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PROPOSALS FOR COUNCIL DECISIONS
CONCERNING THE SPECIFIC PROGRAMMES IMPLEMENTING
THE FIFTH FRAMEWORK PROGRAMME OF THE
EUROPEAN COMMUNITY FOR RESEARCH, TECHNOLOGICAL
DEVELOPMENT AND DEMONSTRATION ACTIVITIES
(1998 to 2002)

(presented by the Commission)

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EXPLANATORY MEMORANDUM

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EXPLANATORY MEMORANDUM

The European Parliament, in its opinion of 18 December 1987, and the Council, in the common position which it adopted on 23 March 1998, have endorsed the general principles underlying the Commission's proposal concerning the fifth framework programme for Community research. These principles place emphasis on a concentration of research activities that will make it possible to meet the Union's main socio-economic needs through the implementation of multidisciplinary activities grouped together in thematic programmes. They also apply to the activities of the Joint Research Centre (JRC).

This having been achieved, it is essential that the discussions concerning the specific programmes should be conducted in parallel with the last stages in the adoption of the final decision on the fifth framework programme, so that it can come on stream in 1999.

Pending that decision, proposals for specific programmes have been drawn up taking into account how close Parliament and the Council are in their positions with regard to the overall structure. At this stage, it is necessary to specify the arrangements for implementation with a view to achieving the objectives set: concentration of activities, close targeting of Community needs, and flexible application.

Since questions of energy and environment are closely linked, the Commission's proposals maintain an overall and multidisciplinary approach rather than dividing the programme in question into two separate subprogrammes. Furthermore, and in line with Parliament's position, a single key action has been retained for "health, food and environmental factors" covering a number of common issues which will benefit from being treated together.

In the case of the JRC, the specific programmes which concern it develop the Commission's initial proposal which has received the backing of Parliament and the JRC's Governing Board. They are based on the specific nature of its role with regard to Union policies, in connection with serving the citizen in the framework of sustainable and competitive growth. The activities carried out by the JRC complement those of the other specific programmes; effective coordination will be ensured where necessary.

The EURATOM specific programme assigns priority to the safety of the fuel cycle and the control of nuclear materials.

In comparison with the Commission's proposals, the first readings of Parliament and the Council increase the number of research priorities in the following areas:

- Under the *first* thematic programme ("Quality of life and management of living resources"), research on the ageing population has been given additional priority as a key action. Additional priorities have been introduced into the key action on

“Integrated development of rural and coastal areas” (forestry, protection of land and prevention of erosion, prenormative research) and in the generic technologies (genomes and neurosciences).

- Under the *third* thematic programme (“Competitive and sustainable growth”), a key action on “land transport and marine technologies” has been introduced while the key action on “the city of tomorrow” has disappeared from this programme.
- Under the *fourth* thematic programme (“Preserving the ecosystem”), research on “global change” has been given additional priority as a key action, with the addition also of “climate and biodiversity”. A new key action on “sustainable marine ecosystems” has been introduced. The balance of the priorities and objectives of the key action on “the city of tomorrow” (cultural heritage) have been altered; energy research has been separated into two key actions.
- Under the horizontal programme on “Improving human potential”, additional importance has been assigned to socio-economic research (as a key action).

This increase in research activities provides extra justification for the Commission’s request for an overall budget of ECU 16.3 billion. This request is in fact fully in line with the perspective opened by Agenda 2000. It fully respects the spirit and the letter of the latter: the aim is to give a fresh boost to research and, while respecting the general context of budgetary rigour, to increase spending relative to GDP growth. However, to take account of Parliament’s opinion and the Council’s position, the breakdown has been adjusted to the distribution of research activities in a structure based on four thematic programmes.

In the case of the JRC, the Commission has proposed a reduced budget in the nuclear field and a modest increase in the non-nuclear field by focusing the efforts on support of Community policies, concerning notably citizens, sustainable development and European competitiveness. In these areas the JRC has acknowledged expertise and independence which will only be preserved with an adequate level of resources.

The overall budget proposed by the Commission for the framework programme is based on an analysis of needs and a clear definition of research objectives. The proposals concerning the specific programmes present these requirements in detail for the first time.

It emerges clearly from this that the effectiveness of the programmes and the key actions could be seriously jeopardised by budget cuts, in the absence of corresponding changes in the general programme objectives. The level of Community RTD for each priority would risk falling below the critical threshold needed in order to sustain the Community’s competitiveness and meet the expectations of its citizens. What is at stake has to be seen in the light of the increased spending by the European Union’s main competitors.

The research activities proposed comply with the objectives of the framework programme and the criteria set out in Annex I to the framework programme and in each specific programme. They have therefore been designed to give added value at Community level

and their content corresponds to major European problems.

To ensure that the framework programme applies the new strategic approach and can be adapted to developments in science and technology over four years, new provisions are needed concerning the activities of each programme committee. The proposals must guarantee the overall coherence of the programmes, their integrity and their efficient management. In particular, and following the recommendations of the Davignon Panel, which examined Community research over a five-year span, a basic principle is that the programme committees should handle strategic matters, while the Commission should bear the sole responsibility for day-to-day management. The Commission will regularly inform the programme committees of the economic and social impact of the programmes and the means deployed to ensure the European dimension, in particular as regards complementarity between the research activities carried out through these programmes and activities at national level or in other European RTD forums such as Eureka.

In addition, the Commission will set up consultative groups comprising recognised personalities representative of scientific circles, industry and users, and with a balanced composition of members from these three categories, in order to ensure interaction with the circles concerned. These groups will advise the Commission, in particular on the implementation of the key actions or clusters of key actions. The Commission will seek, while setting up these groups, a balanced participation of women and men, and will encourage Member States to do the same for the composition of Programme Committees.

* *

These proposals represent a decisive stage in putting into place the fifth framework programme. They reflect the major concern of focusing Community research on industrial competitiveness and the quality of life of Europe's citizens. They provide a detailed picture of the content of the research work to be undertaken and the arrangements for implementation. The European Parliament, the Council of Ministers, the Economic and Social Committee and the Committee of the Regions are invited to consider these proposals with a view to a decision being adopted in good time to launch the programmes by the end of 1998 and preserve the continuity of European research under the fifth framework programme.

For reasons of coherence, the proposals are presented in the form of a single document comprising all the specific programmes under the fifth framework programme, as listed in the table of contents.

In parallel, another document is being presented concerning the proposals for Council decisions concerning the specific programmes implementing the framework programme of the European Atomic Energy Community (EURATOM) for research and training activities.

**Proposal for a
COUNCIL DECISION
adopting a specific programme for research,
technological development and demonstration
on “Quality of life and
management of living resources”
(1998 to 2002)**

PROPOSAL FOR A COUNCIL DECISION
adopting a specific programme for research,
technological development and demonstration on "Quality of life and management
of living resources" (1998 to 2002)

0177 (CNS)

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 130i(4) thereof,

Having regard to the proposal from the Commission,¹

Having regard to the opinion of the European Parliament,²

Having regard to the opinion of the Economic and Social Committee,³

Whereas by Decision No .../EC,⁴ the European Parliament and the Council adopted the fifth framework programme of the European Community (hereinafter referred to as the fifth framework programme) for research, technological development and demonstration (hereinafter referred to as RTD) activities for the period 1998 to 2002 specifying *inter alia* the activities to be carried out in the field of the quality of life and the management of living resources;

Whereas Article 130i(3) of the Treaty stipulates that the framework programme shall be implemented through specific programmes developed within each activity under the framework programme, and that each specific programme shall define the detailed rules for implementing it, fix its duration and provide for the means deemed necessary,

Whereas, in accordance with Article 4(2) of Decision No 1110/94/EC of the European Parliament and of the Council of 26 April 1994 concerning the fourth framework programme of the European Community activities in the field of research, technological development and demonstration (1994 to 1998)⁵ and Article 4(2) of the Council Decisions on the specific programmes implementing the fourth framework programme, the Commission has had an external assessment conducted which it has transmitted to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions together with its conclusions and comments;

¹ OJ No , p.

² OJ No , p.

³ OJ No , p.

⁴ OJ No , p.

⁵ OJ No L 126, 18.5.1994, p. 1. Decision last amended by Decision No 2535/97/EC (OJ L 347, 18.12.1997, p. 1).

Whereas the Scientific and Technical Research Committee has been consulted on the scientific and technological content of the specific programmes, as set out in the working paper⁶ adopted by the Commission on 5 November 1997;

Whereas, in accordance with Article 130j of the Treaty, Council Decision .../.../EC⁷ of ... concerning the rules for the participation of undertakings, research centres and universities and for the dissemination of research results (hereinafter referred to as the rules for participation and dissemination) applies to this specific programme and allows the participation of the Joint Research Centre in the indirect actions covered by this specific programme;

Whereas, for the purpose of implementing this programme, in addition to cooperation covered by the Agreement on the European Economic Area or by an association agreement, it may be appropriate to engage in international cooperation activities, in particular on the basis of Article 130m of the Treaty, with third countries or international organisations;

Whereas implementation of this programme will also comprise activities and mechanisms aimed at stimulating, disseminating and exploiting RTD results, in particular vis-à-vis small and medium-sized enterprises, and activities to stimulate the mobility and training of researchers;

Whereas, in accordance with the objectives of the first action plan for innovation, research activities under the fifth framework programme should be geared more towards innovation;

Whereas the implementation of this programme should be monitored with a view to adapting it, where appropriate, to scientific and technological developments; whereas in due course there should also be an assessment of progress with the programme by independent experts,

⁶ COM(97)553 final of 5.11.1997.

⁷ OJ No L

HAS ADOPTED THIS DECISION

Article 1

In accordance with Article 3(1) of the fifth framework programme, the specific programme on "Quality of life and management of living resources" (hereinafter referred to as the specific programme) is hereby adopted for the period from [the date of adoption of this programme] to 31 December 2002.

Article 2

1. In accordance with Annex III to the fifth framework programme, the amount deemed necessary for carrying out the specific programme (hereinafter referred to as the amount) is ECU 2635 million, including a maximum of 6,30% for the Commission's administrative expenditure.
2. An indicative breakdown of this amount is given in Annex I.
3. Of this amount
 - ECU 547 million is for the period 1998 to 1999, and
 - ECU 2088 million is for the period 2000 to 2002.

Where appropriate, the latter figure will be adapted in accordance with Article 3(3) of the fifth framework programme.

4. The budgetary authority shall, in compliance with the scientific and technological objectives and priorities laid down in this Decision, set the appropriations for each financial year taking into account the availability of resources within the multiannual financial perspective.

Article 3

1. The general outlines, the scientific and technological objectives and the priorities for the specific programme are set out in Annex II. They are consistent with the fundamental principles and the three categories of selection criteria indicated in Annex I to the fifth framework programme.
2. In accordance with these principles and criteria the selection criteria indicated in Article 10 of the rules for participation and dissemination shall be applied for the selection of the RTD activities to be carried out.

A selection criterion specific to this programme shall also be applied: the participation of industrial entities in the shared-cost actions should be appropriate to the nature of the activity.

All these criteria shall be complied with in the implementation of the programme, including the work programme referred to in Article 5(1), although they may be weighted differently.

3. The rules for participation and dissemination shall apply to the specific programme.
4. Detailed rules for financial participation by the Community in the specific programme are defined in Article 4 of the fifth framework programme.
5. The indirect RTD actions under the specific programme are defined in Annexes II and IV to the fifth framework programme.

Specific rules for implementing the programme are set out in Annex III.

Article 4

In the light of the criteria set out in Article 3, and the scientific and technological objectives and priorities set out in Annex II, the Commission shall:

- (a) monitor the implementation of the specific programme and, where appropriate, submit proposals for adapting it, in accordance with Article 5(1) of the fifth framework programme,
- (b) have the external assessment provided for in Article 5(2) of the fifth framework programme conducted concerning the activities carried out in the fields covered by the specific programme.

Article 5

1. The Commission shall draw up a work programme specifying:
 - (a) the content of Annex II,
 - (b) the indicative timetable for the implementation of the specific programme,
 - (c) the coordination arrangements indicated in Annex III,
 - (d) and, where necessary, the selection criteria and the arrangements for applying them for each type of indirect RTD action.

The work programme shall be updated where appropriate.

2. For the purpose of implementing the indirect RTD actions, the Commission shall, on the basis of the work programme, initiate the procedures set out in the rules for participation and dissemination, primarily through calls for proposals.

Article 6

1. The Commission shall be responsible for the implementation of this specific programme.
2. It shall be assisted by a Programme Committee composed of representatives of the Member States and chaired by the representative of the Commission.
3. The representative of the Commission shall submit to the Programme Committee a draft of the measures to be taken concerning:
 - the drawing-up and updating of the work programme referred to in Article 5(1),
 - the drawing-up of the terms of reference for the external assessment provided for in Article 5(2) of the fifth framework programme,
 - any adjustment to the indicative breakdown of the amount as set out in Annex I.

Article 7

1. The Programme Committee shall deliver its opinion on the draft measures referred to in Article 6(3) within a time limit which the Chairman may lay down according to the urgency of the matter. The opinion shall be delivered by the majority laid down in Article 148(2) of the Treaty in the case of decisions which the Council is required to adopt on a proposal from the Commission. The votes of the representatives of the Member States within the Committee shall be weighted in the manner set out in that Article. The Chairman shall not vote.

The Commission shall adopt the measures envisaged if they are in accordance with the opinion of the Committee.

If the measures envisaged are not in accordance with the opinion of the Committee, or if no opinion is delivered, the Commission shall, without delay, submit to the Council a proposal relating to the measures to be taken. The Council shall act by a qualified majority.

If, on expiry of a period of six weeks from the referral of the matter to the Council, the Council has not acted, the proposed measures shall be adopted by the Commission.

2. The Commission shall regularly inform the Programme Committee of progress with the implementation of the specific programme, and shall in particular provide it with information about the results of the evaluation and selection of the indirect RTD actions.

Article 8

This Decision is addressed to the Member States.

Done at Brussels,

For the Council

The President

ANNEX I

INDICATIVE BREAKDOWN OF THE AMOUNT

Type of activity	Total
a) Key actions	76,1%
i) Health, food and environmental factors	19,0%
ii) Control of infectious diseases	12,7%
iii) The cell factory	15,2%
iv) Sustainable agriculture, fisheries and forestry, including integrated development of rural areas	21,6%
v) The ageing population	7,6%
b) Research and technological development activities of a generic nature	20,9%
c) Support for research infrastructures	3,0%
TOTAL	ECU 2635 million

ANNEX II

THE GENERAL OUTLINES, THE SCIENTIFIC AND TECHNOLOGICAL OBJECTIVES AND THE PRIORITIES

INTRODUCTION

Economic and political developments in Europe have globally resulted in greater prosperity, increased life expectancy and better working conditions. These improvements have, however, been accompanied by challenges such as higher health-care costs, an ageing population, and environmental degradation. Increasingly, a gap is becoming evident between natural resources, whether from agriculture and fisheries, mining or the global environment, and human activities. Paradoxically, this has occurred at a time when there is an "explosion" in the knowledge base concerning the structure and working of all living things, pointing towards new developments in the corresponding sectors, e.g. health-care, pharmaceuticals, agriculture, food, etc.

Europe has a strong tradition and an excellent record in research and application of life sciences and technologies. Furthermore, Europe provides a huge single market with a tradition of receptiveness for bio-based products. It has, therefore, the potential to address and solve major challenges such as a varied and safe food supply, affordable health-care, better medicines, etc. The scientific basis on which living and natural materials are exploited for these ends is undergoing a dramatic change, in which the intimate and interactive workings of living beings are being revealed. With the progress of scientific knowledge in recent decades, one can now expect to probe more deeply the questions surrounding the production of food, the curing of diseases, and the sustainable management and use of biological resources. One can also anticipate clarifying their relationships with human behaviour and needs, industrial practices and consumer demands.

The strategic objective of the programme is to link the ability to discover to the ability to produce, in order to address the needs of society and to meet the requirements of the consumer, leading to future wealth and job creation. The strategy of this programme is to focus on specific areas where growing knowledge potentially contains technical answers to some of the pressing questions asked by the citizen which require to be tackled on a European scale.

The novelty of this approach is the willingness to couple the dynamics of massive knowledge production with few areas where there are expected to be desirable spin-offs, while pursuing the renewal of knowledge to reinforce European strengths in fields associated with further growth and quality of life.

The proposed scientific and technological solutions should be seen as part of an integrated "system" approach, in which man is at the core of the issue of the "quality of life" and of "management of living resources". Five key actions have been identified in which European research should make a contribution, by way of innovative products, processes or services, to problem resolution. These key actions are targeted at socio-economic needs and the Community's policy objectives, eg in agriculture and fisheries, industry and consumers, and in the fields of health and environment.

They are supplemented with research and technological development activities of a generic nature as well as support to research infrastructures aiming at building up, in the longer term, the knowledge base in areas of strategic importance for the future.

Meeting socio-economic needs. On the demand side, research should be developed which promotes health, reconciles economic developments with environmental requirements, and improves the response to consumer needs. On the supply side, there is huge potential for economic growth and job-creation in this field, both in the traditional industries including primary production and in the nascent high technology industries.

Increasing European added value. The major cross-border issues should be addressed selectively, such as health aspects of diseases (epidemiology, nutrition, food safety, ageing, rare diseases), or transboundary resources management (terrestrial and aquatic living resources). Other areas such as drug abuse, biosafety or bioethics, involve the reinforcement of scientific bases in support of Community policies. Many of the activities to be addressed in the programme (e.g. genome research, neurosciences, technology assessment), due to their size and complexity, are only feasible if they are addressed at the European level.

Improving European competitiveness. The programme will capitalise on specific scientific strengths in knowledge areas and in productive sectors with strong growth potential, such as the biotechnology and food industries. Thus, the heart of this programme, improving the quality of life, promoting life sciences and technologies and decoupling economic growth from environmental degradation, will contribute in the short and in the longer term to European competitiveness and employment. Europe must promote start-ups in particular in the areas of biotechnology and the agro-food industry which have recently shown a consistent growth rate.

Promoting biosafety. The assessment of the behaviour and impact on health of recombinant organisms (e.g. transgenic plants, microorganisms, vaccines, etc.) and of their fate in the environment, where relevant, is part of every key action.

Respecting an ethical framework. Full respect of human rights and fundamental ethical principles will be ensured throughout all activities in the specific programme in accordance with Article 6 of the European Parliament and Council Decision on the Fifth Framework Programme.

LINKS AND COMPLEMENTARITY WITH THE OTHER PROGRAMMES

Coordination with other thematic programmes is based on promoting synergetic interactions and complementary activities and avoiding unnecessary duplication:

- Coordination with the specific programme on a "User-friendly information society is based on the following principle : activities concerned with information society technologies as such (which include development, demonstration and take-up actions) will be concentrated in the "User-friendly information society" programme; activities concerned with the deployment, integration and adaptation of information society technologies in applications relating to the quality of life and the management of living resources will be conducted in this programme.
- Coordination with the programmes on "Competitive and sustainable growth" and "Preserving the ecosystem" is based on close interaction between the key action "Health, food and environmental factors" of this programme and the key action "Products, processes and organisation" of the programme on "Competitive and sustainable growth" and the corresponding aspects of the programme on "Preserving the ecosystem". Similar interactions will be established between the key actions "The cell factory" and "Sustainable management of agriculture, fisheries and forestry, including integrated development of rural areas" with the relevant actions of the programmes on "Competitive and sustainable growth" and "Preserving the ecosystem".
- Close coordination will be developed with the programme "Confirming the international role of Community research", in particular where collaboration with international initiatives could bring added value to European RTD efforts.
- Full use will be made of the possibilities offered by COST and EUREKA and by co-operation with international organisations to foster synergy between actions and projects in this programme and nationally funded research activities. In the case of co-operation with EUREKA, projects corresponding to priority themes of common interest may be developed in the context of the key actions.
- Specific activities aimed at facilitating the involvement of entities in third countries and maintaining links with specialists from third countries trained in Europe will be carried out, which will also contribute to the international dimension of the programme.
- Concerning innovation and the participation of SMEs, as new knowledge in the biosciences constantly drives innovation, research partnerships need to be flexible and inclusive. A competitive partnership requires a high level of interaction of biology, engineering, information management, standardisation, capital investment, intellectual

property rights, etc., which brings success only on a single-project basis. It will be imperative that measures to stimulate e.g. SMEs and financial partners accompany programme management for each individual action. An "innovation unit" will focus the promotion activities with a view to the deployment and use of the results of this programme; it will also help to ensure complementarity and an interface with the innovation activities implemented in the context of the programme on "Innovation and participation of SMEs".

- Training with a view to providing qualified human resources in the entrepreneurial and professional sectors, as well as socio-economic analysis of technology impacts, will be carried out within this programme, to accommodate the rapid turn-over of new expertise in many traditional fields.

(a) KEY ACTIONS

(i) Health, Food and Environmental Factors

Objectives and RTD priorities

The overall goal of this key action is to improve the health of European citizens by providing them with safe, healthy and varied food products and by reducing the negative impact of environmental factors such as air pollution, heavy metals, toxic substances, electromagnetic radiation and noise, as well as the effects of pollution at the workplace. A new multidisciplinary approach viewing the whole food chain as an integrated entity while examining issues of food safety, pre-normative aspects, new and improved raw materials, food processing, and a more profound understanding of the links between food consumption, well-being and health will be developed. This key action will also study in detail the interactions between environmental factors and human health. The following scientific and technological objectives will be pursued:

- **Development of safe and flexible and new and/or improved manufacturing processes and technologies.** The aim is to improve the quality and consumer acceptability of food, while ensuring traceability of raw materials and final products.
RTD priorities: improved use of raw materials, production and processing systems; development of food crops and functional foods; use of fishery by products and poorly exploited species; quality and traceability of raw materials and food products in the food chain; minimal processing and process control; advanced food technologies and packaging systems; improvement of traditional technologies; quality monitoring and quality assurance, including the development of methods for measuring quality.
- **Development of tests to detect and processes to eliminate infectious and toxic agents.** Research will focus on the hazards of food contaminants, their exact origins and strategies for safer food production.
RTD priorities: improved understanding and control of contamination conditions; rapid detection tests for pathogens, xenobiotics and hormones; new and safer methods of food production; new methodologies for assessing microbial, chemical and allergenic risks.
- **Research into the role of food in promoting and sustaining health with respect to diet and nutrition, toxicology, epidemiology, environmental interaction, consumer choice and public health.** The aim is to reduce diet-related risk factors contributing to chronic disease and to develop new approaches for improved nutrition and more balanced diets.

RTD priorities: the role and impact of food and diet on physiological functions, and physical and mental performance; the particular nutritional needs of defined population groups; links between diet and chronic diseases and disorders including genetic factors involved; consumer protection, attitudes and reactions with regard to food products, food-processing methods and labelling.

- **Research into diseases and allergies related to or influenced by the environment, and research into their treatment and prevention.** The focus is on health impairment caused directly by exposure to the environment and on ways of treatment and prevention, based on sound epidemiological data and an understanding of pathogenesis mechanisms.

RTD priorities: analysis and quantification of the impact of environmental factors on human health; assessment of the relative importance of, and the interactions between, factors impinging on health; improved understanding of the interrelations between environmental and public-health indicators for better treatment and prevention; development of an integrated approach to risk assessment taking into account environmental and public-health aspects.

- **Development of new methods of diagnosis, risk assessment and of processes to reduce causes and harmful environmental health effects.** The objective is to use a multi-disciplinary approach for better understanding of the interactions between the social and physical environment and health and to improve the identification of vulnerable groups to environmental exposures and to identify preventive measures in order to reduce causes and environmental factors hazardous to health.

RTD priorities: bio-markers (including bio-indicators) of environmental exposure, effect and/or susceptibility to environmental agents, including mixed exposures and cumulative effects; improvement of predictive toxicity testing and mechanism-based risk assessment aiming at an eventual reduction, refinement and eventual replacement of animal testing; improved methods and technologies for long and short-term exposure and effects assessment; epidemiological and biomedical studies on possible effects linked to non-ionising irradiation, particularly from cellular phones.

(ii) Control of Infectious Diseases

Objectives and RTD priorities

The overall goal of this key action is to combat established, emerging or re-emerging infectious diseases, linked to old, new or mutated agents in humans or animals. This would be achieved primarily by mixing complementary expertise in transdisciplinary projects, by linking these activities to national and international organisations, and by encouraging the interface between academic research, policy-makers, health-care providers and the human and animal health-care industry, pursuing the following scientific and technological objectives:

- **The development of improved or novel mono-component, multi-component and combined vaccines, especially against viral diseases, including the support of multi-centre clinical trials.**

RTD priorities: vaccines against emerging and re-emerging infectious diseases and other diseases related to infectious agents (e.g. some cancers) with a view to reduction and eventual replacement of animal testing; vaccines against animal pathogens; development of European networks for clinical and field trials of vaccines and drugs including, where necessary, better understanding of the immune system.

- **New and improved strategies to identify and control infectious diseases, directed at treatment and prevention and based on studies on pathogenesis, emergence of resistance and immunological control.**

RTD priorities: improved understanding of mechanisms of protection against infectious agents, of drug resistance and control of immunological responses; technologies for safer and more efficient vaccines and immunotherapy; specific risk factors, including xenotransplants influencing the spread of infectious diseases and development of new strains; development and validation of diagnostic tests; development of an early-warning system and response network for infectious diseases; improved methodologies for early and accurate detection of adverse reactions to drugs and vaccines.

