markets in these countries for renovation (residential repair and maintenance) and infrastructure. The importance of enhancing the performance of existing buildings and facilities should be stressed, given that in excess of 80% of the built environment that will be in use in 2030 is already constructed.

In the international marketplace, the European construction sector is a major contributor towards European exports, reported as winning more than 50% of major international construction contracts and with a volume of business greater than Japan by 10% and 30% greater than US companies. Maintaining this competitive advantage depends crucially on creating a culture of innovation throughout the sector.

The sector has a key influence on sustainability. It extracts more raw materials than any other sector, and the creation and operation of the built environment (including the energy used in processing and transporting construction materials and products) accounts for at least 50% of European energy consumption. Beyond these wider challenges, there are specific needs relating to buildings and infrastructure in Europe. There is an urgent need to address the rehabilitation and regeneration of many of the urban areas of Europe, particularly in the new Member States. Examples include raising the quality of social housing, preserving cultural heritage and introducing manufacturing processes to construction.
The on-going difficulties and delays encountered in the realisation of the Trans European Networks (TEN's), as well as other major infrastructure projects, illustrate the significance of the construction sector to the fulfilment of European goals. The issues are both economic and environmental but in particular the economic viability of the TENs would be enhanced if their construction costs – and hence their call on national budgets - could be reduced.

Primary Technical, Economic and Political Justification for action

Today there is a view that construction is not only an industry that provides physical products but also one that supplies and facilitates a set of environmental (and maybe other) services housed in the envelopes of buildings, of communications services manifested in bridges, tunnels etc; of utility services and of the collection of services and experiences that make up urban living. This 'service' perspective represents a radical change in thinking for those who commission and those who supply construction outputs. It views the delivered output not as a physical object, but as an asset that, over its operational life, will support, facilitate and influence the activities associated with it. It shifts attention from the traditional focus on hand-over and the defects period, to the years beyond - whether or not the supplier has (e.g. through a public-private partnership) a commercial interest in that performance.

This paradigm shift, coupled with the drive for sustainability, is regarded as the key driver for change and improvement in construction in future years. When products of construction are viewed as assets, and the industry that supplies them as a service industry, new business drivers are introduced, new relationships are created with clients in both public and private sectors, and new supply structures evolve.

The industry is not only challenged to provide a set of high quality outputs, but also to provide the most effective long-term support service to its clients while responding to society's requirements for sustainability. In this context, and in line with the Lisbon objectives, the European construction industry has to evolve, and it is clear that any strategy to achieve European economic and social objectives must include measures to improve the efficiency and sustainability of the processes and products in the creation, operation and maintenance of the built environment.

Development of the Technology Platform (State of play)

Discussions on the creation of one or more technology platforms for construction commenced in 2003 and have involved industry federations, their members, other key organisations and the EC. In early 2004, the European Council for Construction Research Development and Innovation (ECCREDI) set up a working group to prepare detailed proposals for a technology platform, and progress was, inter alia, reported at the following public events:

- 6-7 Nov. 2003, Warsaw, E-Core workshop "Construction research in Enlarged European Union"
- 2-3 February 2004, Brussels, FP6 Brokerage and Partnering workshop for construction sector
- 27 May 2004, Brussels, E-CORE full network meeting to discuss the draft of E-Core Strategy
- Several internal ECCREDI meetings and meetings with EC officials

Within the working group, there has been a strong link to the ongoing development of the E-CORE strategy for construction RTD in Europe, which is being taken forward under the auspices of the E-CORE project co-ordinated by ECCREDI.

The E-CORE B4E Conference in Maastricht on 14/15 October 2004, at which the strategy will be further debated, will be an important opportunity for presenting to a wider audience the purpose and deliverables of the proposed new ETP in construction and to launch the first meeting of the High Level Group (HLG). A key early stage in the work of the platform is to develop visions and roadmaps for research needs in selected focus areas. It is envisaged that these individual visions will ultimately be brought together in a wider long-term Vision 2030 for the built environment which will identify the main technological issues, needs and barriers to innovation in the sector and which will develop a strategic agenda and associated action plan and roadmaps to maintain Europe's leadership in construction.

As a result of the discussions noted above, the following priority focus areas have been identified:

1) Underground Construction
2) Cities: New concept of houses
3) Cities: urban issues/living
4) Energy positive buildings
5) Safety of workers
6) Infrastructure

The mobilisation of all main stakeholders in a technology platform to achieve focused visions in key areas of technological challenge in construction is expected to deliver substantial benefits, including:

- Development of focused roadmaps and visions for key areas, which will influence future Framework Programmes and wider European policies towards construction;
- Radical technological and organisational transformation of the construction sector and modernisation in key industry-led priority areas, leading to the key goal of a sustainable industry and built environment;
- Development (ultimately) of a long-term and updateable vision for the sector in Europe;
- Concentration of effort, leading to greater impact;
- Stimulation and increased effectiveness of public and private investment in R&D, so contributing to the European objective that investment should be at the level of 3% of GDP;

- Underpinning EU enlargement through opening up new markets, whilst enhancing standards and stimulating greater competition;
- Underpinning equitable markets for public works through facilitating the use of cutting-edge technologies in major construction works in the context of the implementation of the Single Market;
- Facilitating the implementation of regulations linked to the energy performance of buildings and contributing to the achievement of the Kyoto objective;
- Contributing to safer and healthier working and living environment, leading, inter alia, to an improved legal framework for health and safety in construction and a corresponding reduction in accidents in the workplace;
- Contributing to the eradication of the (false) public perception that construction is a low technology industry.

The composition of the HLG will be decided upon so as to ensure a balanced representation of Industry (including associations, manufacturers, suppliers, operators, contractors, consultants, and architects) of Research and Education sectors, of Stakeholders and of representative of citizens. In order to ensure adequate support and continuity to the work of the HLG, an expert support group will work in parallel. A 'shadow' group of representatives of Member States and accession countries should further enable discussions about a better coordination of actions.

Working groups are now being formed for these focus areas. The technology platform will co-ordinate actions across the focus areas, recognising that many of the issues involved will be common to several areas, and some may run across all areas.

Activities (existing and planned in short term)

- Some 346 projects on construction related Research, including Thematic Networks, SSA, have been funded under FP5 and a further 50 under FP6 have been launched considering all priorities….
- An ERA-NET project "Erabuild" has been retained and is being co-ordinated by TEKES, Finland a tentative member of the HLG.
- Active efforts to bring together relevant national, regional and local projects and initiatives, as well as privately funded industrial R&D are ongoing through E-CORE.
- European Commission Services Project Team around DGs Research, Enterprise and Environment (being set up)
- Task force, advisory council, board, assembly have to be set up.
- Secretariat (to be taken up by one of the members).

Specific Deliverables (short to medium term)

- **Strategic Research Agenda** focussed on key, industry led technological challenges including ways to leverage private and public strategic R&D investment.
- **Deployment Strategy,** including recommended policy measures.
- **European Technology Roadmaps** including an analysis of transition strategies.
- **Public-private partnerships** (article 171).
- **Identification of barriers** to investment in RTD and of ways to overcome these.
- **International cooperation strategy.**
- **System for monitoring implementation of the strategy.**

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EUR 21265 — TECHNOLOGY PLATFORMS - From Definition to Implementation of a Common Research Agenda

Luxembourg: Office for Official Publications of the European Communities

2004 — 88 pp. — 21.0 x 29.7 cm

ISBN 92-894-8191-9

Publications Office
Publications.eu.int

ISBN 92-894-8191-9