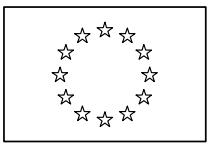

COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 21.9.2005
COM(2005) 440 final

2005/0185 (CNS)

Proposal for a

COUNCIL DECISION

concerning the Specific Programme "Cooperation" implementing the Seventh Framework Programme (2007-2013) of the European Community for research, technological development and demonstration activities

(presented by the Commission)

EXPLANATORY MEMORANDUM (EC TREATY)

1. CONTEXT OF THE PROPOSALS

The proposals for five specific programmes follow the Commission's proposal for a 7th Framework Programme (2007-2013) adopted on 6 April 2005[1]. A structure was presented in terms of four main specific programmes - "Cooperation", "Ideas", "People" and "Capacities" - each corresponding to a major objective of European research policy; a further specific programme is for the direct actions of the Joint Research Centre. The Commission will be presenting proposals for the "Rules for Participation and Dissemination" that apply to the 7th Framework Programme.

The policy context and objectives are those set out in the Communication "Building the ERA of knowledge for growth"[2]. To meet these objectives and implement in full the specific programmes will require a doubling of the budget as proposed by the Commission.

Research, technology, education and innovation are a significant way of creating jobs in a long term and sustainable manner. They are also the key to economic growth, competitiveness, health, quality of life and the environment. The research Framework Programme, alongside Community programmes in the areas of education and innovation, is aimed to progress towards the knowledge economy and society. The specific programmes of the 7th Framework Programme are designed to address, in combination with the necessary national and private efforts, major weaknesses in the level, quality and impact of European research. The dissemination and transfer of knowledge is a key added value of European research actions, and measures will be taken to increase the use of results by industry, policy makers and society.

Europe must invest more in research and a new emphasis is needed if the European Union is to progress towards the objective of investing 3% of its GDP in research by 2010. The 7th Framework Programme will contribute to this, both through direct financing but also by leveraging additional public and private investments in research.

Europe needs more researchers in order to increase and improve its research efforts. Alongside other actions, such as the European Charter for Researchers and national policy measures, the 7th Framework Programme is designed to stimulate more people to embark upon and pursue research careers, and once again attract leading research talent to Europe.

Financial support at a European level offers opportunities to increase the excellence and effectiveness of research which cannot be achieved at national level. The specific programmes of the 7th Framework Programme represent further consolidation of the European Research Area, achieving critical mass and structures in new areas of research and by new means, and further supporting the free movement of ideas, knowledge and researchers.

Throughout the implementation of the specific programmes the potential for European level actions to strengthen excellence in research will be exploited to the maximum, notably through EU wide competitions backed with rigorous and independent evaluation of proposals.

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1 COM(2005) 119.
2 COM(2005) 118.

This implies identifying and supporting existing excellence wherever it exists across the European Union as well as creating capacities for future research excellence.

The impact of the specific programmes will be enhanced through complementarities with other Community policies and programmes, and in particular the Structural Funds, the education programmes, and the Competitiveness and Innovation Programme.

2. PRIOR CONSULTATION

The preparation of the specific programme proposals has taken account of the views expressed by the EU Institutions, in particular the European Parliament and European Council, as well as other stakeholders including researchers and users of research. This includes the ongoing discussions and inputs in relation to the proposal for the 7th Framework Programme decisions, the extensive consultations and inputs collected during the preparation of that proposal, and further work in identifying future research priorities such as that being undertaken by European Technology Platforms.

The Specific Programme proposal draws from the in-depth impact assessment undertaken for the 7th Framework Programme proposal[3] which demonstrated the strong and specific added value of each of the specific programme proposed. In addition, the proposals take account of the outcome of the five year assessment of the Framework Programme[4].

3. LEGAL ASPECTS

The proposal for the specific programmes is based on Title XVIII of the Treaty, Articles 163 to 173, and in particular Article 166(3) concerning implementation of the Framework Programme through specific programmes.

4. BUDGETARY IMPLEMENTATION

The legislative financial statements attached to each proposed Decision set out the budgetary implications and the human and administrative resources.

The Commission intends to set up an executive agency which will be entrusted with certain tasks required to implement the "Cooperation", "People" and "Capacities" Specific Programmes. This approach will also be taken for the implementation of the "Ideas" programme (see Section 7.2 below).

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3 SEC(2005) 430.

4 COM(2005) 387.

5. A COHERENT AND FLEXIBLE IMPLEMENTATION

5.1. Adapting to new needs and opportunities.

It is vital that the implementation of the specific programmes is sufficiently flexible to remain at the forefront of scientific and technological developments and respond to emerging scientific, industrial, policy or societal needs. Those actions which allow researchers themselves to identify topics will be particularly important in this respect. For other actions, this will be achieved primarily through the work programmes which will be updated on an annual basis. This will be undertaken with the assistance of the committees of Member State representatives where it is envisaged that the committees' clear focus will be on the work programmes. Revisions may be made more rapidly in case of new priorities requiring an urgent response, in particular arising from unforeseen policy needs.

This multi-annual programming will benefit from a wide range of inputs to ensure that the activities supported maintain direct relevance to the evolving research needs of industry and EU policies. External advice will be sought, including for each of the themes within the Cooperation specific programme, with effective multi-disciplinary coverage and a balance of academic and industrial views.

For the Ideas programme, an entirely new approach will be taken whereby the preparation of an annual work programme will be entrusted to an independent scientific council as part of the establishment of an autonomous European Research Council (see Section 7.2 below).

Additional external inputs, in particular for the Cooperation programme, will be facilitated in particular from the **European Technology Platforms** established in various fields which should play a strong and dynamic role to ensure the industrial relevance. The research priorities identified in the Strategic Research Agendas defined by the platforms are well reflected in the specific programme proposals, and will provide an important input in the multiannual programming.

Other fora and groups may provide the Commission with timely advice on new priorities in particular areas, such as European Strategy Forum on Research Infrastructures (ESFRI) and platforms established to consider strategic research agendas relevant to social or environmental policy areas.

An important new opportunity that will be provided by the Framework Programme is an innovative financing mechanism, the **Risk-Sharing Finance Facility,** aimed at fostering private sector expenditure in RTD by improving access to European Investment Bank (EIB) loans for large European actions which need to combine several sources of financing, including loans. These large European actions are "Joint Technology Initiatives" and large collaborative projects funded directly by the Framework Programme within the Cooperation programme, and new research infrastructure projects under the Capacities programme. Other large European collaborative projects such as Eureka ones could also be considered, in accordance to eligibility criteria. The contribution envisaged from the specific programmes to the EIB will significantly improve the access to debt finance and thereby exercising a significant leverage effect on private investments in RTD.

5.2. Cross cutting issues

Overall coherence in the implementation of the 7th Framework Programme will be ensured by the Commission, taking full account of the guaranteed autonomy and independence of the European Research Council in the Ideas programme.

The work programmes across the other specific programmes will be revised in a coordinated way to allow cross cutting issues to be fully taken into account. The committees of Member State representatives also have an important responsibility in assisting the Commission in the effective coherence and coordination of implementation across and within these specific programmes. This implies a strong level of coordination within Member States and between representatives of different committee configurations.

Where actions to be supported have a strong relevance to different parts of the Cooperation, People and Capacities specific programmes, joint calls will be used building on the experience gained in the 6th Framework Programme. This will be particularly important for research topics that cut across the themes in the Cooperation programme, and such calls will be clearly identified in the work programme.

The following issues that cut across the Cooperation, People and Capacities specific programmes are of particular importance, and particular arrangements for a coordinated approach are foreseen:

- *International cooperation*: all of these specific programmes are open to international cooperation, and have dedicated actions in this respect. A strategic approach will be taken across the Framework Programme to promote European research excellence and competitiveness and to address specific global or regional issues where there is a mutual interest and benefit. A coherent approach across the specific programmes in line with this strategy will be ensured and the Capacities programme will have a major role in this respect.

- *Research infrastructures:* the main support to research infrastructures will be implemented in the Capacities programme, and this programme will ensure a coordinated approach with relevant research activities in the other programmes, notably the Cooperation programme.

- *Cross cutting policy research*: Arrangements for effective coordination within the Commission services will be put in place, in particular to ensure that activities continue to meet the needs of developments in EU policies. For this purpose, the multi-annual programming may draw on the help of user groups of different Commission services associated with the policies concerned, and in this context an internal structure will be created to ensure the coordination of marine science and technologies across the relevant thematic areas.

- *SME participation:* the participation of SMEs will be optimised across the specific programmes. In addition to the strengthened SME specific actions in the Capacities programme: SME research interests are included throughout the Cooperation programme and topics of particular interest to SMEs will be further identified in the work programmes and calls for proposals; the activities in the People programme have a special emphasis on the involvement of SMEs; and SMEs will also be able to participate in the Ideas programme. The simplification measures envisaged and the increased flexibility in choosing the appropriate funding scheme will benefit in particular SME participation.

- *Dissemination and knowledge transfer*: the need to foster the uptake of research results is a strong feature across the specific programmes, with a particular emphasis on transferring knowledge between countries, across disciplines and from academia to industry, including through the mobility of researchers. The involvement of potential users in helping to define priorities (in particular through the European Technology Platforms) is important in this aspect. The complementary actions under the Competitiveness and Innovation Programme will also reinforce the use of research results by addressing the barriers to innovation and strengthening innovation capabilities.

- *Science in society*: this activity in the Capacities programme will also play a role to ensure that society aspects are properly taken into account in all specific programmes, and that interactions between scientists and the wider public are deepened.

6. SIMPLIFICATION AND MANAGEMENT METHODS

A significant simplification will be achieved in the implementation of the 7th Framework Programme, following the ideas presented in the Commission Working Document of 6 April 2005 and extensive dialogue with Member States and stakeholders on the basis of this document. Many of the proposed measures are to be presented in the Rules for Participation and Dissemination, notably to reduce "red tape" significantly and simplify the funding schemes and reporting requirements.

Within the specific programmes, proposed improvements include:

- Improved efficiency and consistency of implementation through the externalisation of administrative tasks to an executive agency.

- Rationalising funding schemes whereby implementation of each Specific Programme will make use of the instruments necessary to realise the objectives of the Programme.

- A clearer presentation of evaluation criteria: to be included in the Work Programmes following the principles set out in each Specific Programme.

- Clearly presented work programmes such that potential participants are well informed about the opportunities available which meet their particular needs and interests. For example, work programmes and calls will, where appropriate, highlight those topics of particular interest to SMEs or where cooperation with third countries is beneficial.

- Simplifications in other aspects, such as streamlining the approval of projects, the new funding and support schemes, and further use of databases and information tools to provide better communication.

7. CONTENT OF THE SPECIFIC PROGRAMMES

7.1. Cooperation

The Cooperation specific programme is designed to gain leadership in key scientific and technological areas by supporting cooperation between universities, industry, research centres and public authorities across the European Union as well as the rest of the world. Previous framework programmes demonstrate the impact of such actions in restructuring research in

Europe and pooling and leveraging resources. The 7th Framework Programme will distribute these impacts more widely and the nine themes proposed correspond to the major fields of progress in knowledge and technology where excellent research must be strengthened to address European social, economic, public health, environmental and industrial challenges.

The programme represents strong elements of continuity with previous framework programmes building on the demonstrated added value of European support of this type. There are, in addition, important novelties in this specific programme which require specific consideration for the implementation:

- Responding to the need for ambitious pan-European public private partnerships to accelerate the development of major technologies, through the launch of **Joint Technology Initiatives**[5]. A first set of initiatives have been identified with clear objectives and deliverables in the areas of innovative medicines, nanoelectronics, embedded computing systems, hydrogen and fuel cells, aeronautics and air traffic management and global monitoring for environment and security. These will be the subject of separate proposals (eg, under Article 171 of the Treaty). Further Joint Technology Initiatives, such as in the areas of zero emission power generation and renewable energy, may be identified during the implementation of the 7th Framework Programme.

- A strengthened approach to the coordinating national research programmes. The successful **ERA-NET** scheme will be continued and implemented within the themes. Existing ERA-NETs from the 6th Framework Programme will be allowed to submit follow up proposals to deepen their cooperation or broaden the consortia to new participants, and new ERA-NETs to address new topics will be supported. The scheme will also be open to public bodies planning a research programme but which is not yet in operation. In addition, an ERA-NET PLUS scheme will be introduced to provide an incentive for joint calls for transnational research projects organised between a number of countries.

- Following the experience of the European and Developing Countries Clinical Trials Partnership (EDCTP) Article 169 initiative, a further four **Article 169 initiatives** have been identified with the close cooperation of Member States. Such initiatives in the fields of ambient assisted living, Baltic Sea research and metrology are listed in the Cooperation programme and an Article 169 initiative to bring together national research performing SME-related programmes is mentioned in the Capacities programme. Further initiatives may be identified during the implementation of the 7th Framework Programme.

- A more targeted approach to **international cooperation** within each theme and across themes is foreseen with specific cooperation actions to be identified in the work programmes in line with the strategic approach for international cooperation foreseen and through policy dialogues and networks with different regions of partner countries.

- A component on to allow a flexible response to **emerging needs** and **unforeseen policy needs** will be supported under each of the themes and the implementation will build on the experience of the Scientific Support for Policy and New and Emerging Science and

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[5] As set out in the Commission Staff Working Document, *Report on European Technology Platforms and Joint Technology Initiatives: Fostering Public-Private R&D Partnerships to Boost Europe's Industrial Competitiveness* - SEC(2005) 800, 10.6.2005.

Technology schemes introduced in the 6th Framework Programme, as well as the Future and Emerging Technology scheme in the ICT area.

7.2. Ideas

Europe does not perform well in terms of truly outstanding research or mastering new fast-growing areas of science. The Ideas programme will provide such a pan-European mechanism to support the truly creative scientists, engineers and scholars, whose curiosity and thirst for knowledge are most likely to make the unpredictable and spectacular discoveries that can change the course of human understanding and open up new vistas for technological progress and solving enduring social and environmental problems. Driving up the quality of basic research through European wide competitions will generate significant social and economic benefits[6].

The "Ideas" programme adopts the term "*frontier research*" which reflects a new understanding of basic research. At the forefront of creating new knowledge, "frontier research" is an intrinsically risky endeavour that involves the pursuit of fundamental advances in science, technology and engineering, without regard for established disciplinary boundaries or national borders.

The programme will follow an "investigator driven" approach, allowing researchers the scope to propose their own topics. Grants will be provided for individual teams, leaving the flexibility for a team to consist of any grouping of researchers appropriate for the conduct of the projects, from one single institution or several institutions, in one country or across national borders. In all cases, scientific excellence and not administrative requirements should drive the formation of the teams. The programme will ensure differentiation from national funding actions in basic research by its strategic objectives and European scope.

The creation of a **European Research Council** (ERC) for implementing the Ideas programme represents a new departure. Two key structural components of the ERC will be established - an independent Scientific Council and a dedicated implementation structure – operating according to the principles of trust, credibility and transparency, it should provide adequate financial means and work with high efficiency, and it should guarantee a high degree of autonomy and integrity, while being consistent with the requirements for accountability.

The **Scientific Council** will consist of representatives of the European scientific community, at the highest level, acting in their personal capacity, independently of political or any other interests. Its members will be appointed by the Commission, following an independent process for their identification.

The mandate of the Scientific Council will include:

(1) *Scientific strategy:* Establishment of the overall scientific strategy for the programme, in the light of scientific opportunities and European scientific needs. On a permanent basis, in accordance with the scientific strategy, the establishment of the work programme and necessary modifications, including calls for proposals and criteria on

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6 *Frontier Research: the European Challenge.* High Level Expert Group Report, European Commission, May 2005.

the basis of which proposals are to be funded, and, as may be required, the definition of specific topics or target groups (e.g. young/emerging teams).

(2) *Monitoring and quality control:* As appropriate, from a scientific perspective, establishment of positions on implementation and management of calls for proposals, evaluation criteria, peer review processes including the selection of experts and the methods for peer review and proposal evaluation, on the basis of which the proposal to be funded will be determined; as well as any other matter affecting the achievements and impact of the Specific Programme, and the quality of the research carried out. Monitoring quality of operations and evaluation of programme implementation and achievements and recommendations for corrective or future actions.

(3) *Communication and dissemination:* Communication with the scientific community and key stakeholders on the activities and achievements of the programme and the deliberations of the ERC. Regularly report to the Commission on its activities.

The **dedicated implementation structure** will be responsible for programme execution, as provided for in the annual work programme. It will, in particular, implement the evaluation procedures, peer review and selection process according to the principles established by the Scientific Council and will ensure the financial and scientific management of the grants. In this regard, in the first instance, the Commission intends to establish an Executive Agency to which it will delegate the execution tasks. The implementation structure will maintain continual close liaison with the Scientific Council on all aspects of programme execution. In future and subject to an independent evaluation of the efficiency of the ERC's structures and mechanisms, an alternative structure, for example under the provisions of Article 171 of the Treaty, may be established.

The European Commission will act as the guarantor of the ERC's full autonomy and integrity. This means that the Commission's responsibility for the implementation of the programme will be effected by ensuring that the ERC's implementation structure are put into place, and that the programme is executed by the ERC in line with the objectives that have been set, following the scientific orientations and the requirements of scientific excellence, as they are determined by the Scientific Council, acting independently.

The Commission will be responsible for formally adopting the work programme for the "Ideas" programme. It will exercise this responsibility in line with the approach set out above. As a general rule, the Commission will adopt the work programme as proposed by the Scientific Council. If the Commission is unable to adopt the work programme as proposed, for example because the latter does not correspond to the objectives of the programme, or does not conform to Community legislation, the Commission will be required to state its reasons publicly. This procedure is designed to ensure that the operation of the ERC according to the principles or autonomy and integrity, are fully and transparently respected.

7.3. People

The People specific programme forms part of a broad and integrated strategy to strengthen, qualitatively and quantitatively, human resources in R&D in Europe. The programme will stimulate people to embark on and pursue research careers, encourage researchers to stay in Europe, and attract the best brains to Europe. There is a unique added value of European actions through harmonised instruments, stronger structuring effects and greater efficiency than bilateral arrangements between Member States.

The activities build on the long and successful experience of the Marie Curie actions in responding to researchers needs for training, mobility, and career development. While offering considerable continuity, a stronger focus is given to the following aspects:

- An **increased structuring effect**, for example through the introduction of co-funding of regional, national and international programmes in the action line "Life-long training and career development". The "co-funding"-mode would not replace the mode where individual post-doc fellowships are applied for and awarded at European level, as is currently exclusively the practice in the 6th Framework Programme. However, the individual fellowships have reached a stage of maturity in Europe. At the same time the national offers in this area remain fragmented in terms of objectives, evaluation methods and working conditions, and are still often restricted as regards their international or European dimension. It is therefore proposed to co-fund, on the basis of open calls for proposals, a selection of those programmes corresponding to the Framework Programme objectives. Evaluation and selection will be on merit without limitations regarding the origin of the selected fellows, and applying acceptable employment and working conditions (in terms of e.g. salary, social security, mentoring, professional development).

- **Participation of industry:** while the bottom-up character of the Marie Curie actions will be preserved, a stronger orientation will be placed on training and career development for and in different sectors, in particular in the private sector. This will be achieved by an emphasis on the development of complementary skills and competences, crucial for a better understanding of research in enterprise and for the quality of their research. This will be enhanced by stimulating intersectoral experiences through active participation of industry, in all the actions and by putting in place the dedicated scheme for knowledge sharing in partnerships between the public and private sector, including in particular SMEs.

- The **international dimension** will be reinforced. Besides outgoing fellowships with a mandatory return, aimed at contributing to the life long training and career development of EU-researchers, the international co-operation through researchers from third countries is further expanded. In addition, new dimensions are introduced for collaboration with EU neighbouring and EU S&T Agreement countries. Furthermore support of "scientific diasporas" of European researchers abroad and foreign researchers within Europe will be provided.

7.4. Capacities

The Capacities specific programme will enhance research and innovation capacity throughout Europe. The programme is a combination of continuation and reinforcement of actions in previous framework programmes and in addition important novelties.

A major new element is the foreseen strategic approach to supporting the construction of new research infrastructure which will complement the continued support for optimal use of existing research infrastructure. The support for construction of new infrastructure will be implemented through a two-stage approach: preparatory phase and a construction phase. Building on the work by ESFRI (The European Strategy Forum on Research Infrastructure) on the development of a European roadmap for new research infrastructure, the Commission will identify priority projects to which a possible EC support could be given under the 7th Framework Programme. For those projects, the Commission will act as a facilitator, in particular in facilitating financial engineering mechanisms for the construction phase, including facilitating access to EIB loans through the Risk Sharing Finance Facility. Annex 1

presents the ESFRI "list of opportunities", which consists of concrete examples of new, large-scale research infrastructures, which the scientific community in Europe will need in the coming decade.

The two schemes to support research for the benefit of SMEs and SME associations will be pursued with an increased budget to respond to the growing need of SMEs to outsource research.

Regions of Knowledge actions build on the successful pilot action. The aim is to enable transnational networks of regions to make full use of their research strengths, enable them to absorb new knowledge arising from research and to facilitate the emergence of "research-driven clusters" associating universities, research centres, enterprises and regional authorities.

An important new element is the action to unlocking the full Research Potential in the EU´s "convergence" and outermost regions. The realisation of the knowledge-based economy and society relies on strengthening the excellence of European research, but also on better using "untapped" high research potential which exists all over the EU. Actions will allow for the recruitment of researchers from other EU countries, the secondment of research and management staff, the organisation of evaluation facilities and the acquisition and development of research equipment. Such actions will complement the needs and opportunities for reinforcing the research capacities of existing and emerging centres of excellence in these regions which can be met by Structural Funds.

Science in Society represents a significant expansion of work in previous Framework Programme. It will foster better sciences, lead to better EU polices and a more engaged and informed public.