- **Aspects connected with public-health and care-delivery systems, notably management, prevention and surveillance aspects.**

RTD priorities: organisational and economic public health aspects; surveillance, monitoring and assessment methodologies in prevention and cure; methodologies for product safety surveillance in the market place.

(iii) The "Cell Factory"

Objectives and RTD priorities

This key action is aimed at helping the Community's enterprises, either established or starting up, to exploit the advances made in life sciences and technology, particularly in the fields of health, environment, agriculture, agro-industries and high value-added products such as chemicals. It is aimed at the development of multidisciplinary technologies based on the exploitation of the properties of micro-organisms, plants and animals, in particular at the tissue, cellular and sub-cellular levels. The objective is to understand the versatile functioning of cells and to develop bio-reactors, bio-molecules and bio-processes with high added value capable of enhancing the quality of life and health. Being a prerequisite to the functioning of cells as minute factories, sufficient knowledge will have to be secured of their blueprint at the scale at which they operate, through underpinning contributions of structural biology, physiology, nanobiotechnology, genomics and proteomics, with the support of notably physico-chemistry, bioinformatics and biochemical engineering. This key action should also

aim at using RTD to reinforce the prenormative by making cell cultures available as models for medicine, pharmacology, toxicology and environmental monitoring as a substitute for testing. Emphasis would be put on the following scientific and technological objectives:

- **New and innovative health-related processes and products particularly from molecular engineering (for example diagnostics, antibiotics, anti-cancer agents, including plant produced therapeutics).** Research will focus on bio-products relevant to preventing, detecting and treating human and animal diseases and improving the quality of life.

*RTD priorities: Improved understanding of the cell, gene functions and gene-delivery methods applicable to the development of new diagnostic and therapeutic substances and strategies; anti-cancer agents, antibiotics, antibodies and therapeutics, vaccine production, novel *in vitro* testing and screening methods as alternatives to animal testing; cells as production units and as diagnostic and detection tools.*

- **Energy-efficient bio-remediation and waste bio-treatment processes.** The objective is to prevent, detect, monitor, treat and remove pollution as well as to maximise the economic value of waste.

RTD priorities: new bio-processes for preventing industrial pollution, treating, upgrading, and/or recycling bioaccumulable wastes and industrial by-products; bioassays and biosensors; bio-degradation of recalcitrant chemicals by microbial catalysts alone or in combination with plant systems and/or chemical catalysts; biodiversity and ecological dynamics of natural and introduced populations

- **New biological processes and products, new processing technologies using micro-organisms, plants or animals for agri-food and agro-industry and high-value-added chemical applications.** The focus is on high-value bio-molecules and bio-processes leading to enhanced exploitation of renewable resources and to enhanced expression of desirable characteristics for micro-organisms, plants and animals.

RTD priorities: approaches at genome level and exploiting the cellular and sub-cellular characteristics of improved micro-organisms, plants and animals taking into account socio-economic, agronomic, ecological and/or consumer perspectives; development of methods and strategies for identifying recombinant organisms and their residues in the environment and their impact on human and animal health; new biocatalysts; use of terrestrial and marine organisms as a source of new valuable products; identification and sustainable use of metabolic and genetic diversity.

(iv) Sustainable agriculture, fisheries and forestry, including integrated development of rural areas

Objectives and RTD priorities

The aim is to develop knowledge and technologies for the production and exploitation of living resources, including forests, covering the whole production chain, taking into account the highly competitive international context and in the light of the need for adaptation to the evolution of the common agricultural and fisheries policies, whilst also providing the scientific basis for Community regulations and standards, and to promote the multi-functional role of forests and the sustainable management and utilisation of forest resources as an integral factor of rural development. The priority areas are as follows:

- **New and/or improved systems of production and exploitation in agriculture, fisheries and aquaculture, including the multi-functional management of forests.** These systems will combine competitiveness, sustainable management of resources, product quality and employment.

RTD priorities:

For agriculture: sustainable farm production systems and methods and corresponding ex-ante and ex-post control and analysis; diversification of production and activities; support to Community policies on plant health (prevention prediction, protection), animal health (prevention, control, eradication of major diseases and zoonoses) and animal welfare; identification and characterisation of the quality of agro-food products and agricultural farm-processed products and farm-processing technologies; definition of parameters, specifications, methods, forms of organisation and technologies for total quality; organic farming systems; plant and animal breeding and genetic resources.

For fisheries: support to integrated fishery management linking resource conservation, means of capture, interactions with ecosystems, market requirements and socio-economic considerations; identification and characterisation of the quality of marine products and technologies; development of new concepts for the sustainable use of marine living resources.

For aquaculture: sustainable production systems with the reduction of impact on ecosystems and diversification of cultivated species (both plant and animal); improvement of production techniques; promotion of genetic improvement, disease resistance and control

For forests: multifunctional management of forests; support to forest policy issues; diversification (non-wood uses, agro-sylvo-pastoral systems), multifunctional and sustainable management combining quality production with conservation and protection. Forests ecosystems biodiversity and protection of forests soils. Sustainable and multi-purpose utilisation of forest resources; the forestry-wood chain; strategies for the sustainable management and utilization of forest resources; efficient, environment-friendly processes and recycling technologies; high value added and diversified products accounting for market needs, and consumer requirements.

- **Integrated production and exploitation of biological materials for non-food uses.** This will cover integrated production and processing chains with the emphasis on end-use and market requirements.
RTD priorities: industrial products from the green chemical, biopolymers and bioenergy integrated chains.
- **Support for common policies.** The aim is to develop methods of control, surveillance and protection to support the sound implementation of the common agricultural and fisheries policies and related activities and to provide support for Community regulations by prenormative research activities. This research may also be useful to the Community in the context of international trade negotiations and of dispute settlements in the framework of WTO, in the area of agriculture.
RTD priorities: reliable, transparent and cost-effective methods of monitoring, assessment and control; prenormative research to provide the scientific basis for regulations in the context of the common agricultural and fisheries policies.
- **New tools and models for the integrated and sustainable development of rural and other relevant areas.** This approach is based on optimisation of the specific potential of each area, including at regional level, the diversification of activities and land use and the involvement of the people concerned.
RTD priorities: analysis of the situation and changes under way, taking into account the relationships between all the sectors involved and the factors influencing technological and socio-economic changes; diversification and job opportunities; development of the "integrated rural and fishery development" concept, with the investigation of potentials and constraints, the elaboration of new models and tools, including for spatial planning and the improvement of the organisational capacity of local actors; support to follow-up and evaluation of rural and coastal development programmes and policies with tools to monitor, assess and forecast socio-economic and environmental benefit.

(v) **The Ageing Population**

Objectives and RTD priorities

The overriding goal of this key action is to promote quality of life and healthy ageing and independence in old age by preventing and treating age-related diseases and disability, and their societal consequences. A complementary objective will be to reduce the need for long-term care and limit the constantly increasing costs of health-care systems.

- **RTD into age-related illnesses and health problems with high morbidity where there is a real prospect of significant prevention, treatment or delay in onset.**
RTD priorities: studies on major age-related diseases (e.g. Parkinson's and Alzheimer's diseases); physiology and pathophysiology of ageing and disability; co-morbidity studies.

- **RTD into biological, psychological, social and economic determinants of healthy ageing and of the mechanisms leading to disability.**
RTD priorities: cellular and molecular bases of ageing; genetic predisposition; immunology of ageing; basic biological and psychological mechanisms underlying age-related changes (including occupational and genetic effects); model studies for specific ageing processes; biomarkers; endocrine, neurocrine and metabolic factors of ageing; psychological implications of ageing.
- **Demographic and epidemiological research on ageing and disability trends to enable prediction of the size and nature of the ageing population as a basis for policy and planning.**
RTD priorities: clinical trials; analysis and quantification of demographic, medical, sociological, lifestyle (including exercise, mobility and nutrition) and environmental factors; prevention; methodology linked to collection of specific data.
- **RTD into new approaches to delaying the onset of disability, to reducing the challenge to older people of their social and physical environment, including the design and development of products and services adapted to their needs (e.g. in housing, transport and leisure) and to supporting mental and physical functioning.**
RTD priorities: methodology relating to quality of life, social integration and coping mechanisms; technologies contributing to less dependency; research on sensory degeneration; psychomotor, sensory and cognitive impairments; rehabilitation and replacement therapies; intervention assessment studies; assessment and quantification of needs and design/development of competitive and adapted products and services.
- **RTD into effective and efficient delivery of health and social care services to older people, including comparative research on the financing of long term care and pensions.**
RTD priorities : health care outcome research for elderly and disabled, research into specific health services and social care services, as well as into health care services organisation; efficiency and quality of health care delivery for the elderly; impact of ageing on the evolution and financing of care systems, notably for long term care, and of pensions.

(b) RESEARCH AND TECHNOLOGICAL DEVELOPMENT ACTIVITIES OF A GENERIC NATURE

These activities have a longer-term impact that may even preclude the possibility of satisfying some of the citizens' expressed needs, for as long as fragmentary knowledge is not pooled together to a sufficient degree of completeness. There is, in the related disciplines, a time-dependent need for integration of the science base, which is why industry, services and policy-making in Europe must maintain or reinforce their response capacity in a rapidly changing world.

Efficient interaction between research laboratories and industry will be promoted. Clustering of projects involving core centres and associated laboratories will be encouraged to create a critical mass, to promote interaction between basic and applied research and to ensure maximum transfer of knowledge to and from industry and undertakings. Support ranging from training of young scientists to fellowships for senior researchers will be developed.

• Chronic and degenerative diseases (in particular cancer and diabetes), cardiovascular diseases and rare diseases

Major challenges in biomedical research are the elucidation of the aetiology and pathogenesis of multi factorial diseases (genetic, environmental, lifestyle) of high (e.g. cardiovascular, cancer, diabetes) or low (e.g. rare diseases) morbidity. There is an urgent need to improve diagnosis, treatment, prevention and surveillance through epidemiology and applying advances in modern technology, requiring a multinational approach. The objective is to increase knowledge with regard to the epidemiology, pathogenesis and diagnosis of diseases by integrating basic and clinical research, and to apply modern technology to the treatment and control of major diseases, including rare (e.g., Creutzfeldt-Jakob Disease) and orphan diseases (e.g. illnesses which are prevalent in developing countries but are receiving less attention for research in industrialised countries).

RTD priorities: contribution of molecular, genetic, environmental and lifestyle factors and their interactions to the aetiology, pathophysiology, progress and outcome of diseases, leading to new approaches to prevention, diagnosis and treatment. Evaluation of novel interventions where multinational, large-scale studies/trials are required, and optimum use of data-bases, registries, reagents and sample banks.

• Research into genomes and diseases of genetic origin

The aim of this activity is to identify the physiological functions of genes and to improve the understanding of the meaning of sequence information. The new knowledge and technologies deriving from this generic action should promote the exploitation of genome information to the benefit of European health, industry and the environment. The organisation of collaboration in this area will underpin the development of expression systems to facilitate the study of genes of industrial and agronomic interest as well as the design of effective molecular and gene-based preventive and therapeutic strategies for human and animal disease.

RTD priorities: this area will address the meaning of genome information. This will require structural studies; comparative analyses of genomes and proteomes; development of novel and user-friendly informatics approaches to enable acquisition of, access to and interpretation of genomic and functional data; development of novel expression systems, model organisms, mutant, transgenic and hybrid organisms; development and application

of underpinning biochemistry, biophysical, statistical and computational approaches. Particular emphasis will be given to improve the knowledge and understanding of genetic diseases.

Neurosciences

This activity will provide new insights and a better understanding of the mechanisms governing the interrelationship of biological and psychological processes, to promote new diagnostic (e.g. imaging), preventive and therapeutic approaches to neurological and psychiatric disorders and to underpin opportunities for education, innovation in health care and computational industries. In this context, synergy and an appropriate flow of information will be strengthened with the Human Frontier Science Programme.

RTD priorities: understanding cell communication, including mechanisms of learning and memory; mechanisms of brain development, disorder and repair, and their clinical, epidemiological and social implications. Brain theory, computational neurosciences, and neuroinformatics; human behaviour, cognition and functional mapping of the brain. Integration of theoretical and experimental approaches; integration of basic and clinical research in developing innovative diagnostic, preventive and therapeutic strategies based on novel genetic, cellular, non-invasive, pharmacological and psychological approaches.

• Public-health and health-services research

Improvement of health systems: To improve the health of European citizens and the effectiveness and cost-effectiveness of health-promotion and health-care technologies and interventions, enhance health and safety at work, evaluate health-care models, develop the evidence base for clinical practice and health policy, and study public-health variations across Europe.

RTD priorities: improved methodologies in epidemiology; identification of new health determinants (including factors leading to inequalities in health) and aetiologic factors of disease through common methodologies and comparative research; socio-economic and organisational determinants of prevention, care and health services; work-related exposure to biological, chemical and physical agents and to physical and mental stress.

Fighting drug-related problems: To prevent and, where appropriate, control drug-related health problems through establishing the psychological and socio-economic factors involved in drug-taking and drug abuse, developing better understanding of the long-term health and social consequences of abuse, and developing more effective treatment strategies.

RTD priorities: comparative and analytical research on biological and social causes, risk factors and effects of drug addiction and misuse; psychological and socio-economic factors of drug abuse; long-term health effects of drug consumption; physical detection aspects, drug profiling and biological monitoring of drugs.

• Study of problems relating to biomedical ethics and bioethics in the context of respect for fundamental human values

The objective is to identify the ethical, legal and social questions raised, not only by biomedical and biological research alone but also, more broadly, by scientific and technological developments to understand and address issues of public concern, and to analyse the ethical dimension of legal and regulatory measures.

*RTD priorities: ethical aspects of life sciences research and its application to medical practice, animals, plants, and the environment.*⁸

• **Study of the socio-economic aspects of life sciences and technologies within the perspective of sustainable development (the impact on society, economy and employment)**

Competitiveness and sustainable development will together be the source of the Union's future wealth and employment opportunities, ensuring an enhanced quality of life for Europe's citizens.

Simultaneous pursuit of these objectives is only possible through an adequate recognition of the key interrelations between technologies, environment and society and integration of knowledge into sustainable development policies.

Socio-economic research is also needed to enhance the quality of the public debate, as illustrated by the interest shown in the applications of modern biotechnologies. The regulatory process in life sciences and technologies and its impact on citizens' confidence influences public opinion, which in turn has a strong impact on decision-makers.

The objectives are to assist in the construction of strategies and models for sustainable development and to provide a sound scientific basis for the conception and implementation of relevant policies, exploiting knowledge and technologies from the life sciences and technologies (including the creation of employment opportunities in the bio-industries); and to develop a better understanding of the links between science and policy, including the ways in which opinions on the benefits and risks of technological progress are formed and are reflected in the regulatory process.

RTD priorities: technology evaluation and assessment, public perception, education and opinion forming in the field of life sciences and technologies; analysis of social and

⁸ Research activities under this programme must comply with the international conventions and codes of conduct, and in particular the Helsinki Declaration of the World Medical Association adopted by the World Medical Assembly.

Research will be carried out also taking into account: the European Convention on Human Rights and Biomedicine of the Council of Europe; the opinions of the Group of Advisors on the Ethical Implications of Biotechnology (1991-1996) and the opinions of the European Group on Ethics in Science and New Technologies (as from 1998); the Universal Declaration on the Human Genome and Human Rights of UNESCO of 11 November 1997 and the resolutions of the WHO, as well as EC legislation (Council Directives of 26 January 1965 and 20 May 1975 on the approximation of the laws, regulations and administrative provisions relating to proprietary medicinal products (65/65/EEC and 75/319/EEC) - Council Directive of 24 November 1986 on the approximation of the laws, regulations and administrative provisions of the Member States relating to the protection of animals used for experimental and other scientific purposes (86/609/EEC).

No research modifying or seeking to modify the genetic constitution of human beings by alteration of germ cells or of any stage of embryo development which may make this alteration hereditary, and research activities aiming at the creation of individuals by reproductive cloning whether it involves embryo splitting or nucleus transfer will be carried out under the present programme.

Concerning animal experimentation, the principles of replacement by alternative methods, reduction of the number of animals and the refinement of experiments must be applied. Animal suffering must be avoided or kept to a minimum. These principles must be applied particularly rigorously to the animal species that are the closest to human beings.

Modification of the genetic heritage of animals and animal cloning will be envisaged within this programme only for objectives which are justified on ethical grounds and when carried out under conditions respecting animal welfare and the genetic diversity.

Participants in EC research projects must conform to national legislation and applicable codes of conduct and seek the approval of the relevant ethics committee prior to the start of the RTD activities.

economic driving forces and of new opportunities in the bioindustries; development of indicators and knowledge bases relevant to decision-making and regulation; analysis of the social and economic aspects of the links between life sciences and technologies and policies in the field of industry, agriculture, fisheries, environment, sustainable development, public health, etc.

(c) SUPPORT FOR RESEARCH INFRASTRUCTURES

Objectives

To broaden access, to make optimum use of and to improve the consistency of the existing European research fabric at Community level.

To facilitate and to encourage the development of RTD facilities in response to emerging needs.

In order to reinforce the European added value and the optimisation of the required efforts, Community support will be directed towards: **transnational co-ordination**, integrated management of, specific aspects of operation of, access to and improvement of existing facilities; **co-ordination and complementation** of national or multinational initiatives to develop facilities needed at the European level; **networking** of communities of researchers and users through research projects and specific training activities centred on appropriate infrastructures, or cooperation of several partners, leading to an integrated service provider; **increasing the compatibility** of dispersed systems, aiming to provide rapid and effective integration of facilities and resources.

Classes of infrastructures

- Biological data and collections of biological material. Databases, information services and networks of biological expertise; major specialised instrumentation for the study of biological structures; collections of genetic materials, living and non-living specimens; breeding of animals to develop models of human diseases.
- Clinical research facilities, including pre-clinical research and clinical trials.
- Facilities for aquaculture and fishery research.

ANNEX III

SPECIFIC RULES FOR IMPLEMENTING THE PROGRAMME

The specific programme will be implemented through the indirect RTD actions defined in Annexes II and IV to the fifth framework programme. In addition, the following rules specific to this programme will apply:

1. Accompanying measures

The accompanying measures will comprise in particular:

- studies in support of the specific programme, including the preparation of future activities,
- the exchange of information, conferences, seminars, workshops and scientific and technical meetings,
- recourse to external expertise, including access to scientific data bases, in particular for the purposes of the monitoring of the specific programme provided for in Article 5(1) of the fifth framework programme, the external assessment provided for in Article 5(2) of the fifth framework programme and the evaluation of indirect RTD actions and the monitoring of their implementation,
- dissemination, information and communication activities, including scientific publications, activities for the exploitation of results and the transfer of technologies, encouragement of innovation financing and assistance with the protection of intellectual property,
- training schemes related to RTD activities covered by the specific programme,
- support for schemes to provide information and assistance for research players, including SMEs.
- recourse to external capacities for the establishment of and access to services and networks for information, assistance and promotion of research and innovation.

2. Coordination arrangements

The Commission will endeavour to ensure complementarity between the indirect RTD actions within the programme, in particular by grouping them around a common objective, and to avoid duplication; while respecting the legitimate interests of proposers of indirect RTD actions.

Coordination will also be ensured between actions under the specific programme and those carried out in:

- other specific programmes implementing the fifth framework programme,

- the research and training programmes implementing Council Decision .../.../Euratom of ... concerning the fifth framework programme of the European Atomic Energy Community (Euratom) for research and training activities (1998-2002),⁹
- other European research frameworks such as Eureka and COST,
- other Community research-related instruments such as PHARE, TACIS, MEDA, the EIF, the Structural Funds and the EIB,

It will comprise:

- (i) the identification of common themes or priorities, resulting in particular in:
 - the exchange of information,
 - the carrying out of work decided upon jointly, entailing in particular the joint initiation of one of the procedures referred to in Article 9 of the rules for participation and dissemination,
- (ii) the reassignment of proposals for indirect RTD actions between specific programmes or between a specific programme and a research and training programme.

⁹ OJ No L

FINANCIAL STATEMENT

1. TITLE OF OPERATION.

Proposal for a Council Decision adopting a specific programme for research, technological development and demonstration on "Quality of life and management of living resources" (1998 to 2002)

2. BUDGET HEADING INVOLVED.

Sub-section B6, heading B6-6111 "Quality of life and management of living resources "

3. LEGAL BASIS

Article 130i of the EC Treaty

European Parliament and Council Decision No ... of ... on the Fifth Framework Programme of the European Community for research, technological development and demonstration (1998 to 2002) (OJ No L ..., ..., p. ...).

4. DESCRIPTION OF OPERATION.

4.1 General objective of the operation.

The strategic objective of the programme is to link the ability to discover to the ability to produce, in order to address the needs of society and to meet the requirements of the consumer, leading to future wealth and job creation. The strategy of this programme is to focus on specific areas where growing knowledge potentially contains technical answers to some of the pressing questions asked by the citizen which require to be tackled on a European scale.

The novelty of the approach is the willingness to couple the dynamics of massive knowledge production with a few areas where there are expected to be desirable spin-offs, while pursuing the renewal of knowledge to reinforce European strengths in fields associated with further growth and quality of life.

The research activities will focus on clearly identified needs:

- meeting socio-economic needs,
- increasing European added value,
- improving European competitiveness,
- promoting biosafety,

- respecting an ethical framework.

This specific programme is based on key actions, research and development activities of a generic nature, and support for research infrastructures.

4.2 Period covered by the operation.

1998 to 2002

The arrangements for renewal are provided for in Article 130i of the EC Treaty.

5. CLASSIFICATION OF EXPENDITURE/

5.1 NCE

5.2 DA

5.3 Type of revenue involved:

Certain Associated States will contribute to the financing of the specific programme.

In accordance with Article 27 of the Financial Regulation, certain revenue may be available for re-use.

6. TYPE OF EXPENDITURE/REVENUE .

The implementation arrangements for the specific programme are as follows:

6.1 Indirect RTD actions and rate of financial participation

The indirect RTD actions will comprise: shared-cost actions, Marie Curie fellowships, thematic networks, concerted actions and accompanying measures.

The rate of financial participation of the Fifth Framework Programme in these actions is as follows:

Indirect RTD action	Rate of participation:
RTD projects	50% of total eligible costs ^{1,2}
Demonstration projects	35% of total eligible costs ^{1,2}
Combined RTD/demonstration projects	35% to 50% of total eligible costs ^{1,2,3}
Support for access to research infrastructures	Maximum of 100% of additional eligible costs
"Cooperative research" projects	50% of total eligible costs ¹
Exploratory awards	75% of total eligible costs
Training fellowships	Maximum of 100% of additional eligible costs ^{1, 4}
Thematic networks	Maximum of 100% of additional eligible costs
Concerted actions	Maximum of 100% of additional eligible costs
Accompanying measures	Maximum of 100% of total eligible costs

6.2 The arrangements for coordination between research actions within one and the same area consist of identifying common themes or priorities, leading, among other things, to the exchange of information, the performance of jointly agreed work and/or the reassignment of proposals for indirect RTD actions between specific programmes or between a specific programme and a research and training programme.

7. FINANCIAL IMPACT

7.1 Method of calculating total cost of operation .

The amount deemed necessary is ECU 2635 million for the period from 1998 to 2002.

¹ These rates will perhaps have to be adjusted in particular cases to comply with the Community framework on State aid for research and development and Article 8 of the WTO Agreement on subsidies and countervailing measures.

² In the particular case of legal entities which do not keep analytical accounts, the eligible additional costs engendered by the research are financed to the extent of 100%.

³ 35% for the "demonstration" part and 50% for the "RTD" part.

⁴ In the case of industry host fellowships, this amount will normally represent about 50% of the eligible total costs.

7.2 Itemised breakdown of cost

Type of activity	Total (%)
a) Key actions with the following objectives:	76.1
i) Health, food and environmental factors	19
ii) Control of infectious diseases	12.7
iii) The cell factory	15.2
iv) Sustainable agriculture, fisheries and forestry, including integrated development of rural areas	21.6
v) The ageing population	7.6
b) Research and technological development activities of a generic nature	20.9
c) Support for research infrastructures	3
TOTAL	100

7.3 Operational expenditure included in Part B of the Budget

Administrative expenditure: ECU 166 million, i.e. 6.3 % of the amount deemed necessary.

7.4 Indicative schedule of appropriations

The schedule is established on the basis of the breakdown of the maximum overall amount and the indicative schedule of appropriations for the period 1998-2002 in the proposal for the Fifth Framework Programme.

Commitment appropriations		Payment appropriations				Total
		1999	2000	2001	2002 and subsequent years	
1999	547	79.5	191	109	167.5	547
2000	638		224.5	197	216.5	638
2001	763			212	551	763
2002	687				687	687
Total	2 635	79.5	415.5	518	1 622	2 635

The final amounts will be laid down by the Budgetary Authority.

8. FRAUD PREVENTION MEASURES.

There is a wide range of administrative and financial checks at all stages of the procedure for concluding and implementing research contracts, including the following:

- Prior to conclusion of the contract:
 - Selection of proposals on the basis of the scientific merit of the project and of an assessment as to whether the research costs are in line with the nature of the research, its duration and its potential impact;
 - Analysis of the financial data transmitted by the proposers on their contract negotiation form.
- After the contract has been signed:
 - Scrutiny of statements of expenditure prior to payment, carried out at two levels (by the scientific officer and the financial officer);
 - On-the-spot checks enabling the detection of errors or other irregularities through an examination of the supporting documents. In order to make these checks more effective, the Commission's departments have set up an audit unit

which coordinates all the checks performed. These checks are either carried out by members of the audit unit or entrusted to auditing companies with which the Commission has concluded contracts, under the supervision of officials from the audit unit;

- Internal audit by the Financial Controller;
- On-the-spot inspections by the Commission's Financial Controller and by the European Court of Auditors.

9. ELEMENTS OF COST-EFFECTIVENESS ANALYSIS

10. 9.1 Specific and quantified objectives; target population

This specific programme consists of:

(a) Key actions with the following objectives:

(i) Health, Food and Environmental Factors

Objectives and RTD priorities

The overall goal of this key action is to improve the health of European citizens by providing them with safe, healthy and varied food products and by reducing the negative impact of environmental factors such as air pollution, heavy metals, toxic substances, electromagnetic radiation and noise, as well as the effects of pollution at the workplace.

The following scientific and technological objectives will be pursued:

- Development of safe and flexible new and/or improved manufacturing processes and technologies.
- Development of tests to detect and processes to eliminate infectious and toxic agents.
- Research into the role of food in promoting and sustaining health with respect to diet and nutrition, toxicology, epidemiology, environmental interaction, consumer choice and public health.
- Research into diseases and allergies related to or influenced by the environment, and research into their treatment and prevention.
- Development of new methods of diagnosis, risk assessment and of processes to reduce causes and harmful environmental health effects.

(ii) Control of Infectious Diseases

Objectives and RTD priorities

The overall goal of this key action is to fight against established, emerging or re-emerging infectious diseases, linked to old, new or mutated agents in humans or in animals.

The following scientific and technological objectives will be pursued:

- Development of improved or novel mono-component, multi-component and combined vaccines, especially against viral diseases, including the support of multi-centre clinical trials.
- New and improved strategies to identify and control infectious diseases, directed at treatment and prevention and based on studies on pathogenesis, emergence of resistance and immunological control.
- Aspects connected with public-health and care-delivery systems, notably management, prevention and surveillance aspects.

(iii) The "Cell Factory"

Objectives and RTD priorities

This key action is aimed at helping the Community's enterprises, either established or starting up, to exploit the advances made in life sciences and technology, particularly in the fields of health, environment, agriculture, agro-industries and high value-added products such as chemicals. It is aimed at the development of multidisciplinary technologies based on the exploitation of the properties of micro-organisms, plants and animals, in particular at the cellular and sub-cellular levels. The objective is to understand the versatile functioning of cells and to develop bio-reactors, bio-molecules and bio-processes with high added value capable of enhancing the quality of life and health. Being a prerequisite to the functioning of cells as minute factories, sufficient knowledge will have to be secured of their blueprint at the scale at which they operate, through underpinning contributions of structural biology, physiology, nanobiotechnology, genomics and proteomics, with the support of notably physico-chemistry, bioinformatics and biochemical engineering. This key action should also aim at RTD to make cell cultures available as models for medicine, pharmacology, toxicology and environmental monitoring, to substitute for animal testing and for prenormative purposes. Emphasis would be placed on the following scientific and technological objectives:

- New and innovative health-related processes and products particularly from molecular engineering (for example diagnostics, antibiotics, anti-cancer agents, including plant produced therapeutics).
- Energy-efficient bio-remediation and waste bio-treatment processes.

- New biological processes and products, new processing technologies on the basis of micro-organisms, or certain plant and animal characteristics, for agri-food and agro-industry and high-value-added chemical applications.

(iv) Sustainable agriculture, fisheries and forestry, including integrated development of rural areas

Objectives and RTD priorities

The aim is to develop knowledge and technologies for the production and exploitation of natural resources, including forests, covering the whole production chain, adapted to the highly competitive international context and in the light of the need to adapt to the evolution of the common agricultural and fisheries policies, whilst also providing the scientific basis for Community regulations and standards.

The priority areas are as follows:

- New and/or improved systems of production and exploitation in agriculture, fisheries, aquaculture and forestry, including the multifunctional management of forests.
- Integrated production and exploitation of biological materials for non-food uses.
- Support for common policies.
- New tools and models for the integrated and sustainable development of rural and other relevant areas.

(v) The Ageing Population

Objectives and RTD priorities

The overall goal of this key action is to promote healthy ageing and independence in old age by preventing and treating age-related diseases and disability, and their societal consequences. A complementary objective will be to reduce the need for long-term care and limit the constantly increasing costs of health-care systems.

- RTD into age-related illnesses and health problems of high morbidity where there is a real prospect of significant prevention, treatment or delay in onset.
- RTD into biological, psychological, social and economic determinants of healthy ageing and of the mechanisms leading to disability.
- Demographic and epidemiological research on ageing and disability trends to enable prediction of the size and nature of the ageing population as a basis for policy and planning.
- RTD into new approaches to delaying the onset of disability, to reducing the challenge to older people of their social and physical environment, including the design and development of products and services adapted to their needs (e.g. in housing and transport and leisure), and to supporting mental and physical functioning.

- RTD into effective and efficient delivery of health and social care services to older people, including comparative research on the financing of long term care and pension system.

(b) Research and technological development activities of a generic nature:

These activities have a longer-term impact that may even preclude the possibility of satisfying some of the citizens' expressed needs, for as long as fragmentary knowledge is not pooled together to a sufficient degree of completeness. There is, in the related disciplines, a time-dependent need for integration of the science base, which is why industry, services and policy-making in Europe must maintain or reinforce their response capacity in a rapidly changing world.

- Chronic and degenerative diseases (in particular cancer and diabetes), cardiovascular diseases and rare diseases
- Research into genomes and diseases of genetic origin
- Neurosciences
- Public health and health services research
- Study of problems relating to biomedical ethics and bioethics in the context of respect for fundamental human values
- Study of the socio-economic aspects of life sciences and technologies within the perspective of sustainable development (the impact on society, economy and employment).

(c) Support for research infrastructures

Objectives

To broaden access, to make optimum use of and to improve the consistency of the existing European research fabric at Community level.

To facilitate and to encourage the development of RTD facilities in response to emerging needs.

In order to reinforce the European added value and the optimisation of the required efforts, Community support will be directed towards: transnational co-ordination; co-ordination and complementation; networking; and increasing the compatibility of dispersed systems.

The target population is as follows: firms, especially SMEs, research centres and universities.

9.2 Grounds for the operation

Economic and political developments in Europe have globally resulted in greater prosperity, increased life expectancy and better working conditions. These improvements have, however, been accompanied by challenges such as higher health care costs, an ageing population, and environmental degradation. Increasingly, a gap is becoming evident between natural resources, whether from agriculture and fisheries, mining or the

global environment, and human activities. Paradoxically, this has occurred at a time when there is an "explosion" in the knowledge base concerning the structure and working of all living things, pointing towards new developments in the corresponding sectors, e.g. health-care, pharmaceuticals, agriculture, food, etc.

Europe has a strong tradition and an excellent record in research and application of life sciences and technologies. Furthermore, Europe provides a huge single market with a tradition of receptiveness for bio-based products. It has, therefore, the potential to address and solve major challenges such as a varied and safe food supply, affordable health care, better medicines, etc. The scientific basis on which living and natural materials are exploited for these ends is undergoing a dramatic change, in which the intimate and interactive workings of living beings are being revealed. With the progress of scientific knowledge in recent decades, one can now expect to probe more deeply the questions surrounding the production of food, the curing of diseases, and the sustainable management and use of biological resources. One can also anticipate clarifying their relationships with human behaviour and needs, industrial practices and consumer demands.

Under Article 130f of the EC Treaty, the Community will by this new action continue to strengthen European industry's science and technology base, foster the development of international competitiveness and promote research activities deemed necessary under other chapters of the Treaty.

This continuation is proposed following an assessment, in line with the SEM2000 initiative, of activities over the past five years.

This proposal for a new operation follows the conclusions of the five-year assessment panel, notably in proposing that efforts be concentrated on five key actions (see point 9.1).

9.3 Monitoring and evaluation of the operation

9.3.1 Monitoring of the projects

Ex-ante evaluation

In order to guarantee the quality of RTD projects, the Commission will evaluate all the proposals received, following calls for proposals, on the basis of the priorities indicated in the specific programmes and the work programmes. For this purpose, it will be assisted, *inter alia*, by independent experts.

Intermediate and final project evaluation:

It is the responsibility of the project coordinator to send the Commission, at regular intervals, the technical and financial progress reports; the detailed final (technical and financial) report covering all the work carried out, setting out the results obtained and the objectives attained and summary reports for publication. These reports will be monitored by the Commission staff, possibly with the assistance of outside experts.

9.3.2 Monitoring and evaluation of the specific programme

Annual monitoring of the implementation of the specific programme:

The Commission will examine each year, with the help of appropriately qualified independent experts, progress with the implementation of the specific programme in the light of the criteria set out in Article 3(2) of the specific programme.

It will assess, in particular, whether the objectives, priorities and financial resources are still appropriate to the changing situation. Where appropriate, it will submit proposals to adapt or supplement the specific programme.

Five-year and/or final evaluation:

In addition, before submitting its proposal for a Sixth Framework Programme, the Commission will have an external assessment conducted by high-level independent experts on the management of, and progress made in, Community activities carried out during the five years preceding the assessment, in particular in the light of the criteria set out in Article 3(2) of the specific programme. The Commission will communicate the conclusions of this assessment, accompanied by its comments, to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions.

Furthermore, in accordance with Article 130p of the Treaty establishing the European Community, the Commission produces an annual report to the European Parliament and the Council on activities relating to research and technological development and the dissemination of results.

10. ADMINISTRATIVE EXPENDITURE (PART A OF SECTION III OF THE COMMISSION BUDGET)

Not applicable.

**Proposal for a
COUNCIL DECISION
adopting a specific programme for research,
technological development and demonstration
on a "User-friendly information society"
(1998 to 2002)**

PROPOSAL FOR A COUNCIL DECISION
of
adopting a specific programme for research,
technological development and demonstration (1998 to 2002)
on a "User-friendly information society"

0178 (CNS)

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 130i(4) thereof,

Having regard to the proposal from the Commission,¹

Having regard to the opinion of the European Parliament,²

Having regard to the opinion of the Economic and Social Committee,³

Whereas by Decision No .../EC,⁴ the European Parliament and the Council adopted the fifth framework programme of the European Community (hereinafter referred to as the fifth framework programme) for research, technological development and demonstration (hereinafter referred to as RTD) activities for the period 1998 to 2002 specifying *inter alia* the activities to be carried out in the field of a user-friendly information society;

Whereas Article 130i(3) of the Treaty stipulates that the framework programme shall be implemented through specific programmes developed within each activity under the framework programme, and that each specific programme shall define the detailed rules for implementing it, fix its duration and provide for the means deemed necessary;

Whereas, in accordance with Article 4(2) of Decision No 1110/94/EC of the European Parliament and of the Council of 26 April 1994 concerning the fourth framework programme of the European Community activities in the field of research, technological development and demonstration (1994 to 1998)⁵ and Article 4(2) of the Council Decisions on the specific programmes implementing the fourth framework programme, the Commission has had an external assessment conducted which it has transmitted to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions together with its conclusions and comments;

¹ OJ No , p.

² OJ No , p.

³ OJ No , p.

⁴ OJ No , p.

⁵ OJ No L 126, 18.5.1994, p. 1. Decision last amended by Decision No 2535/97/EC (OJ L 347, 18.12.1997, p. 1).

Whereas the Scientific and Technical Research Committee has been consulted on the scientific and technological content of the specific programmes, as set out in the working paper⁶ adopted by the Commission on 5 November 1997;

Whereas, in accordance with Article 130j of the Treaty, Council Decision .../.../EC⁷ of ... concerning the rules for the participation of undertakings, research centres and universities and for the dissemination of research results (hereinafter referred to as the rules for participation and dissemination) applies to this specific programme and allows the participation of the Joint Research Centre in the indirect actions covered by this specific programme;

Whereas, for the purpose of implementing this programme, in addition to cooperation covered by the Agreement on the European Economic Area or by an association agreement, it may be appropriate to engage in international cooperation activities, on the basis of notably Article 130m of the Treaty, with international organisations and with third countries;

Whereas implementation of this programme will also comprise activities and mechanisms aimed at stimulating, disseminating and exploiting RTD results, in particular vis-à-vis small and medium-sized enterprises, and activities to stimulate the mobility and training of researchers;

Whereas, in accordance with the objectives of the first action plan for innovation, research activities under the fifth framework programme should be geared more towards innovation;

Whereas the implementation of this programme should be monitored with a view to adapting it, where appropriate, to scientific and technological developments; whereas in due course there should also be an assessment of progress with the programme by independent experts,

⁶ COM(97)553 final of 5.11.1997.

⁷ OJ No ..., ..., p. ...

HAS ADOPTED THIS DECISION:

Article 1

In accordance with Article 3(1) of the fifth framework programme, the specific programme, the Information Society Technologies (IST) Programme, on a "User-friendly information society" (hereinafter referred to as the specific programme) is hereby adopted for the period from [*the date of adoption of this programme*] to 31 December 2002.

Article 2

1. In accordance with Annex III to the fifth framework programme, the amount deemed necessary for carrying out the specific programme (hereinafter referred to as the amount) is ECU 3925 million, including a maximum of 7,30% for the Commission's administrative expenditure.
2. An indicative breakdown of this amount is given in Annex I.
3. Of this amount
 - ECU 853,4 million is for the period 1998 to 1999, and
 - ECU 3071,6 million is for the period 2000 to 2002.

Where appropriate, the latter figure will be adapted in accordance with Article 3(3) of the fifth framework programme.

4. The budgetary authority shall, in compliance with the scientific and technological objectives and priorities laid down in this Decision, set the appropriations for each financial year taking into account the availability of resources within the multiannual financial perspective.

Article 3

1. The general outlines, the scientific and technological objectives and the priorities for the specific programme are set out in Annex II. They are consistent with the fundamental principles and the three categories of selection criteria indicated in Annex I to the fifth framework programme.
2. In accordance with these principles and criteria the selection criteria indicated in Article 10 of the rules for participation and dissemination shall be applied for the selection of the RTD activities to be carried out.

A selection criterion specific to this programme shall also be applied: the participation of industrial entities in the shared-cost actions should be appropriate to the nature of the activity.

All these criteria shall be complied with in the implementation of the programme, including the work programme referred to in Article 5(1), although they may be weighted differently.

3. The rules for participation and dissemination shall apply to the specific programme.
4. Detailed rules for financial participation by the Community in the specific programme are defined in Article 4 of the fifth framework programme.
5. The indirect RTD actions under the specific programme are defined in Annexes II and IV to the fifth framework programme.

Specific rules for implementing the programme are set out in Annex III.

Article 4

In the light of the criteria set out in Article 3, and the scientific and technological objectives and priorities set out in Annex II, the Commission shall:

- (a) monitor the implementation of the specific programme and, where appropriate, submit proposals for adapting it, in accordance with Article 5(1) of the fifth framework programme,
- (b) have the external assessment provided for in Article 5(2) of the fifth framework programme conducted concerning the activities carried out in the fields covered by the specific programme.

Article 5

1. The Commission shall draw up a work programme specifying:
 - (a) the content of Annex II,
 - (b) the indicative timetable for the implementation of the specific programme,
 - (c) the coordination arrangements set out in Annex III,
 - (d) and, where necessary, the selection criteria and the arrangements for applying them for each type of indirect RTD action.

The work programme shall be updated where appropriate.

2. For the purpose of implementing the indirect RTD actions, the Commission shall, on the basis of the work programme, initiate the procedures set out in the rules for participation and dissemination, primarily through calls for proposals.

Article 6

1. The Commission shall be responsible for the implementation of this specific programme.
2. It shall be assisted by a Programme Committee composed of representatives of the Member States and chaired by the representative of the Commission.
3. The representative of the Commission shall submit to the Programme Committee a draft of the measures to be taken concerning:
 - the drawing-up and updating of the work programme referred to in Article 5(1),
 - the drawing-up of the terms of reference for the external assessment provided for in Article 5(2) of the fifth framework programme,
 - any adjustment to the indicative breakdown of the amount as set out in Annex I.

Article 7

1. The Programme Committee shall deliver its opinion on the draft measures referred to in Article 6(3) within a time limit which the Chairman may lay down according to the urgency of the matter. The opinion shall be delivered by the majority laid down in Article 148(2) of the Treaty in the case of decisions which the Council is required to adopt on a proposal from the Commission. The votes of the representatives of the Member States within the Committee shall be weighted in the manner set out in that Article. The Chairman shall not vote.

The Commission shall adopt the measures envisaged if they are in accordance with the opinion of the Committee.

If the measures envisaged are not in accordance with the opinion of the Committee, or if no opinion is delivered, the Commission shall, without delay, submit to the Council a proposal relating to the measures to be taken. The Council shall act by a qualified majority.

If, on expiry of a period of six weeks from the referral of the matter to the Council, the Council has not acted, the proposed measures shall be adopted by the Commission.

2. The Commission shall regularly inform the Programme Committee of progress with the implementation of the specific programme, and shall in particular provide it with information about the results of the evaluation and selection of the indirect RTD actions.

Article 8

This Decision is addressed to the Member States.

Done at Brussels,

For the Council

The President

ANNEX I

INDICATIVE BREAKDOWN OF THE AMOUNT

Key Actions	87,0%
1. Systems and services for the citizen	17,0%
2. New methods of work and electronic commerce	17,0%
3. Multimedia content and tools	17,0%
4. Essential technologies and infrastructures	36,0%
RTD activities of a generic nature Future and emerging technologies	10,0%
Support for research infrastructures	3,0%
TOTAL	3925 MECU ⁸

⁸ Of which :

- at least 10% for cross-programme themes, including 2% for integrated application platform.

ANNEX II

THE GENERAL OUTLINES, THE SCIENTIFIC AND TECHNOLOGICAL OBJECTIVES AND THE PRIORITIES

INTRODUCTION

We are undergoing a fundamental transformation: from an industrial society to the information society. Information society technologies increasingly pervade all industrial and societal activities and are accelerating the globalisation of economies, in particular by providing SMEs with new ways to access to the global marketplace, and societies.

Europe's industrial competitiveness, its jobs, its quality of life and the sustainability of growth depend on it being at the leading edge of the development and take-up of information society technologies. Also, by enabling communities in remote and rural areas to overcome isolation and to compete in the global economy, information society technologies contribute to cohesion in the European Union.

At the same time, the technologies underpinning the development of the information society are in rapid evolution. Advances in information processing and communications are opening up exciting new possibilities. There is a shift from stand-alone systems to networked information and processes. Digitisation is resulting in the convergence of information processing, communications and media. Content is of increasing significance. However, the increasing diversity and complexity of systems is also presenting new challenges for their development and use.

It will not be possible to realise the full potential of the information society in Europe with only today's technologies and applications. Key requirements such as usability, dependability, interoperability and, above all, affordability are far from being sufficiently met for the broad deployment of information society technologies (i.e. information and communication technologies, systems, applications and services) in all areas. Continuous efforts are required, in research, technological development, demonstration and technology take-up.

Strategic Objectives of the Programme

The strategic objective of the Information Society Technologies (IST) Programme is to realise the benefits of the information society for Europe both by accelerating its emergence and by ensuring that the needs of individuals and enterprises are met.

The programme has four inter-related specific objectives, which both focus the technology developments and enable the close articulation between research and policy needed for a coherent and inclusive information society. For the private individual the objective is to meet the needs and expectations of European citizens for high-quality, affordable general-interest services. Addressing the requirements and concerns of Europe's enterprises, workers and consumers the objective is to enable both individuals and organisations to innovate and be more effective and efficient in their work and business, whilst at the same

time improving the quality of the individual's working life. Multimedia content is central to the information society; the objective here is to confirm Europe as a leading force in this field and enable it to realise the potential of its creativity and culture. For the essential technologies and infrastructures that form the building blocks of the information society the objective is to drive their development, enhance their applicability and accelerate their take up in Europe.

Novelty of the approach. Community-funded research in information and communication technologies and applications is integral to the overall strategy of the European Union for the information society, which was defined by the Action Plan 'Europe's way towards the information society' and revised in the Action Plan adopted in November 1996. The Information Society Technologies (IST) Programme introduces a new approach to the information society theme of the Framework Programme.

Integration The context, rationale and objectives of the IST Programme necessitate a single and integrated programme which reflects the convergence of technologies and media and of industries and markets, together with the increasing significance of content, and responds to the need to integrate research and development and take-up actions. To this effect, this programme consists of a set of four key actions centred on the four specific objectives and a specific activity on longer-term or higher-risk research on future and emerging technologies. These activities complement each other and are derived by grouping together the technologies, systems, applications and services and the research and development and take-up actions with the greatest affinity or interdependence. Each activity has its own specific focus and priorities, however, the key issues of usability, interoperability, dependability and affordability will be addressed ubiquitously throughout the programme.

Cross-programme themes The coordination and integration of the activities through a single work programme allows a "theme" that cuts across the programme (e.g. interfaces, mobility or satellite-related activities) to be addressed in a coherent manner in more than one activity, each concentrating on and contributing from its particular perspective. Clustering and concertation will be used to focus, coordinate and integrate activities. Work, spanning the programme, will be undertaken on integrated application platforms to provide seamless interaction between citizens, businesses and administrations - these will be demonstrated and assessed in "digital sites", encompassing cities or regions, paving the way to "digital communities" in urban, rural and remote areas, and will be appropriately coordinated with initiatives in the Structural Funds. It will build on activities from all parts of the programme.

Flexibility The technological scope of the activities provides the flexibility to re-focus over time, through the single rolling work programme (defined in consultation with the key actors), to respond to changes in industrial and societal needs and the technological context.

Socio-economic needs. A vast range of goods, services and processes are being transformed through the integration and use of information society technologies. Work will target the quantitative and qualitative benefits that information society technologies offer in all industrial and societal activities, from more competitive methods of working and doing business to higher-quality, lower-cost general interest services or new forms of leisure and entertainment. It will take account of the ageing population and the necessity

to remove discriminating factors, such as gender bias, and the need to contribute to increasing resource efficiency and reducing environmental impact. Socio-economic research, together with the results of other Community initiatives that identify needs for information society technologies, such as regional programmes, will be integrated throughout the programme, to support the take-up of information society technologies; and into its management. As too will be work on statistics, which are central to the information society and for which information society technologies offer new ways to attain the highest standards of quality and the widest and most rapid and accessible dissemination. Particular attention will be paid to ensuring that the "innovation dimension" is actively addressed, and to stimulating and supporting the participation of SMEs, so as to contribute to the effective take-up of research results for economic and societal benefit.

European added value. Realising the full potential of the information society requires technologies, infrastructures, applications and services, accessible and usable by anyone, anywhere, anytime, whether it be for business or individual use. Collaborative research and technological development is needed to create both the critical efforts and the interoperability necessary to ensure this in Europe. Pan-European research is also needed to ensure that content, together with its creation and use, properly reflects and exploits the EU's cultural diversity and many languages.

European competitiveness. Information society technologies are integrated in or support products and processes in all sectors of the economy. To be competitive in the global marketplace Europe needs to master both the supply and use of information society technologies. To this end, to accelerate the realisation of knowledge as innovation, this programme integrates actions to stimulate the take-up of information society technologies with the research and technological development to ensure that the conditions and requirements for their use can be met. In addition to demonstrations and trials, these include actions to stimulate the development and diffusion of the skills necessary to take-up research and development results (such as validations, assessments, awareness building, first-user actions and best-practice initiatives) and consensus building and standardisation activities.

LINKS AND COMPLEMENTARITY WITH THE OTHER PROGRAMMES

Articulation with the other thematic programmes is based on concentrating the activities concerned with the development, demonstration and take-up of information society technologies in this programme and concentrating their deployment (domain-specific integration research as well as use) in specific domains in the other thematic programmes. Close coordination will be established with other programmes and relevant policy initiatives in areas where the deployment of information society technologies plays a critical role. Particular attention will be paid to the programmes covering manufacturing, transport, the environment and health care. In the case of satellite-related activities, these will be coordinated with related activities in other programmes in the context of the Commission's Space Coordination Group. In accordance with Article 6 of the European Parliament and Council Decision on the fifth framework programme, the utmost respect will be ensured for human rights and fundamental ethical principles in all the activities under the specific programme.