An important aim of the 7th Framework Programme is to build a strong and coherent international science and technology policy and activities in the Capacities programme will support this approach, in particular by helping to identify priorities for cooperation.

The coherent development of policies will put a greater emphasis on the co-ordination of national and regional research policies through a specific support scheme for trans-national policy cooperation initiatives by Member States and regions. This will reinforce the implementation of the open method of co-ordination to research policies and foster concerted or joint initiatives between groups of countries and regions in areas involving a strong trans-national dimension.

7.5. Joint Research Centre actions

While continuing to provide scientific and technical support to the EU policy making the JRC will further reinforce its customer-driven orientation and its strong networking with the scientific community. It will develop its activities in the specific context of growth, sustainable development and security.

The JRC actions will also respond to the call for 'better regulation' of the new Lisbon agenda. New challenges associated with the growing need to respond to the crises, emergencies and pressing political imperatives will be met by building up capacities and facilities in selected areas in view of providing adequate support in an EU context. An integrated approach to the provision of scientific and technical support to policies will also be a key feature of this specific programme.

8. BUILDING THE ERA OF KNOWLEDGE FOR GROWTH

Achieving the necessary rapid progress towards a knowledge economy and society requires a new ambition and effectiveness in European research. All actors across the European Union - national governments, research establishments, industry – have their role to play in this endeavour.

The specific programmes to implement the 7th Framework Programme are designed to maximise the leverage and impact of European level research spending within the available budget. Key features are the focus on four objectives in the corresponding specific programmes, with activities and means of implementation designed to meet these objectives; a strong element of continuity together with major new approaches; a consistent focus on supporting existing excellence and creating the capacity for tomorrows research excellence; a streamlined and simplified management to ensure a user-friendliness and cost effectiveness; and an inbuilt flexibility such that the Framework Programme can respond to new needs and opportunities.

Annex 1

ESFRI "LIST OF OPPORTUNITIES"[7]

- Facility for Antiproton and Ion Research (FAIR)
- Facility for intense secondary beams of unstable isotopes (SPIRAL II)
- European deep-sea neutrino telescope (KM3NeT)
- Extremely Large Telescope (ELT) – for optical astronomy
- Pan-European Research Infrastructure for Nano -Structures (PRINS)
- European Spallation Source (ESS) – neutron source
- European XFEL – for hard X rays
- IRUVX FELs Network – from infrared to soft X rays
- ESRF upgrade – synchrotron
- High Performance Computer for Europe (HPCEUR)
- Marine vessel for coastal research – essentially Baltic Sea
- Research Icebreaker Aurora Borealis
- European Multidisciplinary Seafloor Observatory (EMSO)
- European infrastructure for research in, and protection of, biodiversity
- Advanced infrastructure for brain and whole body imaging
- Bio-informatics infrastructure for Europe
- European network of advanced clinical research centres
- European network of bio-banks and genomic resources
- High security laboratories for emerging diseases and threats to public health
- Infrastructure for functional analysis of a whole mammalian genome
- Model testing facilities for biomedical research
- European Research Observatory for the Humanities and Social Sciences (EROHS)

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[7] *Towards New Research Infrastructures for Europe: the ESFRI "List of Opportunities",* March 2005, www.cordis.lu/esfri/.

- European Social Survey (ESS)

“Global projects”

- ITER
- International Space Station (ISS)
- International Linear Collider (ILC)
- Square Kilometer Array (SKA) – radio telescope
- International Fusion Materials Irradiation Facility (IFMIF)

2005/0185 (CNS)

Proposal for a

COUNCIL DECISION

concerning the Specific Programme "Cooperation" implementing the Seventh Framework Programme (2007-2013) of the European Community for research, technological development and demonstration activities

(Text with EEA relevance)

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 166 thereof,

Having regard to the proposal from the Commission[8],

Having regard to the opinion of the European Parliament[9],

Having regard to the opinion of the European Economic and Social Committee[10],

Whereas:

(1) In accordance with Article 166(3) of the Treaty, Decision No /EC of the European Parliament and the Council concerning the 7th Framework Programme of the European Community for research, technological development and demonstration activities, (2007-2013) (hereinafter referred to as 'the Framework Programme') is to be implemented through specific programmes that define detailed rules for their implementation, fix their duration and provide for the means deemed necessary.

(2) The Framework Programme is structured in four types of activities: trans-national cooperation on policy-defined themes ("Cooperation"), investigator-driven research based on the initiative of the research community ("Ideas"), support of training and career development of researchers ("People"), and support of research capacities ("Capacities"). Activities under "Cooperation" as regards indirect actions should be implemented by this Specific Programme.

(3) The rules for the participation of undertakings, research centres and universities and for the dissemination of research results, for the Framework Programme (hereinafter referred to as 'the rules for participation and dissemination') should apply to this programme.

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8 OJ C , , p. .
9 OJ C , , p. .
10 OJ C , , p. .

(4) The Framework Programme should complement the activities carried out in the Member States as well as other Community actions that are necessary for the overall strategic effort for the implementation of the Lisbon objectives, alongside in particular with those on structural funds, agriculture, education, training, competitiveness and innovation, industry, health, consumer protection, employment, energy, transport and environment.

(5) Innovation and SME-related activities supported under this Framework Programme should be complementary to those undertaken under the Framework Programme for Competitiveness and Innovation.

(6) Implementation of the Framework Programme may give rise to supplementary programmes involving the participation of certain Member States only, the participation of the Community in programmes undertaken by several Member States, or the setting up of joint undertakings or other arrangements within the meaning of Articles 168, 169 and 171 of the Treaty.

(7) This Specific Programme should contribute to the grant to the European Investment Bank for the constitution of a "Risk-Sharing Finance Facility" in order to improve access to EIB loans.

(8) As provided for under Article 170 of the Treaty, the Community has concluded a number of international agreements in the field of research and efforts should be made to strengthen international research cooperation with a view to further integrating the Community into the world-wide research community. Therefore, this Specific Programme should be open to the participation of countries having concluded agreements to this effect and should be also open on the project level, and on the basis of mutual benefit, to the participation of entities from third countries and of international organisations for scientific cooperation.

(9) Research activities carried out within this programme should respect fundamental ethical principles, including those which are reflected in the Charter of Fundamental Rights of the European Union,

(10) The Framework Programme should contribute towards promoting sustainable development.

(11) Sound financial management of the Framework Programme and its implementation should be ensured in the most effective and user-friendly manner possible, as well as ease of access for all participants, in compliance with Council Regulation (EC, Euratom) No 1605/2002 of 25 June 2002 on the Financial Regulation applicable to the general budget of the European Communities, Commission Regulation (EC, Euratom) No 2342/2002 of 23 December 2002 laying down detailed rules for implementation of the Financial Regulation and any future amendments.

(12) Appropriate measures should also be taken to prevent irregularities and fraud and the necessary steps should be taken to recover funds lost, wrongly paid or incorrectly used in accordance with Council Regulation (EC, Euratom) No 1605/2002 of 25 June 2002 on the Financial Regulation applicable to the general budget of the European Communities, Commission Regulation (EC, Euratom) No 2342/2002 of 23 December 2002 laying down detailed rules for implementation of the Financial Regulation and

any future amendments, Council Regulations (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests[11], (Euratom, EC) No 2185/96 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities[12] and Regulation (EC) No 1073/1999 of the European Parliament and of the Council concerning investigations conducted by the European Anti-Fraud Office (OLAF)[13].

(13) The measures necessary for the implementation of this Decision should be adopted in accordance with Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission[14].

(14) Each thematic area should have its own budget line in the General Budget of the European Communities.

(15) In the implementation of this programme adequate attention needs to be paid to gender mainstreaming, as well as to, inter alia, the working conditions, transparency of recruitment processes, and career development as regards the researchers recruited on projects and programmes funded under the actions of this programme, for which the Commission Recommendation of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers[15] offers a reference framework,

HAS ADOPTED THIS DECISION:

Article 1

The Specific Programme "Cooperation" for Community activities in the area of research and technological development, including demonstration activities, hereinafter the "Specific Programme" is hereby adopted for the period from 1 January 2007 to 31 December 2013.

Article 2

The Specific Programme shall support the activities for "Cooperation" supporting the whole range of research actions carried out in trans-national cooperation in the following thematic areas:

(a) Health;

(b) Food, Agriculture and Biotechnology;

(c) Information and Communication Technologies;

(d) Nanosciences, Nanotechnologies, Materials and new Production Technologies;

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11 OJ L 312, 23.12.1995, p. 1.
12 OJ L 292, 15.11.1996, p. 2.
13 OJ L 136, 31.5.1999, p. 1.
14 OJ L 184, 17.7.1999, p. 23
15 C(2005) 576.

(e) Energy;

(f) Environment (including Climate Change);

(g) Transport (including Aeronautics);

(h) Socio-economic Sciences and Humanities;

(i) Security and Space.

Implementation of this Specific Programme may give rise to supplementary programmes involving the participation of certain Member States only, the participation of the Community in programmes undertaken by several Member States, or the setting up of joint undertakings or other arrangements within the meaning of Articles 168, 169 and 171 of the Treaty.

The objectives and the broad lines of those activities are set out in Annex I.

Article 3

In accordance with Annex II of the Framework Programme, the amount deemed necessary for the execution of the Specific Programme shall be EUR 44 432 million, of which less than 6% shall be for the Commission's administrative expenditure. An indicative breakdown of this amount is given in Annex II.

Article 4

1. All research activities carried out under the Specific Programme shall be carried out in compliance with fundamental ethical principles.

2. The following fields of research shall not be financed under this programme:

   – research activity aiming at human cloning for reproductive purposes,

   – research activity intended to modify the genetic heritage of human beings which could make such changes heritable[16],

   – research activities intended to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

3. The following research shall not be financed under this programme:

   – research activities that are prohibited in all the Member States,

   – research activities to be carried out in a Member State where such research is prohibited.

[16] Research relating to cancer treatment of the gonads can be financed.

Article 5

1. The Specific Programme shall be implemented by means of the funding schemes established in Annex III to the Framework Programme.

2. Annex III to this Specific Programme sets out a first set of Joint Technology Initiatives that will be the subject of separate decisions, for example under Article 171 of the Treaty, and sets out the arrangements for a grant to the European Investment Bank for the establishment of a Risk Sharing Finance Facility.

3. Annex IV sets out a number of initiatives for the joint implementation of national research programmes that would be the subject of a separate decision on the basis of Article 169 of the Treaty.

4. The rules for participation and dissemination shall apply to this Specific Programme.

Article 6

1. The Commission shall draw up a work programme for the implementation of the Specific Programme, setting out in greater detail the objectives and scientific and technological priorities set out in Annex I, the funding scheme to be used for the topic on which proposals are invited, and the timetable for implementation.

2. The work programme shall take account of relevant research activities carried out by the Member States, associated countries and European and international organisations. It shall be updated where appropriate.

3. The work programme will specify the criteria on which proposals for indirect actions under the funding schemes shall be evaluated and projects selected. The criteria will be those of excellence, impact and implementation and within this framework additional requirements, weightings and thresholds may be further specified or complemented in the work programme.

4. The work programme may identify:

   (a) organisations that receive subscriptions in the form of a membership fee;

   (b) support actions for the activities of specific legal entities.

Article 7

1. The Commission shall be responsible for the implementation of the Specific Programme.

2. The procedure laid down in Article 8(2) shall apply for the adoption of:

   (a) the work programme referred to in Article 6(1);

   (b) any adjustment to the indicative breakdown of the amount as set out in Annex II.

3. The procedure laid down in Article 8(3) shall apply for the adoption of RTD actions involving the use of human embryos and human embryonic stem cells.

Article 8

1. The Commission shall be assisted by a Committee

2. Where reference is made to this paragraph, the management procedure laid down in Article 4 of Decision 1999/468/EC shall apply, in compliance with Article 7(3) thereof.

3. Where reference is made to this paragraph, Articles 5 and 7 of Decision 1999/468/EC shall apply.

4. The period provided for in Articles 4(3) and 5(6) of Decision 1999/468/EC shall be two months.

5. The Commission shall regularly inform the Committee of the overall progress of the implementation of the Specific Programme, and shall provide it with information about all RTD actions funded under this programme.

This Decision is addressed to the Member States.

Done at Brussels,

For the Council
The President

ANNEX I

SCIENTIFIC AND TECHNOLOGICAL OBJECTIVES, BROAD LINES OF THE THEMES AND ACTIVITIES

In this Specific Programme, support will be provided to trans-national co-operation at every scale across the European Union and beyond, in a number of thematic areas corresponding to major fields of the progress of knowledge and technology, where research must be supported and strengthened to address European social, economic, public health, environmental and industrial challenges.

The overarching aim is to contribute to sustainable development within the context of promoting research at the highest level of excellence.

The nine themes determined for EU action are the following:

(1) Health;

(2) Food, Agriculture and Biotechnology;

(3) Information and Communication Technologies;

(4) Nanosciences, Nanotechnologies, Materials and new Production Technologies;

(5) Energy;

(6) Environment (including Climate Change);

(7) Transport (including Aeronautics);

(8) Socio-economic Sciences and the Humanities;

(9) Security and Space.

Each theme is described in terms of the objective, the approach to implementation, and the activities including those involving large scale initiatives (as set out in Annexes III and IV), international cooperation, emerging needs and unforeseen policy needs.

The principle of sustainable development and gender equality will be duly taken into account. Furthermore, considerations of the ethical, social, legal and wider cultural aspects of the research to be undertaken and its potential applications, as well as socio-economic impacts of scientific and technological development and foresight, will where relevant form a part of the activities under this Specific Programme.

Pluridisciplinary and cross-thematic research, including joint calls

Special attention will be paid to priority scientific areas which cut across themes, such as marine sciences and technologies. Pluridisciplinarity will be encouraged by joint cross-thematic approaches to research and technology subjects relevant to more than one theme. Such cross thematic approaches will be implemented, among others, through:

– The use of joint calls between themes where a research topic is clearly relevant to the activities under each of the respective themes;

– The special emphasis within the "emerging needs" activity for cross-disciplinary research;

– The use of external advice from a broad range of disciplines and backgrounds for establishing the work programme;

– For policy relevant research, through ensuring coherence with EU polices;

Coordination between the themes in this Specific Programme and the actions under other specific programmes of the 7th Framework Programme, such as those on research infrastructures in the "Capacities" Specific Programme, will be ensured by the European Commission.

Adaptation to evolving needs and opportunities

The continued industrial relevance of the themes will be ensured by relying, among other sources, on the work of the various "European Technology Platforms". This Specific Programme will thereby contribute to the implementation of the Strategic Research Agendas established and developed by the European Technology Platforms where these present genuine European added value. The broad research needs identified in available Strategic Research Agendas are already well reflected across the nine themes identified below. The more detailed incorporation of their technical content will be reflected subsequently when formulating the detailed work programme for specific calls for proposals.

The continued relevance of the themes to the formulation, implementation and assessment of EU policies and regulations will also be ensured. This concerns policy areas such as those of health, safety, consumer protection, energy, the environment, development aid, fisheries, maritime affairs, agriculture, animal health and welfare, transport, education and training, information society and media, employment, social affairs, cohesion, and justice and home affairs, along with pre-normative and co-normative research relevant to improving the quality of standards and their implementation. In this context, platforms that bring together stakeholders with the research community to consider strategic research agendas relevant to social. environmental or other policy areas may play a role.

Under each theme, besides the activities defined, specific actions to respond to "emerging needs" and "unforeseen policy needs" will be implemented in an open and flexible way. The implementation of these actions will ensure a simple, coherent and coordinated approach throughout the Specific Programme and the funding of cross-disciplinary research cutting across or lying outside the themes.

- **Emerging needs:** through specific support for research proposals aiming at identifying or further exploring, in a given field and/or at the intersection of several disciplines, new scientific and technological opportunities, in particular linked with a potential for significant breakthroughs. This will be implemented through:

  – Open, "bottom up" research on topics identified by researchers themselves to develop new scientific and technological opportunities ("Adventure" actions")

or to assess new discoveries or newly-observed phenomena which could indicate risks or problems to society ("Insight" actions);

– Initiatives focused on specific, highly challenging objectives in emerging scientific and technological fields that promise major advances and a large potential impact on economic and social developments, and may involve groups of complementary projects ("Pathfinder" actions).

- **Unforeseen policy needs:** to respond in a flexible way to new policy needs that arise during the course of the Framework Programme, such as unforeseen developments or events requiring a quick reaction like new epidemics, emerging concerns in food safety, natural disaster responses or actions of solidarity. This will be implemented in close relationship with the relevant European Union policies. The annual work programme may be altered in the event of urgent research needs.

- **Dissemination, knowledge transfer and broader engagement**

In order to strengthen the diffusion and use of the output of EU research, the dissemination of knowledge and transfer of results, including to policy makers, will be supported in all thematic areas[17], including through the funding of networking/brokerage initiatives, seminars and events, assistance by external experts and electronic information services. This will be implemented in each thematic area by means of:

– Integration of dissemination and knowledge transfer actions within projects and consortia, through suitable provisions in the financing schemes and reporting requirements;

– Offering targeted assistance to projects and consortia to provide them with access to the necessary skills to optimise the use of results;

– Specific dissemination actions which take a proactive approach to disseminating results from across a range of projects, including those from previous Framework Programmes and other research programmes, and which target specific sectors or sets of stakeholders as potential users;

– Dissemination to policy makers, including standardisation bodies, to facilitate the use of policy relevant results by the appropriate bodies at international, European, national or regional levels;

– CORDIS services to foster the dissemination of knowledge and the exploitation of research results;

– Initiatives to foster dialogue and debate on scientific issues and research results with a broader public beyond the research community.

Coordination of dissemination and knowledge transfer across the Framework Programme will be ensured. Complementary actions to support innovation will be implemented by the Competitiveness and Innovation Programme. Potential synergies between education and

[17] In some cases, certain restrictions may apply to Security research, in conformity with the Rules for Participation and Dissemination.

research will be exploited and good practice identified, in particular to promote careers in research.

SME participation

The optimal participation of Small and Medium Sized Enterprises (SMEs) will be facilitated across the thematic areas, in particular by improved financial and administrative procedures and more flexibility in choosing the appropriate financial scheme. Furthermore, the research needs and potential of SMEs are duly taken into account in developing the content of the thematic areas of this Specific Programme and areas which are of particular interest to SMEs will be identified in the work programme. Specific actions to support research for the benefit of SMEs or SME associations are included in the "Capacities" Specific Programme, and actions to promote SME participation across the Framework Programme will be funded under the Competitiveness and Innovation Programme.

Ethical aspects

During the implementation of this Specific Programme and in the research activities arising from it, fundamental ethical principles are to be respected. These include, *inter alia*, the principles reflected in the Charter of Fundamental Rights of the EU, including the following: protection of human dignity and human life, protection of personal data and privacy, as well as animals and the environment in accordance with Community law and the latest versions of relevant international conventions, guidelines and codes of conduct, e.g. the Helsinki Declaration, the Convention of the Council of Europe on Human Rights and Biomedicine signed in Oviedo on 4 April 1997 and its Additional Protocols, the UN Convention on the Rights of the Child, the Universal Declaration on the human genome and human rights adopted by UNESCO, UN Biological and Toxin Weapons Convention (BTWC), International Treaty on Plant Genetic Resources for Food and Agriculture, and the relevant World Health Organisation (WHO) resolutions.

Account will also be taken of the Opinions of the European Group of Advisers on the Ethical Implications of Biotechnology (1991-1997) and the Opinions of the European Group on Ethics in Science and New Technologies (as from 1998).

In compliance with the principle of subsidiarity and the diversity of approaches existing in Europe, participants in research projects must conform to current legislation, regulations and ethical rules in the countries where the research will be carried out. In any case, national provisions apply and no research forbidden in any given Member State or other country will be supported by Community funding to be carried out in that Member State or country.

Where appropriate, those carrying out research projects must seek the approval of the relevant national or local ethics committees prior to the start of the RTD activities. An ethical review will also be implemented systematically by the Commission for proposals dealing with ethically sensitive issues or where ethical aspects have not been adequately addressed. In specific cases an ethical review may take place during the implementation of a project.

In accordance with Article 4(3) of this Decision no funding will be granted for research activities that are prohibited in all the Member States.

The Protocol on protection and welfare of animals annexed to the Treaty requires that the Community pays full regard to the welfare requirements of animals in formulating and

implementing Community policies including research. Council Directive 86/609/EEC on the protection of animals used for experimental and other scientific purposes requires that all experiments be designed to avoid distress and unnecessary pain and suffering to the experimental animals; use the minimum number of animals; involve animals with the lowest degree of neurophysiological sensitivity; and cause the least pain, suffering, distress or lasting harm. Altering the genetic heritage of animals and cloning of animals may be considered only if the aims are ethically justified and the conditions are such that the animals' welfare is guaranteed and the principles of biodiversity are respected.

During the implementation of this programme, scientific advances and national and international provisions will be regularly monitored by the Commission so as to take account of any developments.

Research on ethics related to scientific and technological developments will be carried out in the "Science in Society" part of the "Capacities" Specific Programme.

Collaborative research

Collaborative research will constitute the bulk and the core of EU research funding. The objective is to establish, in the major fields of advancement of knowledge, excellent research projects and networks able to attract researchers and investments from Europe and the entire world, strengthening the EU industrial and technological base and supporting EU policies .

This will be achieved by supporting collaborative research, which will include the active participation of industry, through the range of funding schemes: collaborative projects, networks of excellence, and co-ordination/support actions.

Joint Technology Initiatives

In a limited number of cases, the scope of a RTD objective and the scale of the resources involved justify setting up long term public private partnerships in the form of Joint Technology Initiatives. These initiatives, mainly resulting from the work of European Technology Platforms and covering one or a small number of selected aspects of research in their field, will combine private sector investment and national and European public funding, including grant funding from the Research Framework Programme and loan finance from the European Investment Bank. Joint Technology Initiatives will be decided on the basis of separate proposals (e.g. on the basis of Article 171 of the Treaty).