Reflecting the global nature of the information society, international cooperation will play a major role in the development and take-up of information society technologies. This will

be reflected in the participation in and operation of this programme, including support for international initiatives such as IMS (Intelligent Manufacturing Systems), and in its linkages with the programme on 'Confirming the international role of European research' addressing support for organisations from third countries. Specific activities to facilitate the participation of organisations from third countries and to maintain links with European-trained specialists in third countries will also be used in addressing the international dimension of the programme. Where appropriate, work will complement and be coordinated with that in the COST framework. Innovation activities integrated throughout the programme will provide a focus for the promotion of the deployment and use of results stemming from this programme and help ensure complementarity with and interface to innovation activities carried out within the programme 'Innovation and participation of SMEs'. In addition, links with EUREKA, Trans-European Network actions and the Structural Funds will be used to establish routes and mechanisms for the further take-up and the deployment of results. Links with the programme on 'Innovation and participation of SMEs' will complement the actions to facilitate the effective participation of SMEs that are integrated in this programme. The work on skills development and socio-economic research integrated in this programme will be enhanced through the appropriate links with the horizontal programme on 'Improving human potential' and European Social Fund initiatives. This programme's work on '*Research networking*' will interface with the 'Improving human potential' programme's support for access to large computing facilities and with the 'support for research infrastructure' activities of the other thematic programmes.

Full use will be made of the possibilities offered by COST and EUREKA, and by cooperation with international organisations, to foster synergy between actions and projects in this programme and nationally funded research activities. In the case of cooperation with EUREKA, projects corresponding to priority themes of common interest may be developed in the context of the key actions.

(i) KEY ACTIONS

SYSTEMS AND SERVICES FOR THE CITIZEN

Objectives and RTD priorities

The aim of this work is to foster the creation of the next generation of user-friendly, dependable, cost-effective and interoperable general-interest services, meeting user demands for flexible access for everybody, from anywhere, at any time. Work includes RTD addressing the whole of the key action, as well as specific RTD in the following fields: health; special needs, including ageing and disability; administrations; environment; and transport. Certain of the ubiquitous issues addressed throughout the whole of this programme will be taken up further in order to pay due consideration to the needs and expectations of the typical users in this key action, in particular the usability and acceptability of new services, including the security and privacy of information and the socio-economic and ethical aspects.

- **Health.** Work will cover new generation computerised clinical systems, advanced telemedicine services and health network applications to support health professionals, continuity of care and health service management, and intelligent systems allowing citizens to assume greater participation and responsibility for their own health.

RTD priorities: professional health care: systems enhancing the ability of health care professionals for prevention, diagnosis, care and rehabilitation, such as intelligent systems for non-invasive diagnosis and therapy, intelligent medical assistants, and advanced medical imaging; advanced telemedicine applications; "virtual hospitals" offering single-point-of-entry services; high-speed secure networks and applications for linking hospitals, laboratories, pharmacies, primary care and social centres for continuity of care; health service workflow management and re-engineering; new generation electronic health records and cards for sophisticated health data objects; personal health systems: systems for personal health monitoring and fixed or portable prevention systems, including advanced sensors, transducers and micro-systems; personal medical advisors for supervision of prevention and treatment; tele-systems and applications for supporting care in all contexts; user-friendly and certified information systems for supporting health education and health awareness for citizens; the work will be complemented by take-up actions including validations and assessments, together with first-user actions and other best-practice initiatives.

- **Persons with special needs, including the disabled and the elderly.** Work will address person/system interfaces and adaptive and assistive systems to overcome problems caused by environmental barriers and by physical or intellectual impairments, as well as intelligent systems and services to support autonomous living, social integration and participation in the information society.

RTD priorities: "design-for-all" products, systems and services, including improved participatory design methods, multi-modal terminals and universal interfaces; adaptive systems: communication tools for persons with special requirements, mobility support devices, both at home or in the wider environment, robotics control systems; multimedia applications for supporting daily living and social integration at home, work, education,

transport, leisure, etc., social support and intervention networks, new methods of service delivery; take-up: a key aspect will be validations and demonstrations.

• **Administrations.** Work will focus on multimedia systems and services addressing the specific needs of all types of administrations (e.g. Community, national, regional, local), in particular to support the widening and deepening of the EU, and offering interactive services to citizens and/or making them available at natural meeting-points for people, especially in remote and rural areas. Attention will be paid to improving effectiveness and internal efficiency.

RTD priorities: technologies and systems for on-line support for the democratic process and for improved, distance- and language-independent, access to information and services, in order to support one-stop service access and transaction handling for citizens and businesses; multilingual personalised services and intelligent multi-functional systems facilitating interaction between citizens and administrations, including the development of virtual for a (public hearings, opinion polling, etc.); systems and tools for enabling statistics to play their role in enhancing the transparency and accessibility of administrations and for promoting multimedia data interchange between administrations; the innovative applications to support the adaptation of administrations to the information and processing systems needs of Community policies; take-up: best practice and other take-up measures will be a priority.

• **Environment.** Work will focus on new generation monitoring, forecasting and decision-support systems and services, addressing both external and internal environments, for administrations, industries and the public, together with advanced systems and services for the identification, assessment, monitoring and prevention of risks, and for the management and mitigation of emergencies, both natural and man-made (including anti-personnel landmines).

RTD priorities: monitoring, forecasting and decision support: intelligent information systems on air/water/soil quality and for monitoring and management of natural resources; advanced systems for water/air/sea/soil/waste pollution monitoring, prevention and warning; high-performance systems and advanced tools for environmental data fusion, data mining and modelling, including geo-referenced data; integrated information tools and support systems for sustainable development and to improve ecological and resource efficiency; risks and emergencies: advanced management systems exploiting satellite imagery, remote sensing, sensor systems, real-time systems, and communication networks; take-up: a key aspect will be validations and demonstrations.

• **Transport and tourism.** Work will address IST development, validation and demonstration of intelligent infrastructure and vehicle systems for the management of all modes of transport, including for intermodal operations and "mobility chains" for freight and passengers, for safety and operational efficiency in all modes, supporting inter alia actions in "Competitive and Sustainable Growth", as well as for information, mobility and tourism related systems and services.

RTD priorities: surveillance, positioning and guidance systems and the necessary enhancement of terrestrial and satellite communication and positioning infrastructures, fixed, on-board and portable interactive multimedia devices, and tele-payment systems - in particular for traffic and demand management, collective and individual transport, fleet and freight operations supporting the whole logistics chain, and user information; new traffic control systems with advanced interfaces, simulation and prediction tools, including systems for managing large-scale events and crises; on-board human-centred systems for safety and efficiency, including vision enhancement, driver impairment watch, obstacle detection and advanced warning, crash-avoidance, and systems ensuring compliance with regulations (e.g. speed limits); telematic systems for intelligent vehicle operations in all modes of transport; on-board "info-mobility" services, including infotainment; multimedia personalised information systems for the transport and tourism sectors, including tele-reservation and tele-payment, systems and services addressing weather, leisure and tourism; decision support systems for increased efficiency and planning in the tourism sector; virtual mobility services; take-up: assessment of economic and technical viability, qualification actions, together with best practice actions.

NEW METHODS OF WORK AND ELECTRONIC COMMERCE

Objectives and RTD priorities

The aim of this work is to develop information society technologies to enable European workers and enterprises, in particular SMEs, to increase their competitiveness in the global marketplace, whilst at the same time improving the quality of the individual's working life, through the use of information society technologies to provide the flexibility to be free from many existing constraints on both working methods and organisation, including those imposed by distance and time. It covers both the development and the trading of goods and services, in particular in the electronic marketplace, and takes into account the different requirements of the individual worker, consumer and of businesses and organisations, and includes the related training. Considerations of the global context, in particular the rapid evolution of the marketplace, and socio-economic factors will guide the work, and the objective will be to develop and demonstrate world-best work and business practices, exploiting European strengths such as electronic payments, smart cards, mobile systems, software for business process modelling and enterprise management and consumer protection.

• **Flexible, mobile and remote working methods and tools.** Work will focus on enabling, validating and demonstrating competitive, flexible and human-centred work methods and organisation, including in administrations and non-profit organisations, by means of an integrated approach to the combination of business process and work organisation, human resource management, and information society technologies, informed by socio-economic and legal requirements analysis and considerations of the global context and actual business practice. It will address the needs of workers, enterprises and consumers alike. Best-practice pilots and scaleable demonstrations, together with dissemination actions to stimulate broad experimentation and adoption will be major features of the work.

RTD priorities: work methods: telework and networked cooperative working; mobile working; simulation- and virtual-reality-based methods, for both individual and collaborative working; entrepreneurship and portfolio working; organisation: integrating new or re-engineered work methods and structures in all sectors, including administrations, taking into account existing practices; agile, extended, virtual enterprises and networks of individuals; management and integration of workflow; organisational methodologies, including benchmarking and scenario planning; transformation methods and change and risk management; socio-economic issues (including the necessary statistical methods and tools): analysis of change; human resources and training; human factors, usability and ergonomics and safety in the workplace; implications for and coherence with the legal and regulatory framework; the work will be complemented by take-up actions including validations and assessments, together with first-user actions and other best-practice initiatives.

• **Management systems for suppliers and consumers.** Work will focus on seamless end-to-end support, covering both tangible and intangible products, for electronic trading and distributed virtual enterprises and marketplaces. It will cover applications or systems for interactions within and between consumers, individual entrepreneurs, businesses and administrations. It will address both business and work processes covering the full value chain and the information society technologies needed to support them.

RTD priorities: information society technologies systems to address processes in development, including: life-cycle support, design, engineering and maintenance, logistics and distribution management, quality control, productivity measurement; systems to address processes in marketing and sales, including: customer interaction, negotiation and contracting, mass customisation, packaging and trading; systems to address processes in financial services, integrating where appropriate support for the EURO, including: ordering, billing and payment, accounting and taxation; public and private procurement; systems to address processes in management, including: decision support and planning; virtual and real marketplace management systems; systems for on-line business information search and management, including directories and catalogues; systems to address consumer processes, including: product and service selection and purchase; systems for supporting the protection of consumers' rights; take-up: best practice and other take-up measures will be a priority; work will be complemented by validation and assessment in trials, and by concertation measures to contribute to standards.

• **Information security.** Work will focus on technologies to boost trust and confidence in the information infrastructure, and in its services and information resources, as being reliable, efficient and user-friendly for new methods of work and doing business. This includes protecting information integrity, managing intellectual property rights, enhancing privacy and techniques for combating computer crime.

RTD priorities: electronic signature, certification and authentication techniques; representation of product data; prevention of fraud and misrepresentation of goods; electronic IPR management technologies; privacy enhancing technologies, including those avoiding the improper collection, recording and disclosure of personal and business data; secure electronic transactions and payments, including anonymous ones and integrating next-generation smart-cards; critical systems management and reliable next generation electronic commerce infrastructures; support for the development of and conformance to the legal and regulatory framework; technologies to generate confidence in meaningfully managing vast amounts of data by businesses and consumers, including

user customisation; take-up: technology assessment, trials, demonstrators for building confidence and concertation for ensuring interoperability and contributing to internationally recognised standards.

MULTIMEDIA CONTENT AND TOOLS

Objectives and RTD priorities

The aim of this work is to improve the functionality, usability and acceptability of future information products and services to enable linguistic and cultural diversity and contribute to the valorisation and exploitation of Europe's cultural patrimony, to stimulate creativity, and to enhance education and training systems, in particular for lifelong learning. Work will cover new models, methods, technologies and systems for creating, processing, managing, networking, accessing and exploiting digital content, including audiovisual content. An important research dimension will be new socio-economic and technological models for representing information, knowledge and know-how. The work will address both applications-oriented research, focusing on publishing, audiovisual, culture and education and training and generic research in language and content technologies for all applications areas, and will include validation, take-up, concertation and standards.

• **Interactive electronic publishing and digital heritage and cultural content.** For *interactive electronic publishing*, work will focus on new publishing and media paradigms for both commercial and private use (including the evolution of the World-Wide-Web). It will address future publishing systems able to handle new combinations of content and to provide users with new levels of interaction and control, and cover new forms of content such as virtual objects, in multi-user environments, or immersive, animated content. Three fast-evolving application areas will be addressed: knowledge publishing, in particular for scientific and business content; lifestyle publishing, in particular for news, entertainment and information for the citizen; and geographic and statistical information, including related socio-economic information, particularly where complex information needs new presentation forms for the non-specialist user. The work on *digital heritage and cultural content* will aim to improve access to cultural patrimony, facilitate its valorisation and stimulate cultural development by expanding the key contribution of libraries, museums and archives to the emerging "culture economy", including economic, scientific and technological development. Actions will particularly address new digital processes and cover business and economic models, especially those which stimulate new partnerships through networking and new services for the citizen.

RTD priorities: for interactive electronic publishing: generating creative content through advanced tele-collaborative real-time authoring and design systems and skills development (for example for 3-D or virtual reality design and conceptual modelling); systems for the generation and re-use of content from different media; collaborative creative expression and publishing; managing digital content by supporting distributed and networked content; processing large sets of data in innovative ways (e.g. visualisation, scenario development or spatial analysis); devising new metrics for valuing information assets; personalising content delivery (via push or pull technologies), by cost-effective content packaging, advertising and transactions, customer profiling and individualised design and presentation (in a manner that respects the user's right to privacy); exploring the limits between domain-specific and domain-

independent content; the work will be complemented by take-up actions including validations and assessments, together with first-user actions and other best-practice initiatives; for digital heritage and cultural content: integrated access to heterogeneous distributed collections and repositories in digital and traditional form (e.g. library holdings, museum exhibition material, public archive contents, multimedia art or sound archives, digital film collections and digital cinematic distribution networks); improving the functionalities of large-scale repositories of content by providing rich and powerful interactive features and advanced management and copyright techniques; preservation of and access to valuable multimedia content from multiple sources, covering electronic materials and electronic surrogates of fragile physical objects; take-up: a key aspect will be validations and demonstrations.

• **Education and training.** Work will aim at providing the EU with a blueprint for a seamless and cost-effective implementation of advanced technologies for enhancing both education and training systems. This work will focus on the common needs of different teaching and learning processes, on new approaches to lifelong learning, and on innovative ways of integrating multimedia pedagogic material.

RTD priorities: improving the learning process through more autonomous and more individualised learning: work will include local learner support, peer learning, remote tutoring, curriculum/course design systems, and accreditation systems; developing higher quality learning material by improving the quality of the content itself, the embedded pedagogical or didactic approaches, and the adaptability to learner needs: work will address new instructional design tools, learner modelling techniques, modelling methods for knowledge transfer, as well as learning ergonomics, and will cover content ranging from simple hypermedia to advanced simulations; broadening access to learning resources and services for all: work will address common platforms allowing full access to services across heterogeneous networks, including harmonised identification and retrieval of knowledge resources.

• **Human language technologies.** Work will focus on advanced human language technologies enabling cost-effective interchanges across language and culture, natural interfaces to digital services and more intuitive assimilation and use of multimedia content. Work will address written and spoken language technologies and their use in key sectors such as corporate and commercial publishing, education and training, cultural heritage, global business and electronic commerce, public services and utilities, and special-needs groups. Work will also include the development of electronic language resources in standard and re-usable formats.

RTD priorities: adding multilinguality to systems at all stages of the information cycle, including content generation and maintenance in multiple languages, localisation of software and content, automated translation and interpretation, and computer-assisted language training; enhancing the natural interactivity and usability of systems where multimodal dialogues, understanding of messages and communicative acts,

unconstrained language input-output and keyboard-less operation can greatly improve applications; enabling active assimilation and use of digital content, where work will apply language-processing models, tools and techniques for deep information analysis and metadata generation, knowledge extraction, classification and summarisation of the meaning embodied in the content, including intelligent language-based assistants; the work will be complemented by take-up actions including validations and assessments, together with first-user actions and other best-practice initiatives.

• **Information access, filtering, analysis and handling.** Work will focus on advanced technologies for the management of information content to empower the user to select, receive and manipulate (in a manner that respects the user's right to privacy) only that information required when faced with an ever increasing range of heterogeneous sources. Improvements in the key functionalities of large-scale multimedia asset management systems (including the evolution of the World-Wide Web) will support the cost effective delivery of information services and their usage.

RTD priorities: mastering information: rich descriptive models of digital information content, covering all media types and supporting all human senses, in addition to spatial and temporal aspects; associated tools to enable users to develop information profiles, possibly based on vague concepts and enabled via personalised agents; radically new cognitive relations between the system and users via individualised metaphors or visualisation techniques; information management systems: new organisation and management methods for multimedia information sources: work will explore advanced techniques for data warehousing integrating access control mechanisms, quality assurance, integrity control and technical protection of multimedia "fragments"; information categorisation, labelling and filtering enabling selective information retrieval and filtering (including for the control of illegal and harmful content); take-up: first-user and other take-up measures will be a priority; work will be complemented by validation and assessment in trials, and by concertation measures to contribute to standards.

ESSENTIAL TECHNOLOGIES AND INFRASTRUCTURES

Objectives and RTD priorities

The aim of this work is to promote excellence in the technologies which are crucial to the information society, to accelerate their take-up and broaden their fields of application. The work will address the convergence of information processing, communications and networking technologies and infrastructures. The focus will be on technologies and infrastructures common to several applications, while those specific to one application only would be addressed in the context of that application in other parts of the Framework Programme.

• **Technologies for and the management of information processing, communications and networks, including broadband, together with their implementation, interoperability and application.** The work will focus on the development and convergence of information processing, telecommunications and broadcast network and system technologies.

RTD priorities: concurrent systems: technologies and tools for the sharing and interactive use of remote resources and concurrent activities in geographically dispersed locations, in the context of heterogeneous hardware and software architectures and systems; real-time systems handling large volumes of data; basic technologies and tools supporting real-time embedded systems applications - related work should actively contribute to, or adhere to, standards; broadband telecommunications networks: reliable high capacity terabit optical transmission; a major effort in photonic technologies for end-to-end optical transparency in core and access networks; technologies and architectures, including specifically all-optical networks: topological and functional layout, switching and routing, operation and management; technologies for network integration (notably for the convergence of fixed and mobile, including satellite, networks) and new service independent architectures and systems, to ensure all users have affordable access to broadband multimedia nomadic services; interoperability and interworking of networks particularly at the network management and service levels, to increase capacity, flexibility and functionality and to promote the introduction of competition and new intelligent network services (including the evolution of the Internet); generic service management models capable of handling the increased network complexity, new architectures and the requirements for network dependability and security; take-up: measures to promote and transfer best practice, for concertation to contribute to standards, and to test and validate technologies and services in field trials.

• **Technologies and engineering for software, systems and services, including high-quality statistics.** Work will centre around the development, deployment, operation and evolution of software-intensive systems embedded in goods and services as well as facilitating production and enterprise processes, including technologies and tools for testing and validation at all stages:

RTD priorities: software and systems engineering: work will focus on dependable, survivable and scalable systems and address the reduction of the development cycle and costs; the use and further development, as required, of reliable methods and tools will be a central issue; the integration of custom and off-the-shelf components into systems will be a key aspect; service engineering will address the integration of heterogeneous platforms and networks and the increasing complexity and sophistication of the new services and their creation and provision - the objective will be to develop technologies and tools for rapid, customised and cost-effective service creation, deployment, provision and management that provide for an open information and communications service infrastructure, with the necessary reliability, security and quality of service; software technologies work will foster knowledge-based methods and tools, which increase the usability as well as the capability of systems and the intelligence in the network, this includes the timely collection, production, dissemination and communication of high-quality information (including statistical and management information); take-up: best practice and other take-up measures will be a priority; work will be complemented by the validation and assessment of technologies, systems and services in field trials, and by concertation measures to contribute to standards.

• **Real-time and large-scale simulation and visualisation technologies.** Work will address the development and integration of advanced simulation and visualisation technologies and environments in all applications. Work will include distributed simulations and shared virtual environments.

RTD priorities: simulation and visualisation: work on simulation environments will include pre-processing, advanced post-processing (including visualisation and virtual reality) and tools for the validation of simulation with experimental and archival data; tools to support the integration of simulation in industrial and business processes will be a priority; technologies and tools for distributed simulations with emphasis on support for the interoperability of heterogeneous software and hardware systems; shared virtual environments scaleable over large networks; population with autonomous agents and visualisation, such as through avatars; the work will be complemented by take-up actions including validations and assessments, together with first-user actions and other best-practice initiatives.

• **Mobile and personal communications and systems, including satellite-related systems and services.** Work will target the move to an integrated seamless network that ensures global personal connectivity and enables access to wireless multimedia communications and services by anyone, from anywhere, at any time, with capabilities, quality and performance comparable to those of fixed network services.

RTD priorities: work will focus on the development and evolution of new generations of affordable terrestrial and satellite broadband wireless architectures, systems and technologies, exploiting new spectrum frontiers, for both private and public environments, supporting advanced services and maximising spectral efficiency and network performance; addressing full coverage through a multiplicity of radio systems deployed in a multi-layer, multi-dimension cell architecture; service mobility and terminal roaming across terrestrial and satellite wireless and wired networks will be a priority; software reconfigurable networks, systems and terminals, to facilitate improved network planning, interoperability and interworking; miniaturised, low-cost, low-power mobile and portable communication terminals (both hardware and software aspects); technologies, services and applications supporting interactive mobile and personal multimedia services, with regional or global coverage and integrated where appropriate with terrestrial and satellite navigation services; take-up: a key aspect will be validations and demonstrations of broadband interactive mobile multimedia technologies and services; a major effort will be dedicated to technology assessment and concertation measures to contribute to standards.

• **Interfaces making use of the various senses.** Work will address the provision of intuitive ways to capture, deliver and interact with systems. Work will include the development and integration of advanced sensor, actuator and display technologies.

RTD priorities: multimodal, multisensory interfaces and novel tools and devices, validation and assessment will be central to this work; technologies including image and auditory scene processing, understanding and synthesis will be developed and integrated to provide new solutions for the work and leisure/entertainment environments; the work will facilitate the introduction of technologies such as augmented and virtual reality; the development and integration of a range of advanced display technologies for professional and consumer applications will be addressed; emphasis will be given to the development of low-cost and low-power interfaces, as well as the use of new flexible materials for portable and mobile subsystems; included are issues such as user adaptability, user interaction modelling and profiling; take-up will be stimulated, in particular, by first-user actions.

• **Peripherals, sub-systems and microsystems.** Work will address the need for advanced intelligent (computing and communications) network peripherals which can have multiple functionality yet remain user-friendly. Work on sub-systems will cover the building blocks of information processing and communications systems and networks. Work on intelligent microsystems will, in this context, cover miniaturised systems comprising sensing and/or actuating with processing functions, and normally combining two or more of electrical, mechanical, optical, chemical, organic, biological, magnetic or other properties, integrated onto a single chip or a multichip hybrid.

RTD priorities: integration, low-power consumption and miniaturisation will be the drivers for technology development for peripherals and terminals, as well as software and hardware modules for content capture, storage and manipulation; the development of advanced mass storage methodologies is a key requisite; sub-systems: in addition to basic building blocks a major focus will be home systems; microsystems work will be concentrated on facilitating the broader application of intelligent microsystems, primarily for the medical, biochemical, environmental, automotive and aerospace applications, as well as their use in measurement and control systems or sub-systems; the primary aim is to transfer competence from research to industrial use and to facilitate access to existing technologies for prototyping and small volume production; the integration of optical interconnects into microelectronic subsystems and microsystems for high-performance applications (e.g. electro-optical circuit boards); the work will be supported through measures complementing those in "Competitive and Sustainable Development" addressing the manufacturability of intelligent microsystems and the associated assembly, interconnect, packaging, materials and equipment technologies, together with support for the appropriate design and simulation activities; take-up: the work will be complemented by concertation for coordination and to contribute to standards, and in particular for microsystems by first-user actions.

• **Microelectronics.** Work will address materials, equipment, processes, design and test methodologies and tools which enable the development of electronic components, their packaging, interconnection and application. The approach will be system-oriented and application-driven, and will aim at reinforcing strengths and exploiting technological opportunities drawing on appropriate microelectronic technology solutions best filling generic application requirements.

RTD priorities: application and hardware/software co-design methods and tools; the key technology requirements will be addressed through support for semiconductor materials and equipment development and assessment, packaging and interconnect technology, notably for the most advanced generations; the focus will be on broadening applicability through the development of cost-effective active and passive silicon, silicon-based, or compound semiconductor components and subsystems for applications with generic characteristics, in particular mobility (low power, high frequency wireless communications), high complexity/high performance systems, systems resistant to hostile environments in terms of reliability and endurance, measurement and control; the development, integration or customisation of advanced signal and data processing functions into sub-systems together with their associated memory and input/output functions will be a priority, together with macrocells and support tools for classes of applications; optical technologies: new optical sources, optoelectronic integrated circuits, active and passive optical components and devices at new wavelengths, including optoelectronic devices based on organic compounds; take-up: promotion of application and design competencies will be addressed in thematic clusters; a major

effort will be devoted to technology assessment, first-user and other best-practice measures.

(ii) ACTIVITIES FOR GENERIC RESEARCH AND DEVELOPMENT OF TECHNOLOGIES

“FUTURE AND EMERGING TECHNOLOGIES”

This specific activity on future and emerging technologies will cover research that is of a longer-term nature or involves particularly high risks - compensated by the promise of major advances and the potential for industrial and societal impact. Such research will typically be either transdisciplinary or in an emerging discipline. It will reinforce the link and flow of ideas, initiatives and people between academia and industry in the EU. This activity complements the domain-specific work integrated in each of the key actions.