Joint Technology Initiatives are identified on the basis of a series of criteria including:

- Added value of European-level intervention;
- The degree and clarity of definition of the objective to be pursued;
- Strength of the financial and resource commitment from industry;
- Scale of the impact on industrial competitiveness and growth;
- Importance of the contribution to broader policy objectives;
- Capacity to attract additional national support and leverage current or future industry funding;

– Inability of existing instruments to achieve the objective.

Particular attention will be paid to the overall coherence and coordination between Joint Technology Initiatives and national programmes and projects in the same fields. The involvement of SMEs, where appropriate, will also be encouraged.

A first set of Joint Technology Initiatives are identified in Annex III and will be the subject of separate proposals (e.g. under Article 171 of the Treaty). Further Joint Technology Initiatives may be identified on the basis of the above criteria and be proposed during the implementation of the 7th Framework Programme.

Co-ordination of non-Community research programmes

The action undertaken in this field will make use of two main tools: the ERA-NET scheme and the participation of the Community in jointly implemented national research programmes (Treaty Article 169). The action will also be used to enhance the complementarity and synergy between the Framework Programme and activities carried out in the framework of intergovernmental structures such as EUREKA, EIROforum and COST. Financial support for the administration and coordination activities of COST will be provided so that COST can continue to contribute to coordination and exchanges between nationally funded research teams.

Where the actions are within the scope of one of the themes, they will be supported as an integral part of the activities under that theme. Where the actions are of a horizontal nature, they will be supported jointly across all of the relevant themes.

Where the actions are within the scope of another Specific Programme implementing the 7th Framework Programme, they will be supported under that Specific Programme.

The ERA-NET scheme will develop and strengthen the coordination of national and regional research activities by:

– Providing a framework for actors implementing public research programmes to step up the coordination of their activities. This will include support for new ERA-NETs as well as for the broadening and deepening of the scope of existing ERA-NETs, e.g. by extending their partnership, as well as opening mutually their programmes;

– Providing additional EU financial support to those participants that create a common fund for the purpose of joint calls for proposals between their respective national and regional programmes ("ERA-NET PLUS").

The participation of the Community in national research programmes jointly implemented on the basis of Article 169 is especially relevant to European co-operation on a large scale in "variable geometry" between Member States sharing common needs and/or interests. Such Article 169 initiatives will be launched in areas identified in close association with the Member States, including the possible cooperation with intergovernmental programmes, on the basis of the criteria defined in the 7th Framework Programme decision.

A number of initiatives for the joint implementation of national research programmes are identified in the description in Annex IV and will be the subject of a separate decision on the basis of Article 169 of the Treaty. Further initiatives may be identified and proposed during the implementation of the 7th Framework Programme.

International co-operation

International cooperation actions will support an international Science and Technology policy that has two interdependent objectives:

- To support and promote European competitiveness through strategic research partnerships with third countries including highly industrialised and emerging economies in science and technology by engaging the best third country scientists to work in and with Europe.

- To address specific problems that third countries face or that have a global character, on the basis of mutual interest and mutual benefit.

The international scientific cooperation policy of the EU will stress and develop cooperation to generate, share and use knowledge through equitable research partnerships taking into account the country, regional and socio-economic context and knowledge base of partner countries. The strategic approach is to enhance EU competitiveness and global sustainable development through such partnerships between the EU and third countries at bilateral, regional and global levels based on mutual interest and benefit. To this end the EU's role as a global player should be also promoted through multilateral international research programmes. The international cooperation actions supported will be connected to mainstream policy issues in order to support fulfilling international commitments of the EU and contribute to sharing European values, competitiveness, socio-economic progress, environmental protection and welfare under the umbrella of global sustainable development.

International cooperation will be implemented in this Specific Programme in each thematic area and across themes through:

- The opening of all activities carried out in the thematic areas to researchers and research institutions from all International Cooperation Partner countries and industrialised countries[18]. In addition there will be a particular emphasis to encourage third country participation in identified areas of mutual interest.

- Specific co-operation actions in each thematic area dedicated to third countries in the case of mutual interest in co-operating on particular topics. The identification of specific needs and priorities will be closely associated with relevant bilateral co-operation agreements and with ongoing multilateral and bi-regional dialogues between the EU and these countries or groups of countries. Priorities will be identified based on the particular needs, potential and level of economic development in the region or country. To this end, an international cooperation strategy and implementation plan will be developed with specific targeted actions within or across the themes, e.g. in health, agriculture, sanitation, water, food security, social cohesion, energy, environment, fisheries, aquaculture and natural resources, sustainable economic policy and information and communication technologies. These actions will serve as privileged tools for implementing the co-operation between the EU and these countries. Such actions are, in particular, actions aiming at reinforcing the research capacities and cooperative capacities of candidate, neighbourhood, and developing and emerging countries. The actions will be the subject of targeted calls and

[18] As defined in the Rules for Participation and Dissemination. Particular requirements may apply to Security research.

particular attention will be paid to facilitating access of the relevant third countries, notably developing countries, to the actions.

These activities will be implemented in coordination with international cooperation actions under the “People” and the “Capacities” specific programmes.

THEMES

1. Health

Objective

Improving the health of European citizens and increasing the competitiveness of European health-related industries and businesses, while addressing global health issues including emerging epidemics. Emphasis will be put on translational research (translation of basic discoveries into clinical applications), the development and validation of new therapies, methods for health promotion and disease prevention, diagnostic tools and technologies, as well as sustainable and efficient health care systems.

Approach

This research will advance our understanding on how to more efficiently promote good health, to prevent and treat major diseases and to deliver health care. It will help integrate the vast amount of genomics data to generate new knowledge and applications in medicine and biotechnology. It will foster translational health research, which is essential to ensure practical benefits from biomedical research. It will allow Europe to contribute more effectively to international efforts combating diseases of global importance, as illustrated by the ongoing programme on "European and Developing Countries Clinical Trials Partnership" (EDCTP) for combating HIV/AIDS, malaria and tuberculosis (Article 169)[19]. It will reinforce health policy-driven research at the European level and especially the comparisons of the models, systems and data of national databases.

This research will help improve the competitiveness of European health care biotechnology and medical technology sectors, where SMEs are the main economic drivers, and pharmaceutical industries. In particular, it is envisaged to support a European Technology Platform[20] on innovative medicines, aiming at overcoming the research bottlenecks in the drug development process. Special attention will be given to bridging the gap between research activities and exploitation by providing support for demonstrating proof of concept and clinical validation. This research will also contribute to the development of norms and standards for new advanced therapies (e.g. regenerative medicine) needed to help EU industry face worldwide competition.

Gender aspects in research will be considered and integrated in the projects[21] whenever appropriate. Special attention will be given to communicating research outcomes and engaging in dialogue with civil society, in particular with patient groups, at the earliest

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19 Other new important initiatives regarding the co-ordination of national research programmes may be supported where needed.

20 Strategic research agendas of other European Technology Platforms may be supported where they are of major importance for health-related industries.

21 Risk factors, biological mechanisms, causes, clinical manifestation, consequences and treatment of disease and disorders often differ between women and men. Therefore, all activities funded within this Theme must reflect the possibility of such differences in their research protocols, methodologies and analysis of results.

possible stage, of new developments arising from biomedical and genetics research. A wide dissemination and use of the results will also be assured.

Two strategic issues, child health[22] and the health of the ageing population will be addressed across the three main blocks of activities set out below, with priorities highlighted in the work programme. Other multi-disciplinary areas will also be included. This will ensure a visible and coherent approach to these issues across the Theme, whilst avoiding duplication.

Activities

- **Biotechnology, generic tools and technologies for human health**

This activity aims at developing and validating the necessary tools and technologies that will make possible the production of new knowledge and its translation into practical applications in the area of health and medicine.

– *High-throughput research:* to develop new research tools for modern biology that will enhance significantly data generation and improve data and specimen (biobanks) standardisation, acquisition and analysis. The focus will be on new technologies for: sequencing; gene expression, genotyping and phenotyping; structural genomics; bioinformatics and systems biology; other "omics".

– *Detection, diagnosis and monitoring*: to develop visualisation, imaging, detection and analytical tools and technologies for biomedical research, for prediction, diagnosis, monitoring and prognosis of diseases, and for support and guidance of therapeutic interventions. The focus will be on a multidisciplinary approach integrating areas such as: molecular and cellular biology, physiology, genetics, physics, chemistry, nanotechnologies, microsystems, devices and information technologies. Non- or minimally- invasive and quantitative methods and quality assurance aspects will be emphasised.

– *Innovative therapeutic approaches and interventions:* to consolidate and ensure further developments in advanced therapies and technologies with broad potential application. The focus will be on gene and cell therapy, regenerative medicine, transplantation, immunotherapy and vaccines, and other medicines. Related technologies, such as advanced targeted delivery systems, advanced implants and prosthetics, and non- or minimally-invasive technology-assisted interventions will also be addressed.

– *Predicting suitability, safety and efficacy of therapies:* to develop and validate the parameters, tools, methods and standards needed for bringing to the patient safe and effective new biomedicines [for conventional medicines[23], these issues will be addressed through the proposed Joint Technology Initiative on Innovative Medicines]. The focus will be on approaches such as pharmacogenomics, in silico, in vitro (including alternatives to animal testing) and in vivo methods and models.

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[22] Support will in particular be given to specific clinical studies to provide evidence for the appropriate use of off-patent products currently used off-label in paediatric populations.

[23] Pharmaceuticals and bio-pharmaceuticals.

- **Translating research for human health**

This activity aims at increasing knowledge of biological processes and mechanisms involved in normal health and in specific disease situations, to transpose this knowledge into clinical applications, and to ensure that clinical data guide further research.

– *Integrating biological data and processes: large-scale data gathering, systems biology.*

- *Large scale data gathering*: to use high-throughput technologies to generate data for elucidating the function of genes and gene products and their interactions in complex networks. The focus will be on: genomics; proteomics; population genetics; comparative and functional genomics.

- *Systems biology*: the focus will be on multidisciplinary research that will integrate a wide variety of biological data and will develop and apply system approaches to understand and model biological processes.

– *Research on the brain and related diseases, human development and ageing.*

- *Brain and brain-related diseases:* to better understand the integrated structure and dynamics of the brain, and to study brain diseases and search for new therapies. The focus will be to explore brain functions, from molecules to cognition, and to address neurological and psychiatric diseases and disorders, including regenerative and restorative therapeutic approaches.

- *Human development and ageing*: to better understand the process of life-long development and healthy ageing. The focus will be on the study of human and model systems, including interactions with factors such as environment, behaviour and gender.

– *Translational research in major infectious diseases: to confront major threats to public health.*

- *Anti-microbial drug resistance:* the focus will be on combining basic research on molecular mechanisms of resistance, microbial ecology and host-pathogen interactions with clinical research towards new interventions to reduce the emergence and spread of multi-drug resistant infections.

- *HIV/AIDS, malaria and tuberculosis*: the focus will be on developing new therapies, diagnostic tools, preventive vaccines and chemical transmission barriers such as HIV microbicides. Research efforts will confront the three diseases at global level, but will also address specific European aspects. Preclinical and early clinical research activities will be emphasised, and where relevant (e.g. for HIV/AIDS vaccines) collaboration with global initiatives is foreseen.

- *Emerging epidemics*: the focus will be on confronting emerging pathogens with pandemic potential including zoonoses (e.g. SARS and highly pathogenic influenza). Where appropriate, provisions will be made for rapidly initiating collaborative research aimed at expediting development of new diagnostics, drugs and vaccines for efficient prevention, treatment, and control of infectious disease emergencies.

– *Translational research in other major diseases.*

- *Cancer*: the focus will be on disease aetiology; identifying and validating drug targets and biological markers that aid in the prevention, early diagnosis and treatment; and assessing the effectiveness of prognostic, diagnostic and therapeutic interventions.

- *Cardiovascular disease*: the focus will be on diagnosis, prevention, treatment and monitoring of heart and blood vessel diseases (including vascular aspects of stroke) using broad multidisciplinary approaches.

- *Diabetes and obesity:* for the former, the focus will be on aetiologies of the different types of diabetes, and their related prevention and treatment. For the later, the focus will be on multidisciplinary approaches including genetics, life style and epidemiology.

- *Rare diseases*: the focus will be on Europe-wide studies of natural history, pathophysiology and on development of preventive, diagnostic and therapeutic interventions. This sector will include rare Mendelian phenotypes of common diseases.

- *Other chronic diseases*: the focus will be on non-lethal diseases with a high impact on the quality of life at old age such as functional and sensory impairment and other chronic diseases (e.g. rheumatoid diseases).

- **Optimising the delivery of health care to European citizens**

This activity aims at providing the necessary basis both for informed policy decisions on health systems and for more effective strategies of health promotion, disease prevention, diagnosis and therapy.

– *Enhanced health promotion and disease prevention:* to provide evidence for the best public health measures in terms of life styles and interventions at different levels and in different contexts. Focus will be on the wider determinants of health and how they interact at both the individual and community level (e.g. diet, stress, tobacco and other substances, physical activity, cultural context, socio-economic and environmental factors). In particular, mental health will be addressed in a life-course perspective.

– *Translating clinical research into clinical practice* including better use of medicines, and appropriate use of behavioural and organisational interventions and health therapies and technologies. Special attention will be given to patient safety: to identify the best clinical practice; to understand decision making in clinical settings in primary and specialised care; and to foster applications of evidence-based medicine and patient empowerment. Focus will be on the benchmarking of strategies; investigating outcomes of different interventions including medicines, taking into consideration pharmacovigilance evidence, specificities of the patient (e.g. genetic susceptibility, age, gender and adherence) and cost benefits.

– *Quality, solidarity and sustainability of health systems*; to provide a basis for countries to adapt their health systems in the light of experience of others, taking into account the importance of national contexts and population characteristics (ageing, mobility, migration, education, socioeconomic status and the changing world of work etc). Focus will be on organisational, financial and regulatory aspects of health systems, their

implementation and their outcomes in terms of effectiveness, efficiency and equity. Special attention will be paid to investment issues and human resources.

International cooperation

International cooperation is an integral part of the Theme and is of particular importance for areas addressing global health problems, such as anti-microbial resistance, HIV/AIDS, malaria, tuberculosis and emerging pandemics. This may also involve priority setting in the context of international initiatives, such as the Global HIV Vaccine Enterprise. Subject to the consolidation of a long-term sustainable partnership in clinical research between Europe and Developing countries, further support will be provided[24] to the European and Developing Countries Clinical Trials Partnership (EDCTP) in response to its achievements and future needs. The EDCTP programme will remain focused on advanced clinical testing for the development of new vaccines, microbicides and drugs against the three diseases in sub-Saharan Africa.

Specific cooperation actions will be implemented in the areas formulated through bi-regional dialogues in third Countries/Regions and international fora, as well as within the context of Millennium Development Goals. Such priority areas adapted to local needs and through partnerships may include: health policy research, health systems and health care service research, maternal and child health, reproductive health, control and surveillance of neglected communicable diseases and emerging unforeseen policy needs in those regions.

An annual subscription to the international Human Frontier Science Programme Organisation (HFSPO)[25] will be made jointly with the "Information and Communication Technologies" theme. This will allow EU non-G8 Member States to fully benefit from the Human Frontier Science Programme (HFSP) and provide increased visibility for European research.

Responding to emerging needs and unforeseen policy needs

Research on emerging needs will be implemented on the basis of "bottom up" and "focussed" initiatives, in coordination with other Themes and this will include a broad and inter-disciplinary research portfolio. Support for unforeseen European Union policy needs may address, for example occupational health and safety, health impact assessment, risk assessment, statistical indicators, management and communication in the public health domain, as well as obligations under international health treaties including the Framework Convention on Tobacco Control[26] and the International Health Regulations[27]. This will complement the health policy-driven research supported above.

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24 E.g. a grant to the EDCTP European Economic Interest Grouping.

25 The European Community is a member of the HFSP Organisation (HFSPO) and has funded HFSP under previous Framework Programmes.

26 Framework Convention on Tobacco Control, 2004/513/EC.

27 International Health Regulations 2005 – Resolution 58.3 of the 58th World Health Assembly, 23 May 2005.

2. Food, Agriculture and Biotechnology

Objective

Building a European *Knowledge Based Bio-Economy*[28] by bringing together science, industry and other stakeholders, to exploit new and emerging research opportunities that address social and economic challenges: the growing demand for safer, healthier and higher quality food, taking into account animal welfare and rural contexts; the sustainable production and use of renewable bio-resources; the increasing risk of epizootic and zoonotic diseases and food related disorders; threats to the sustainability and security of agricultural and fisheries production resulting in particular from climate change.

Approach

This theme will strengthen the knowledge base, deliver the innovations and provide policy support for building and developing a European Knowledge Based Bio-Economy (KBBE). Research will focus on the sustainable management, production and use of biological resources, in particular through life sciences and biotechnology and the convergence with other technologies, to provide new, eco-efficient and competitive products from European agriculture, fisheries, aquaculture, food[29], health, forest based and related industries**.** Research will make important contributions to the implementation and formulation of EU policies and regulations and specifically address or support: the Common Agricultural Policy; agriculture and trade issues; food safety regulations; Community Animal Health Policy, disease control and welfare standards; environment and biodiversity; EU Forestry Strategy; and the Common Fisheries Policy aiming to provide sustainable development of fishing and aquaculture. Research will also seek to develop new and existing indicators supporting analysis, development and monitoring of these policies.

Agro-food industries, of which 90% are SMEs, will particularly benefit from many research activities, including targeted dissemination and technology transfer activities, in particular as regards the integration and uptake of advanced eco-efficient technologies, methodologies and processes and the development of standards. High-tech start-ups from the bio-, nano- and ICT are expected to provide important contributions to the areas of plant breeding, improved crops and plant protection, advanced detection and monitoring technologies for ensuring food safety and quality, and new industrial bioprocesses.

Several European Technology Platforms, covering the areas of plant genomics and biotechnology, forestry and forest based industries, global animal health, farm animal breeding, food, aquaculture and industrial biotechnology, will contribute in setting common research priorities for this theme, in identifying possible future large scale initiatives such as demonstration projects for the production of bulk chemicals from biomass (plant cell wall, biofuels, biopolymers) and help ensure broad participation and integration of all stakeholders. Actions to enhance the co-ordination of national research programmes will be pursued wherever appropriate, in close co-ordination with ERA-Net projects, Technology

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[28] The term "bio-economy" includes all industries and economic sectors that produce, manage and otherwise exploit biological resources (and related services, supply or consumer industries), such as agriculture, food, fisheries, forestry, etc.

[29] Food includes seafood.

Platforms and other relevant actors, such as the Standing Committee on Agricultural Research (SCAR) or any future European maritime research co-ordination structure.

Consideration of the social, ethical, gender, legal, environmental, economic and wider cultural aspects and potential risks and impacts (foresight) of the scientific and technological development will form a part of the activities, where relevant.

Activities

- **Sustainable production and management of biological resources from land, forest, and aquatic environments**[30]

– Enabling research on the key long term drivers of sustainable production and management of biological resources (micro-organisms, plants and animals) including the exploitation of biodiversity and of novel bioactive molecules within these biological systems. Research will include 'omics' technologies, such as genomics, proteomics, metabolomics, and converging technologies, and their integration within systems biology approaches, as well as the development of basic tools and technologies, including bioinformatics and relevant databases, and methodologies for identifying varieties within species groups.

– Increased sustainability and competitiveness, while decreasing environmental impacts, in agriculture, forestry, fisheries and aquaculture through the development of new technologies, equipment, monitoring systems, novel plants and production systems, the improvement of the scientific and technical basis of fisheries management, and a better understanding of the interaction between different systems (agriculture and forestry; fisheries and aquaculture) across a whole ecosystem approach. For land based biological resources, special emphasis will be placed on low input and organic production systems, improved management of resources and novel feeds, and novel plants (crops and trees) with improved composition, resistance to stress, nutrient use efficiency, and architecture. This will be supported through research into biosafety, co-existence and traceability of novel plants systems and products. Plant health will be improved through better understanding of ecology, biology of pests, diseases and other threats and support to controlling disease outbreaks and enhancing sustainable pest management tools and techniques. For biological resources from aquatic environments, emphasis will be placed on essential biological functions, safe and environmentally friendly production systems and feeds of cultured species and on fisheries biology, dynamics of mixed fisheries, interactions between fisheries activities and the marine ecosystem and on fleet-based, regional and multi-annual management systems.

– Optimised animal production and welfare, across agriculture, fisheries and aquaculture, *inter alia* through the exploitation of genetic knowledge, new breeding methods, improved understanding of animal physiology and behaviour and the better understanding and control of infectious animal diseases, including zoonoses. The latter will also be addressed by developing tools for monitoring, prevention and control, by underpinning and applied research on vaccines and diagnostics, studying the ecology of

[30] Complementary research relating to sustainable management and conservation is addressed under "Environment including Climate Change". Research on other tools and technologies that support sustainable production and management will be done under the relevant themes.

known or emerging infectious agents and other threats, including malicious acts, and impacts of different farming systems and climate. New knowledge for the safe disposal of animal waste and improved management of by-products will also be developed.

– Providing the tools needed by policy makers and other actors to support the implementation of relevant strategies, policies and legislation and in particular to support the building of the European Knowledge Based Bio-Economy (KBBE) and the needs of rural and coastal development. The Common Fisheries Policy will be supported through the development of adaptive approaches supportive to a whole ecosystem approach for the harvesting of marine resources. Research for all policies will include socio-economic studies, comparative investigations of different farming systems, cost-effective fisheries management systems, the rearing of non-food animals, interactions with forestry and studies to improve rural and coastal livelihoods.

- **Fork to farm: Food, health and well being**

– Understanding consumer behaviour as a major factor in the competitiveness of the food industry and the impact of food on the health, and well-being of the European citizen. The focus will be on consumer perception and attitudes towards food, understanding societal trends, and identifying determinants of food choice and consumer access to food.

– Understanding dietary factors and habits as a major controllable factor in the development and reduction of occurrence of diet-related diseases and disorders. This will involve the development and application of nutrigenomics and systems biology, and the study of the interactions between nutrition, physiological and psychological functions. It could lead to reformulation of processed foods, and development of novel foods, dietetic foods and foods with nutritional and health claims. The investigation of traditional, local, and seasonal foods and diets will also be important to highlight the impact of certain foods and diets on health, and to develop integrated food guidance.

– Optimising innovation in the European food industry through the integration of advanced technologies into traditional food production, key process technologies to enhance the functionality of food, the development and demonstration of high-tech, eco-efficient processing and packaging, smart control applications and more efficient management of by-products, wastes and energy. New research will also develop sustainable and novel technologies for animal feed, including safe feed processing formulations and for feed quality control.

– Assuring chemical and microbiological safety and improving quality in the European food supply. This will include understanding the links between microbial ecology and food safety; developing methods and models addressing the integrity of the food supply chains; new detection methods, and technologies and tools for risk assessment, management, and communication, and enhance the understanding of risk perception.

– Protecting both human health and the environment through a better understanding of the environmental impacts on and of food/feed chains. This will involve study of food contaminants and health outcomes, developing enhanced tools and methods for the assessment of impacts of food and feed chains on the environment. Assuring quality and the integrity of the food chain requires new models for commodity chain analysis and total food chain management concepts, including consumer aspects.

- **Life sciences and biotechnology for sustainable non-food products and processes**

– To strengthen the knowledge base and develop advanced technologies for terrestrial or marine biomass production for applications in energy and industry. This will include plant, animal and microbial genomics and metabolomics to improve the productivity and composition of raw materials and biomass feedstocks for optimised conversion to high added value products, while exploiting natural or enhanced terrestrial and aquatic organisms as novel sources. This will fully incorporate life cycle analysis of farming practices, transportation, and storage and market deployment of bio-products. Accordingly the application of industrial biotechnologies within the whole crop chain to realise the full potential of the bio-refinery approach, including socioeconomic, agronomic, and ecological and consumer aspects will be addressed. This will be enhanced by an increased understanding and control of plant and microbial metabolism at the cellular and sub-cellular level, in the production of high value commodities deploying bio-processes with increased yield, quality and purity of conversion products, including biocatalytic process design. Furthermore, biotechnologies for novel and improved high quality, high added value and renewable forest-based products and processes will be used or developed to increase sustainability of wood and wood production, including timber and renewable bioenergy stocks. Finally, the potential of biotechnology to detect, monitor, prevent, treat and remove pollution with an emphasis on maximising the economic value of waste and by-products through new bio-processes, alone or in combination with plant systems and/or chemical catalysts will be addressed.

International cooperation

International co-operation is a priority aspect for Food, Agriculture and Biotechnology research and will be strongly encouraged throughout the entire area. Research of specific interest for developing countries will be supported, taking into account Millennium development goals and already ongoing activities. Specific actions will be undertaken to foster co-operation with priority partner regions and countries - particularly those involved in bi-regional dialogues and bilateral S&T agreements as well as neighbourhood countries and emerging economies and developing countries.

Furthermore, multilateral co-operation will be carried out to address either challenges requiring broad international efforts, such as the dimension and complexity of systems biology in plants and micro-organisms, or to address global challenges and EU international commitments (security and safety of food and drinking water, global spread of animal diseases, equitable use of biodiversity, the restoration of world fisheries to Maximum Sustainable Yield by 2015 and the influence of/on climate change).

Responding to emerging needs and unforeseen policy needs

Research on emerging needs may address, for example, the development of new concepts and technologies, such as on crisis management systems and the integrity of the food chain.

A flexible response to unforeseen policy needs will take particular account of relevant policies for building a European Knowledge Based Bio-Economy.

3. Information and Communication Technologies

Objective

Improve the competitiveness of European industry and enable Europe to master and shape the future developments of Information and Communication Technologies (ICT) so that the demands of its society and economy are met. Activities will strengthen Europe's scientific and technology base and ensure its global leadership in ICT, help drive and stimulate innovation through ICT use and ensure that ICT progress is rapidly transformed into benefits for Europe's citizens, businesses, industry and governments.

Introduction

Information and communication technologies (ICT) play a unique, proven role in fostering innovation, creativity and competitiveness of all industry and service sectors. They are essential for addressing key societal challenges and modernising public services and they underpin progress in all science and technology fields. Europe must therefore master and shape the future developments of ICT and ensure that ICT-based services and products are taken up and used to deliver the maximum possible benefits for citizens and businesses.

These are the targets of the Union's Information Society policy, as highlighted in the i2010 initiative, aiming at a competitive convergent information economy in Europe, a significant rise in European investment in ICT research and innovation and a very high level of accessibility in the Information Society.

New ICT technologies will open up many new opportunities for higher-value products and services, many of which are in areas where Europe already enjoys industrial and technological leadership. Partnering at European level is the optimal approach to ICT investment. More than ever before, such efforts are needed to keep pace with soaring research costs in an era of global competition, and increasingly complex and interdependent technologies.

The ICT theme prioritises strategic research around key technology pillars, ensures end-to-end integration of technologies and provides the knowledge and the means to develop a wide range of innovative ICT applications. The activities will leverage industrial and technological advance in the ICT sector and improve the competitive edge of important ICT-intensive sectors – both through innovative high-value ICT-based products and services and from improvements of organisational processes in businesses and administrations alike. The theme will also support other policies of the European Union, by mobilising ICT to meet public and societal demands.

Activities will cover collaboration and networking actions, support to Joint Technology Initiatives – including selected aspects of research in the areas of Nanoelectronics Technologies and Embedded Computing Systems – and national programme co-ordination initiatives – including in the area of Ambient Assisted Living. The priorities of the activities will include topics relying, among other sources, on the work of European Technology Platforms. Thematic synergies will also be developed with related activities in other Specific Programmes.

The active participation of small and medium-sized enterprises and other small entities in the activities is essential given their role in promoting innovation. They play vital roles in the development and nurturing of new visions in ICT and their applications and in transforming them into business assets.

Activities

- **ICT Technology Pillars**:

– *Nano-electronics, photonics and integrated micro/nano-systems*: process, device and design technologies to improve size, density, performance, energy efficiency, manufacturing and cost-effectiveness for components, systems-on-a-chip, systems-in-a-package and integrated systems; basic photonic components for wide range of applications; high-performance/high-density data storage systems; very large area/highly integrated display solutions; sensing, actuating, vision and imaging devices; ultra low power systems, alternative energy sources/storage; heterogeneous technologies/systems integration; multi-functional integrated micro-nano-bio-info systems; large-area electronics; integration in different materials/objects; interfacing with living organisms; (self-)assembly of molecules or atoms into stable structures.

– *Ubiquitous and unlimited capacity communication networks*: cost-effective mobile and broadband network technologies and systems including terrestrial and satellite networks; convergence of different fixed, mobile, wireless and broadcasting networks spanning from the personal area to the regional and global area; interoperability of wired and wireless communications services and applications, management of networked resources, service reconfigurability; complex networking of ad-hoc intelligent multimedia devices, sensors and microchips.

– *Embedded systems, computing and control*: more powerful, secure, distributed, reliable and efficient hardware/software systems that can perceive, control and adapt to their environment while optimising the use of resources; methods and tools for system modelling, design and engineering to master complexity; open composable architectures and scale-free platforms, middleware and distributed operating systems to enable truly seamless collaborative and ambient intelligent environments for sensing, actuation, computing, communication, storage, and service delivery; computing architectures incorporating heterogeneous, networked and reconfigurable components including compilation, programming and run-time support; control of large-scale, distributed, uncertain systems.

– *Software, Grids, security and dependability*: technologies, tools and methods for dynamic and trusted software, architectures and middleware systems that underpin knowledge-intensive services, including their provision as utilities; service-oriented, interoperable and scale-free infrastructures, grid-like virtualisation of resources, network-centric operating systems; open platforms and collaborative approaches for development of software, services and systems; composition tools; mastering emergent behaviours of complex systems; improving dependability and resilience of large-scale, distributed and intermittently connected systems and services; secure and trusted systems and services, including privacy-aware access control and authentication, dynamic security and trust policies, dependability and trust meta-models.

– *Knowledge, cognitive and learning systems*: methods and techniques to acquire and interpret, represent and personalise, navigate and retrieve, share and deliver knowledge, recognizing the semantic relationships in content for use by humans and machines; artificial systems that perceive, interpret and evaluate information and that can cooperate, act autonomously and learn; theories and experiments that move beyond incremental advances benefitting from insights into natural cognition, in particular learning and memory, also for the purpose of advancing systems for human learning.

– *Simulation, visualisation, interaction and mixed realities*: tools for modelling, simulation, visualisation, interaction, virtual, augmented and mixed reality and their integration in end-to-end environments; tools for innovative design and for creativity in products, services and digital audio-visual media; more natural, intuitive and easy-to-use interfaces and new ways to interact with technology, machines, devices and other artefacts; multilingual and automatic machine translation systems.

New perspectives in ICT drawing on other science and technology disciplines (physics, materials, biotechnologies, life-sciences, cognitive and social sciences etc) are provided in the whole of the ICT theme. These are bringing breakthroughs that lead to innovation in ICT and to entirely new industry and service sectors. They span from miniaturisation of ICT devices to sizes compatible and interacting with living organisms (like novel ICT components and computing systems based on synthetic biomolecular structures), to new computing and communication sciences inspired by the living world, to fully eco-compatible ICT devices inspired by natural systems, and to modelling and simulation of the living world (like simulation of human physiology across several biological levels).

- **Integration of Technologies**:

– *Personal environments*: integration of multimodal interfaces, sensing techniques and micro-systems, personal communication and computing devices, ICT systems embodied in personal accessories, wearable systems and implants and their connection to services and resources, placing emphasis on integrating all facets of a person's presence and identity.

– *Home environments*: communication, monitoring, control and assistance of the home, buildings and public spaces; seamless interoperability and use of all devices taking account of cost efficiency, affordability and usability; new services and new forms of interactive digital content and services; access to information and management of knowledge.

– *Robotic systems*: flexible and dependable robot systems operating in human and unstructured environments and co-operating with people; networked and cooperating robots; miniaturised robots; modular design and modelling of integrated robotic systems.

– *Intelligent infrastructures*: ICT tools making critical infrastructures more efficient and user-friendly, easier to adapt and maintain, more robust to usage and resistant to failures; data integration tools; ICT for systemic risk assessment, early warning and automated alerts.

- **Applications Research:**

– *ICT meeting societal challenges*: To ensure that all European citizens can reap the maximum benefit from ICT products and services, to improve inclusiveness, seamless access and interactivity of services of public interest, and to strengthen the innovation role of public sector services, improving their efficiency and effectiveness.

  – for *health*: personal non-obtrusive systems that enable citizens to manage their well-being such as wearable or implantable monitoring devices and autonomous systems for supporting a healthy state; emerging techniques such as molecular imaging for improved prevention and individualised medicine; health knowledge discovery and application in clinical practice; modelling and simulation of organ functions; micro- and nano-robotic devices for minimally invasive surgical and therapeutic applications;

  – for *governments*: use of ICT in an interdisciplinary approach in public administrations combined with organisational change and new skills in order to deliver innovative, citizen-centric services for all; advanced ICT based research and solutions to improve democratic and participatory processes and the performance and quality of public sector services, interaction with and between administrations and governments, and support legislative and policy development processes in all stages of democracy;

  – for *inclusion*: to empower individuals and their communities and improve equal participation of all citizens in the information society, while preventing digital divides due to disability, low skills, poverty, geographic isolation, culture, gender or age, inter alia through support to assistive technology, promoting independent living, increasing e-skills, and developing products and services designed-for-all;

  – for *mobility*: integrated ICT-based safety systems for vehicles based on open, secure and dependable architectures and interfaces; interoperable co-operative systems for transport efficiency and safety, based on communication between vehicles and with the transport infrastructure and integrating accurate and robust location technologies; personalised, location-aware info-mobility and multi-modal services, including intelligent service solutions for tourism;

  – in support of *the environment and sustainable development*: risk and emergency management; smart sensor networks to improve hazard forecasting, natural resources management including systems for reduction of pollutants; increasing energy efficiency; managing human response to environmental stresses and to sustain biodiversity; alert systems and timely and reliable public safety communication; assistive technologies and support systems for operation under harsh, hazardous or risky conditions; eco-efficient and sustainable production of ICT: advanced data and information management for environmental monitoring and risk assessment, contributing to INSPIRE; GMES and GEOSS.

– *ICT for content, creativity and personal development*:

  – novel forms of interactive, non-linear and self-adaptive content; creativity and enriched user-experience; cross-media content customisation and delivery; combining all-digital content production and management with emerging semantic technologies; user-oriented use, access to and creation of content;

  – technology-enhanced *learning* systems, tools and services, adapted to different learners in different contexts; issues underlying human learning when the process is mediated by using ICT; improving people's abilities to become active learners;

  – intelligent services for access to *cultural* heritage in digital form; tools for communities to create new cultural memory based on living heritage; methods and tools for preservation of digital content; making digital objects usable by future users whilst keeping authenticity and integrity of their original creation and context of use.

– *ICT supporting businesses and industry*:

  – dynamic, network-oriented *business* systems for product and service creation and delivery; decentralised control and management of intelligent items; digital business ecosystems, in particular software solutions adaptable to the needs of small- and medium-sized organisations; collaboration services for distributed *work*spaces; augmented group presence, group management and sharing support;

  – *manufacturing*: networked intelligent controls for high-precision manufacturing and low-resource utilisation; wireless automation and logistics for rapid plant reconfiguration; integrated environments for modelling, simulation, presentation and virtual production; manufacturing technologies for miniaturised ICT systems and for systems interwoven with all kinds of materials and objects.

– *ICT for trust and confidence*:

  – tools supporting the trust and confidence of ICT and its applications; multiple and federated identity management systems; authentication and authorization techniques; systems meeting privacy needs deriving from new technological developments; rights and asset management; tools to protect against cyber threats.

International cooperation

International cooperation will be encouraged in the ICT theme to address issues of common interest aiming at interoperable solutions with strategic partners with high mutual benefits, and to contribute to the spread of the information society in emerging economies and developing countries. Specific actions will be identified for the countries or regions with which Europe needs to focus collaboration, with a particular emphasis on cooperation with emerging economies and developing countries and neighbourhood countries.

A subscription will be made available jointly with theme 1 "Health" to the international Human Frontier Science Programme (HFSP) to promote interdisciplinary research and novel collaborations between scientists from different fields, and provide the possibility for non-G8 Member States to fully benefit from the programme.

Activities under this Theme support the Intelligent Manufacturing Systems (IMS) scheme, which allows RTD cooperation between its member regions[31].

Responding to emerging needs and unforeseen policy needs

A *Future and Emerging Technologies* activity will attract and foster trans-disciplinary research excellence in emerging ICT-related research domains. Foci include: exploring the new miniaturisation and computing frontiers including for example the exploitation of quantum effects; harnessing the complexity of networked computing and communication systems; exploring new concepts of and experimenting with intelligent systems for new personalised products and services.

Research that aims at better understanding *trends and impacts of ICT* on society and the economy may include, for example: impacts of ICT on productivity, employment, skills and wages; ICT as a driver for innovation in public and business services; obstacles to wider and faster innovation and use of ICT; new business models and exploitation paths; usability, utility and acceptability of ICT-based solutions; privacy, security and trust of ICT infrastructures; ethical issues of ICT developments; links to ICT-related legal, regulatory and governance frameworks; analyses of ICT support to, and impact on, EU policies.

4. Nanosciences, Nanotechnologies, Materials and new Production Technologies

Objective

Improve the competitiveness of European industry and ensure its transformation from a resource-intensive to a knowledge-intensive industry, by generating breakthrough knowledge for new applications at the crossroads between different technologies and disciplines.

Approach

To enhance its competitiveness, European industry needs radical innovations. It must concentrate its capabilities on high-added-value products and technologies to meet customer requirements, as well as environmental, health and other societal expectations. Research is integral to meeting these competing challenges.

A key element of this theme is the effective integration of nanotechnology, materials sciences and new production methods so as to achieve and maximise the impacts for industrial transformation and, at the same time, supporting sustainable production and consumption. The theme will support all industrial activities operating in synergy with other themes. Applications in all sectors and areas will be supported and this includes materials

[31] The agreement for scientific and technical cooperation in the domains of IMS is stipulated between the European Community and the United States of America, Japan, Australia, Canada, Korea and the EFTA States of Norway and Switzerland.

sciences, high performance manufacturing and process technologies, nanobiotechnology or nanoelectronics.

The medium term approach is to focus on a convergence of knowledge and skills drawn from different disciplines exploiting application-driven scientific and technological synergies. In the long term the theme aims to capitalise on the enormous prospects of nanosciences and nanotechnologies for the creation of a true knowledge-based industry and economy. In both cases it will be essential to ensure uptake of the knowledge generated through effective dissemination and exploitation of the results.

Strong contributions to industrial needs and complementarities through initiatives and funded projects will be ensured in particular through European Technology Platforms (e.g. in the potential areas of sustainable chemistry, new manufacturing, industrial safety, nano-medicine, steel, forest-based sector etc) and support to Joint Technology Initiatives.

The theme is particularly relevant to SMEs due to their needs and role in advancing and using technologies. Areas of particular relevance include: nano-instruments, -tools, and –devices (due to the concentration of high-growth, high technology SMEs in this sector); technical textiles, (typical of a traditional sector undergoing a rapid transformation process affecting many SMEs); space systems; mechanical industries (e.g. machine tools- where European SMEs are world leaders), as well as other sectors which involve many SMEs that will benefit from the introduction of new business models, materials and products.

Specific actions to coordinate programmes and joint activities conducted at national and regional level will be carried out through the ERA-NET and ERA-NET PLUS schemes so as to promote convergence of research programmes, and to reinforce critical mass and synergies within the European Technology Platforms. Industrial research will also benefit from the coordination of activities in areas such as metrology, toxicology, standards and nomenclature.

Activities

- **Nanosciences and nanotechnologies**

The objective is to create materials and systems with pre-defined properties and behaviour, based on increased knowledge and experience with matter at the nano scale. This will lead to a new generation of high added-value, competitive products and services with superior performance across a range of applications, while minimising any potential adverse environmental and health impacts. Interdisciplinarity, integrating theoretical and experimental approaches, will be promoted.

The focus will be new knowledge on the interactions of atoms, molecules and their aggregations with both natural and artificial entities. The research will also address the relevant instruments, tools, pilot lines and demonstration activities required for highly novel approaches to nanotechnology-based manufacturing in the most promising industrial sectors.

In addition, the activity will focus on related challenges and the societal context and acceptance of nanotechnology. This will include research on all aspects of risk assessment (e.g. nano-toxicology and -ecotoxicology), as well as safety, nomenclature, metrology and standards which are becoming increasingly important to pave the way for industrial

applications. Specific actions will also be launched for establishing dedicated centres of knowledge and expertise as well as a focal point to implement the Commission's integrated and responsible approach towards nanotechnology as outlined in the associated Action Plan[32].

- **Materials**

New advanced materials with higher knowledge content, new functionalities and improved performance are increasingly critical for industrial competitiveness and sustainable development. According to the new models of manufacturing industry, it is the materials themselves which are becoming the first step in increasing the value of products and their performance, rather than the processing steps.

Research will focus on developing new knowledge-based materials with tailored properties. This requires an intelligent control of intrinsic properties, processing and production, and taking into account potential impacts on health and the environment throughout their entire life-cycle. Emphasis will be placed on new advanced materials obtained using the potential of nanotechnologies and biotechnologies and/or "learning from nature", in particular higher performance nano-materials, bio-materials and hybrid materials.

A multidisciplinary approach will be fostered, involving chemistry, physics and increasingly the biological sciences. Materials characterisation, design and simulation are also essential to better understand materials phenomena, in particular the structure–property relationships at different scales; to improve materials assessment and reliability, and to extend the concept of virtual materials for materials design. The integration of nano-molecular-macro levels in chemical and materials technologies will be supported for developing new concepts and processes such as in catalysis, and process intensification and optimisation.

- **New Production Technologies**

A new approach to manufacturing is required for the transformation of EU industry from a resource intensive to a knowledge-based industrial environment and will depend on the adoption of totally new attitudes towards the continued acquisition, deployment, protection and funding of new knowledge and its use, including towards sustainable production and consumption patterns. This entails creating the right conditions for continuous innovation (in industrial activities and production systems, including construction, devices, and services) and for developing generic production "assets" (technologies, organisation and production facilities) while also meeting safety and environmental requirements.

The research will focus on a number of strands: the development and validation of new industrial models and strategies covering all aspects of product and process life-cycle; adaptive production systems that overcome existing process limitations and enable new manufacturing and processing methods; networked production to develop tools and methods for co-operative and value-added operations at a global scale; tools for the rapid transfer and integration of new technologies into the design and operation of manufacturing processes; and the exploitation of the convergence of the nano-, bio-, info- and cognitive

[32] Commission Communication, *Nanosciences and Nanotechnologies: an action plan for Europe 2005-09* - COM(2005) 243.

technologies to develop new products and engineering concepts and the possibility of new industries.

- **Integration of technologies for industrial applications**

The integration of knowledge and technologies of the three areas of research above is essential in order to speed up the transformation of European industry and its economy, while adopting a safe, socially responsible and sustainable approach.

The research will focus on new applications and novel, step-change solutions responding to major challenges, as well as to the RTD needs identified by the different European Technology Platforms. The integration of new knowledge and nano-, materials-, and production-technologies will be supported in sectoral and cross-sectoral applications such as health, construction, space industry, transport, energy, chemistry, environment, textiles and clothing, pulp and paper, and mechanical engineering, as well as in the generic subject of industrial safety.