To ensure a seamless coverage of the information society technologies the door needs to be kept open to any new idea with a potential industrial or societal impact, in a bottom-up fashion. This openness will need to be reinforced in specific areas with highly focused well-coordinated pro-active initiatives of a strategic nature. Flexibility is essential just as is an appropriate balance between proactive initiatives which need careful, but rapid, planning on the one hand and, on the other hand, openness to new highly promising ideas as they arise.

The Open Domain

By definition the topics addressed cannot be prescribed. Project proposals could include, in a non-prescriptive way, knowledge technologies (covering technologies for the representation, creation and handling of knowledge), technologies for computation- or bandwidth-intensive applications, future devices and circuits (including those based on nano, quantum, photonic or bio-electronic effects and technologies for very large scale integration), and ultra-complex systems (such as ultra-high performance computers and super-intelligent networks).

Proactive Initiatives

Complementing the open domain, a number of proactive initiatives having a strategic perspective and addressing areas of substantial future growth, where close coordination across different projects is necessary, will be defined in the course of the execution of the programme. The definition of topics will be based on their potential for long-term industrial and societal impact (including employment through “start-ups”), on the opportunity offered by scientific advances or a combination of both. The planning of the proactive initiatives will need to make allowance for the necessity to be able to react rapidly if windows of opportunity present themselves unexpectedly through scientific advances.

Initiatives will each consist of a set of autonomous but closely coordinated and appropriately networked projects. The networked nature of the initiative could be reinforced with some central research facilities when these provide economies of scale to the participants of multiple projects. For example, experimental shared nano-fabrication

facilities, model spaces or communities for experiments in the areas of interfaces or virtual reality, and so forth.

The actual choices will be made at appropriate times through consultations with the research community, following the setting of an agenda that draws on a very broad body of scientific and technological opinion. In this context, advance knowledge will be sought through a combination of a series of strategic workshops, aimed towards setting trends and research targets, and a technology-watch activity, to be carried out in close cooperation with the JRC's 'Institute for Prospective Studies' and the 'Scientific and Technological Options Assessment' Unit of the European Parliament where appropriate.

(iii) SUPPORT FOR RESEARCH INFRASTRUCTURES

“RESEARCH NETWORKING”

Broadband Interconnection of National Research and Education Networks

The objective is to facilitate the supply of trans-European broadband interconnections between national research, education and training networks at capacities and of a quality matching the aggregated need of Europe's academic and industrial researchers and to keep the resulting network at the forefront of the state of the art. This implies an upgrading of the existing capacity of 34 Mbits/s via 622 Mbits/s to gigabits/s, including support for different levels of 'Quality of Service' and the necessary connectivity to third countries, in the context of the global evolution of the Internet. This aim is to facilitate effective European collaborative research, education and training activities (including the creation of "virtual laboratories" and "virtual institutes"), enabled by the deployment of state of the art Internet-based applications within the academic and industrial research communities. This work will support research in all fields and therefore the whole Framework Programme.

Advanced European Experimental Testbeds

The objective is the integration of leading-edge collaborative research and development, demonstration and take-up activities, from all key actions in this programme, addressing future generations of communication technologies, protocols, services and distributed applications. This experimental interconnection of the testbeds of individual operators, industries, universities and research facilities in Europe (together with necessary connections to third countries) will provide a practical basis for collaborative research efforts (e.g. in photonic networks, service configuration protocols or mobile broadband services). It will also lead to the early availability of the most advanced infrastructure of all types, which will in turn allow for early experiments with advanced applications (e.g. remote high-volume data visualisation, meta-computing or networked immersive virtual reality) requiring very high bandwidth or new services. It will also enable Europe to play a leading role in defining, standardising and validating the next generations of network protocols (including those for the Internet) and other emerging broadband services. It will contribute to the long-term interoperability and seamlessness of advanced network infrastructures, services and applications.

ANNEX III

SPECIFIC RULES FOR IMPLEMENTING THE PROGRAMME

The programme shall be implemented through the direct and indirect RTD actions defined in Annexes II and IV of the Fifth Framework Programme. In addition, the following rules, specific to the programme, shall apply:

1. Accompanying Measures

These include:

- take-up measures, including trials, best practice actions, first user actions, assessment and qualification actions and other actions aimed at stimulating broad take-up, particularly in SMEs, and encouraging innovation;
- measures in support of standardisation and other measures aimed at usability, interoperability and dependability of information and communication technologies, systems applications and services;
- measures in support of the interconnection of research infrastructures and other installations needed for RTD;
- mechanisms including publications, technology transfer networks and innovation activities, in co-ordination with the Third Activity;
- measures aimed at facilitating the participation of undertakings, research and user organisations in the programme, especially SMEs, in co-ordination with the Third Activity;
- training activities related to the RTD activities covered by the programme, addressing both researchers and users, in co-ordination with the Fourth Activity;
- analyses of the socio-economic consequences associated with information society technologies developments, in co-ordination with the Fourth Activity;
- support for exchanges of information, conferences, seminars, workshops or other scientific or technical meetings and the management of clustered RTD activities;
- studies and the use of external expertise, including databases, in support of the programme and for the preparation of future activities, including for the annual monitoring provided for in Article 5(1) of the Fifth Framework Programme, the external assessment provided for in Article 5(2) of the Fifth Framework Programme, and for the evaluation of the indirect RTD actions or in the monitoring of their implementation.

The Community contribution for the measures set out under point (1), and which are not the subject of procurement, may be up to 100% of the eligible costs. On the basis of the

principle of sound and efficient financial management, the Community financial contribution may be limited, for certain actions or measures, to 100% or less of those cost categories deemed necessary or appropriate for achieving the specific objectives of the action.

2. Coordination arrangements

The Commission will endeavour to ensure complementarity between the indirect RTD actions under the programme, in particular by grouping them around a common objective, and to avoid duplication, while respecting the legitimate interests of proposers of indirect RTD actions.

Coordination will also be ensured between actions under the specific programme and those carried out in:

- other specific programmes implementing the fifth framework programme,
- the research and training programmes implementing Council Decision .../.../Euratom of ... concerning the fifth framework programme of the European Atomic Energy Community (Euratom) for research and training activities (1998-2002),⁹
- other European research frameworks such as Eureka and COST,
- other Community research-related instruments such as PHARE, TACIS, MEDA, the EIF, the Structural Funds and the EIB,

It will comprise:

- (i) the identification of common themes or priorities, resulting in particular in:
 - the exchange of information,
 - the carrying out of work decided upon jointly, entailing in particular the joint initiation of one of the procedures referred to in Article 9 of the rules for participation and dissemination,
- (ii) the reassignment of proposals for indirect RTD actions between specific programmes or between a specific programme and a research and training programme.

⁹ OJ No L

FINANCIAL STATEMENT

1. TITLE OF OPERATION

Proposal for a Council Decision adopting a specific programme for research, technological development and demonstration on "The user-friendly information society" (1998 to 2002).

2. BUDGET HEADING INVOLVED.

Subsection B6, heading B6-6121 "Creating a user-friendly information society".

3. LEGAL BASIS

Article 130i of the EC Treaty.

European Parliament and Council Decision No ... of ... concerning the fifth framework programme of the European Community for research, technological development and demonstration (1998 to 2002) (OJ No L ..., ..., p. ...).

4. DESCRIPTION OF OPERATION.

4.1 General objective of the operation

The opportunities afforded by the creation of the information society will be available both to individuals and to businesses in the EU. The information society technologies are bringing about radical change in the Union's competitiveness, its ability to pursue sustainable, job-creating growth, and the quality of life available to its citizens.

Given that one priority in the future development of the Union is to take account of the convergent dimension of data-processing, communications and media, as well as the importance of the subject matter they convey, the thematic programme "Creating a user-friendly information society" focuses on technological developments and the research-development-dissemination nexus, with a view to exploiting these technologies.

The approach is novel: a single programme, reflecting the convergence of the telecommunications, media and information technologies sectors, and the impact of content, responds to the need to integrate research and development and take-up actions in a concentrated and dynamic approach. The programme is therefore structured around four "key actions" centred on specific objectives, and two longer-term "transversal" activities. Clearly, all of these specific objectives are structured and closely coordinated, in both the design and the management of the programme, around horizontal themes relating to the information society as a whole, and even to other framework programme actions or programmes, both thematic and horizontal

(satellite-related technologies, links to the citizen in terms of health or transport, international cooperation, innovation and participation of SMEs).

4.2 Period covered by the operation.

1998 to 2002

The arrangements for renewal of the operation are provided for in Article 130i of the EC Treaty.

5. CLASSIFICATION OF EXPENDITURE OR REVENUE.

5.1 NCE.

5.2 DA.

5.3 Type of revenue involved:

Certain Associated States will contribute to the financing of the specific programme.

In accordance with Article 27 of the Financial Regulation, certain revenue may be available for re-use.

6. TYPE OF EXPENDITURE OR REVENUE.

The implementation arrangements for the specific programme are as follows:

6.1 Indirect RTD actions and rate of financial participation

The indirect RTD actions will comprise shared-cost actions, thematic networks, concerted actions and accompanying measures.

The rate of financial participation of the fifth framework programme in these actions is as follows:

Indirect RTD action	Rate of participation
RTD projects	50% of eligible costs ⁽¹⁾⁽²⁾
Demonstration projects	35% of eligible costs ⁽¹⁾⁽²⁾
Combined RTD/demonstration projects	35 % to 50 % of eligible costs ⁽¹⁾⁽²⁾⁽³⁾
Support for access to research infrastructures	Maximum of 100% of eligible additional costs
“Cooperative research” projects	Maximum of 50% of eligible costs ⁽¹⁾
Exploratory awards	Maximum of 75% eligible costs of the exploratory phase
Thematic networks	Maximum of 100% of eligible additional costs
Research training networks	Maximum of 100% of eligible additional costs
Concerted actions	Maximum of 100% of eligible additional costs
Accompanying measures	Maximum of 100% of eligible costs

6.2 **The coordination arrangements** for research actions within the same area consist of identifying common themes or priorities, leading, *inter alia*, to the exchange of information, the performance of jointly agreed work and/or the reassignment of indirect RTD actions between specific programmes or between a specific programme and a research and training programme.

7. FINANCIAL IMPACT

7.1 Method of calculating total cost of operation

The amount deemed necessary is ECU 3925 million for the period from 1998 to 2002.

¹ These rates may have to be adjusted in particular cases to comply with the Community framework on State aid for research and development and Article 8 of the WTO Agreement on subsidies and countervailing measures.

² In the particular case of legal bodies which do not keep analytical accounts, the eligible additional costs engendered by the research are financed at a rate of 100%.

³ 35% for the “demonstration” part and 50% for the “RTD” part.

7.2 Itemised breakdown of cost

Type of action	Total (%)
a) Key actions with the following objectives:	87
i) Systems and services for the citizen	17
ii) New methods of work and electronic commerce	17
iii) Multimedia content and tools	17
iv) Essential technologies and infrastructures	36
b) RTD activities of a generic nature	10
c) Support for research infrastructures	3
Total:	100

7.3 Operational expenditure included in Part B of the Budget

Administrative expenditure: ECU 286.5 million, or 7.3 % of the amount deemed necessary: ECU 3 925 million.

7.4 Indicative schedule of appropriations

The schedule is established on the basis of the breakdown of the maximum overall amount and the indicative schedule of appropriations for the period 1998-2002 set out in the proposal for the 5th framework programme.

Commitment appropriations		Payment appropriations				Total
		1999	2000	2001	2002 and subsequent years	
1999	853.4	180	384.5	155.1	133.8	853.4
2000	944		255.2	321.2	367.6	944
2001	1 032			249.2	782.8	1 032
2002	1 095.6				1 095.6	1 095.6
Total	3 925	180	639.7	725.5	2 379.8	3 925

The final amounts will be laid down by the Budgetary Authority.

8. FRAUD PREVENTION MEASURES.

A wide range of administrative and financial checks exist at all stages of the procedure for awarding and executing research contracts, including the following:

Prior to conclusion of the contract:

- Selection of proposals based on the scientific value of the project and on how realistic the research costs are in relation to the nature of the research, its duration and its potential impact;
- *A priori* analysis of the financial viability of the potential contractors.

After the contract has been signed:

- Scrutiny of statements of expenditure prior to payment, at both financial and scientific level;
- On-the-spot checks allowing errors or other irregularities to be detected through examination of supporting documents. To make these checks more effective, an audit unit has been set up within the Directorate-General. Checks are either carried out directly by members of the audit unit or entrusted to external auditing companies with which the Commission has concluded a contract, under the supervision of officials from the audit unit;
- Internal audit by the Financial Controller;
- On-the-spot inspections by the Commission's Financial Controller and by the Court of Auditors of the European Union.

9. ELEMENTS OF COST-EFFECTIVENESS ANALYSIS.

9.1 Specific and quantifiable objectives; target population

The specific programme is structured around the following actions:

- a) Key actions with the following objectives:

i) Systems and services for the Citizen

The aim of this key action is to address the needs of policies and users, to provide the latter with easier access at the lowest cost to quality general-interest services and boost the industry providing these services, and to pave the way to «digital communities», both in urban and rural areas. In this context, it will be based on the following priorities:

- as regards health: on computerised medical systems, on secure high-capacity health networks and telemedicine;
- as regards persons with special requirements, including the disabled and the elderly: on advanced interfaces and on tele-systems to integrate the elderly and the disabled into society;
- as regards public administrations: on advanced multimedia systems to facilitate access to and provision of services of public interest;
- as regards the environment: on monitoring, forecasting and decision-support systems, and on systems for the management and mitigation of emergencies, both natural and man-made (including anti-personnel landmine);
- as regards transport and tourism: on the advanced intelligent systems needed for management of all modes of transport as well as for associated tele-services.

The population targeted by this key action encompasses the end-users of the technologies and applications to be developed, including the citizens as consumers, and the service providers involved in the relevant general interest areas.

ii) New methods of work and electronic commerce

The aim of this key action is to develop technologies to help companies operate more efficiently and make trading in goods and services more efficient, and to improve working conditions and the quality of work. The following priority avenues have been selected:

- flexible, mobile and remote working method, for individuals and for co-operative and group working, and working methods based on simulation and virtual reality, including the related training;
- management systems for suppliers and consumers, including systems supporting mass customisation and interoperable and secure payment systems;
- information and network security, including cryptography, techniques for combating and preventing piracy of computer sites, the technical means for authentication and the protection of integrity and intellectual property and privacy enhancing technologies.

The population targeted by this key action encompasses the European citizens as workers and companies, in particular small- and medium-sized enterprises.

iii) Multimedia content and tools

The aim of this key action is to facilitate life-long education and training, to stimulate creativity, promote linguistic and cultural diversity and improve the functionality of future information products and services, taking into account their user-friendliness and affordability. Research puts emphasis on the development of intelligent systems for education and training and of innovative forms of multimedia

content, including audiovisual content, and tools for structuring and processing them. This key action will focus on four main lines:

- interactive electronic publishing, with support new methods for creating and structuring publications and the personalised dissemination of information and accessing of scientific and cultural items through networking of libraries, archives and museums;
- education and training: systems, services and software enabling the development and demonstration of new methods using multimedia, broad-band communications, simulation and virtual reality;
- new language technologies, including the interfaces, which help to make information and communications systems more user-friendly;
- advanced technologies for accessing, filtering and analysing information to help manage the information explosion and facilitate the use of multimedia contents, notably as regards geographical information systems.

The population targeted by this key action encompasses the organisations involved in the definition, production and distribution of multimedia contents, and the intermediate and end-users of these contents.

iv) Essential technologies and infrastructures

The aim of this key action is to promote excellence in the technologies, which are crucial to the information society, to speed up their take-up and broaden their field of application. This key action will focus as a matter of priority on:

- computing, communication and network technologies, including broad-band networks, together with their implementation, management, interoperability and application;
- technologies and engineering for software, systems and services, including high-quality statistics;
- real-time and large-scale simulation and visualisation technologies,
- mobile and personal communications and systems, including satellite-related systems and services;
- interfaces making use of the various senses;
- peripherals, subsystems and microsystems, and
- microelectronics (technologies, tools, equipment and hardware necessary for the design and manufacture of circuits and components and the development of applications).

The population targeted by this key action encompasses the research communities and the companies as well as the leading-edge uses of the potential RTD applications.

b) Future and emerging technologies

To make it possible to develop, form a visionary perspective, future and emerging technologies with a potential impact on industry and society, research topics could include, in a non-prescriptive way:

- technologies for the representation, creation and handling of knowledge;
- nanoscale, quantum, photonic, bio-electronic technologies including technologies for very large scale integration, ultra-high performance computers and super-intelligent networks.

The population targeted by this action encompasses the research communities, both in academic institutions and large companies.

c) Support for research infrastructure

The priority is to provide support for the advanced high-speed computer systems needed for research in all fields of science and technology, including in the global context of the development of the Internet. Member States shall continue to have responsibility for the promotion of national networks and infrastructure, The role of the European Community shall be to provide added value to promote further opening, networking and interoperability.

The population targeted by this action encompasses the various research communities.

9.2 Grounds for the operation

Information and communication technologies, which pervade all economic activity and are accompanying, indeed accelerating, the globalisation of economies, are playing a decisive part in the current transformation of the industrial society towards the information society.

Europe's industrial competitiveness, its ability to create jobs, the quality of life of its citizens and the sustainability of its growth depend increasingly on the technologies which make up the information society. The same technologies contribute to economic cohesion by reinserting remote and rural areas into the normal competitive environment, and promote social cohesion, *inter alia* by enabling persons with special needs (the elderly, the disabled, those suffering some form of exclusion) to integrate into society.

The information society technologies are in rapid evolution, as witnessed notably by the shift from stand-alone systems to networked systems. Digitisation is resulting in the convergence of information processing, telecommunications and new media. This makes the definition of content increasingly significant. At the same time, the

diversity and complexity of systems is also presenting new challenges for their development and use.

To meet the challenges thrown up by the information society technologies and exploit the industrial and societal opportunities they offer, Europe needs to continue its efforts on the research, technological development, demonstration and take-up of the new technologies and their applications. Large industrialised countries, in particular the United States and Japan, have recently defined ambitious programmes for developing key technologies for the information society. This makes even more critical for the European Union to air its willingness to achieve its potential, in order to secure its technological independence, improve the competitiveness of its industry as well as the efficiency of its organisations involved in the delivery of general interest services, and to assert its societal model.

The future deployment of information society technologies depends in particular on the technical solutions, which are found for such essential requirements as usability, interoperability and affordability. Industry in general, but also public administrations involved in supplying general-interest services and citizens (whether as workers or consumers), are expecting the information society technologies to enable them to pursue their activities more effectively and in harmony with the newly globalising economic and social space.

The fifth framework programme takes a novel approach. For one thing, the research actions are integral to the overall EU strategy for the information society, as defined in the Action Plan. Also, the programme is put forward as an integrated whole reflecting the convergence of technologies and applications, media and content, industries and markets. Lastly, the programme will pay particular attention to such transversal themes as interfaces, mobility, satellite-related activities and integrated applications platforms. The research objectives are linked to the economic and social objectives of EU policies, and take systematic account of the added value which co-operation on a European scale is likely to bring to their attainment.

9.3 Monitoring and evaluation of the operation

9.3.1 Monitoring and evaluation of the specific programme

Annual monitoring of the state of implementation of the specific programme

Article 5(1) of the Decision concerning the fifth framework programme stipulates that the Commission must examine, each year, the implementation of the fifth framework programme and its specific programmes in the light of the criteria set out in particular in Annex I to the framework programme. These are criteria relating to social demands (employment, quality of life and health, the environment), economic development and scientific and technological prospects (growth, competitiveness, prospects for technological advances) and linked to "Community value added" and the principle of subsidiarity. This examination is performed with the assistance of appropriately qualified independent experts, chosen to represent the various research players in a balanced fashion. Such monitoring enables the Commission to assess whether the objectives, priorities and financial resources are still appropriate to the

changing situation. Where appropriate, the Commission must submit proposals to adapt or supplement the framework programme and/or the specific programmes.

The relevant indicators will be defined as part of the annual monitoring, with reference to the criteria set out *inter alia* in Annex I. General and specific indicators of output, both quantitative and qualitative, will be produced, as will indicators of impact.

Five-year assessment and/or final evaluation:

Prior to submitting its proposal for the sixth framework programme, the Commission shall have an external assessment conducted by independent high-level experts into the management and progress with Community activities carried out during the five years preceding this assessment in the light of the criteria set out in Article 3(2) of the specific programme. It shall communicate the conclusions of this assessment, accompanied by its comments, to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions.

Annual Report (Article 130p)

Fulfilling the requirement of Article 130p of the EC Treaty, the Commission prepares each year a report on the activities conducted in the field of research and technological development and the dissemination of results. This annual report is sent to the European Parliament and the Council.

9.3.2. Monitoring of projects

Ex ante evaluation

In order to secure the quality of RTD projects, the Commission evaluates all the proposals received, following calls for proposals, on the basis of priorities defined in the specific programmes and the work programmes. To this end, the Commission is assisted, *inter alia*, by independent experts.

Annual project review

A review of projects is carried out each year, with the possible assistance of external experts, on the basis of technical and financial reports specifying progress of the work and, where appropriate, of a demonstration of the pilot work and an on-site visit. These reports allow in particular to carry out an assessment of the quality of the technical deliverables for each project.

The aim of the annual review is to compare the achievements with the objectives initially stated. This allows, if required, to revise the latter taking into account not only the appraisal on the work done over the review period, but also the developments of the information society. The review leads to a recommendation to the Commission services on the future of each project.

10. ADMINISTRATIVE EXPENDITURE (PART A OF SECTION III OF THE COMMISSION BUDGET)

Not relevant.

Proposal for a

COUNCIL DECISION

**adopting a specific programme for research,
technological development and demonstration
on "Competitive and sustainable growth"**

(1998 to 2002)

PROPOSAL FOR A COUNCIL DECISION
adopting a specific programme for research,
technological development and demonstration on “Competitive and sustainable growth”
(1998 to 2002)

0179 (CNS)

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 130i(4) thereof,

Having regard to the proposal from the Commission,¹

Having regard to the opinion of the European Parliament,²

Having regard to the opinion of the Economic and Social Committee,³

Whereas by Decision No .../EC,⁴ the European Parliament and the Council adopted the fifth framework programme of the European Community (hereinafter referred to as the fifth framework programme) for research, technological development and demonstration (hereinafter referred to as RTD) activities for the period 1998 to 2002 specifying *inter alia* the activities to be carried out in the field of competitive and sustainable growth;

Whereas Article 130i(3) of the Treaty stipulates that the framework programme shall be implemented through specific programmes developed within each activity under the framework programme, and that each specific programme shall define the detailed rules for implementing it, fix its duration and provide for the means deemed necessary;

Whereas, in accordance with Article 4(2) of Decision No 1110/94/EC of the European Parliament and of the Council of 26 April 1994 concerning the fourth framework programme of the European Community activities in the field of research, technological development and demonstration (1994 to 1998)⁵ and Article 4(2) of the Council Decisions on the specific programmes implementing the fourth framework programme, the Commission has had an external assessment conducted which it has transmitted to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions together with its conclusions and comments;

¹ OJ No , p.

² OJ No , p.

³ OJ No , p.

⁴ OJ No , p.

⁵ OJ No L 126, 18.5.1994, p. 1. Decision last amended by Decision No 2535/97/EC (OJ L 347, 18.12.1997, p. 1).

Whereas the Scientific and Technical Research Committee has been consulted on the scientific and technological content of the specific programmes, as set out in the working paper⁶ adopted by the Commission on 5 November 1997;

Whereas, in accordance with Article 130j of the Treaty, Council Decision .../.../EC⁷ of ... concerning the rules for the participation of undertakings, research centres and universities and for the dissemination of research results (hereinafter referred to as the rules for participation and dissemination) applies to this specific programme and allows the participation of the Joint Research Centre in the indirect actions covered by this specific programme;

Whereas, for the purpose of implementing this programme, in addition to cooperation covered by the Agreement on the European Economic Area or by an association agreement, it may be appropriate to engage in international cooperation activities, on the basis of notably Article 130m of the Treaty, with international organisations and with third countries;

Whereas implementation of this programme will also comprise activities and mechanisms aimed at stimulating, disseminating and exploiting RTD results, in particular vis-à-vis small and medium-sized enterprises, and activities to stimulate the mobility and training of researchers;

Whereas, in accordance with the objectives of the first action plan for innovation, research activities under the fifth framework programme should be geared more towards innovation;

Whereas the implementation of this programme should be monitored with a view to adapting it, where appropriate, to scientific and technological developments; whereas in due course there should also be an assessment of progress with the programme by independent experts;

⁶ COM(97)553 final of 5.11.1997.

⁷ OJ No L ..., ..., p. ...

HAS ADOPTED THIS DECISION:

Article 1

In accordance with Article 3(1) of the fifth framework programme, the specific programme on "Competitive and sustainable growth" (hereinafter referred to as the specific programme) is hereby adopted for the period from [the date of adoption of this programme] to 31 December 2002.

Article 2

1. In accordance with Annex III to the fifth framework programme, the amount deemed necessary for carrying out the specific programme (hereinafter referred to as the amount) is ECU 2895 million, including a maximum of 6,30% for the Commission's administrative expenditure.
2. An indicative breakdown of this amount is given in Annex I.
3. Of this amount
 - ECU 640 million is for the period 1998 to 1999, and
 - ECU 2255 million is for the period 2000 to 2002.