International cooperation

The increasingly international dimension of industrial research requires a well-coordinated approach to working with third countries. International cooperation will therefore be important across the theme.

Specific actions may include: activities with industrialised countries and those having signed a S&T cooperation agreement in the fields of the Theme; specific initiatives with emerging economies and developing countries to secure their access to knowledge; dialogue with major countries on a "code of conduct" for the responsible and safe development of nanotechnology; and the Intelligent Manufacturing Systems (IMS) scheme, which allows RTD cooperation between its member regions[33]. Initiatives to coordinate and exchange research data will be encouraged (such as in environmental and health safety issues for nanotechnologies), paving the way for a common understanding of regulatory needs by policy makers across the world.

Responding to emerging needs and unforeseen policy needs

Research on emerging needs will be implemented notably to develop and consolidate European capabilities in specific emerging and interdisciplinary research areas with high potential for the future. Any unforeseen policy needs will be addressed in a flexible way and may, for example, relate to standardisation, to support the safe transformation towards a knowledge based industry, or to potential environmental and health impacts of nanotechnologies.

[33] The agreement for scientific and technical cooperation in the domains of IMS is between the European Community and the United States of America, Japan, Australia, Canada, Korea and the EFTA States of Norway and Switzerland.

5. Energy

Objective

Transforming the current fossil-fuel based energy system into a more sustainable one based on a diverse portfolio of energy sources and carriers combined with enhanced energy efficiency, to address the pressing challenges of security of supply and climate change, whilst increasing the competitiveness of Europe's energy industries.

Approach

Current projections show most of the crucial energy indicators (e.g. energy consumption, fossil fuel dependency, import dependency, CO_2 emissions, energy prices) to be moving in the wrong direction, in the EU and even more so worldwide. Energy research will facilitate reversing these trends, striking a balance between increasing the efficiency, affordability, acceptability and security of existing technologies and sources of energy, whilst simultaneously aiming at a longer-term paradigm shift in the way Europe generates and consumes energy. Energy research will thus directly contribute to the success of EU policy and, in particular, the achievement of current and future EU energy and greenhouse gas reduction targets.

Following a broad technology portfolio approach, in accordance with the conclusions of the green paper "Towards a European strategy for the security of energy supply"[34], research will focus on the development of cost-effective technologies for a more sustainable energy economy for Europe (and world-wide) and allow European industry to compete successfully on the global stage. Activities will address all time horizons and embrace the whole chain from fundamental and applied research and technological development through to large-scale technology demonstration ("lighthouse projects"), underpinned by cross-cutting and socio-economic research to validate research results and to provide a rational basis for policy decisions and market framework development. Wherever possible, an integrated approach will be adopted, stimulating the necessary feedback and cooperation between the various stakeholders concerned. Integrated actions that cut across or exploit the synergies between different research areas will be encouraged.

Strengthening the competitiveness of the European energy sector, in the face of severe global competition, is an important objective of this Theme, providing the capability for European industry to attain or maintain world leadership in key energy technologies. In particular, SMEs are the lifeblood of the energy sector, play a vital role in the energy chain and will be key to promoting innovation. Their strong participation in research and demonstration activities is essential and will be actively promoted.

The strategic research agendas and deployment strategies developed by European Technology Platforms are an important input for the research priorities in the Theme. Such platforms are established on hydrogen and fuel cells and photovoltaics and the concept is being extended to other areas, such as biofuels, zero emission power generation and future electricity networks. The ETP on hydrogen and fuels cells will form the basis for a Joint Technology Initiative and similar initiatives could be envisaged in other areas, such as zero

[34] COM(2002) 279, 29.11.2000.

emission power generation and renewables. Actions to enhance the co-ordination of national programmes will be pursued wherever appropriate.

In order to strengthen the diffusion and use of the output of research, the dissemination of knowledge and transfer of results, including to policy makers, will be supported in all areas. This will complement actions in the Intelligent Energy - Europe Programme component of the Competitiveness and Innovation Programme to support innovation and remove non-technological barriers to the widespread market deployment of demonstrated energy technologies.

Activities

- **Hydrogen and fuel cells**

The integrated research and deployment strategy developed by the European Hydrogen and Fuel Cell Technology Platform provides the basis for a strategic, integrated programme for transport, stationary and portable applications, aimed at providing a strong technological foundation for building a competitive EU fuel cell and hydrogen supply and equipment industry. The programme will comprise: fundamental and applied research and technological development; large-scale demonstration ("lighthouse") projects to validate research results and provide feedback for further research; cross-cutting and socio-economic research activities to underpin sound transition strategies and provide a rational basis for policy decisions and market framework development. The industrial applied research, demonstration and cross-cutting activities of the programme will preferably be implemented through the Joint Technology Initiative. This strategically managed, goal-oriented action will be complemented and closely co-ordinated with more upstream collaborative research effort aimed at achieving breakthrough on critical materials, processes and emerging technologies.

- **Renewable electricity generation**

Development and demonstration of integrated technologies for electricity production from renewables, suited to different regional conditions, in order to provide the means to raise substantially the share of renewable electricity production in the EU. Research should increase overall conversion efficiency, significantly drive down the cost of electricity, enhance process reliability and further reduce the environmental impact. Emphasis will be on photovoltaics, wind and biomass (including biodegradable fraction of waste). Furthermore, research will aim at realising the full potential of other renewable energy sources: geothermal, thermal solar, ocean and small hydropower.

- **Renewable fuel production**

Development and demonstration of improved conversion technologies for the sustainable production and supply chains of solid, liquid and gaseous fuels from biomass (incl. biodegradable fraction of waste), in particular biofuels for transport. Emphasis should be on new types of biofuels as well as on new production and distribution routes for existing biofuels, including the integrated production of energy and other added-value products through biorefineries. Aiming to deliver 'source to user' carbon benefits, research will focus on improving energy efficiency, enhancing technology integration and use of feedstock. Issues such as feedstock logistics, pre-normative research and standardisation for safe and

reliable use in transport and stationary applications will be included. To exploit the potential for renewable hydrogen production, biomass, renewable electricity and solar energy driven processes will be supported.

- **Renewables for heating and cooling**

Development and demonstration of a portfolio of technologies to increase the potential of heating and cooling from renewable energy sources to contribute to sustainable energy. The aim is to achieve substantial cost reductions, increase efficiencies, further reduce environmental impacts and optimise the use of technologies in different regional conditions. Research and demonstration should include new systems and components for industrial applications (incl. thermal seawater desalination), district and/or dedicated space heating and cooling, building integration and energy storage.

- **CO_2 capture and storage technologies for zero emission power generation**

Fossil fuels will inevitably continue to contribute a significant share of the energy mix for decades to come. To make this option compatible with the environment, particularly as regards climate change, drastic reductions in the adverse environmental impacts of fossil fuel use are needed, aiming at highly efficient power generation with near zero emissions. The development and demonstration of efficient and reliable CO_2 capture and storage technologies are crucial, aiming at decreasing the cost of CO_2 capture and storage to less than 20€/tonne, with capture rates above 90%, as well as proving the long-term stability, safety and reliability of CO_2 storage.

- **Clean coal technologies**

Coal fuelled power plants remain the workhorse of electricity generation worldwide, but have considerable potential for further efficiency gains and emissions reductions, particularly concerning CO_2. To maintain competitiveness and contribute to the management of CO_2 emissions, the development and demonstration of clean coal conversion technologies will be supported to significantly increase plant efficiency and reliability, minimise pollutant emissions and reduce overall costs, under various operating conditions. Looking towards future zero emission power generation, these activities should prepare for, complement and be linked with developments on CO_2 capture and storage technologies.

- **Smart energy networks**

To facilitate the transition to a more sustainable energy system, a wide-ranging R&D effort is required to increase the efficiency, flexibility, safety and reliability of the European electricity and gas systems and networks. For electricity networks, the goals of transforming the current electricity grids into a resilient and interactive (customers/operators) service network and removing the obstacles to the large-scale deployment and effective integration of renewable energy sources and distributed generation (e.g. fuel cells, microturbines, reciprocating engines), will also necessitate the development and demonstration of key enabling technologies (e.g. innovative ICT solutions, storage technologies for RES, power electronics and HTS devices). For gas networks, the objective is to demonstrate more intelligent and efficient processes and systems for gas transport and distribution, including the effective integration of renewable energy sources.

- **Energy efficiency and savings**

The vast potential for energy savings and improvements in energy efficiency[35] need to be harnessed through the optimisation, validation and demonstration of new concepts and technologies for buildings, services and industry. This incorporates the combination of sustainable strategies and technologies for increased energy efficiency, the use of renewable energy and poly-generation and the integration of demand management systems at large scale in cities and communities. These large-scale actions may be supported by innovative R&D addressing specific components or technologies, e.g. for poly-generation and eco-buildings. A key aim is the optimisation of the local community energy system, balancing a significant reduction in energy demand with the most affordable and sustainable supply solution, including the use of new fuels in dedicated fleets[36].

- **Knowledge for energy policy making**

Development of tools, methods and models to assess the main economic and social issues related to energy technologies. Activities will include the building of databases and scenarios for an enlarged EU and the assessment of the impact of energy and energy-related policies on security of supply, environment, society and competitiveness of the energy industry. Of particular importance is the impact of technological progress on EU policies.

International cooperation

Given the global nature of the challenges, threats and opportunities, international collaboration is an increasingly important element of energy research. Specific actions will support strategically important multi-lateral co-operation initiatives, such as the International Partnership for the Hydrogen Economy (IPHE), the Carbon Sequestration Leadership Forum (CSLF) and the Johannesburg Renewable Energy Coalition (JREC). Other specific actions will be supported, addressing issues such as the environmental consequences of energy policies, energy supply inter-dependency, technology transfer and capacity building.

International Scientific Co-operation in the field of energy will also support the aim of the EU Energy Initiative for poverty eradication and sustainable development (EUEI) launched at the World Summit on Sustainable Development (WSSD), namely to contribute to the achievement of the Millennium Development Goals (MDGs) through the provision of reliable and affordable access to sustainable energy for the poor.

Responding to emerging needs and unforeseen policy needs

Research on emerging needs will help to identify and explore new scientific and technological opportunities in the domain of energy supply, conversion use and sustainability, often in combination with other areas and disciplines, such as biotechnology and new materials and production processes. Unforeseen policy needs for which a quick reaction might be required include, for example, the developments of international climate

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35 As recognised by the Green Paper on Energy Efficiency or "Doing More for Less" - COM(2005) 265, 22.6.2005.

36 Building upon the experience of the CONCERTO and CIVITAS initiatives supported in the 6th Framework Programme.

change actions and the response to severe disruptions or instabilities in energy supply or price.

6. Environment (including Climate Change)

Objective

To promote sustainable management of the natural and human environment and its resources by advancing our knowledge on the interactions between the biosphere, ecosystems and human activities, and developing new technologies, tools and services, in order to address in an integrated way global environmental issues. Emphasis will be put on prediction of climate, ecological, earth and ocean systems changes, on tools and on technologies, for monitoring, prevention and mitigation of environmental pressures and risks including on health and for the sustainability of the natural and man-made environment.

Approach

Protecting the environment is essential for the quality of life of current and future generations as well as for economic growth. Given that the Earth's natural resources and the man-made environment are under pressure from growing population, urbanisation, continuous expansion of the agriculture, transport and energy sectors, as well as climate variability and warming at local, regional and global scales, the challenge facing the EU is to ensure continuous and sustainable growth while at the same time reducing negative environmental impacts. EU-wide cooperation is motivated by the facts that countries, regions and cities face common environmental problems and that critical mass is needed given the scale, scope and high level of complexity of environmental research. Such cooperation also facilitates common planning, use of connected and inter-operable databases, and the development of common indicators, of assessment methodologies and of coherent and large scale observation and forecasting systems. Furthermore international co-operation is necessary for the completion of knowledge and the promotion of better management at a global level.

Research under this topic[37], will contribute to the implementation of international commitments of EU and Member States such as the United Nations Framework Convention on Climate Change, Kyoto and Montreal protocols, post-Kyoto protocol initiatives, the UN Convention on Biological Diversity, the UN Convention to Combat Desertification, and the World Summit on Sustainable Development 2002, including the EU Water Initiative (as well as promoting sustainable production and consumption). It will also contribute to the Intergovernmental Panel on Climate Change, Group on the Earth Observation (GEO) initiative and take into account the Millennium Ecosystem Assessment. In addition, it will support the research needs arising from existing and emerging EU legislation and policies, the implementation of the 6th Environmental Action Programme, associated thematic strategies and other emerging strategies (e.g. the mercury strategy), and the action plans on Environmental Technologies and on Environment and Health.

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[37] Complementary research relating to the production and use of biological resources is addressed under the "Food, Agriculture and Biotechnology" theme.

The promotion of innovative environmental technologies will contribute to achieving sustainable use of resources, to mitigating and adapting to climate change, and to protecting the ecosystems and the man-made environment. Research will also contribute to technological developments that will improve the market positioning of European enterprises, in particular of SMEs, in areas such as environmental technologies. European Technology Platforms, such as those on water supply and sanitation, sustainable chemistry, construction, and forestry, confirm the need for EU level action and the implementation of relevant parts of their research agendas will be supported in the activities below.

Co-ordination of national programmes will be reinforced by broadening and deepening the scope of existing ERA- NETs in environmental research, including a joint implementation of programmes in Baltic Sea research and new ERA-NETs.

Specific attention will be paid to strengthening the dissemination of EU research outcomes - also through the exploitation of synergies with complementary funding mechanisms at EU and Member State levels - and to stimulating their uptake by relevant end-users, targeting in particular policy makers.

Activities

- **Climate change, pollution, and risks**

– *Pressures on environment and climate*

Integrated research on the functioning of climate and the earth system is needed in order to observe and analyse how these systems evolve and predict future evolution. This will enable the development of effective adaptation and mitigation measures to climate change and its impacts. Advanced climate change models from the global to sub-regional scales will be developed and applied to assess changes, potential impacts and critical thresholds. Changes in atmospheric composition and in the water cycle will be studied and risk based approaches will be developed taking into account changes in droughts, storms and floods patterns. Pressures on environmental quality and on climate from pollution of the air, water and soil will be investigated as well as the interactions between the atmosphere, the stratospheric ozone layer, land surface, ice and oceans. Consideration will be given to feedback mechanisms and abrupt changes (e.g. ocean circulation), and to impacts on biodiversity and ecosystems.

– *Environment and health*

Multidisciplinary research on interactions of environmental risk factors and human health is needed to support the Environment and Health action plan and the integration of public health concerns and disease characterisation related to emerging environmental risks. Research will focus on multiple exposures via different exposure routes, identification of pollution sources and new or emerging environmental stressors (e.g. indoor and outdoor air, electromagnetic fields, noise, and exposure to toxic substances) and their potential health effects. Research will also aim at integrating research activities on human biomonitoring regarding scientific aspects, methodologies and tools to develop a coordinated and coherent approach. It will include European cohort studies, with attention to vulnerable population groups, and methods and tools for improved risk characterisation, assessment and comparisons of risks and health impacts. Research will develop biomarkers and modelling

tools taking into account combined exposures, variations in vulnerability and uncertainty. It will also deliver methods and decision support tools (indicators, cost-benefit and multi-criteria analyses, health impact assessment, burden of disease and sustainability analysis) for risk analysis, management and communication, and for policy development and analysis.

– *Natural hazards*

Managing natural disasters requires a multi risk approach. There is a need for improved knowledge, methods and integrated framework for the assessment of hazards, vulnerability and risks. Furthermore mapping, prevention and mitigation strategies including consideration of economic and social factors need to be developed. Disasters related to climate (such as storms, droughts, forest fires, landslides and floods), and geological hazards (such as earthquakes, volcanoes and tsunamis) will be studied. This research will allow the underlying processes to be better understood, and prediction and forecasting methods to be improved on the basis of a probabilistic approach. It will also underpin the development of early warning and information systems. Societal repercussions of major natural hazards will be quantified.

- **Sustainable Management of Resources**

– *Conservation and sustainable management of natural and man-made resources*

Research activities will be targeted to improve the knowledge basis and develop advanced models and tools needed for the sustainable management of resources and the creation of sustainable consumption patterns. This will enable the prediction of the behaviour of ecosystems and their restoration, and the mitigation of degradation and loss of important structural and functional elements of ecosystems (for biodiversity, water, soil and marine resources). Research on ecosystem modelling will take account of protection and conservation practices. Innovative approaches to develop economic activities from ecosystem services will be promoted. Approaches will be developed to prevent desertification, land degradation and erosion, and to stop biodiversity loss. Research will also address sustainable management of forests and the urban environment including planning, and waste management. The research will benefit from and contribute to the development of open, distributed, inter-operable data management and information systems and will underpin assessments, foresight, and services related to natural resources and their use.

– *Evolution of marine environments*

Specific research is required to improve our understanding of the impacts of human activities on the ocean and seas and on the resources of the marine environment, including the pollution and eutrophication of regional seas and coastal areas. Research activities in aquatic environments, deep sea ecosystems and seabed will be carried out in order to observe, monitor and predict the behaviour of this environment and enhance understanding of the sea and the sustainable use of ocean resources. The impact of human activities on the ocean will be assessed through integrated approaches taking into account marine biodiversity, ecosystem processes and services, ocean circulation and seabed geology.

- **Environmental Technologies**

– *Environmental technologies for the sustainable management and conservation of the natural and man-made environment*

New or improved environmental technologies are needed to reduce the environmental impact of human activities, protect the environment and manage resources more efficiently and to develop new products, processes and services more beneficial for the environment than existing alternatives. Research will target in particular: technologies preventing or reducing environmental risks, mitigating hazards and disasters, mitigating climate change and the loss of biodiversity; technologies promoting sustainable production and consumption; technologies for managing resources or treating pollution more efficiently, in relation to water, soil, air, sea and other natural resources, or waste; technologies for the environmentally sound and sustainable management of the human environment including the built environment, urban areas, landscape, as well as for the conservation and restoration of cultural heritage.

– *Technology assessment, verification and testing*

Research will focus on the risk and performance assessment of technologies, including processes and products, and the further development of related methods such as the life cycle analysis. Moreover, focus will be given to: long-term opportunities, market potential and socio-economical aspects of environmental technologies; chemicals risk assessment, intelligent testing strategies and methods for minimising animal testing, risk quantification techniques; and research support to the development of the European Environmental Technologies Verification and Testing system.

- **Earth observation and assessment tools**

– *Earth observation*

Research activities will be devoted to the development and integration of the Global Earth Observation System of Systems (GEOSS) for environment and sustainable development issues in the framework of the GEO initiative[38]. Interoperability between observation systems, information management and data sharing, and optimisation of information for understanding, modelling and predicting environment phenomena will be addressed. These activities will focus on natural hazards, climate change, weather, ecosystems, natural resources, water, land use, environment and health, and biodiversity (including the aspects of risk assessment, forecasting methods and assessment tools) in order to produce advances for the GEOSS societal benefit areas and contribute to GMES.

– *Assessment tools for sustainable development*

Tools are needed to quantitatively assess the environmental and research policy contribution to competitiveness and sustainable development, including assessments of market-based and regulatory approaches as well as the impacts of current trends in production and consumption patterns. Such tools will include models that consider the links

[38] Including financial support to the GEO secretariat.

between the economy, environment and society and hence beneficial and efficient strategies of adaptation and prevention. Research will also seek to improve existing indicators and develop new ones to assess sustainable development policy priorities, and to analyse the linkages between them, taking into account the existing set of EU sustainable development indicators. The analysis of technology, socio-economic drivers, externalities and governance as well as foresight studies, will be included. Areas of application include land use and marine policies and the economic, political and social conflicts related to climate change.

International cooperation

Environmental problems have invariably a transboundary, regional or global dimension and international cooperation will be an important aspect in this theme. Particular areas relate to EU international commitments, such as Climate Change, Biodiversity, Desertification and chemicals and wastes conventions as well as the Johannesburg Summit decisions on sustainable development as well as other regional conventions. Attention will also be given to relevant research actions stemming from EU environmental strategies and action plans[39].

Scientific and technological partnerships with developing countries will contribute to the Millennium Development Goals in several fields (e.g. reverse the loss of environmental resources, improvement of water management, supply and sanitation, and facing the environmental challenges of urbanisation), areas where SMEs could also play a key role. Particular attention will be given to the relation between global environmental issues and the regional and local development problems relating to natural resources, biodiversity, land use, natural and man-made hazards and risks, climate change, environmental technologies, environment and health as well as on policy analysis tools. Cooperation with industrialised countries will enhance access to global research excellence.

The establishment of the GEOSS for Earth observation will promote international co-operation for understanding Earth systems and sustainability issues, and co-ordinated data collection for scientific and policy purposes.

Responding to emerging needs and unforeseen policy needs

Research on emerging needs in this theme may address questions such as the interactions between people, ecosystems and the biosphere or new risks related to natural, man induced and technologically induced disasters.

Support to respond to unforeseen environmental policy needs could, for example, relate to sustainability impact assessments of new EU policies such as in environment, maritime policy, standards and regulations.

[39] Examples are the Killarney recommendations for Biodiversity Research Priorities for the 2010 Target (Malahide conference in 2004), the EU Action Plan on Climate Change in the Context of Development Cooperation (2004), priority actions identified by the Committee for Science and Technology of the UNCCD, EU and global strategies addressing chemicals and pesticides safe management etc.

7. Transport (including Aeronautics)

Objective

Based on technological advances, develop integrated, "greener", "smarter" and safer pan-European transport systems for the benefit of the citizen and society, respecting the environment and natural resources; and securing and further developing the competitiveness and the leading role attained by the European industries in the global market.