Where appropriate, the latter figure will be adapted in accordance with Article 3(3) of the fifth framework programme.

4. The budgetary authority shall, in compliance with the scientific and technological objectives and priorities laid down in this Decision, set the appropriations for each financial year taking into account the availability of resources within the multiannual financial perspective.

Article 3

1. The general outlines, the scientific and technological objectives and the priorities for the specific programme are set out in Annex II. They are consistent with the fundamental principles and the three categories of selection criteria indicated in Annex I to the fifth framework programme.
2. In accordance with these principles and criteria the selection criteria indicated in Article 10 of the rules for participation and dissemination shall be applied for the selection of the RTD activities to be carried out.

A selection criterion specific to this programme shall also be applied: the participation of industrial entities in the shared-cost actions should be appropriate to the nature of the activity.

All these criteria shall be complied with in the implementation of the programme, including the work programme referred to in Article 5(1), although they may be weighted differently.

3. The rules for participation and dissemination shall apply to the specific programme.
4. Detailed rules for financial participation by the Community in the specific programme are defined in Article 4 of the fifth framework programme.
5. The indirect RTD actions under the specific programme are defined in Annexes II and IV to the fifth framework programme.

Specific rules for implementing the programme are set out in Annex III.

Article 4

In the light of the criteria set out in Article 3, and the scientific and technological objectives and priorities set out in Annex II, the Commission shall:

- (a) monitor the implementation of the specific programme and, where appropriate, submit proposals for adapting it, in accordance with Article 5(1) of the fifth framework programme,
- (b) have the external assessment provided for in Article 5(2) of the fifth framework programme conducted concerning the activities carried out in the fields covered by the specific programme.

Article 5

1. The Commission shall draw up a work programme specifying:
 - (a) the content of Annex II,
 - (b) the indicative timetable for the implementation of the specific programme,
 - (c) the coordination arrangements set out in Annex III,
 - (d) and, where necessary, the selection criteria and the arrangements for applying them for each type of indirect RTD action.

The work programme shall be updated where appropriate.

2. For the purpose of implementing the indirect RTD actions, the Commission shall, on the basis of the work programme, initiate the procedures set out in the rules for participation and dissemination, primarily through calls for proposals.

Article 6

1. The Commission shall be responsible for the implementation of this specific programme.
2. It shall be assisted by a Programme Committee composed of representatives of the Member States and chaired by the representative of the Commission.
3. The representative of the Commission shall submit to the Programme Committee a draft of the measures to be taken concerning:
 - the drawing-up and updating of the work programme referred to in Article 5(1),
 - the drawing-up of the terms of reference for the external assessment provided for in Article 5(2) of the fifth framework programme,
 - any adjustment to the indicative breakdown of the amount as set out in Annex I.

Article 7

1. The Programme Committee shall deliver its opinion on the draft measures referred to in Article 6(3) within a time limit which the Chairman may lay down according to the urgency of the matter. The opinion shall be delivered by the majority laid down in Article 148(2) of the Treaty in the case of decisions which the Council is required to adopt on a proposal from the Commission. The votes of the representatives of the Member States within the Committee shall be weighted in the manner set out in that Article. The Chairman shall not vote.

The Commission shall adopt the measures envisaged if they are in accordance with the opinion of the Committee.

If the measures envisaged are not in accordance with the opinion of the Committee, or if no opinion is delivered, the Commission shall, without delay, submit to the Council a proposal relating to the measures to be taken. The Council shall act by a qualified majority.

If, on expiry of a period of six weeks from the referral of the matter to the Council, the Council has not acted, the proposed measures shall be adopted by the Commission.

2. The Commission shall regularly inform the Programme Committee of progress with the implementation of the specific programme, and shall in particular provide it with information about the results of the evaluation and selection of the indirect RTD actions.

Article 8

This Decision is addressed to the Member States.

Done at Brussels,

For the Council

The President

ANNEX I

INDICATIVE BREAKDOWN OF THE AMOUNT

Type of activity	Total
(a) Key actions	74,3%
(i) Innovative products, processes and organisation	24,2%
(ii) Sustainable mobility and intermodality	13,8%
(iii) Land transport and marine technologies	5,2%
(iv) New perspectives for aeronautics	31,1%
(b) Research and technological development activities of a generic nature	24,2%
(c) Support for research infrastructures	1,5%
TOTAL	2895 MECU

ANNEX II

THE GENERAL OUTLINES, THE SCIENTIFIC AND TECHNOLOGICAL OBJECTIVES AND THE PRIORITIES

INTRODUCTION

Competitiveness and sustainability are the keys to the long-term future of the Union's economy: creation of wealth and jobs, enhancement of the quality of life, and preservation of the environment and the natural resource base. They depend on the capacity of citizens, enterprises, regions, nations and the Community to generate and use the knowledge, science and technology of tomorrow, in high-quality goods, processes and services, and in new and more efficient organisational forms. Research activities are clearly crucial in generating a more competitive technological base for European industry and in fostering the transition to a sustainable world, which will involve both a transformation of working practices and an optimised use of resources.

Competitiveness and sustainability can no longer be considered a matter for individual organisations or sectors alone. In the context of an increasingly interlinked and globalising economy a "systems approach" is necessary, in which research activities support the development of coherent, interconnected and eco-efficient industrial and social systems, responding not only to market but also to societal needs. At the heart of these systems will be *efficient and quality-based production systems*, embedded in agile organisations and producing high-quality eco-friendly products and services (in Europe there are more than 2 million industrial enterprises employing more than 40 million people, with 80 million working in related services). These wealth-creating activities should, in turn, be supported by key products and services, including efficient *transport systems* and *clean and safe vehicles*, promoting trade and the sustainable mobility of goods and people. Competitive and sustainable growth also depends on the development of *quality materials* and *reliable measurement and testing methods*, as well as the optimal use of specific *research infrastructures*, whether physical or virtual. Such a holistic approach is the best way to improve the long-term efficiency and sustainability of Europe's economic system in the face of world-wide evolving market constraints and socio-environmental responsibility.

Strategic objective of the programme

The objective of this specific programme must be to support research activities contributing to competitiveness and sustainability, particularly where these two objectives interact. In this context, industry's role will be not only to identify areas for collaboration but also to bring together and integrate projects, especially cross-sectoral projects along the value chain, so that technology uptake and innovation are more efficiently ensured across Europe. The development of new concepts such as eco-industry, intermodality, new generations of aircraft and other means of transport, and innovative approaches to the integration of new technologies will help to prepare industrial sectors for the challenges of the new millennium, and to generate a strategic vision of research in all industrial sectors throughout Europe. Research activities will focus on clearly identified needs.

Answering to socio-economic needs. By stimulating holistic approaches, by strengthening the innovative capacity of the European industrial system and by fostering the creation of businesses and services built on emerging technologies and new market opportunities, the

programme will help face the major challenges of society, in particular employment. In parallel, research into sustainable mobility and environmentally friendly processes, products and services will contribute to improving quality of life.

Stimulating European added value. Activities to solve the cross-border problems arising in connection with the various key actions have a clear European dimension, as does the development of norms and standards in support of Community policies. Achieving the critical mass needed to attain concrete and tangible results in cost-intensive technologies will also necessitate mobilising national and other RTD Community resources.

Supporting European competitiveness. Europe suffers from a recognised gap compared with its major competitors, inasmuch as it is less able to translate its scientific knowledge into innovation. Not only research but also innovation in respect of new concepts of products and services, production systems and organisational concepts (e.g. eco-industries) should be fostered to boost competitiveness and productivity.

Ethical framework. Full respect of human rights and fundamental ethical principles will be ensured throughout all activities in the specific programme in accordance with Article 6 of the European Parliament and Council Decision on the 5th Framework Programme.

The key actions "*innovative products, processes and organisation*", "*sustainable mobility and intermodality*", "*new perspectives for aeronautics*" and "*Land transport and marine technologies*" are intended to combine efforts in various research areas (e.g. materials, application of information society technologies, environmentally friendly technologies, etc.) to achieve the objectives described above. This multi-sectoral dimension will also be sought in research activities related to *materials, measurement and testing*, and *support for research infrastructures*. The approach to all these activities will also pay particular attention to the "innovation" dimension and to stimulating and supporting the involvement of SMEs so as to reduce the gap between the achievement of the research results and their effective use by the economy and society.

LINKS AND COMPLEMENTARITY WITH OTHER PROGRAMMES

RTD activities will be integrated and coordinated as necessary, within and between the different key actions and programmes, as well as with the JRC. Appropriate links will be established between these activities. This should provide mechanisms by which industry, public authorities, users and the research community can work jointly on the resolution of common problems, particularly in fields such as intelligent production systems, microsystems, next generation of aircraft and other means of transport or traffic management.

The economic and technological challenge of deploying, adapting and integrating life sciences and technologies related to energy, the environment or the information society is crucial for promoting competitive and sustainable growth. The specific applications meeting this challenge form an integral part of the various activities of this programme and will be conducted in close coordination with the specific programmes concerned.

Coordination with the specific programme on the user-friendly information society is based on the following principle: activities related to information society technologies as such (including development and technology demonstration and assimilation activities) will be concentrated in the user-friendly information society programme, while activities linked to the deployment and

integration of these technologies and their adaptation to applications relating to competitive and sustainable growth will be conducted under this programme.

Aspects related with the horizontal programmes are outlined below:

- Many of the problems addressed by this programme can only be dealt with effectively in a broader **international context**. For this reason close coordination will be developed with the programme on confirming the international role of Community research, in particular on issues where world competition is stiff and where major geo-economic challenges are at stake. This is clearly the case for production, transport, maritime, materials and standardisation related research activities, where collaboration with international initiatives (e.g. the Intelligent Manufacturing Systems (IMS) initiative) would bring added value to European research work. Full use will be made of the possibilities offered by COST and EUREKA and by co-operation with international organisations to foster synergy between actions and projects in this programme and nationally funded research activities. In the case of co-operation with EUREKA, projects corresponding to priority themes of common interest may be deployed in the context of the key actions. Specific activities aimed at facilitating the involvement of entities in third countries and maintaining links with specialists from third countries trained in Europe will be carried out, which will also contribute to the international dimension of the programme.
- In view of the increasing need to bridge the gap between research results and their potential applications, and of the large number of companies which could be interested in the potential results, particular attention should be paid to activities related to **innovation and the participation of SMEs**. This will be the case for all activities in this programme (e.g. cooperative research, large industrial projects, support to research infrastructures), and it will be closely coordinated with the programme on the promotion of innovation and encouragement of participation of SMEs. An innovation cell will centralise promotion activities with a view to the deployment and use of the results of this programme; it will also help ensure complementarity and an interface with the innovation activities pursued under the programme "Innovation and the participation of SMEs".
- Improving the know-how, skills and qualifications of European researchers in the fields covered by the programme should considerably enhance Europe's capability to produce tangible and lasting impacts. For this reason, research activities should be developed in association with measures linked to **training and socio-economic aspects**, which will thus form an integral part of the programme, and of projects if appropriate.

(a) **KEY ACTIONS**

(i) Innovative Products, processes and organisation

Objectives and RTD priorities

The overall goal of this key action is to develop new and improved methods of design, advanced equipment and process technologies for production⁸ that improve the quality and reduce the costs of processes for services and products (aiming for a substantial improvement in these factors in the medium term), reduce overall life-cycle impacts, improve understanding of “soft technology” aspects (organisation, management, logistics, teleworking, etc.), so as to integrate them fully into relevant industrial processes, and ultimately contribute to employment growth (aiming at creating and maintaining in Europe a number of jobs comparable, in percentage terms, to those of Europe’s major competitors). Implementation of the key action will focus on systemic approaches to production (products, production facilities, processes and organisation) and on clustering and integrating projects into targeted groups, which will make it easier to take account of socio-economic, ecological and competition aspects. Particular attention will be paid to the involvement of SMEs, taking account of their specific needs and their roles in the supply chain. Where appropriate, research activities will be coordinated with the activities of other programmes, and also with international initiatives (IMS, Eureka).

- **Efficient design and manufacturing.** The aim is to improve competitiveness through increased industrial added value, quality and responsiveness to market, reduced time-to-market and material intensity in product/service combinations.

RTD priorities: technologies for integrated product-service design and development, multi-technology integrated products (including production equipment and facilities) and related manufacturing processes; advanced production and construction techniques and equipment for higher process accuracy and reliability; manufacturing technologies and equipment for optimal use of resources and for product miniaturisation, including the manufacture and assembly of microsystems; methods to overcome the barriers between designers and consumers.

- **Intelligent production.** The aim is to optimise the level of performance of all elements of the industrial environment through the deployment, integration and application of information society technologies in production systems.

RTD priorities: intelligent and reconfigurable production systems, machinery, and equipment; on-line control using advanced sensors; extended life and optimal use of production facilities; intelligent operation and maintenance systems, including self-repair; application of advanced technologies for flexible and interoperable supply/production/distribution systems and networks, including the integration of developments in the field of electronic commerce.

- **Eco-efficient processes.** The goal is to minimise “full life-cycle” impacts on the environment, taking account of all essential elements of the industrial system ranging from extraction through production to waste management, with emphasis on resource intensive processes.

⁸ The term “production” encompasses all industrial activities from extraction of raw materials to the processing and manufacture of components and end-products. It covers all industrial sectors and associated services, including construction.

RTD priorities: clean and eco-efficient processing technologies; research aimed at mastering basic phenomena such as synthesis, catalysis, separation and reaction mechanisms, process modelling and simulation; impact monitoring and assessment of risks; in situ and on-line recovery of waste; novel processes for treatment, reuse and safe disposal of waste and for upgrading, reusing or dismantling products and production systems.

- **Organisation of production and work.** The goal is to move towards high performance industrial systems, agile customer-driven networked industrial enterprises, including SMEs, with multi-skilled highly motivated labour force, working in efficient and pleasant workplaces and taking into consideration the diversity and specificity of European society and manufacturing tradition.

RTD priorities: study of human, organisational, socio-economic and regulatory determinants for a smooth transition of enterprises towards efficient and sustainable production and consumption; new decision-making tools and new approaches to the management of change and human resources; studies on the impact and acceptance of new business ideas and new industrial production patterns, compatible with the concept of sustainability.

(ii) Sustainable mobility and intermodality

Objectives and RTD priorities

The overall aim of this key action is to achieve a better long-term reconciliation of the growing demand for mobility with the need to respect environmental, social, economic and safety constraints. It will help to break the link between economic growth and increased traffic volumes; reduce the negative impact of transport modes; and encourage their more sustainable use. Particular attention will be paid to intermodality and how best to integrate the respective strengths of the various modes of transport in order to provide user-oriented door-to-door services for both passengers and freight. This should result in a better management of mobility.

- **Modal and intermodal transport management systems.** The aim is to develop, validate, demonstrate and facilitate the deployment of rational, high-performance transport management systems for air, sea, inland waterway, rail, road and urban transport, both on a modal basis and for integrated intermodal transport, interfacing *inter alia* with the possibilities offered by the programme for a user-friendly information society, including the application and validation of related information and related integrated systems to facilitate their deployment.

RTD priorities: development, validation and demonstration of modal and intermodal traffic and transport management systems, including operational, regulatory, administrative and structural solutions for their deployment, and pricing systems; integration of information and data exchange systems across modes including real time user information, electronic documentation and user services with transport management and logistics; second generation satellite navigation⁹ and positioning systems; improvements to satellite-supported haulage; integration of services such as traffic management, vehicle and freight unit identification, location and guidance, pricing, freight planning, travel information and passenger services within the transport system.

⁹ Space-related activities are subject to an overall coordination across the various programmes.

- **Infrastructures and their interfaces with transport means and systems.** The goal is to enhance interconnectivity and interoperability and to promote intermodality in the transport system, through integration of all its components across the modes at the levels of infrastructure, transfer points, transport means, equipment, operations, services and the regulatory framework.

RTD priorities: more efficient use and reduced operating, development and maintenance costs of existing infrastructure; effective interchanges; interconnection between trans-European, regional and local networks; innovative infrastructure concepts and operations; relationship between transport, land use, regional planning, environment and health; reduced congestion, energy consumption, pollution, and infrastructure degradation; integration of vehicles and public transport in the transport system; innovative concepts for sustainable mobility in urban and rural areas and for inter-urban traffic; safety, including for the transport of dangerous goods; accessibility, safety, security and comfort of transport, including for people with special needs; human factors such as human/machine interface, human behaviour, user and operator acceptance of new "intelligent" systems, optimal training methods and use of simulators.

- **Socio-economic scenarios for the mobility of people and goods.** The aim is to develop strategies and tools for managing the impact of economic and social developments, including deregulation and liberalisation of transport services and globalisation of economic and commercial activities, on mobility demand and transport policies.

RTD priorities: scenarios on travel supply and demand and policy options for mobility demand, market organisation and accessibility; legal, institutional, organisational and financing aspects of transport systems and infrastructures; understanding of the role and constraints of logistics with a view to optimisation; benchmarking tools; methods for enforcement of regulations; methodologies to measure costs and benefits, safety, performance and impacts of different transport systems, networks and their operations; assessment of new technologies and concepts, including their impact on employment, users, the environment, work organisation, social conditions, and safety and security.

(iii) Land transport and marine technologies

Objectives and RTD priorities

The aim is to meet the technological challenges needed to develop and validate the next generation of vehicles, vessels, offshore structures and intelligent and efficient interfaces for logistic infrastructures, and to develop offshore and submarine technologies permitting the sustainable exploitation of marine resources. Vehicles must be capable of meeting all public demands for sustainable mobility and improved safety, while reducing the environmental impact and reinforcing Europe's economic strength. The activities under this key action will be closely coordinated with the activities on land and maritime transport under the key actions on "Sustainable mobility and intermodality" and "Systems and services for the citizen".

- **Critical technologies for road and rail vehicles.** The aim is the acquisition of technologies to support the improvement of transport vehicles and major infrastructure components. Such technologies must be economical, safe, intelligent, clean, efficient, reliable and responsive to new social and economic needs and the expectations of Europeans.

RTD priorities. Technologies for on-board and fixed propulsion systems characterised by high efficiency, environmental friendliness and cost effectiveness; for noise, vibration and electro-magnetic reduction; light-weight components and structures; application of

microtechnologies and sensor technologies for advanced components and systems; technologies for improved safety.

- **Innovative road and rail vehicle concepts.** The aim is the development and demonstration of new vehicle concepts using new construction techniques and materials and fulfilling all functional, technological, social and economic constraints. This should contribute to the development of improved transport systems, with increased efficiency and comfort, enhanced safety and environmental friendliness, and improving availability, maintainability, manufacturability and recyclability of vehicles. Priority will be given to concepts for the long-distance transport of passengers or goods, with the key action on "The city of tomorrow and the cultural heritage" dealing with the technologies and demonstrations relating to urban transport.

RTD priorities: Integration of new systems, structures, and power trains supported by parallel research into specific technologies for vehicle design, engineering and manufacturing operations; integration of on-board systems for intelligent and safe vehicles; integration of technologies for cost-effective vehicle design, manufacturing and use, within a whole life-cycle approach.

- **Human-vehicle interaction.** The aim is to develop cost-effective routes for the upgrading and industrial deployment of on-board components and systems, to be translated into enhanced operability of the various land transport means, proving their flexibility, reconfigurability, robustness, and breadth of applicability. The work will focus on the incorporation of human-vehicle interaction systems within the overall production chain and vehicle concept.

RTD priorities: Methodologies supporting the incorporation of human-vehicle interaction elements within the overall vehicle design and prototyping processes; effective architecture for intelligent vehicle monitoring using fault-tolerant, modular, plug-in technologies; ergonomic vehicle design; cognitive engineering technologies for effective driver-vehicle or occupant-vehicle interaction; technologies for improved cabin environment.

- **Advanced technologies for the development of ships and offshore platforms.** The aim is the validation and demonstration of advanced technologies for the development of vessels and offshore structures complying with safety, efficiency and environmental friendliness principles. The acquisition and integration of critical technologies meeting these three objectives will cover all aspects of design, production, operation and decommissioning or dismantling.

RTD priorities: Development of critical technologies for vessels, systems and sub-systems, covering safety concepts, environmental protection, efficiency, production, dismantling and recycling. Research will also cover the development of the new generation of on-board systems, application of new materials, structures and components, and new, optimised and alternative power train concepts.

- **Use of the sea and inland waterways to transport goods and passengers.** The aim is to develop and validate innovative vessel concepts with maximised performances, guided by economics while fulfilling customers requirements. This will also include new technological solutions for cargo handling, fast intermodal facilities, for port, inland waterways and marine infrastructures.

RTD priorities: Integration of technologies, of advanced equipment and systems for innovative vessel concepts; integration of technologies for efficient, safe and environmentally friendly transshipment facilities and operations; research to support concurrent development of technical standards, guided by life cycle approaches and performance based criteria.

- **Technologies for the rational and sustainable management of the sea.** The aim is the development of technologies intended for the study and observation of the seas and the sustainable exploitation of the energy and mineral resources of the sea, including offshore and submarine technologies, unmanned vehicles and submarine acoustics, promoted by a coherent approach to the exploitation of the sea as a source of minerals and energy, improvement of coastal zone management and minimisation of the environmental impact of sea-based activities.

RTD priorities: application of innovative technologies to monitor and forecast the state of the sea, the environment and the sea floor, especially in the deep sea, including remote-controlled vehicles; safe and efficient submarine technologies for sensing, control, and data transfer in order to improve accessibility to and the exploitation of marine mineral resources, including offshore structures and floating production units.

Specific coordination activities with other key actions and with EUREKA are planned in order to maximise the effectiveness of Community research.

(iv) New perspectives for aeronautics

Objectives and RTD priorities

The overall goal of this key action is to facilitate the development of aircraft and their subsystems and components in order to foster the competitiveness of the European industry while assuring the sustainable growth of air transportation. The medium-term targets of the RTD effort, including large-scale validation activities, are to substantially reduce development time and costs of new aircraft; improve efficiency (fuel consumption and maintenance costs) and reduce environmental impacts (pollutant emissions and perceived external noise) and accident rates (by at least the same factor as the growth of traffic volume). In technological terms particular emphasis will be placed on integration for subsonic aircraft and the use of enabling technologies for the second generation of supersonic aircraft.

- **Acquisition of critical technologies.** The aim is to contribute to the long-term competitiveness of the European aeronautics industry from a strategic perspective by stimulating the development of enabling technologies and a new generation of aircraft concepts, including aircraft more respectful of the environment.

RTD priorities: innovative approaches and evolutionary advances in aerodynamics, structures and application of new materials, propulsion, noise, equipment and systems, advanced sensors and avionics; development of multi-disciplinary technologies, such as aeroelasticity, flight mechanics and airframe-propulsion integration; methods and processes for aircraft design and manufacture.

- **Technology integration for new-generation aircraft.** The aim is to facilitate the introduction and combination of the newest technologies and to demonstrate their economic and operational feasibility for new aeronautic products over their long life time. This will involve a multi-disciplinary approach, including technology integrator platforms at the required scale, focusing on lower design, production and operational costs, reduction of consumption, aircraft performance, and environmental aspects.

RTD priorities: advanced design tools and concurrent engineering for reconfigurable, flexible, distributed and multi-site production systems; advanced developments in propulsion, structural and aerodynamic efficiency and systems performance and integration; airframe, engine and systems technologies and operational procedures to reduce significantly emissions and engine noise, and improve cabin environment.

- **Operational efficiency and safety.** The aim, with the integration of on-board systems, is to help alleviate congestion in airports, increase air traffic management (ATM) system capacity, and improve the safety performance of aviation, to accommodate the threefold increase in air traffic which is expected over the next 15 years. This work will be closely coordinated with the air-transport-related activities carried out under the key actions "Sustainable Mobility and Intermodality" and "Systems and Services for the Citizen". Particular attention will be paid to the development of on-board technologies and their incorporation into vehicles in an operational setting.

RTD priorities: validation and integration of on-board systems for improving the operational capabilities of aircraft and supporting their integration within the future ATM system; maintenance techniques and condition monitoring for improved aircraft reliability and dispatch availability; technologies and methodologies, including the study of human-factor aspects and flight simulation, for more effective accident prevention and improved aircraft design for passenger survivability.

(b) RESEARCH AND TECHNOLOGICAL DEVELOPMENT ACTIVITIES OF A GENERIC NATURE

These activities, with potential multi-sectoral applications, will help the development of European technological capacity and stimulate the flow of ideas, knowledge and applications to complement and support the key actions.

- **New materials and their production and transformation**

Objectives and RTD activities

Efforts will be made to support and network RTD projects leading to the optimisation of collaboration, information exchange, and Community added value. These networks will form the backbone of the structure of the research activities. They will also play an important role in stimulating international collaboration between Member States and with third countries (e.g. CEECs, United States, China) and developing foresight, socio-economic and strategic studies and impact and risk assessment.

- **Materials with a wide range of applications.** The aim is to promote research on the most promising avenues for improving the functionality and performance of existing materials, and the development of new materials with distinctly new or radically improved characteristics.