Approach

The European transport system is a vital element to European economic and social prosperity. It serves key roles in the transportation of people and goods in a local, regional, national, European and international context. This theme will address some of the ongoing challenges, as recognised in the White Paper on Transport[40], in improving the contributions that transport systems make to society and industrial competitiveness within an enlarged EU, whilst minimising the negative impacts and consequences of transport in relation to the environment, energy usage, security and public health.

A new integrated approach will be taken which links all transport modes, addresses the socio-economic and technological dimensions of research and knowledge development, and encapsulates both innovation and the policy framework.

The various Technology Platforms set up in this field (ACARE for aeronautics and air transport, ERRAC for rail transport, ERTRAC for road transport, WATERBORNE for waterborne transport, Hydrogen and Fuel cells) have elaborated long-term visions and Strategic Research Agendas (SRA) which constitute useful inputs to the definition of this theme and complement the needs of policy makers and expectations of society. Selected aspects of the SRAs may justify setting up Joint Technology Initiatives. ERA-NET activities present opportunities to facilitate further trans-national coordination for specific topics within the Transport sector and will be pursued wherever appropriate.

Activities of particular relevance to SMEs include efforts to ensure robust technology driven supply chains in the various sectors; enabling SMEs to access research initiatives; and facilitating the role and start-up of high-tech SMEs, particularly in the advanced transport technologies and 'services-related' activities specific to transport as well as the development of systems and applications in satellite navigation domains.

Existing policy needs as well as the development, assessment and implementation of new policies (for example Maritime Policy), will be addressed within and across the different activity lines. The work will include studies, models and tools that deal with strategic monitoring and forecasting and integrate knowledge relating to the main economic, social, safety and environmental issues for transport. Activities supporting cross-cutting thematic topics will focus on transport specificities, for example security aspects as an inherent requirement to the transport system; the use of alternative energy sources in transport

[40] "*European Transport Policy for 2010: time to decide"* - COM(2001) 370.

applications; and monitoring of environmental effects of transport, including climate change.

Support will also be given to dissemination and exploitation activities and impact assessments, with particular attention to the specific user needs and policy requirements in the transport sector.

Activities

Aeronautics and air transport

Activities will contribute to key Community policies as well as to the implementation of the ACARE Strategic Research Agenda. The quantitative objectives correspond to the 2020 time horizon of this Agenda. The scope of the research includes all aircraft, passenger travel and airside related aspects of the air transport system.

The greening of air transport: Developing technologies to reduce the environmental impact of aviation with the aim to halve the emitted carbon dioxide (CO_2), cut specific emissions of nitrogen oxides (NOx) by 80% and halve the perceived noise. Research will focus on furthering green engine technologies including alternative fuels technology as well as improved vehicle efficiency of fixed-wing and rotary wing aircraft, new intelligent low-weight structures, and improved aerodynamics. Issues such as improved aircraft operations at the airport (airside and landside) and air traffic management, manufacturing, maintenance and recycling processes will be included.

Increasing time efficiency: Realising a step-change in aviation in order to accommodate the projected growth of three times more aircraft movements by improving punctuality in all weather conditions and reducing significantly the time spent in travel-related procedures at airports. Research will develop and implement an innovative Air traffic Management (ATM) system within the context of the SESAME[41] initiative, by integrating air, ground and space components, together with flow management and more aircraft autonomy. Design aspects of aircraft to improve handling of passengers and cargo, novel solutions for efficient airport use and connecting air transport to the overall transport system will also be addressed. The most efficient coordination of the development of ATM systems in Europe will be ensured through the SESAME initiative[42].

Ensuring customer satisfaction and safety: Introducing a quantum leap in passenger choice and schedule flexibility, whilst achieving a five-fold reduction in accident rate. New technologies will enable a wider choice of aircraft/engine configurations ranging from wide body to small size vehicles, increased levels of automation in all the elements of the system, including the piloting. Focus will also be on improvements for passengers comfort, well being and new services and active and passive safety measures with special emphasis on the human element. Research will include the adaptation of airport and air traffic operations to different type of vehicles and 24-hour utilisation at acceptable community noise levels.

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41 European air traffic control infrastructure modernisation related to the Single European Sky implementation.

42 For this purpose, the establishment of a Joint Undertaking for the coordination of ATM activities is envisaged.

Improving cost efficiency: Fostering a competitive supply chain able to halve the time-to-market, and reduce product development and operational costs, resulting in more affordable transport for the citizen. Research will focus on improvements to the whole business process, from conceptual design to product development, manufacturing and in-service operations including the integration of the supply chain. It will include improved simulation capabilities and automation, technologies and methods for the realisation of the zero-maintenance aircraft, as well as lean aircraft, airport and air traffic management operations.

Protection of aircraft and passengers: Preventing hostile action of any kind to incur injury, loss, damage or disruption to travellers or citizens due to the effects of aircraft misuse. Research will focus on the relevant elements of the air transport system including security measures in cabin and cockpit designs, automatic control and landing in the case of unauthorised use of aircraft, protection against external attacks, as well as security aspects of airspace management and airport operations.

Pioneering the air transport of the future: Exploring more radical, environmentally efficient and innovative technologies that might facilitate the step change required for air transport in the second half of this century and beyond. Research will address aspects such as new propulsion and lifting concepts, new ideas for the interior space of airborne vehicles, new airport concepts, new methods of aircraft guidance and control, alternative concepts of air transport system operation and its integration with other transport modes.

Surface transport (rail, road and waterborne)

The greening of surface transport: Developing technologies and knowledge for reduced pollution (air, water and soil) and environmental impact such as climate change, health, biodiversity and noise. Research will improve the cleanliness and energy-efficiency of power-trains and promote the use of alternative fuels, including hydrogen and fuel cells. Activities will cover infrastructure, vehicles, vessels and component technologies, including overall system optimisation. Research in developments specific to transport will include manufacturing, construction, operations, maintenance, repair, inspection, recycling, end of life strategies and interventions at sea in case of accident.

Encouraging modal shift and decongesting transport corridors[43]*:* Developing and demonstrating seamless door-to-door transport for people and goods as well as technologies to ensure effective intermodality, including in the context of rail transport competitiveness. This includes activities addressing the interoperability and operational optimisation of local, regional, national and European transport networks, systems and services and their intermodal integration. The activities will aim at optimised use of infrastructure including terminals and specialised networks, improved transport, traffic and information management, enhanced freight logistics and passenger intermodality.. Intelligent systems, new vehicle/vessel concepts and technologies including loading and unloading operations will be developed. Knowledge for policy making will include infrastructure pricing and charging, assessments of EU transport policy measures and trans-European networks policy and projects.

[43] In view of the objective to re-establish the modal split of 1998 activities addressing one single mode will concentrate on rail and waterborne transport.

Ensuring sustainable urban mobility: Focusing on the mobility of people and goods by research on the 'next generation vehicle' and its market take-up, bringing together all elements of a clean, energy efficient, safe and intelligent road transport. Research on new mobility concepts, innovative organisational and mobility management schemes and high quality public transport will aim at ensuring access for all and high levels of intermodal integration. Innovative strategies for clean urban transport[44] will be developed and tested. Particular attention will be paid to non-polluting modes of transport, demand management, rationalisation of private transport, and information and communication strategies, services and infrastructures. Tools supporting policy development and implementation will include transport and land use planning.

Improving safety and security: Developing technologies and intelligent systems to protect vulnerable persons such as drivers, riders, passengers, crew, and pedestrians. Advanced engineering systems and risk analysis methodologies will be developed for the design of vehicles, vessels and infrastructures. Emphasis will be placed on integrative approaches linking human elements, structural integrity, preventive, passive and active safety, rescue and crisis management. Safety will be considered as an inherent component of the total transport system embracing infrastructures, goods and containers, transport users and operators, vehicles and vessels and measures at policy and legislative levels, including decision support and validation tools; security will be addressed wherever it is an inherent requirement to the transport system.

Strengthening competitiveness: Improving the competitiveness of transport industries, ensuring sustainable, efficient and affordable transport services and creating new skills and job opportunities by research and developments. Technologies for advanced industrial processes will include design, manufacturing, assembly, construction and maintenance and will aim at decreasing life cycle costs and development lead-times. Emphasis will be placed on innovative product concepts and improved transport services ensuring higher customer satisfaction. New production organisation including the supply chain management and distribution systems will be developed.

Support to the European global satellite navigation system (Galileo)

The European Global Satellite Navigation, encompasses EGNOS and Galileo, and provides a worldwide positioning and timing infrastructure[45].

Exploiting the full potential: promoting growth in the use of the services ranging from open to commercial access, safety-of-life to "search and rescue" and public regulated service; freight transport management applications; exploiting by-product services; demonstrating the benefits and efficiencies of satellite navigation.

Providing the tools and creating the appropriate environment: ensuring safe use of services, mainly through certification in key application domains; preparing and confirming the adequacy of services to new policies and legislation, including their implementation; addressing public regulated services according to the approved policy of access; developing essential digital topology, cartography, geodesy data and systems for use in navigation applications; addressing safety and security needs and requirements.

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44 Building upon the experiences of the CIVITAS Initiative.

45 The research activities will be managed by the European GNSS Supervisory Authority.

Adapting receivers to requirements and upgrading core technologies: improving receiver performances, integrating low-power consumption and miniaturisation technologies, completing in-door navigation coverage, coupling with radio frequency identification devices, exploiting software receiver technology, combining with other functions as telecommunication, supporting key navigation ground-based infrastructure technology to ensure robustness and flexibility.

Supporting infrastructure evolution: preparing second generation system, adapting to evolving user demands and market forecasts, taking advantage of infrastructure internationalisation to address global markets and developing world-wide standards.

International Co-operation

International co-operation is an important component of the RTD activities in this field, and will be encouraged where there are interests for industry and policy-makers. Broad topic areas for specific actions will be where there is market attraction (for example global trade development and connecting networks and services at continental and intercontinental level); opportunities to access and acquire science and technology that is complementary to the current European knowledge and of mutual benefit; and where Europe responds to global needs (for example climate change) or contributes to international standards and global systems (for example applied logistics and satellite navigation infrastructure).

Emerging needs and unforeseen policy needs

Initiatives under emerging needs will support research that responds to critical events and challenges of future transportation systems for example novel transport and vehicle concepts, automation, mobility or organisation.

Unforeseen policy needs that may require specific transport-related research could include broad societal issues such as the changes in the demographics, lifestyles and expectations of society for transport systems; as well as emerging risks or problems of high importance to European society.

8. Socio-Economic Sciences and the Humanities

Objective

Generating an in-depth, shared understanding of complex and interrelated socio-economic challenges Europe is confronted with, such as growth, employment and competitiveness, social cohesion and sustainability, quality of life, education, cultural issues and global interdependence, in particular with the view of providing an improved knowledge base for policies in the fields concerned.

Approach

The research priorities address key societal, economic and cultural challenges facing Europe and the world now and in the future. The proposed research agenda constitutes a coherent approach to addressing these challenges. The development of a socio-economic and humanities knowledge base on these key challenges will make a significant contribution to promoting shared understanding across Europe and to the resolution of wider international problems. The research priorities will help improve the formulation,

implementation, impact and assessment of policy in virtually all Community policy areas at the European, national, regional and local levels, and a substantial international perspective is included in most of the research

In addition to socio-economic research and foresight an emphasis will be placed on humanities research, which will provide different perspectives and make an essential contribution across the theme on, for example, the historical, cultural and philosophical aspects, including relevant language, identity and values questions.

The work will also build upon relevant national research programmes, complementing the research activities below, and taking advantage of the ERA-NET scheme and the possible use of Article 169. For certain issues, use may also be made of social platforms to discuss future research agendas; these would involve the research community and societal stakeholders.

The research will be facilitated by research infrastructures which generate new research data, including through surveys, make available existing data for international comparative research, and provide access to source materials and advanced research tools as well as to the results of existing research in many fields. Some of these actions will be carried out through the Infrastructures element of the Capacities programme and others by projects under this theme. The research will rely on access to and the use of official statistics.

Specific dissemination actions targeted at particular groups and the general public will be undertaken, including workshops and conferences for researchers to discuss with policy-makers and other stakeholders, and the diffusion of results using various media.

Appropriate coordination of socio-economic and humanities research and foresight elements across the Cooperation and other specific programmes will be assured.

Activities

Growth, employment and competitiveness in a knowledge society

This will aim to develop and integrate research on the issues affecting growth, employment and competitiveness in order to provide an improved and integrated understanding of these issues for the continued development of a knowledge society. It will benefit policy and support progress towards achieving these objectives. The research will integrate the following aspects of the question:

– The changing role of knowledge throughout the economy, including the role of different types of knowledge and competences, education and lifelong learning, and intangible investment.

– Economic structures, structural change and productivity issues, including the role of the services sector, of finance, demographics, demand and the processes of long-term change.

– Institutional and policy questions, including macroeconomic policy, labour markets, institutional contexts, and policy coherence and coordination.

It will include important new challenges and opportunities from increased globalisation, emerging economies, relocation, and EU enlargement. Employment questions will include unemployment and underemployment.

Combining economic, social and environmental objectives in a European perspective

This aims to support the societal goal of combining economic, social and environmental objectives and so improve the basis for sustainable development. The research in this activity will address two interrelated issues:

– How European socio-economic models and those outside Europe have fared in combining the objectives, the conditions under which this occurred including the role of dialogue, social partnership, institutional change and their ability to confront new challenges.

– Economic cohesion between regions and regional development in an enlarged EU; and social cohesion (including inequalities, social protection and social services, taxation policies, ethnic relations, education and social exclusion, and health) as well as its relation to social problems such as poverty, housing, crime, delinquency and drugs.

In addressing these issues, consideration will be given to the existence of trade-offs or synergies between the economic, social, environmental objectives in the world context, spatial aspects, long-term sustainability, and issues for developing countries.

Major trends in society and their implications

The aim is to understand and assess the implications of particular key trends in European society that have major consequences for citizens, their quality of life and for policies, and thus to provide an underpinning for many policy areas. Empirical and theoretical research will address initially three major trends:

– Demographic change including ageing, births and migration.

– Changes in the related aspects of lifestyles, families, work, consumption, health and quality of life including child, youth and disabilities issues.

– Cultural interactions in an international perspective including traditions from different societies, diversity of populations, discrimination, racism, xenophobia and intolerance.

Gender issues and changing values will be included. In addition, changes in criminality and crime perception will be examined, as will changes in corporate social responsibility.

Europe in the world

The aim is to understand changing interactions and interdependencies between world regions and their implications for the regions concerned, especially for Europe, and the related issue of addressing emerging threats and risks in a world context and their connection to human rights, freedoms and well-being. The research will involve two related tracks:

– Flows of trade, finance, investment, migration and their impact; uneven development, poverty and sustainability; economic and political relations and global governance. This will explore cultural interactions including media and religions and distinctive non-European approaches.

– Conflicts, their causes and resolution; the relation between security and destabilising factors such as poverty, crime, environmental degradation and resource scarcity; terrorism, its causes and consequences; security-related policies and perceptions of insecurity and civil-military relations.

In both, Europe's role in the world, the development of multilateralism and international law, the promotion of democracy and fundamental rights including different notions of these, and Europe as seen from outside, will be addressed.

The citizen in the European Union

In the context of the future development of the EU, the aim is to improve understanding of, first, the issues involved in achieving a sense of democratic "ownership" and active participation by citizens as well as effective and democratic governance, and, second, Europe's diversities and commonalities in terms of culture, institutions, law, history, languages and values. The research will address:

– Participation (including of youth), representation, accountability and legitimacy; the European public sphere, media and democracy; various forms of governance in the EU and policy processes; the role of civil society; citizenship and rights; and related values of the population.

– European diversities and commonalities, including their historical origins and evolution; differences in institutions (including norms, practices, laws); cultural heritage; various visions and perspectives for European integration including the views of the populations; identities; approaches to multiple coexisting cultures; the role of language, the arts and religions; attitudes and values.

Socio-economic and scientific indicators

With a view to improving the use of indicators in policy, the aim is to develop a more profound understanding of their use in policy development and implementation and to propose improvements in indicators and methods for their use. The research will address:

– How indicators are used in policy objectives, policy development and implementation, in a variety of fields and from macro to micro levels, the adequacy of existing indicators and their use, and proposals for new indicators and sets of indicators.

– How evidence-based policy might be better supported by indicators and methods for their use; indicators for policy with multiple objectives, for policy coordination and for regulation; support by official statistics for such indicators.

– Use of indicators and related approaches for evaluation of research programmes including impact assessment.

Foresight activities

The aim is to provide national, regional and Community policy-makers with foresight knowledge for the early identification of long term challenges and areas of common interest that can help them formulate policy. Four types of activities will be covered:

– Wide socio-economic foresight on a limited number of key challenges and opportunities for the EU, exploring issues such as the future and implications of ageing, migration, globalisation of knowledge, changes in crime and major risks.

– More focused thematic foresight on the developments in emerging research domains or those cutting across existing domains, as well as on the future of scientific disciplines.

– Foresight on research systems and policies in Europe and on the future of key actors involved.

– Mutual learning and co-operation between national and/or regional foresight initiatives; co-operation between EU, third country and international foresight initiatives.

International cooperation

Given the strong international dimension of the research, international cooperation will be developed in all areas of the theme. Specific international cooperation actions will be undertaken on a number of selected subjects on a multilateral and bilateral basis identified on the basis of the needs of the partner countries as well as those of Europe.

Emerging needs and unforeseen policy needs

Research on emerging needs will offer a space for researchers to identify and address research challenges not specified above. It will encourage innovative thinking about challenges facing Europe not being widely discussed up to now or other relevant combinations of issues, perspectives and disciplines. Research to respond to unforeseen policy needs will also be undertaken, in close consultation with those involved in policy.

9. Security and Space

Objective

To develop the technologies and knowledge for building capabilities with a civil application focus needed to ensure the security of citizens from threats such as terrorism and crime as well as from the impact and consequences of unintended incidents such as natural disasters or industrial accidents; to ensure optimal and concerted use of available and evolving technologies to the benefit of European security while respecting fundamental human rights; and to stimulate the co-operation of providers and users for security solutions; through the activities at the same time to reinforce the technology basis of the European security industry and to strengthen its competitiveness.

Supporting a European Space Programme focusing on applications such as GMES with benefits for citizens and for the competitiveness of the European space industry.

This will contribute to the development of a European Space Policy, complementing efforts by Member States and by other key players, including the European Space Agency.

9.1 Security

Approach

Security in the EU is a precondition of prosperity and freedom. The Security Research theme has a civil application focus and it supports not only the implementation of EU policies and initiatives relevant to security such as the Common Foreign and Security Policy or the Hague Programme with the objective of creating an EU-wide area of justice, freedom and security but also in areas such as transport, health (including the EU Health Security Programme[46]) civil protection (including natural and industrial disasters), energy and environment. Through this, the theme will also contribute to growth and employment and the competitiveness of the European security industry It will facilitate the various national and international actors to co-operate and co-ordinate in order to avoid unnecessary duplication and to explore synergies wherever possible. The respect of privacy and civil liberties will be a guiding principle throughout the theme.

Activities at Community level will address four security mission areas which have been identified in response to specific challenges of high political relevance and European added value with regard to threats and potential security incidents, and three areas of cross-cutting interest. Each mission area covers six phases which vary in time and emphasis. These six phases are: identify (incident related), prevent (threat related), protect (target related), prepare (operation related), respond (crisis related) and recover (consequence related); they describe what efforts to undertake in the respective phases. The first four phases refer to efforts of avoiding an incident and mitigating its potential negative impacts, the last two refer to efforts of coping with the incident situation and longer term consequences.

For each phase of the individual mission areas, a specific group of capabilities becomes relevant which those responsible for the security of the citizens need to possess in order to effectively cope with threats and incidents. The capabilities indicate how the efforts would be undertaken and will in several cases contribute to more than one phase and/or mission area. Acquiring the capabilities is based on a combination of knowledge, technologies and organisational measures. The latter goes beyond a research programme however; security research activities at European level will contribute to the knowledge and technologies for building up the required capabilities.

Research will be multidisciplinary and mission-oriented, it will range from technology and methodology development, to technology integration, demonstration and validation. A multi-purpose nature of technologies is encouraged to maximize the scope for their application, and to foster cross-fertilisation and take-up of existing technologies for the civil security sector are stimulated. The Security Research theme will complement and integrate the technology- and more systems-oriented research relevant to security which is carried out in other themes.

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[46] With the objective to improve preparedness and response to deliberate releases of biological and/or chemical agents.

Research will be focussed on civil security applications. Recognizing that there are areas of dual use technology relevant to both civilian and military applications, a suitable framework will be established to co-ordinate with the European Defence Agency (EDA).

The involvement of small and medium enterprises (SME) in the activities is as strongly encouraged as that of authorities and organisations responsible for the security of the citizens. The longer term research agenda elaborated by the European Security Research Advisory Board (ESRAB)[47] will support the definition of the content and structure of the research in this theme.