RTD priorities: innovative approaches such as nanostructured materials, supramolecular chemistry, colloidal systems and biomimetic chemistry; new and improved structural and light materials, in particular for construction, transport and high-temperature applications; functional materials, in particular opto-electronics and sensor-related materials, whose properties allow reliable operation; new and improved biomaterials such as implants and hybrid tissues; research improving understanding of deterioration and failure mechanisms.

- **Materials production and transformation processes.** Research will focus on technologies which can ensure quality (especially in the context of the trend towards shorter production cycles), reliability and cost-effectiveness of materials to allow optimum exploitation.

RTD priorities: materials production technologies for high-value-added sectors, especially fine chemistry, minerals, metals, polymers, composites, and ceramics; micro- and

nanopowder processing technologies; surface, coating and interfacial technologies for advanced materials and functional applications.

- **Sustainable use of materials.** Research will focus on the environmental and safety impact of new materials and the reuse of materials, with the aim of increasing the flow of secondary raw materials with reliable material properties, reducing life-cycle impacts and overcoming barriers with customers.

RTD priorities: research supporting the development of materials which are easy to recycle; recycling processes guaranteeing reliable properties and cost-effectiveness of recycled materials; finding uses for waste; research supporting new applications of renewable raw materials, for example for the production of organic chemicals.

- **New materials and production technologies in the steel field**

Objectives and RTD activities

In view of the expiry of the ECSC Treaty in 2002, and the conclusions of the Amsterdam European Council (June 1997), there is an urgent need to speed up the progressive insertion of coal and steel research into the framework programme. The objective is to reduce costs, improve user satisfaction, and increase value added, to the benefit of both the iron and steel industry and suppliers, end users and other research partners.

Steel research will be focused on the development of flexible, compact and safe production lines, cleaner processes, innovative steel products, and improved recycling.

RTD priorities: coke production for metal-working industries, research to reduce the costs and improve the quality of coke, to improve production of reducing gases, reduce emissions, and improve the safety and health of workers in industrial installations; iron and steel making technologies for flexible and cost-effective production; technologies to reduce energy consumption and CO₂ emission, improve steel cleanliness, and increase recycling rates; casting, rolling and downstream treatment, reduction of weight, and coating and surface techniques; development of improved and high-strength steel grades for higher performance and use in extreme conditions; cost-effective application of by-products.

- **Measurements and testing**

Objectives and RTD activities

Prenormative research and technical support for standardisation. Research will focus on the development and validation of measurement and testing methods, and the production of scientific and metrological data needed to define performance and safety criteria for products and services. The goal will be to strengthen Europe's overall competitive position and to promote the implementation of the key actions and of Community policies.

RTD priorities: development of new standards and improvement of existing standards over the range of industrial requirements; support for the development of performance standards and directives to facilitate trade, to protect consumers and the work environment and to favour mutual recognition agreements.

The fight against fraud. Research will focus on developing measurement and testing systems to detect and prevent fraud, in order to better protect the economic interests of enterprises and society and the health of consumers. The long-term aim will be to keep know-how and technology ahead of the defrauder.

RTD priorities: techniques to combat counterfeited or falsely labelled industrial and agricultural products; avoidance of circumvention of trade regulations and Community legislation, including customs tariffs, quotas, and waste disposal; new methods for the detection of drugs and doping, detecting false banknotes and value certificates; identification of the provenance of cultural artefacts.

Improvement of quality. Research will support the development of generic measurement and testing methods, instruments and measuring systems, including software, and this will also strengthen the SME-intensive instrumentation sector. Research will focus further on the development of quality assessment systems for private and public enterprises and on identifying measurable attributes that customers perceive to be present in quality products and services. Research needed to remove technical barriers to trade within Europe and with third countries will also be included. The activities are to be developed in conjunction with the relevant activities in the other programmes.

RTD priorities: calibration and transfer standards, feasibility studies for certified reference materials and banks of reference substances to assure reliability and traceability of measurements; instruments for high-performance measurements; robust and portable instruments for in situ and reference measurements, models and software tools for the validation of measurement methods; tools to support mutual recognition agreements, for improving quality within enterprises, including SMEs, and for measuring customer satisfaction; methodologies to support certification and accreditation in metrologically less developed fields.

(c) SUPPORT FOR RESEARCH INFRASTRUCTURES

Industrial research in Europe is widely recognised for its excellence, with well-established strongholds at national level. To bring competitive advantages, scientific and technological RTD results must, however, be converted into successful applications. Apart from the development of exploitation-oriented projects, there is a real need to share facilities effectively and to exchange data and experience more efficiently, for example for testing new machines, vehicles, or processes. In addition, research constantly generates new data and in increasing quantities. Collecting and organising such data at European level will benefit industry and the whole user community. Not only will research efficiency be improved by reducing duplication but, more importantly, focusing the whole fabric of research infrastructure in Europe on common goals will enable a strategic approach to be put in place.

Objective and activities

Action is needed to **encourage the optimum utilisation of existing research infrastructures and large installations in very close relation to the key actions.** Pooling of resources and transnational access, in particular for research manufacturing centres, transport test facilities, high-power wind tunnels, industrial design computing centres, or materials and structures test facilities, are needed to better exploit new techniques based on fixed major equipment and associated instrumentation. **Integration of the existing facilities must be accomplished as far as possible to avoid duplication of work, increase complementarity and ensure interoperability of data exchanges.** As the stages of development of the various national institutions vary across the Community, there is also a need to reinforce collaboration, in areas such as conformity assessments, training activities and transfer of know-how. In summary, support for research infrastructures is aimed at

- (i) the optimum utilisation of geographically dispersed medium- and large-scale research facilities,

- (ii) the rapid transfer of existing and complementary RTD results to industrial applications, and
- (iii) the improvement and interoperability of common protocols and data exchanges.

- The **support activities for research infrastructures** are aimed at improving the information flow towards European researchers and at facilitating access to facilities to which researchers would not normally have access. This will also encourage and facilitate the improvement of existing and the promotion of new research capabilities in response to emerging needs.

Support activities will stimulate access to facilities related to the various key actions, in particular to computing centres for industrial research, transport test facilities and high-power wind tunnels.

- The setting up of **virtual institutes** will promote the coordination and the pooling of resources between research centres and organisations to achieve synergy **and reap wider benefits** around the objectives of the key actions and generic technologies. This activity will facilitate the creation of virtual facilities generating sufficient critical mass for research into higher performance techniques, instrumentation and technologies. Community support will be limited in time.

Support activities would be meant as an incentive to speed up cooperation and the use of information and communications technologies for geographically dispersed facilities leading to improved transfer and exploitation of results, in particular for SMEs, in the field of materials, production technologies, and measurement and testing.

- Support for **European metrological infrastructure** will reinforce cohesion between Member States and third countries. This will benefit mutual recognition and conformity agreements. Particular attention will be paid to the impact of these agreements on SMEs.

Community funding will be directed towards intercomparisons and inter-laboratory performance analyses, support for interoperable database structures, the production of certified reference materials and the improved use by SMEs in particular of the implementation of the abovementioned agreements and the ISO 9000, ISO 14000 and EN 45000 standards.

- **Reference databases** have been identified as one of the means of strengthening the European research fabric. Efforts will focus on ensuring that the data generated are of acceptable quality and comparability and on bringing together sectorial and local activities in support of European research. Such activities will preserve the property rights of individual organisations.

Support activities, in particular for materials and aeronautics research, will help to catalogue and compare RTD actions at national and international level and the output of different research facilities.

ANNEX III

SPECIFIC RULES FOR IMPLEMENTING THE PROGRAMME

The specific programme will be implemented through the indirect RTD actions defined in Annexes II and IV to the fifth framework programme. In addition, the following rules specific to this programme will apply:

1. Accompanying measures

The accompanying measures will comprise in particular:

- studies in support of the specific programme, including the preparation of future activities,
- the exchange of information, conferences, seminars, workshops and scientific and technical meetings,
- recourse to external expertise, including access to scientific databases, in particular for the purposes of the monitoring of the specific programme provided for in Article 5(1) of the fifth framework programme, the external assessment provided for in Article 5(2) of the fifth framework programme and the evaluation of indirect RTD actions and the monitoring of their implementation,
- dissemination, information and communication activities, including scientific publications, activities for the exploitation of results and the transfer of technologies,
- training schemes related to RTD activities covered by the specific programme other than Marie Curie fellowships,
- support for schemes to provide information and assistance for research players, including SMEs
- recourse to external expertise in setting up and providing access to information, assistance and research and innovation promoting services and networks.

2. Coordination arrangements

The Commission will endeavour to ensure complementarity between the indirect RTD actions under the programme, in particular by grouping them around a common objective, and to avoid duplication, while respecting the legitimate interests of proposers of indirect RTD actions.

Coordination will also be ensured between actions under the specific programme and those carried out in:

- other specific programmes implementing the fifth framework programme,

- the research and training programmes implementing Council Decision .../.../Euratom of ... concerning the fifth framework programme of the European Atomic Energy Community (Euratom) for research and training activities (1998-2002),¹⁰
- other European research frameworks such as Eureka, COST and IMS,
- other Community research-related instruments such as PHARE, TACIS, MEDA, the EIF, the Structural Funds and the EIB,

It will comprise:

- (i) the identification of common themes or priorities, resulting in particular in:
 - the exchange of information,
 - the carrying out of work decided upon jointly, entailing in particular the joint initiation of one of the procedures referred to in Article 9 of the rules for participation and dissemination,
- (ii) the reassignment of proposals for indirect RTD actions between specific programmes or between a specific programme and a research and training programme.

¹⁰ OJ No L

FINANCIAL STATEMENT

1. TITLE OF OPERATION.

Proposal for a Council Decision adopting a specific programme for research, technological development and demonstration on "Competitive and sustainable growth" (1998 to 2002)

2. BUDGET HEADING INVOLVED.

Sub-section B6, heading B6-6131 "Competitive and sustainable growth"

3. LEGAL BASIS .

Article 130i of the EC Treaty

European Parliament and Council Decision No ... of ... on the Fifth Framework Programme of the European Community for research, technological development and demonstration (1998-2002) (OJ No L ..., ... , p. ...).

4. DESCRIPTION OF OPERATION

4.1 General objective of the operation.

The objective of this specific programme must be to support research activities contributing to competitiveness and sustainability, particularly where these two objectives interact. In this context, industry's role will be not only to identify areas for collaboration but also to bring together and integrate projects, especially cross-sectoral projects along the added-value chain, so that technology uptake and innovation are more efficiently ensured across Europe.

Research activities will focus on clearly identified needs.

- Answering to socio-economic needs.
- Stimulating European added value.
- Supporting European competitiveness.
- Ethical framework.

This specific programme is based on key actions, research and technological development activities of a generic nature and support for research infrastructures.

4.2 Period covered by the operation.

1998 to 2002

The arrangements for renewal of the operation are provided for in Article 130i of the EC Treaty.

5. CLASSIFICATION OF EXPENDITURE OR REVENUE.

5.1 NCE

5.2 DA.

5.3 Type of revenue involved:

Certain Associated States will contribute to the financing of the specific programme.

In accordance with Article 27 of the Financial Regulation, certain revenue may be available for re-use.

6. TYPE OF EXPENDITURE OR REVENUE.

The implementation arrangements for the specific programme are as follows:

6.1 Indirect RTD actions and rate of financial participation

The indirect RTD actions will comprise: shared-cost actions, "Marie Curie" fellowships, thematic networks, concerted actions and accompanying measures.

The rate of financial participation of the fifth framework programme in these actions is as follows:

Indirect RTD action	Rate of participation:
RTD projects	50% of total eligible costs ^{1,2}
Demonstration projects	35% of total eligible costs ^{1,2}
Combined RTD/demonstration projects	35% to 50% of eligible total costs ^{1,2,3}
Support for access to research infrastructures	Maximum of 100% of additional eligible costs
"Cooperative research" projects	50% of total eligible costs ¹
Exploratory awards	75% of total eligible costs
Training grants	Maximum of 100% of additional eligible costs ^{1,4}
Thematic networks	Maximum of 100% of additional eligible costs
Concerted actions	Maximum of 100% of eligible additional costs
Accompanying measures	Maximum of 100% of additional eligible costs

6.2 The coordination arrangements for research actions within the same area consist of identifying common themes or priorities, leading, *inter alia*, to the exchange of information, the performance of jointly agreed work and/or the reassignment of indirect RTD actions between specific programmes or between a specific programme and a research and teaching programme.

¹ These rates may have to be adjusted in particular cases to comply with the Community framework on State aid for research and development and Article 8 of the WTO Agreement on subsidies and countervailing measures.

² In the particular case of legal bodies which do not keep analytical accounts, the eligible additional costs engendered by the research are financed 100%.

³ 35% for the "demonstration" part and 50% for the "RTD" part.

⁴ In the case of Industry Host Fellowships, this amount will normally represent about 50% of the eligible total costs.

7. FINANCIAL IMPACT.

7.1 Method of calculating total cost of operation.

The estimated amount required is ECU 2895 million for the period from 1998 to 2002.

7.2 Itemised breakdown of cost

Type of activity	Total (%)
(a) Key actions	74.3
(i) Innovative products, processes and organisation	24.2
(ii) Sustainable mobility and intermodality	13.8
(iii) Land transport and marine technologies	5.2
(iv) New perspectives for aeronautics	31.1
(b) Research and technological development activities of a generic nature	24.2
(c) Support for research infrastructures	1.5
Total :	100

7.3 Operational expenditure included in Part B of the Budget

Administrative expenditure: ECU 182.4 million, or 6.3 % of the estimated amount required:

7.4 Indicative schedule of appropriations

The schedule is established on the basis of the breakdown of the maximum overall amount and the indicative schedule of appropriations for the period 1998-2002 for the proposal for the 5th framework programme.

Commitment appropriations		Payment appropriations				Total.
		1999	2000	2001	2002 and subsequent years	
1999	640	130	256	192	62	640
2000	665.1		230.1	199	236	665.1
2001	796			209.9	586.1	796
2002	793.9				793.9	793.9
Total	2 895	130	486.1	600.9	1 678	2 895

The final amounts will be laid down by the Budgetary Authority.

8. FRAUD PREVENTION MEASURES

There is a wide range of administrative and financial checks at all stages of the procedure for awarding and executing research contracts, including the following:

- Prior to conclusion of the contract:
 - Selection of proposals on the basis of the scientific value of the project and of an assessment as to whether the research costs are realistic in relation to the nature of the research, its duration and its potential impact;
 - Analysis of the financial data transmitted by the proposers on their contract negotiation form.
- After the contract has been signed:
 - Scrutiny of statements of expenditure prior to payment, carried out at two levels (by the scientific officer and the financial officer);
 - On-the-spot checks enabling the detection of errors or other irregularities through an examination of the supporting documents. In order to make these checks more effective, the Commission's departments have set up an audit unit which coordinates the results of all the checks performed. These checks are either carried out by members of the audit unit or entrusted to auditing companies with which the Commission has concluded contracts, under the supervision of officials from the audit unit;
 - Internal audit by the Financial Controller;
 - Unannounced inspections by the Commission's Financial Controller and by the Court of Auditors of the European Union.

9. ELEMENTS OF COST-EFFECTIVENESS

9.1 Specific and quantified objectives; target population

This specific programme consists of:

- (a) Key actions having the following objectives:
 - (i) Innovative products, processes and organisation

The overall goal of this key action will be to develop new and improved methods of design, advanced equipment and process technologies for production⁵ that improve the quality and reduce the costs of processes for services and products (aiming for a substantial improvement in these factors in the medium term), reduce overall life-cycle impacts, improve understanding of “soft technology” aspects (organisation, management, logistics, teleworking, etc.), so as to integrate them fully into relevant industrial processes, and ultimately contribute to employment growth (aiming at creating and maintaining in Europe a number of jobs comparable, in percentage terms, to those of Europe’s major competitors). Implementation of the key action should focus on systemic approaches to production covering products, production facilities, processes and organisation. Particular attention will be paid to clustering and integrating projects into targeted groups, which will make for an easier overall system approach while taking account of socio-economic and ecological aspects.

The RTD priorities:

- Efficient design and manufacturing
- “Intelligent” production.
- Eco-efficient processes
- Organisation of production and work

(ii) Sustainable mobility and intermodality

The overall aim of this key action is to achieve a better long-term reconciliation of the growing demand for mobility with the need to respect environmental, social, economic and safety constraints. It will help to break the link between economic growth and increased traffic volumes; reduce the negative impact of transport modes; and encourage their more sustainable use. Particular attention will be paid to intermodality and how best to integrate the respective strengths of the various modes of transport in order to provide user-oriented door-to-door services for both passengers and freight. This should result in a better management of mobility.

The RTD priorities:

- Modal and intermodal transport management systems
- Infrastructures and their interfaces with transport means and systems.
- Socio-economic scenarios for the mobility of people and goods

⁵ The term “*production*” encompasses all industrial activities from extraction of raw materials to the processing and manufacture of components and end-products. It covers all industrial sectors and associated services, including construction.

(iii) Land transport and marine technologies

The aim is to meet the technological challenges needed to develop and validate the next generation of vehicles, vessels, offshore structures and intelligent and efficient interfaces for logistic infrastructures, and to develop offshore and submarine technologies permitting the sustainable exploitation of marine resources. Vehicles must be capable of meeting public demands for sustainable mobility and improved safety, while reducing the environmental impact and reinforcing Europe's economic strength. In the case of marine technologies the aim is also to promote collaboration and rapid innovation by the industries and the marine community.

The RTD priorities:

- Acquisition of critical technologies.
- Technology integration for new-generation aircraft.
- Operational efficiency and safety.

(iv) New perspectives for aeronautics

The overall goal of this key action is to facilitate the development of aircraft and their subsystems and components in order to foster the competitiveness of the European industry while assuring the sustainable growth of air transportation. The medium-term targets of the RTD effort, including large-scale validation activities, are to substantially reduce development time and costs of new aircraft; improve efficiency (fuel consumption and maintenance costs) and reduce environmental impacts (pollutant emissions and perceived external noise) and accident rates (by at least the same factor as the growth of traffic volume). In technological terms, emphasis must be placed on integration for subsonic aircraft and the use of enabling technologies for the second generation of supersonic aircraft.

The RTD priorities:

- Critical technologies for road and rail vehicles.
- Innovative road and rail vehicle concepts
- Human-vehicle interaction.
- Advanced technologies for the development of ships and offshore platforms
- Use of the sea and inland waterways to transport goods and passengers
- Technologies for the rational and sustainable management of the sea

(b) Research and technological development of a generic nature

Research is focused on the following priority areas:

- New materials and their production and transformation

- New materials and production technologies in the steel field
- Measurements and testing

(c) Support for research infrastructures

In summary, support for research infrastructures is aimed at: (i) the optimum utilisation of distributed medium- and large-scale research facilities; (ii) the rapid transfer of existing and complementary RTD results to industrial applications, and (iii) the improvement and interoperability of common protocols and data exchanges.

- Support activities for research infrastructures: information and access
- Setting up of virtual institutes
- Support for European metrological infrastructures
- Setting up of Reference databases

The target population of this operation is the following: enterprises and more especially SMEs, research centres and universities.

9.2 Grounds for the operation

Competitiveness and sustainability are the keys to the long-term future of the Union's economy: creation of wealth and jobs, enhancement of the quality of life, and preservation of the environment and the natural resource base. They depend on the capacity of citizens, enterprises, regions, nations and the Community to generate and use the knowledge, science and technology of tomorrow, in high-quality goods, processes and services, and in new and more efficient organisational forms. Research activities are clearly crucial in generating a more competitive technological base for European industry and in fostering the transition to a sustainable world, which will involve both a transformation of working practices and an optimised use of resources.

Competitiveness and sustainability can no longer be considered a matter for individual organisations or sectors alone. In the context of an increasingly interlinked and globalising economy a "systems approach" is necessary, in which research activities support the development of coherent, interconnected and eco-efficient industrial and social systems, responding not only to market but also to societal needs. At the heart of these systems will be *efficient and quality-based production systems*, embedded in agile organisations and producing high-quality eco-friendly products and services (in Europe there are more than 2 million industrial enterprises employing more than 40 million people, with 80 million working in related services). These wealth-creating activities should, in turn, be supported by key products and services, including efficient *transport systems* and *clean and safe vehicles*, promoting trade and the sustainable mobility of goods and people. Competitive and sustainable growth also depends on the development of *quality materials* and *reliable measurement and testing methods*, as well as the

optimal use of specific *research infrastructures*, whether physical or virtual. Such a holistic approach is the best way to improve the long-term efficiency and sustainability of Europe's economic system in the face of world-wide evolving market constraints and socio-environmental responsibility.

Under Article 130f of the EC Treaty, the Community will by this new action continue to strengthen European industry's science and technology base, foster the development of international competitiveness and promote research activity as deemed necessary under other chapters of the Treaty.

This continuation is proposed following an assessment, in line with the SEM2000 initiative, of the actions of the past five years.

This Proposal for a new operation follows the conclusions of the five-year assessment panel by proposing that efforts be concentrated on four key actions (see paragraph 9.1).

9.3 Monitoring and evaluation of the operation

9.3.1 Monitoring of the projects

Ex-ante evaluation

In order to guarantee the quality of RTD projects, the Commission will evaluate all the proposals received, following calls for proposals, on the basis of the priorities indicated in the specific programmes and the work programmes. For this purpose, it will be assisted, *inter alia*, by independent experts.

Intermediate and final project evaluation:

It is the responsibility of the project coordinator to send the Commission, at regular intervals, the technical and financial progress reports; the detailed final (technical and financial) report covering all the work carried out, setting out the results obtained and the objectives attained and summary reports for publication. These reports will be monitored by the Commission staff, possibly with the assistance of outside experts.

9.3.2 Monitoring and evaluation of the specific programme

Annual monitoring of the implementation of the specific programme:

The Commission will examine each year, with the help of appropriately qualified independent experts, progress with the implementation of the specific programme in the light of the criteria set out in Article 3(2) of the specific programme.

It will assess, in particular, whether the objectives, priorities and financial resources are still appropriate to the changing situation. Where appropriate, it will submit proposals to adapt or supplement the specific programme.

Five-year and/or final evaluation:

In addition, before submitting its proposal for a Sixth Framework Programme, the Commission will have an external assessment conducted by high-level independent experts on the management of, and progress made in, Community activities carried out during the five years preceding the assessment, in particular in the light of the criteria set out in Article 3(2) of the specific programme. The Commission will communicate the conclusions of this assessment, accompanied by its comments, to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions.

Furthermore, in accordance with Article 130p of the Treaty establishing the European Community, the Commission produces an annual report to the European Parliament and the Council on activities relating to research and technological development and the dissemination of results.

10. ADMINISTRATIVE EXPENDITURE (PART A OF SECTION III OF THE COMMISSION BUDGET).

Not applicable.

**Proposal for a
COUNCIL DECISION
adopting a specific programme for research,
technological development and demonstration
on "Preserving the ecosystem"
(1998 to 2002)**

PROPOSAL FOR A COUNCIL DECISION
adopting a specific programme for research,
technological development and demonstration on
“Preserving the ecosystem”
(1998 to 2002)

0180 (CNS)

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 130i(4) thereof,

Having regard to the proposal from the Commission,¹

Having regard to the opinion of the European Parliament,²

Having regard to the opinion of the Economic and Social Committee,³

Whereas by Decision No .../EC,⁴ the European Parliament and the Council adopted the fifth framework programme of the European Community (hereinafter referred to as the fifth framework programme) for research, technological development and demonstration (hereinafter referred to as RTD) activities for the period 1998 to 2002 specifying *inter alia* the activities to be carried out in the field of preserving the ecosystem;

Whereas Article 130i(3) of the Treaty stipulates that the framework programme shall be implemented through specific programmes developed within each activity under the framework programme, and that each specific programme shall define the detailed rules for implementing it, fix its duration and provide for the means deemed necessary;

Whereas, in accordance with Article 4(2) of Decision No 1110/94/EC of the European Parliament and of the Council of 26 April 1994 concerning the fourth framework programme of the European Community activities in the field of research, technological development and demonstration (1994 to 1998)⁵ and Article 4(2) of the Council Decisions on the specific programmes implementing the fourth framework programme, the Commission has had an external assessment conducted which it has transmitted to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions together with its conclusions and comments;

1 OJ No , p.

2 OJ No , p.

3 OJ No , p.

4 OJ No , p.

5 OJ No L 126, 18.5.1994, p. 1. Decision last amended by Decision No 2535/97/EC (OJ L 347, 18.12.1997, p. 1).

Whereas the Scientific and Technical Research Committee has been consulted on the scientific and technological content of the specific programmes, as set out in the working paper⁶ adopted by the Commission on 5 November 1997;

Whereas, in accordance with Article 130j of the Treaty, Council Decision .../.../EC⁷ of ... concerning the rules for the participation of undertakings, research centres and universities and for the dissemination of research results (hereinafter referred to as the rules for participation and dissemination) applies to this specific programme and allows the participation of the Joint Research Centre in the indirect actions covered by this specific programme;

Whereas, for the purpose of implementing this programme, in addition to cooperation covered by the Agreement on the European Economic Area or by an association agreement, it may be appropriate to engage in international cooperation activities, on the basis of notably Article 130m of the Treaty, with third countries or international organisations;

Whereas implementation of this programme will also comprise activities and mechanisms aimed at stimulating, disseminating and exploiting RTD results, in particular vis-à-vis small and medium-sized enterprises, and activities to stimulate the mobility and training of researchers;

Whereas, in accordance with the objectives of the first action plan for innovation, research activities under the fifth framework programme should be geared more towards innovation;

Whereas the implementation of this programme should be monitored with a view to adapting it, where appropriate, to scientific and technological developments; whereas in due course there should also be an assessment of progress with the programme by independent experts,

⁶ COM(97)553 final of 5.11.1997.