Activities

Activities will address the following *mission areas*:

- **Protection against terrorism and crime:** Activities will concentrate on threat aspects of potential incidents such as offenders, equipment and resources used by them or as mechanisms of attack. A series of capabilities are required to cope with this mission area, many of which primarily relate to the phases "identify", "prevent" and "prepare" and "respond". The ambition is both to avoid an incident and to mitigate its potential consequences. To build up the required capabilities, emphasis will be on issues such as: threat (e.g. Chemical, Biological, Radiological and Nuclear) awareness (e.g. intelligence gathering, collection, exploitation, sharing; alerting), detection (e.g. hazardous substances, individuals or groups, suspect behaviour), identification (e.g. of persons, type and amount of substances), prevention (e.g. control of access and movements, with respect to financial resources, control of financial structures), preparedness (e.g. risk assessment; control of intentionally released biological and chemical agencts; assessment of levels for strategic reserves such as manpower, skills, equipment, consumables; with respect to large scale events etc.), neutralisation and containment of effects of terrorist attacks and crime, law enforcement data processing.
- **Security of infrastructures and utilities:** Activities will concentrate on targets of an incident, examples for infrastructures include large scale event sites, significant sites of political (e.g. parliament buildings) or symbolic (e.g. particular monuments) value and utilities being those for energy (including oil, electricity, gas), water, transport (including air, sea, land), communication (including broadcasting), financial, administrative, public health etc. A series of capabilities are required to cope with this mission area, many of which primarily relate to the phases "protect" but also "prepare". The ambition is both to avoid an incident and to mitigate its potential consequences. To build up the required capabilities, emphasis will be on issues such as: analysing and assessing vulnerabilities of physical infrastructure and its operations; securing existing and future public and private critical networked infrastructures, systems and services with respect to their physical and functional side; control and alert systems to allow for quick response in case of an incident; protection against cascading effects of an incident.
- **Border security:** Activities will deal with two types of issues: (organized or unforeseen) access related security issues where the EU borders are regarded as the outermost perimeter to protect the EU territory (green and blue borders) as well as border access

[47] Established in the course of the three years Preparatory Action for Security Research (PASR 2004-2006).

nodes as part of the (transport) infrastructure and thus potential targets of security threats. A series of capabilities are required to cope with this mission area, many of which primarily relate to the phases "identify", "prevent" and "protect". The ambition is both to avoid an incident and to mitigate its potential consequences. To build up the required capabilities, emphasis will be on issues such as: enhancing the effectiveness and efficiency of all security relevant systems, equipment, tools and processes used at border access nodes (e.g. identification of accessing people, non-invasive detection of people and goods, tracking of substances, sampling, spatial recognition including data capture and analysis etc.); improving the security of Europe's land and coastal borders (e.g. through non invasive and underwater detection of vehicles, tracking of vehicles, spatial recognition including data capture and analysis, surveillance, remote operations etc.); assessment and management of (illegal) migration flows.

- **Restoring security in case of crisis:** Activities will focus on emergency management operations, such as in civil protection (including natural disasters and industrial accidents), humanitarian aid and rescue tasks and support to the Common Foreign and Security Policy (CFSP). A series of capabilities are required to cope with this mission area, many of which primarily relate to the phases "prepare", "respond" and "recover". The ambition is to mitigate the consequences of the incident. To build up the required capabilities, emphasis will be on issues such as: general organisational and operational preparedness to cope with security incidents (e.g. inter-organisational co-ordination and emergency communication, assessment of strategic reserves, strategic inventories etc.), crisis management (e.g. assessment of the incident and priority requirements, evacuation and isolation, neutralisation and containment of effects of terrorist attacks and crime etc.) emergency humanitarian aid and the management of the consequences and cascading effects of a security incident (e.g. the functioning of the public health care system, business continuity, confidence building measures, restoring the disrupted or destroyed functioning of society etc.).

The above areas will be supported by activities in the following areas of cross-cutting interest:

- **Security Systems Integration and interoperability:** Activities will *enable* and/or *contribute to the performance* of technology required for building up the above listed capabilities, thus focusing on cross-cutting issues such as: enhancing the interoperability and intercommunication of systems, equipment, services and processes while ensuring their reliability, protection of confidentiality and integrity of information, traceability of all transactions and their processing etc. Activities will also address standardisation and training matters (including such with respect to cultural, human and organisational interoperability).

- **Security and society:** Activities are of a cross-cutting nature and should be conducted by interacting between natural sciences, technology and other sciences, in particular political, social and human sciences. The focus will be on targeted cultural and socio-economic analyses, scenario building and other research activities related to subjects such as: Security as an evolving concept (comprehensive analyses of security-related needs, in order to define the main functional requirements to address the fluctuating security landscape); vulnerabilities and new threats (e.g. in the field of terrorism and organised crime); the attitude of citizens in crisis situations (e.g. perception of terrorism and crime, behaviour of crowds, public understanding and acceptance of security (and

safety) controls); preparedness and readiness of the citizen in case of terrorist attacks; issues related to communication between authorities and citizens in crisis situations; raising public awareness for threats; citizens' guidance on the internal security advisory and assistance systems in the Member States and at EU level; behavioural, psychological and other relevant analyses of terrorist offenders; ethical issues with respect to personal data protection and integrity of information. Research will also be directed into developing statistical indicators on crime to permit assessments of changes in criminality.

- **Security Research co-ordination and structuring:** This area provides the platform for activities to co-ordinate and structure national, European and international security research efforts, to develop synergies between civil, security and defence research as well as to co-ordinate between the demand and the supply side of security research. Activities will also focus on the improvement of relevant legal conditions and procedures.

International cooperation

International co-operation in the security Research activities will be implemented in conformity with internal and external aspects of the EU Security Policy. Particular requirements and criteria for international co-operation may be specified in the work programme.

Specific international co-operation actions will be considered where there is mutual benefit in line with the EU Security Policy, such as research relating to security activities of global applicability.

Responding to emerging needs and unforeseen policy needs

The Security Research theme is by nature and design flexible. Activities will allow the accommodation of as yet unknown future security threats and related policy needs that may arise. This flexibility will complement the mission-oriented character of the research activities set out above.

9.2 Space

Approach

In this field, the EU will contribute to the definition of common objectives based on user requirements and European policy objectives, to the coordination of activities, avoiding duplications and facilitating interoperability; it will also contribute to the definition of standards. The European Space Policy[48] will serve the objectives of the public authorities and decision-makers while strengthening the competitiveness of the European industry. It will be implemented through a European Space Programme, and the 7th Framework Programme will contribute to support or complement research and technological development actions provided by other stakeholders, public and private, in Europe.

[48] « European Space Policy : Preliminary Elements » - COM(2005) 208.

Actions in this theme will support EU policy objectives, for example in the fields of agriculture, fisheries, environment, telecommunications, security, development, health, humanitarian aid, transport, science as well as ensuring that Europe is involved in regional and international cooperation. Space tools are also foreseen to contribute to law enforcement is some of these fields

The activities set out in this priority aim at: the exploitation of space assets for the implementation of applications, notably GMES (Global Monitoring for Environment and Security); space exploration activities; and enabling activities supporting the strategic role of the European Union.

Exploitation oriented activities are expected to be complementary to actions carried out under other themes in the "Cooperation" Specific Programme (notably those carried out under "Environment" in connection with GEOSS, and those carried out under "Information and Communication Technologies"). Thematic synergies will also be developed with related activities in other specific programmes. Complementary actions are envisaged through the Competitiveness and Innovation Framework Programme and the Education and Training Programme.

Research and technology transfer activities in the Theme could be particularly appealing for SMEs developing innovative technologies, needing familiarisation with new space technology opportunities (spin-in), or developing application for their own space technologies to other markets (spin-off).

Management of certain parts of the space activities could be entrusted to existing external entities, such as the European Space Agency[49]. In the case of GMES, research activities may be implemented through a Joint Technology Initiative (see Annex III).

Activities

- **Space-based applications at the service of the European Society**

– *Global Monitoring for Environment and Security (GMES)*

The objective is to develop appropriate satellite based monitoring and early warning systems as unique and globally available data sources and to consolidate and stimulate evolution of their operational use. This programme will also provide support to the development of operational GMES services, which enable decision-makers to better anticipate or mitigate crisis situations and issues relating to the management of the environment and security. Research activities should mainly contribute to maximise the use of GMES data collected from space-borne sources and to integrating these with data from other observation systems in complex products designed to deliver information and customised services to end-users through an efficient data integration and information management. Research activities should also contribute to enhance monitoring techniques and associated instrument technologies, to develop where necessary new space-based systems or improve the interoperability of existing ones, and to enable their use in (pre)operational services responding to specific types of demand.

[49] Within the terms of the Framework Agreement between the European Community and the European Space Agency - COM(2004) 85.

– In the environmental domain, the demands include the acquisition of independent knowledge on the state and evolution of sustainable use of renewable resources (such as vegetation and forests), wetlands, land cover and land use, the food supply, agricultural environment and fishing, carbon sinks and stocks; atmospheric processes and chemistry; and conditions of oceans. The EC 6th Environmental Action Plan on environmental policies monitoring climate change, air, soil and water quality shall be considered.

– In the security domain demands include improving acquisition, access and exchange of data and information needed in the context of emergency relief response and crisis management. Support is to be given to civil protection for prevention/mitigation, monitoring, risk management and assessment of natural and technological hazards as well as to humanitarian aid for the purpose of proper need assessement and emergency planning in the context of natural disasters and humanitarian crises (refugees, internally displaced persons, etc.). Support is also to be considered to support the implementation of the EU policies namely in the domain of conflict prevention, and border surveillance.

– *Security aspects (complementary to security research and to GMES activities)*

The EC SPASEC Report[50] underlined that space services play such a key role in the well-being of European society that protection of critical infrastructure in the space sector is a priority. This may need services and capabilities for surveillance of space based assets as well as protection for terrestrial infrastructure. The space surveillance system could for example provide information concerning the main characteristics of satellites (e.g. orbital parameters, activity status), the main characteristics of potentially threatening debris (e.g. trajectory, physical parameters) and pertinent information related to space weather and Near Earth Objects. Feasibility studies and the financing of demonstration projects can be foreseen in this area.

– *Applications of Satellite Communications*

The objective is to support innovative satellite communication applications and services, seamlessly integrated in global electronic communication networks, for citizens and enterprises in application sectors encompassing civil protection, security, e-government, telemedicine, tele-education, search and rescue, tourism and leisure activities, personal navigation, fleet management, agriculture and forestry. Research emphasis will be on the development of new applications and the deployment of demonstration missions and preoperational systems where satellite communications represent an efficient response to these needs.

- **Exploration of space**

– The objective is to contribute to space exploration activities (robotic and human), including related technology transfer implications, and to enable the scientific community to access results/data acquired during exploration missions undertaken in the frame of the European Space Programme. Research activities will be carried out, in particular, through supporting actions, feasibility studies and pre-operational projects.

[50] Report of the Panel of Experts on Space and Security (March 2005).

Additional dimensions will have to be considered: the intrinsic international cooperation opportunities and the importance of keeping awareness and disseminating results.

- **RTD for strengthening space foundations**

– *Space technology*

In general the objective is to support the increase of the competitiveness of the European space technology sector at large.

In particular research activities could contribute to space transportation technology by: assessing the long term needs; contributing to system studies taking into account the end-user requirements; contributing to upstream technology research for the next generation of launchers.

– *Space sciences*

The objective is to contribute to the development of advanced technologies to be used in space sciences. Space sciences not only provide deep insights into the structure of the universe, improved understanding of Planet Earth, and a new approach to life and physical sciences, they are also a strong driving force for new technology developments with many subsequent applications of benefit to society. The 7th Framework Programme should complement the ongoing scientific programmes where gaps are identified and be in support of scientific activities on-board the International Space Station (ISS). Supporting activities aiming at facilitating access to scientific data are also envisaged.

International cooperation

Exploitation and exploration of space are, by nature, global ventures. Effective international space cooperation will help to raise the Union's political standing in the world, strengthen its economic competitiveness and enhance its reputation for scientific excellence. Cooperation in the space sector will also support EU's foreign policy objectives (e.g. support for developing countries, neighbourhood countries).

For these reasons space has to be considered a privileged sector for developing international activities, in particular in cooperation with main and emerging space powers, such as Russia; the United States, China, India, Canada, Japan, Ukraine and other countries carrying out space activities.

Efforts will be pursued to promote the use of space-based solutions in support of sustainable development, particularly in Africa. This is coherent with the global approach taken by GMES with regard to the monitoring of the environment[51].

To provide better opportunities for efficient collaboration and to ensure that best international expertise in the space field is integrated in the European Space Programme, specific cooperation actions will be used for bi-or multilateral projects, international and global initiatives and cooperation with emerging economies ands developing countries.

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[51] For example, the Kyoto Protocol, United Nations Convention to Combat Desertification, UN Biodiversity Convention, 2002 World Summit on Sustainable Development conclusions and 2005 G-8 Summit conclusions.

Responding to emerging needs and unforeseen policy needs

Research on emerging needs will enable innovative solutions to technological developments in the space research area, and possible adaptations and applications in other fields (e.g. resources management, biological processes, and new materials). Research to respond to unforeseen policy needs may address topics such as providing space based solutions in support of developing countries, developing new space-observation and communication tools and methods related to relevant Community policies and contributions to social inclusion.

ANNEX II

INDICATIVE BREAKDOWN OF THE AMOUNT

The indicative breakdown is as follows (in EUR million):

Health	8 317
Food, Agriculture and Biotechnology	2 455
Information and Communication Technologies	12 670
Nanosciences, Nanotechnologies, Materials and new Production Technologies	4 832
Energy	2 931
Environment (including Climate Change)	2 535
Transport (including Aeronautics)	5 940
Socio-economic Sciences and the Humanities	792
Security and Space	3 960
TOTAL*	44 432[52],[53]

* Including a contribution to the grant to the European Investment Bank, as referred to in Annex III. Interest income on this contribution shall be added to the grant to the EIB. The Socio-economic Sciences and Humanities theme does not contribute to this amount.

[52] Including amounts for Joint Technology Initiatives (cf. Annex III) and the co-ordination of non-community research programmes (cf. Annex IV) to be decided on the basis of separate proposals (e.g. on the basis of Article 171 of the Treaty).

[53] Including an amount to finance the participation of third country organisations in the Themes, including «opening up» and «specific cooperation actions».

ANNEX III

Joint Technology Initiatives and Risk-Sharing Finance Facility

Joint Technology Initiatives

The research areas for a first set of Joint Technology Initiatives are identified below based on the criteria set out in Annex 1. These Joint Technology Initiatives address a diverse range of challenges. Accordingly, structures must be designed on a case-by-case basis so that they address the particular characteristics of the research area in question.. In each case, a specific structure will be identified for the purpose of implementing the agreed research agenda of the Joint Technology Initiative and bring together the necessary public and private investments and coordination of European efforts. The Commission will grant an amount for the implementation of the research agenda on the basis of separate proposals (e.g. on the basis of Article 171 of the Treaty). Further Joint Technology Initiatives may be identified on the basis of the criteria specified in Annex I and be proposed during the implementation of the 7th Framework Programme.

- *Innovative Medicines Initiative*

The Innovative Medicines Joint Technology Initiative aims at increasing the competitiveness of the European Pharmaceutical sector by providing a coordinated approach to overcome the research bottlenecks in the drug development process, reducing drug development time and clinical attrition rate for new medicines. This will enable faster access to more targeted medicines and an earlier return on research investment and thus leverage more private investment for further research.

Pre-competitive research, as defined through the Strategic Research Agenda (SRA) of the Innovative Medicines Initiative will include: development of tools and methods to better predict the suitability, safety and efficacy of drugs, intelligent infrastructures for data integration and knowledge management through close cooperation between industry, academia and clinical centres at all necessary steps. It will also address education and training gaps to ensure that Europe has the skills to translate research results into benefits for the patient. Close co-operation between the European Community and the Industry and other stakeholders, such as regulatory agencies, patients, academia, clinicians etc., will be ensured, as well as the mobilisation of public and private funds. The implementation of the SRA will be carried out via the Innovative Medicines Initiative (IMI), the appropriate public-private partnership structure to be established especially for this purpose.

- *Nanoelectronics Technologies 2020*

Nanoelectronics is of high strategic importance for European competitiveness because its products are key enablers for innovation in other sectors (multimedia, telecommunications, transport, health, environment, industrial processing, etc.). It requires that R&D and innovation efforts are better structured, optimised and integrated into a larger process involving all actors crucial to achieving a successful outcome in the domain.

The initiative will address the needs for silicon-based technologies throughout four technology domains: (i) the shrinking of logic and memory devices to increase performance and reduce costs, (ii) the development of value-added functions, include sensing, actuating and packaging functions, and their embedding with logic and memory to form complex

System-on-Chip or System-in-Package solutions, (iii) equipment and materials, and (iv) design automation.

- *Embedded Computing Systems*

Embedded computing systems – the invisible electronics and software that impart intelligence to products and processes – are of strategic importance to the competitiveness of important European industrial sectors such as automotive, avionics, consumer electronics, telecommunications, medical systems and manufacturing. Furthermore, the increasing connectivity of these devices creates potential for entirely new markets and societal applications in which Europe must be well placed to benefit from.

The Joint Technology Initiative on *Embedded Computing Systems* will pull together and focus the research effort, leveraging private and public investment to share the high risks and maintain a high level of ambition. The initiative will address the design, development and deployment of ubiquitous, interoperable and cost-effective, yet powerful, safe and secure electronic and software systems. It will deliver reference designs that offer standard architectural approaches for given ranges of applications, middleware that enable seamless connectivity and interoperability, integrated design software tools and methods for rapid development and prototyping, as well as new approaches for interaction between computers and the real world.

- *Hydrogen and Fuel Cells Initiative*

Hydrogen and fuel cells are energy technologies that can bring about a paradigm shift in the way Europe produces and uses energy, offering massive development potential towards long-term independent sustainable energy supply and providing Europe with a crucial competitive edge. The transition to a hydrogen-oriented economy implies large research and capital investment in the creation of new industries, new supply chain structures, infrastructure and human resources.

The Joint Technology Initiative will define and execute a target-oriented European programme of industrial research, technological development and demonstration to deliver robust hydrogen and fuel cell technologies developed to the point of commercial take-off. The main themes of the JTI research agenda will be: fuel cell development for all application sectors and ranges; sustainable hydrogen supply, including production, distribution, storage and delivery; integrated, large-scale demonstration of maturing and advanced technologies in a real operational context; and, market framework preparatory activities. This will be implemented on the basis of a sound and continuously developing EU technology roadmap and business case, detailing transition strategies and long-term goals and implementation milestones.

- *Aeronautics and Air Transport*

Europe must remain at the forefront of key technologies if it is to have sustainable, innovative and competitive aeronautics and air transport industries in the future. As an RTD-intensive industry, the existing competitiveness of the European aeronautical and air transport companies in world markets has been built on significant private research investments (typically 13-15% of the turnover) over many decades. Given the specificities

of the sector, new developments often depend on effective cooperation between the public and the private sector.

Certain aspects of the ACARE Strategic Research Agenda require a scale of effect and continuity of purpose which requires a Joint Technology Initiativefocussing on a coherent and dedicated programme of research on advanced technologies and fostering aspects such as integration, large scale validation, and demonstration.

In the field of Aeronautics and Air Transport, different areas would be addressed, such as environmentally friendly and cost efficient aircraft ("The Green Aircraft"), and air traffic management in support of the Single European Sky policy and SESAME initiative.

- *Global Monitoring for Environment and Security (GMES)*

Europe needs autonomous capability based on a European standard for global monitoring. This will considerably help Europe and its industries in this area, where its competitors are investing heavily in the development of standards for global monitoring systems.

GMES has to respond to the political mandate expressed in the Council Resolution on GMES[54] that followed the June 2001 Gothenburg Summit, the Action Plan on GMES presented in February 2004[55], and its inclusion in the "Initiative for Growth" and the "Quick-start" list.

The future of GMES depends on significant long-term investments by both users and infrastructure providers (both public and private). For this it is essential that GMES assert its a clear and coherent image of itself, which can be easily identified by users, public authorities and industry. Independently of the specific application areas of GMES, this will involve a set of accepted standards, validation mechanisms and policies, under a single political responsibility.

To that purpose a GMES management structure in the form of a Joint Technology Initiative (JTI) could be set up to bring together all relevant players with their resources, notably user organisations at both national and European level.

A JTI for GMES should ensure a strong co-ordination of GMES related activities, including through the following functions:

– consolidation of user requirements for each application area of GMES,

– overseeing and supporting of the development of GMES operational services, associated capacities and infrastructures,

– validation of such services, where appropriate,

– development of mechanisms aiming at ensuring long-term access to data ("data buying").

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54 Council Resolution 2001/C 350/02 (13.11.2001).

55 "Global Monitoring for Environment and Security (GMES): Establishing a GMES capacity by 2008 - (Action Plan (2004-2008)" - COM(2004) 65, 3.2.2004.

A GMES JTI would also be an effective vehicle to promote an active involvement of the private sector, in that it would act as a coordinating and funding agent for industry (including SMEs) and other potential contractors wishing to contribute to the implementation of GMES through the relevant competitive processes.

GMES will give Europe leadership in an area of management and use of major infrastructures, including strategic space capacities. It could also provide a basis for an efficient exploitation of finite natural resources by both public and private entities. It will, thus, help to improve productivity in many sectors which have a need for coherent and up-to-date information on available assets.

Risk-Sharing Finance Facility

In accordance with Annex II, the Community will provide a grant (Coordination and support action) to the European Investment Bank (EIB). This grant will contribute to the Community's objective to foster private sector investment in research by increasing the capacity of the Bank to manage risk, thus allowing for (i) a larger volume of EIB lending for a certain level of risk, and (ii) the financing of riskier European RTD actions than would be possible without such Community support.

The EIB will lend funds raised from international financial markets in accordance with its standard rules, regulations and procedures. It will then use this grant, together with its own funds, as provisions and capital allocation within the bank to cover part of the risks associated with these loans to eligible large European RTD actions.

Based on its financial evaluation, the EIB will assess the level of financial risks and decide the value of the provision or capital allocation. The risk assessment and grading, and the resulting decisions on provisioning and capital allocation, are standard procedures of the Bank, approved and monitored by its shareholders, and will not be altered as a result of the Community contribution. There will be no contingent liability for the Community.

This grant will be disbursed on a yearly basis. The annual amount will be established in the work programmes, taking into consideration the activity report and forecasts that the EIB will present to the Community.

The grant agreement to be concluded with the EIB will establish terms and conditions under which the Community funds can be used as provisions and capital allocations. It will include, *inter alia*, the following terms and conditions:

- The eligible themes and activities. In order to maintain the balance between the contributing specific programmes and their themes and activities, the Community may contractually adapt the eligibility conditions related to any theme or activity, without prejudice for possible modification in accordance with Article 7.2.

- The eligibility of large European RTD actions. By default, "Joint Technology Initiatives" and large collaborative projects funded by the Community under the contributing themes and activities of this Specific Programme shall be automatically eligible. Other large European collaborative projects such as EUREKA ones could also be considered. In accordance with the regulation adopted pursuant to Article 167 of the Treaty, the grant agreement will also establish procedural modalities and will guarantee to the Community

the possibility to veto under certain circumstances the use of the grant for provisioning a loan proposed by the EIB.

- The rules for defining the share of the financial risk that will be covered by the Community grant and the risk threshold beyond which the EIB can use the Community grant.

- The arrangements by which the Community will monitor the EIB lending operations related to the grant.

ANNEX IV

Co-ordination of non-Community research programmes

A number of initiatives for the joint implementation of national research programmes are identified below and will be the subject of a separate decision on the basis of Article 169 of the Treaty. Further initiatives may be identified and proposed during the implementation of the 7th Framework Programme.

In the case of each decision, a dedicated implementation structure will be set up, together with the organisational structure and appropriate governance bodies necessary for the implementation of the action. In accordance with Annex II, the Community will provide financial support to the initiatives and will participate actively in the implementation by the means which are most appropriate for the action.

- Article 169 initiative in the field of Baltic Sea Research

The aim will be to launch and implement a joint R&D programme integrating a number of national programmes in the field of marine science and sustainable development of the Baltic Sea. In line with a number of international, European and regional conventions dealing with the Baltic Sea, this initiative will enable the creation of a platform for synthesising and disseminating findings in the field and will create the necessary R&D to support sustainable development of the Baltic Sea.

- Article 169 initiative in the field of Ambient Assisted Living

A joint R&D programme on Ambient Assisted Living will aim at bringing together national research efforts to address how ICT can enhance the quality of life of elderly people and extend the time they can live independently in their home environment and their surroundings. This includes for example assistance to carry out daily activities, facilitating social contacts, health and activity monitoring and enhancing safety and security. Focus will be the integration of devices, systems and services into cost-effective, reliable and trusted solutions. This initiative will aim at a large-scale European cooperation with sufficient critical mass and long term commitment.

- Article 169 initiative in the field of Metrology

The aim will be to launch and implement a cohesive joint metrology R&D programme integrating a number of national programmes, which will enable Europe to respond to the growing demands for cutting-edge metrology as a tool for innovation, supporting scientific research and policy. The initiative will support, in particular, the objectives of the European National Measurement Systems delivered via the National Metrology Laboratory networks.

LEGISLATIVE FINANCIAL STATEMENT

1. NAME OF THE PROPOSAL:

Proposal for a COUNCIL DECISION adopting a specific programme for research, technological development and demonstration activities: "Cooperation" (2007 to 2013)

2. ABM / ABB FRAMEWORK

RESEARCH.

3. BUDGET LINES

3.1. Budget lines (operational lines and related technical and administrative assistance lines) including headings :

02 04 01 Space; 02 04 02 Preparatory action for the enhancement of European security research; 08 02 01 Genomics and biotechnology for health; 08 05 01 Food quality and safety; 09 04 01 Information society technologies; 08 03 01 Nanotechnologies, intelligent materials, new production processes and devices; 08 06 01 01 Sustainable energy systems; 06 06 02 01 Sustainable energy systems; 08 06 01 03 Global change and ecosystems; 08 04 01 Aeronautics; 08 06 01 02 Sustainable surface transport; 06 06 01 Aeronautics and space; 06 06 02 02 Sustainable surface transport; 08 07 01 Citizens and governance in a knowledge-based society; 08 08 01 01 – 06 06 03 – 09 04 02 – 11 05 01 - Supporting policies and anticipating scientific and technological needs

(final budgetary nomenclature for FP7 will be established in due course)

3.2. Duration of the action and of the financial impact:

2007-2013 subject to the approval of new financial perspectives framework

3.3. Budgetary characteristics :

Budget line	Type of expenditure		New	EFTA contribution	Contributions from applicant countries	Heading in financial perspective
02, 06, 08, 09, and 11	Non-comp	Diff[56]/	YES	YES	YES	**No** [1a]
XX.01	Non-comp	Non-diff[57]	YES	NO	NO	**No** [1a…]

[56] Differentiated appropriations.
[57] Non-differentiated appropriations here after referred to as NDA.

XX.01.05	Non-comp	Non-diff	YES	YES	YES	**No** [1a…]

4. SUMMARY OF RESOURCES

4.1. Financial Resources

4.1.1. Summary of commitment appropriations (CA) and payment appropriations (PA)[58]

EUR million (to 3 decimal places)

Expenditure type	Section no.		2007	2008	2009	2010	2011	2012	2013	Total
Operational expenditure[59]										
Commitment Appropriations (CA)	8.1	a	4.955,289	6.450,321	7.929,201	9.553,215	11.203,503	12.811,940	14.568,946	67.472,416
Payment Appropriations (PA)		b	1.982,116	4.066,715	6.097,835	7.985,639	9.578,238	11.189,390	26.572,482[60]	67.472,416
Administrative expenditure within reference amount[61]										
Technical & administrative assistance (NDA)	8.2.4	C	706,648	720,781	735,196	749,900	764,898	780,196	795,800	5.253,418
TOTAL REFERENCE AMOUNT										
Commitment Appropriations		**a + c**	5.661,937	7.171,102	8.664,398	10.303,115	11.968,401	13.592,136	15.364,746	72.725,834
Payment Appropriations		**b + c**	2.688,764	4.787,496	6.833,031	8.735,539	10.343,136	11.969,586	27.368,282[62]	72.725,834
Administrative expenditure not included in reference amount[63]										
Human resources and associated expenditure (NDA)	8.2.5 d		11,633	11,866	12,103	12,345	12,592	12,844	13,101	86,483
Administrative costs, other than human resources and associated costs, not included in reference amount (NDA)	8.2.6 e		0,807	0,824	0,840	0,857	0,874	0,891	0,909	6,002

Total indicative financial cost of intervention

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58 These figures refer to the expenditure for the entire EC Framework Programme - see COM(2005) 119.

59 Expenditure that does not fall under Chapter xx 01 of the Title xx concerned.

60 Payment appropriations refers to 2013 and following years.

61 Expenditure within article xx 01 05 of Title xx.

62 Payment appropriations refers to 2013 and following years.

63 Expenditure within chapter xx 01 other than articles xx 01 05.

TOTAL CA including cost of Human Resources	a+c +d +e	**5.674,377**	**7.183,791**	**8.677,340**	**10.316,316**	**11.981,867**	**13.605,871**	**15.378,756**	**72.818,319**
TOTAL PA including cost of Human Resources	b+c +d +e	**2.701,204**	**4.800,186**	**6.845,974**	**8.748,741**	**10.356,602**	**11.983,321**	**27.382,292**	**72.818,319**

Co-financing details

If the proposal involves co-financing by Member States, or other bodies (please specify which), an estimate of the level of this co-financing should be indicated in the table below (additional lines may be added if different bodies are foreseen for the provision of the co-financing):

EUR million (to 3 decimal places)

Co-financing body		Year n	n + 1	n + 2	n + 3	n + 4	n + 5 and later	Total
……	f							
TOTAL CA including co-financing	a+c +d+ e+f							

4.1.2. Compatibility with Financial Programming

☒ Proposal is compatible with next financial programming (Commission's February 2004 Communication on the financial perspectives 2007-2013 COM (2004) 101).

☐ Proposal will entail reprogramming of the relevant heading in the financial perspective.

☐ Proposal may require application of the provisions of the Interinstitutional Agreement[64] (i.e. flexibility instrument or revision of the financial perspective).

4.1.3. Financial impact on Revenue

☐ Proposal has no financial implications on revenue

☒ Proposal has financial impact – the effect on revenue is as follows:

Certain Associated States may contribute to the funding of the framework programmes.

In accordance with Article 161 of the Financial Regulation, the Joint Research Centre may benefit from revenue from various types of competitive activities and from other services provided for outside bodies.

[64] See points 19 and 24 of the Interinstitutional agreement.

In accordance with Article 18 of the Financial Regulation, certain revenue may be used to finance specific items.

EUR million (to one decimal place)

		Prior to action	Situation following action					
Budget line	Revenue	[Year n-1]	[Year n]	[n+1]	[n+2]	[n+3]	[n+4]	[n+5]
	a) Revenue in absolute terms							
	b) Change in revenue	Δ						

4.2. Human Resources FTE (including officials, temporary and external staff) – see detail under point 8.2.1.

Annual requirements	2007	2008	2009	2010	2011	2012	2013
Total number of human resources[65]	1.848	1.848	1.848	1.848	1.848	1.848	1.848

5. CHARACTERISTICS AND OBJECTIVES

5.1. Need to be met in the short or long term

The Specific Programme "Cooperation" addresses the need to strengthen competitiveness and underpin EU policies through gaining leadership in key scientific and technological areas. This need will be met by supporting research cooperation of the highest level of excellence between universities, industry, research centres and public authorities across the European Union as well as the rest of the world.

5.2. Value-added of Community involvement and coherence of the proposal with other financial instruments and possible synergy

The value added of the support to be provided in this Specific Programme " will be to bring together resources, disciplines, scientific excellence, thus achieving critical mass, learning and synergies which could not be attained at national level. The better integration of European R&D will be achieved through, improved coordination of national policies, EU-wide dissemination of results, creation of pan-European research teams and networks , and addressing pan-European policy challenges,

[65] Figures indicated in the table refer only to the staff financed by the establishment plan for all indirect actions under the responsibility of DGs RTD, INFSO, TREN, ENTR and FISH. Therefore these figures do not comprise the posts of the establishment plan from the operating budget and the posts from the JRC's establishment plan - see documents COM(2005) 439 & 445.

5.3. Objectives, expected results and related indicators of the proposal in the context of the ABM framework

The overarching aim is to contribute to sustainable development within the context of promoting research at the highest level of excellence. The objective is to support trans-national co-operation in a number of thematic areas corresponding to major fields of the progress of knowledge and technology, where research must be supported and strengthened to address European social, economic, environmental and industrial challenges.

The nine themes determined for EU action are the following:

(1) Health;

(2) Food, Agriculture and Biotechnology;

(3) Information and Communication Technologies;

(4) Nanosciences, Nanotechnologies, Materials and new Production Technologies;

(5) Energy;

(6) Environment (including Climate Change);

(7) Transport (including Aeronautics);

(8) Socio-economic Sciences and the Humanities;

(9) Security and Space.

The more detailed objectives of each of these themes are set out in Annex I to the legislative proposal.

Performance indicators will be developed at three levels:

– Quantitative and qualitative indicators to show the path or direction of scientific and technical progress, such as new standards and tools, scientific techniques, patent applications and licence agreements, new products, processes and services.

– Management indicators to monitor performance internally and support senior management decision making. These could include level of budget execution, time to contract and time to payment.

– Outcome (impact) indicators to assess the overall effectiveness of the research against high level objectives. These could include assessment at the aggregate Framework Programme level (e.g. impact on the achievement of the Lisbon, Goeteborg, Barcelona and other objectives) and assessment at the SP level (e.g. contribution made to the EU S&T and economic performance).

5.4. Method of Implementation (indicative)

Show below the method(s) chosen for the implementation of the action.

☒ ***Centralised Management***

☒ Directly by the Commission

☒ Indirectly by delegation to:

☒ Executive Agencies

☒ Bodies set up by the Communities as referred to in art. 185 of the Financial Regulation

☒ National public-sector bodies/bodies with public-service mission

☐ ***Shared or decentralised management***

☐ With Member states

☐ With Third countries

☐ ***Joint management with international organisations (please specify)***

Relevant comments:

The Commission proposes a centralised management of this programme, both directly by the Commission and indirectly by delegation to an Executive Agency or to structures created for the execution of research and development programmes undertaken by several Member States (Article 169 of the Treaty) or joint undertakings or other structures (Article 171 of the Treaty).

For actions deriving from Article 169 and Article 171, the management structures will be decided on a case-by-case basis according to the specific characteristics of the action concerned. These actions will involve management outside the Commission services.

For other parts of the programme, where the link between the detailed follow-up of the actual projects funded and the development of S&T policy is clear, an executive agency will be entrusted with the administration of calls and evaluations and will perform such tasks as the reception and administrative management of proposals submitted, inviting and paying expert evaluators (chosen by the Commission), providing logistical support to proposal evaluation and possible further tasks, such as financial viability checking and provision of statistics. The continued possibility to sub-contract specific tasks to private companies (e.g. for the development, operation and support of IT tools) will not be ruled out. The evaluation, contracting and project management of the projects will generally be carried out by the Commission services, in order to maintain the close link between such activities and policy formulation. However, in some areas of the programme, these tasks too may be entrusted to an executive agency.

6. MONITORING AND EVALUATION

Monitoring and evaluation aspects are set out in the Legislative Financial Statement of the proposal of the 7th framework programme, COM(2005) 119 final.

7. ANTI-FRAUD MEASURES

Appropriate measures should also be taken to prevent irregularities and fraud and the necessary steps should be taken to recover funds lost, wrongly paid or incorrectly used in accordance with Council Regulation (EC, Euratom) No 1605/2002 of 25 June 2002 on the Financial Regulation applicable to the general budget of the European Communities[66], Commission Regulation (EC, Euratom) No 2342/2002 of 23 December 2002 laying down detailed rules for the implementation of Council Regulation 1605/2002[67], Council Regulations (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests[68], (EC, Euratom) No 2185/96 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities[69] and Regulation (EC) No 1073/1999 of the European Parliament and of the Council concerning investigations conducted by the European Anti-Fraud Office (OLAF)[70].

66 OJ L 248, 16.9.2002, p. 1.
67 OJ L 357, 31.12.2002, p. 1.
68 OJ L 312, 23.12.1995, p. 1.
69 OJ L 292, 15.11.1996, p. 2.
70 OJ L 136, 31.5.1999, p. 1.

8. DETAILS OF RESOURCES

8.1. Objectives of the proposal in terms of their financial cost

Commitment appropriations in EUR million (to 3 decimal places)

(Headings of Objectives, actions and outputs should be provided)	Year 2007		Year 2008		Year 2009		Year 2010		Year 2011		Year 2012		Year 2013		TOTAL	
	No. outputs	Total cost	No. outputs	Total cost	No. outputs	Total cost	No. outputs	Total cost	No. outputs	Total cost	No. outputs	Total cost	No. outputs	Total cost	No. outputs	Total cost
OPERATIONAL OBJECTIVE No.1[71] HEALTH		*636,272*		*812,466*		*986,760*		*1.178,084*		*1.372,497*		*1.562,004*		*1.768,704*		***8.316,788***
OPERATIONAL OBJECTIVE No.2[1] BIOTECHNOLOGIE, FOOD AND AGRICULTURE		*187,852*		*239,871*		*291,329*		*347,815*		*405,213*		*461,163*		*522,189*		***2.455,433***
OPERATIONAL OBJECTIVE No.3[1] INFORMATION SOCIETY		*969,315*		*1.237,734*		*1.503,259*		*1.794,727*		*2.090,901*		*2.379,602*		*2.694,495*		***12.670,033***

[71] As described under Section 5.3.

OPERATIONAL OBJECTIVE No.4[1] NANO, MATERIALS AND PRODUCTION		*369,644*		*472,004*		*573,261*		*684,411*		*797,355*		*907,450*		*1.027,533*				***4.831,658***
OPERATIONAL OBJECTIVE No.5[1] ENERGY		*224,210*		*286,298*		*347,716*		*415,134*		*483,642*		*550,421*		*623,258*				***2.930,678***
OPERATIONAL OBJECTIVE No.6[1] ENVIRONMENT		*193,912*		*247,609*		*300,727*		*359,035*		*418,285*		*476,039*		*539,034*				***2.534,640***
OPERATIONAL OBJECTIVE No7[1] TRANSPORT		*454,480*		*580,333*		*704,829*		*841,489*		*980,355*		*1.115,717*		*1.263,290*				***5.940,493***
OPERATIONAL OBJECTIVE No8[1] SOCIO-ECONOMIC RESEARCH		*60,597*		*77,378*		*93,977*		*112,198*		*130,714*		*148,762*		*168,448*				***792,075***
OPERATIONAL OBJECTIVE No9[1] SPACE AND SECURITY		*302,987*		*386,889*		*469,886*		*560,992*		*653,570*		*743,812*		*842,240*				***3.960,375***
TOTAL COST		**3.399,269**		**4.340,582**		**5.271,744**		**6.293,886**		**7.332,531**		**8.344,970**		**9.449,190**				**44.432,173**

8.2. Administrative Expenditure

8.2.1. Number and type of human resources

Types of post		Staff to be assigned to management of the action using existing and/or additional resources (**number of posts/FTEs**)						
		Year 2007	Year 2008	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013
Officials or temporary staff[72] (XX 01 01)	A*/AD							
	B*, C*/AST							
Staff financed[73] by art. XX 01 02								
Other staff[74] financed by art. XX 01 05	A*/AD							
	B*, C*/AST							
TOTAL[75]		1.848	1.848	1.848	1.848	1.848	1.848	1.848

8.2.2. Description of tasks deriving from the action

Implementation of the Framework Programme

8.2.3. Sources of human resources (statutory)

(When more than one source is stated, please indicate the number of posts originating from each of the sources)

☒ Posts currently allocated to the management of the programme to be replaced or extended

☒ Posts pre-allocated within the APS/PDB exercise for year 2006

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72 Cost of which is NOT covered by the reference amount.

73 Cost of which is NOT covered by the reference amount.

74 Cost of which is included within the reference amount.

75 Figures indicated in the table refer only to the staff financed by the establishment plan for all indirect actions under the responsibility of DGs RTD, INFSO, TREN, ENTR and FISH. Therefore these figures do not comprise the posts of the establishment plan from the operating budget and the posts from the JRC's establishment plan - see documents COM(2005) 439 & 445.

☐ Posts to be requested in the next APS/PDB procedure

☒ Posts to be redeployed using existing resources within the managing service (internal redeployment)

☐ Posts required for year n although not foreseen in the APS/PDB exercise of the year in question

8.2.4. Other Administrative expenditure included in reference amount (XX 01 05 – Expenditure on administrative management)[76]

EUR million (to 3 decimal places)

Budget line (number and heading)	Year 2007	Year 2008	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	TOTAL
Statutory staff xx.01 05 01	**304,222**	**310,306**	**316,513**	**322,843**	**329,300**	**335,886**	**342,603**	**2.261,673**
External staff xx.01 05 02	**205,478**	**209,587**	**213,779**	**218,055**	**222,415**	**226,863**	**231,401**	**1.527,577**
Other administrative expenses xx.01 05 03	**196,948**	**200,888**	**204,904**	**209,002**	**213,183**	**217,447**	**221,796**	**1.464,167**
Total Technical and administrative assistance	**706,648**	**720,781**	**735,196**	**749,900**	**764,898**	**780,196**	**795,800**	**5.253,418**

8.2.5. Financial cost of human resources and associated costs not included in the reference amount

EUR million (to 3 decimal places)

Type of human resources	Year 2007	Year 2008	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	TOTAL
Officials and temporary staff (08 0101 and)	**11,633**	**11,866**	**12,103**	**12,345**	**12,592**	**12,844**	**13,101**	**86,483**
Staff financed by Art XX 01 02 (auxiliary, END, contract staff, etc.)								
Total cost of Human Resources and associated costs (NOT in reference amount)	**11,633**	**11,866**	**12,103**	**12,345**	**12,592**	**12,844**	**13,101**	**86,483**

Calculation– ***Administrative expenditures***

Have been calculated taking into account the following hypothesis:

[76] These figures refer to the expenditure for the entire EC Framework Programme - see COM(2005) 119.

– the number of official staff on the ex part A of the budget remains at 2006 level

– expenditures increased by the 2% each year according to the inflation foreseen such as indicated in Fiche 1 REV (working document of commission services related to the financial perspectives),

– the assumption of 108 000 € for each official staff, and 70.000 € for the external staff (2004 prices)

Calculation– ***Staff financed under art. XX 01 02***

Reference should be made to Point 8.2.1, if applicable

8.2.6 Other administrative expenditure not included in reference amount[77]

EUR million (to 3 decimal places)

	Year 2007	Year 2008	Year 2009	Year 2010	Year 2011	Year 2012 and 2013	TOTAL
XX 01 02 11 01 – Missions	**0,320**	**0,326**	**0,333**	**0,339**	**0,346**	**0,713**	**2,376**
XX 01 02 11 02 – Meetings & Conferences	**0,010**	**0,010**	**0,011**	**0,011**	**0,011**	**0,023**	**0,076**
XX 01 02 11 03 – Committees[78]	**0,478**	**0,487**	**0,497**	**0,507**	**0,517**	**1,065**	**3,550**
XX 01 02 11 04 – Studies & consultations							
XX 01 02 11 05 - Information systems							
2 Total Other Management Expenditure (XX 01 02 11)							
3 Other expenditure of an administrative nature (specify including reference to budget line)							
Total Administrative expenditure, other than human resources and associated costs (NOT included in reference	**0,807**	**0,824**	**0,840**	**0,857**	**0,874**	**1,801**	**6,002**

[77] These figures refer to the expenditure for the entire EC Framework Programme - see COM(2005) 119.

[78] EURAB committee.

amount)							

Calculation - ***Other administrative expenditure <u>not</u> included in reference amount***

These figures are estimated on the basis of the 2006 DG RTD requests increased of the 2% for the yearly foreseen inflation. (Fiche 1 REV)

The needs for human and administrative resources shall be covered within the allocation granted to the managing DG in the framework of the annual allocation procedure. . The allocation of posts should take into account an eventual reallocation of posts between departments on the basis of the new financial perspectives.