⁷ OJ No , p.

HAS ADOPTED THIS DECISION

Article 1

In accordance with Article 3(1) of the fifth framework programme, the specific programme on "Preserving the ecosystem" (hereinafter referred to as the specific programme) is hereby adopted for the period from [the date of adoption of this programme] to 31 December 2002.

Article 2

1. In accordance with Annex III to the fifth framework programme, the amount deemed necessary for carrying out the specific programme (hereinafter referred to as the amount) is ECU 2320 million, including a maximum of 6,30% for the Commission's administrative expenditure.
2. An indicative breakdown of this amount is given in Annex I.
3. Of this amount
 - ECU 440 million is for the period 1998 to 1999, and
 - ECU 1880 million is for the period 2000 to 2002.

Where appropriate, the latter figure will be adapted in accordance with Article 3(3) of the fifth framework programme.

4. The budgetary authority shall, in compliance with the scientific and technological objectives and priorities laid down in this Decision, set the appropriations for each financial year taking into account the availability of resources within the multiannual financial perspective.

Article 3

1. The general outlines, the scientific and technological objectives and the priorities for the specific programme are set out in Annex II. They are consistent with the fundamental principles and the three categories of selection criteria indicated in Annex I to the fifth framework programme.
2. In accordance with these principles and criteria the selection criteria indicated in Article 10 of the rules for participation and dissemination shall be applied for the selection of the RTD activities to be carried out.

A selection criterion specific to this programme shall also be applied: the participation of industrial entities in the shared-cost actions should be appropriate to the nature of the activity.

All these criteria shall be complied with in the implementation of the programme, including the work programme referred to in Article 5(1), although they may be weighted differently.

3. The rules for participation and dissemination shall apply to the specific programme.
4. Detailed rules for financial participation by the Community in the specific programme are defined in Article 4 of the fifth framework programme.
5. The indirect RTD actions under the specific programme are defined in Annexes II and IV to the fifth framework programme.

Specific rules for implementing the programme are set out in Annex III.

Article 4

In the light of the criteria set out in Article 3, and the scientific and technological objectives and priorities set out in Annex II, the Commission shall:

- (a) monitor the implementation of the specific programme and, where appropriate, submit proposals for adapting it, in accordance with Article 5(1) of the fifth framework programme,
- (b) have the external assessment provided for in Article 5(2) of the fifth framework programme conducted concerning the activities carried out in the fields covered by the specific programme.

Article 5

1. The Commission shall draw up a work programme specifying:
 - (a) the content of Annex II,
 - (b) the indicative timetable for the implementation of the specific programme,
 - (c) the coordination arrangements indicated in Annex III,
 - (d) and, where necessary, the selection criteria and the arrangements for applying them for each type of indirect RTD action.

The work programme shall be updated where appropriate.

2. For the purpose of implementing the indirect RTD actions, the Commission shall, on the basis of the work programme, initiate the procedures set out in the rules for participation and dissemination, primarily through calls for proposals.

Article 6

1. The Commission shall be responsible for the implementation of this specific programme.
2. It shall be assisted by a Programme Committee composed of representatives of the Member States and chaired by the representative of the Commission.
3. The representative of the Commission shall submit to the Programme Committee a draft of the measures to be taken concerning:
 - the drawing-up and updating of the work programme referred to in Article 5(1),
 - the drawing-up of the terms of reference for the external assessment provided for in Article 5(2) of the fifth framework programme,
 - any adjustment to the indicative breakdown of the amount as set out in Annex I.

Article 7

1. The Programme Committee shall deliver its opinion on the draft measures referred to in Article 6(3) within a time limit which the Chairman may lay down according to the urgency of the matter. The opinion shall be delivered by the majority laid down in Article 148(2) of the Treaty in the case of decisions which the Council is required to adopt on a proposal from the Commission. The votes of the representatives of the Member States within the Committee shall be weighted in the manner set out in that Article. The Chairman shall not vote.

The Commission shall adopt the measures envisaged if they are in accordance with the opinion of the Committee.

If the measures envisaged are not in accordance with the opinion of the Committee, or if no opinion is delivered, the Commission shall, without delay, submit to the Council a proposal relating to the measures to be taken. The Council shall act by a qualified majority.

If, on expiry of a period of six weeks from the referral of the matter to the Council, the Council has not acted, the proposed measures shall be adopted by the Commission.

2. The Commission shall regularly inform the Programme Committee of progress with the implementation of the specific programme, and shall in particular provide it with information about the results of the evaluation and selection of the indirect RTD actions.

Article 8

This Decision is addressed to the Member States.

Done at Brussels,

For the Council

The President

ANNEX I**INDICATIVE BREAKDOWN OF THE AMOUNT**

Type of activity	Total
(a) Key actions	89,7%
(i) Sustainable management and quality of water	15,1%
(ii) Global change, climate and biodiversity	17,2%
(iii) Sustainable marine ecosystems	6,5%
(iv) The city of tomorrow and cultural heritage	8,6%
(v) Cleaner energy systems, including renewables	19,4%
(vi) Economic and efficient energy for a competitive Europe	22,9%
(b) Research and technological development activities of a generic nature	6,0%
(c) Support for research infrastructures	4,3%
TOTAL	ECU 2320 million

ANNEX II

THE GENERAL OUTLINES, THE SCIENTIFIC AND TECHNOLOGICAL OBJECTIVES AND THE PRIORITIES

INTRODUCTION

Research, technological development and demonstration (RTD) in the fields of energy, environment and sustainable development is essential for the social well-being of Europe's citizens and the implementation of Union policies. Making use of the knowledge and technologies developed by this programme will make it possible to meet a wide range of social and economic needs so reconciling economic development with environmental sustainability. New markets will bring growth and employment; reliable and competitive supply of energy will be ensured and energy requirements will be met. The results will provide the basis for policies formulated at Community level or deriving from international environmental commitments - in particular, the implementation of the Kyoto Protocol requires urgent support for RTD on a number of issues.

This programme will encourage integrated multidisciplinary approaches seeking to solve problems with a European dimension for which scientific and technological developments are needed. People are a key interactive component of the ecosystem and, therefore, a fair balance between scientific and socio-economic disciplines must be found in project implementation.

Harnessing the full spectrum of these RTD activities - ranging from basic research to demonstration projects - and using all suitable instruments, including supporting proposals spanning the spectrum of RTD activities, are envisaged to tackle the major issues at stake, in order to meet the need for a better understanding of natural processes and patterns and the interactions with human activities through to the development of new technologies and instruments ensuring further steps towards sustainable development.

Strategic objective of the programme

The strategic goal is to contribute to sustainable development by focusing on key activities crucial for social well-being and economic competitiveness in Europe. Promoting environmental science and technology will improve our quality of life and boost growth, competitiveness and employment, while meeting the need for sustainable management of resources and protection of the environment. Developing sustainable energy systems and services for Europe and contributing to a more sustainable development world-wide will

lead to increased security and diversity of supply, the provision of high-quality, low-cost energy services, improved industrial competitiveness and reduced environmental impact.

An **innovative approach** based upon two main elements will make it possible to address complex societal-driven issues: integrated multidisciplinary and multisectoral activities involving wherever possible the principal stakeholders - private-public sector partnerships, and end-users from the business, industrial and policy-making sectors - and concentrating on finding solutions to strategic problems, and supporting only proposals which are of substantive regional, European and global significance.

Europe has established a leading RTD role in many areas - this must be sustained and remain at the cutting-edge. In other areas improvements are needed for the future benefit of society, as well as the business and industrial sectors. The RTD and demonstration projects will concentrate through six key actions on tackling the issues of *water scarcity and water quality; global change, climate and biodiversity; sustainable integrated management of marine resources, city of tomorrow and cultural heritage, cleaner energy systems including renewable energies and economical and efficient energy for a competitive Europe* as well as generic activities concerning the fight against major hazards, the development of earth observation technologies, and socio-economic aspects of environment and energy within the perspective of sustainable development (the impact on society, the economy and employment). Specific attention will also be given to maintaining, improving and providing greater access to European RTD infrastructure and facilities essential for performing cutting-edge research in environmental activities.

Socio-economic needs: society is making increasing demands for better living conditions, better safety, and better use of scarce resources including secure and economic energy supplies and services. Availability of clean energy is of importance in terms of comfort and a high quality environment. Water is of economic and strategic value. Rising population and per-capita use of resources, globalisation of economic markets and natural variability in earth systems are causing or exacerbating major environmental problems. The sea is a highway for Europe's trade and a major resource for tourism, but it is also the ultimate repository for many by-products of human activity. Cities together with their cultural heritage are the centre of social, cultural and economic life for 80% of Europe's citizens. These key societal issues will only be solved if in addition to developing technologies the socio-economic context is appropriately analysed and taken into account.

European added value: environmental problems, energy systems, networks and services and the associated environmental impacts, as well as sustainable development issues must

be approached in the global context. In this respect, the European level is the most appropriate: most problems and challenges are common to all Member States and most activities to be addressed in the programme are not only European, but also global, in scale. By mobilising resources and focusing on key targets, the programme will form a key part of the European contribution to global initiatives and programmes. Knowledge generated through collaborative RTD at the European level, together with the coordination of fragmented European knowledge, is essential to address the very serious problems facing the Union. These efforts, including prenormative research, will confer genuine European added value to the efforts to develop appropriate regulatory frameworks, for example in the post-Kyoto process.

European competitiveness: the promotion of sustainable development will not be possible unless economic objectives relating to technological development, competitiveness and growth are reconciled with societal goals such as quality of life, employment, security, health and a high quality environment. This challenge must be met in the context of significant structural and demographic changes, and globalisation of the economy. Improving our quality of life and decoupling economic growth from environmental degradation will contribute to European competitiveness and employment. Secure and economic energy supplies and services are vital for all aspects of economic activity. The need for energy equipment suppliers and operators to be competitive in the global market is vital for employment. Enormous potential will exist for global exploitation from several areas of the programme, strengthening economic competitiveness and creating new jobs such as in the water industry, renewable energy technologies and rational use of energy.

LINKS AND COMPLEMENTARITY WITH THE OTHER PROGRAMMES

Collaboration, coordination and complementarity will be fostered within and between key actions in this and other programmes, including the activities of the JRC. Coordination with other thematic programmes will be based on the following principles: activities in the quality of life and management of living resources programme will concentrate on epidemiology research arising from environmental and climate changes, whereas this programme will focus on the consequences for human health from climate change; activities within the information society programme will concentrate on the development of information society technologies, and activities in this programme on the integration and adaptation of these technologies in applications; and activities in the programme for promoting competitive and sustainable growth will concentrate on the design and development of materials and technologies for generic use and treatment of industrial waste within the production centre but in this programme the activities will concentrate on

the integration, application and demonstration of technologies and materials for energy or urban use, including their design and development where specifically needed for urban or cultural heritage use and the management of industrial waste outside the production centre.

Major examples of collaboration with key actions in other programmes where action to avoid duplication is essential will be found with health, food and environmental factors (climate change and air pollution), sustainable agriculture and fisheries (marine ecosystems), systems and services for the citizen (earth observation technologies and energy distribution networks), land transport and marine technologies (marine ecosystems, transport and offshore hydrocarbon exploitation), sustainable mobility and intermodality (urban environment) and innovative products, processes and organisation of production (urban waste, materials and industrial processes).

Complementarity and coordination will also be assured with the horizontal activities of the Framework Programme.

- Global *international cooperation* with international organisations and the scientific, business and industrial communities from third countries is inescapable to address many cross-border environmental issues central to implementing international conventions and programmes, as well as the environmental consequences of energy policies and cross-border supply interdependency. Close links will be maintained with the pre-accession Central European States to collaborate on tackling some of the research needed to meet common challenges and common objectives corresponding to the programme priorities and as such will be open to third country and international organisations. The focus will continue to be fields of mutual concern and cooperation, particularly on global change and related issues through the development and implementation of mechanisms such as the European Network for Research on Global Change. There will also be coordination with the programme "Confirming the international role of Community research" which will address activities of specific regional relevance to the third countries concerned. Legal entities from third countries and international organisations may participate in this programme according to the priorities set out herewith, in line with the objectives outlined in the programme "Confirming the international role of Community research" and with the rules for participation and dissemination, as well as with Annex IV to this programme. Full use will be made of the possibilities offered by COST and EUREKA and by co-operation with international organisations to foster synergy between actions and projects in this programme and nationally funded research activities. In the case of co-operation with EUREKA, projects corresponding to priority themes of common interest may be developed in the context of the key actions.

- Activities related to *innovation and participation of small and medium-sized enterprises* (SMEs) will be given a particular emphasis to help bridge the gap between research results and their effective exploitation in potential applications by the business and policy-making sectors. The participation of SMEs in all RTD activities will be stimulated and encouraged. Their important potential to contribute to the innovation process is fully recognised. Exploratory awards will be available to facilitate the participation of SMEs in collaborative RTD, as well as in cooperative RTD in the case of SMEs without relevant research facilities of their own. An “innovation unit” will target promotion activities on the deployment and use of the results of this programme; it will also help to ensure complementarity and an interface with the innovation activities implemented in the context of the programme on “Innovation and participation of SMEs”.
- *Training* will continue to be of importance to ensure an appropriately qualified scientific community in the fields of this programme. This will be assured through the Marie Curie and complementary fellowship training schemes, and advanced study and specialised courses. Transfers of staff and knowledge between partners within consortia and wherever possible by public-private sector exchanges will also be promoted.

1.1 (a) KEY ACTIONS

(i) Sustainable management and quality of water

Objectives and RTD priorities

The overall goal of this key action is to meet one of the major demands of European citizens, namely the provision of affordable high quality water, in particular drinking water, in sufficient quantity, while maintaining the integrity of ecosystems. Research will focus on:

- **Development of integrated approaches for the management of water resources and wetlands as well as the development of treatment and purification technologies.** The aim is to develop the knowledge and the technologies needed for the rational management of water resources; to match water supply with demand and achieve cost-efficiency and sustainability; to improve the science base, methodologies and management tools to provide a better understanding of the phenomena and allow integrated management and sustainable use of water and wetlands at catchment scale, within constraints of availability, environmental quality and socio-economic costs-benefits; to develop technologies to prevent and treat pollution of water bodies, to purify water and to use and/or re-use water rationally (including closed loop approaches and reliability of collection and distribution networks).

RTD priorities: tools and methodologies for cost-effective and sustainable integrated water resources and wetlands management; effective transfer of knowledge and skills to water users; development of real scale applications across Europe with a view to supporting EU policy; optimisation of technologies to treat and purify drinking water and to minimise use and pollution of water; process-integrated treatment of waste water at source; rational re-use of water; application of closed loop technologies.

- **Technologies for monitoring and prevention of pollution, protection and management of groundwater and surface water resources.** The aim is to characterise and to assess the state and evolution of the quality and quantity of surface and groundwaters as well as the functioning of aquatic and wetland ecosystems as the basis for more rational management. This will include the development of technologies for assessing and treating pollution originating from contaminated sites and waste disposal sites.

RTD priorities: improved methods of measuring water quality and quantity and techniques for analysing pollutant flows and development of techniques for integrated assessment of soil pollution treatment methods; predictive models and advanced pollution impact assessment methodologies; updated water quality criteria and indicators for water policies.

- **Surveillance, early warning and communication systems.** The aim is to develop systems able to react on different time and space scales, including early warning systems with direct feedback to pollution sources.

RTD priorities: surveillance systems for point and diffuse pollution sources and for the various environmental recipient systems; control and data management systems, including leakage detection and stormwater management and systems for floods and drought assessment.

- **Technologies for the regulation of stocks and technologies for arid and semi-arid regions and generally water-deficient regions.** The aim is to improve and protect water resources and aquatic ecosystems, to optimise water management systems in arid regions, and to better manage water crises.

RTD priorities: integrated approaches at catchment and collection point level incorporating the various political, social, economic and environmental interactions; improved systems for management of water resources and their use at EU, national, regional and local level to assist decision making.

(ii) **Global change, climate and biodiversity**

Objectives and RTD priorities

The main goal of this key action is to develop the scientific, technological and socio-economic basis necessary to underpin implementation of Community policies relating to changes in the environment, and to support the research obligations arising from international commitments in the context of sustainable development. Aiming for an integrated approach, the priorities are:

- **To understand, detect, assess and predict global change processes.** The aim is to focus mainly on European and sub-regional causes and impacts of specific global change problems, such as climate change, ozone depletion, biodiversity loss, loss of fertile land and habitats, disruptions to ocean circulation. Attention will be given to both natural and anthropogenic phenomena, in the context of the sustainable use of natural resources.

RTD priorities: variability and change in and between: atmospheric composition, ozone depletion and UVB radiation; biogeochemical and hydrological cycles, biodiversity, climate, ocean processes, sea level; link between climate change and the frequency and scale of extreme events; socio-economic interactions and impacts on natural resources and human health.

- **To foster better understanding of ecosystems** (terrestrial and marine). The emphasis will be on ecosystem interactions with land surfaces and land use, soil, water, atmosphere and ocean; role of biodiversity and climate change; interactions between ecosystems, biogeochemical cycles, large-scale land degradation and desertification.

RTD priorities: global change scenarios and their impact on terrestrial, freshwater and marine ecosystems and the consequences thereof for food security and resource utilisation; assessment of biodiversity, including losses; assessment of global change and climate change impacts on, and risks to, key sensitive systems or areas; identification and quantification of ecosystem role in biogeochemical cycles; land use modelling, desertification trends.

- **To develop scenarios and strategies for the prevention and mitigation of, and for possible adaptation to, the effects of global change, climate change and loss of biodiversity.** The aim is to provide a sound scientific basis for the development of

tangible management strategies and actions to address the adverse consequences outlined in the key action.

RTD priorities: formulation and evaluation of options, assessing their scientific, economic, technical and policy feasibility, and their social acceptability; conditions for decoupling economic growth and environmental deterioration; assessment and enhancement of institutional capabilities for implementation of international treaties.

- **To support the development of the European component of the global observation systems for climate, terrestrial systems and oceans.** The aim is to identify and help fill key gaps in existing observation system capacity in order to ensure that the necessary data are available to address the prediction, impact assessment and response options to global change.

RTD priorities: development of instruments, systems and methods to establish and process long-term consolidated data sets of key variables by both in-situ measurements and remote sensing techniques. This will cover, as required, the atmosphere, oceans, land, hydrosphere, cryosphere and biosphere.

(iii) Sustainable marine ecosystems

Objectives and RTD priorities

The goal of this key action is to promote sustainable integrated management of marine resources and to contribute to the marine aspects of environment and sustainable development policies of the EU.

This action will contribute to better coordination of national marine policies, and therefore a continued commitment is required, all the more so because the European seas are among the most heavily used in the world. The research objectives are:

- **To develop the scientific knowledge on marine processes, ecosystems and interactions.** The aim is to facilitate the sustainable use of the marine environment and

resources while fully respecting its overall integrity and functioning.

RTD priorities: effects of physical forces, environmental factors and interactions at the ocean boundaries on ecosystem functioning and natural variability; extreme environments and their communities: functioning and potential for exploitation; sedimentary systems and their contribution to the sustainable management and use of shelf, slope and deep-sea floor; origin, delivery and cycling of contaminants, key elements and nutrients, and their impact on ecosystem functioning.

- **To analyse causes, consequences and possible solutions of the present anthropogenic impact on marine ecosystems.** The aim is to reduce the impact of human activity upon the biodiversity and sustainable functioning of marine ecosystems and to develop the technologies required to facilitate safe and profitable economic yet sustainable exploitation of the marine environment.

RTD priorities: effects of anthropogenic activities, including those of species introduction and biogeochemical cycling on ecosystems; mechanisms of marine biodiversity evolution to reverse trends in its reduction; processes that mitigate impact of contaminants and eutrophication, recovery of degraded systems. Development of technologies for (i) the characterisation and monitoring of marine environments; (ii) sample collection; (iii) exploration of living resources for biotechnological applications; (iv) communication, surveying analysis, imaging and monitoring systems, deep sea platforms.

- **To develop the capacity for monitoring and managing coastal phenomena.** The aim is to alleviate pollution, flooding and erosion, in particular of fragile coastlines and to facilitate land reclamation from the sea.

RTD priorities: long-term coastal morphological changes, interactions between ecology, morphology, erosion and impact of human activities; extreme events, risk analysis, sea states propagation from offshore to the coast; tidal inlets and river mouths dynamics and stability; estuarine morphodynamics and estuarine-coastal interaction; fate of pollutants; natural coastal defence mechanisms, impact assessment of structures on marine environment, adaptation of innovative engineering techniques for minimising disturbances of the ecosystem; instrumentation, data management and modelling for effective monitoring.

- **To enable operational forecasting for offshore activities.** The aim is to facilitate safe, sustainable offshore operations within the given environmental constraints and to develop the necessary components of an appropriate marine observation system.

RTD priorities: development of pilot systems for monitoring, prediction and management, with a view to safe offshore operations: (i) observation and measurement techniques and tools for systematic acquisition of ocean parameters, (ii) improve forecasting techniques through refinement of mathematical models

capable of predicting impact of natural and human-induced variations on marine ecosystems and resources, (iii) methodologies to assess the pertinence of environmental parameters, and (iv) best practice compatible with requirements of international regulations and conventions.

(iv) **The city of tomorrow and cultural heritage**

Objectives and RTD priorities

The overall goal of this key action is to support sustainable economic development and competitiveness, improved urban management and integrated planning policy, and help safeguard and improve the quality of life and cultural identity of citizens. It will focus partly on the provision of an integrated socio-economic knowledge-base, and products, services, tools and technologies for better city management and partly on the environmental challenges, particularly in relation to reducing pollutant emissions.

- **Integrated approaches aiming at sustainable development of cities and rational management of resources.** The aim is to create new models for the sustainable development of European cities and city regions and prepare medium- and long-term socio-economic scenarios and research, development and demonstration activities focusing, in particular, on supporting and stimulating economic competitiveness, town planning and architecture, social integration, safety, energy efficiency and conservation (in particular, in buildings and in urban transport) and the exploitation of information networks (the concept of "digital cities").

RTD priorities: urban development scenarios and integrated planning tools; impact of technologies, infrastructure, noise and air pollution from all sources on social development, resource utilisation, health and the environment; demand management, safety and security of supply of essential resources (e.g. energy, land and water); integrated approaches to better use and conservation of resources and reduced pollution and waste taking into account social and environmental sustainability.

- **Protection, conservation and enhancement of European cultural heritage.** The aim is to develop sound management of cultural resources of cities and urban regions to improve citizens' quality of life, tourism and job creation.

RTD priorities: products, methodologies and technologies for diagnosis, protection, conservation, restoration and the sustainable exploitation of the European cultural heritage, focusing on promotion of both movable and immovable cultural assets and the quality of life; measures for protecting cultural heritage against technological and natural hazards; methodologies, including risk assessment, for harmonious and effective integration of cultural heritage into the urban setting.

- **Development and demonstration of technologies for safe, economic, clean, effective and sustainable preservation, renovation, construction, dismantling and demolition of the built environment, in particular for large groups of buildings.** The aim is to conserve, renovate, enhance, protect and develop the built environment in a manner which responds to citizens' and cultural needs, in a framework of long-term sustainability and improved quality of life.

RTD priorities: effective technologies for economic, safe and environment-friendly design, maintenance, repair, modernisation, conversion, construction, dismantling and demolition of the built environment, in particular for large groups of buildings; essential services to combat hazards and deterioration; more efficient management of resources (materials, energy, water, etc.), safety and security, optimum use and re-use of land (above and beneath the ground), including rehabilitation of contaminated sites; reliable environmental impact assessment; indoor environmental management.

- **Comparative assessment and cost-effective implementation of strategies for sustainable transport systems in an urban environment.** The aim is to identify the best innovatory technologies radically reducing pollution levels and urban congestion at affordable prices for users.

RTD priorities: propulsion technologies and the corresponding infrastructure, new vehicle designs with low energy consumption and emissions, such as zero-emission vehicles and microcars; validation and demonstration of prototypes and vehicle fleets to guarantee effective operation, the quality of life and conservation of the cultural heritage.

(v) **Cleaner energy systems, including renewables**

Objectives and RTD priorities

The aim of this key action is to develop technologies which will help minimise the environmental impact of the production and use of energy in Europe and be consistent with the energy policy objectives. These will help preserve the ecosystem by reducing emissions at local and global levels and increasing the share of new and renewable energies. Accordingly action will be taken to investigate cleaner, most notably renewable, energy sources as well as to help reduce the environmental impact of existing fossil fuel use. Work will focus in order of priority on:

- **Large-scale generation of electricity and/or heat with reduced CO₂ emissions from coal, biomass or other fuels, including combined heat and power.** The aim is to obtain substantial improvements in efficiency with reduction of the cost and environmental impact of energy conversion processes, whether based on fossil fuels or

renewable energy sources.

RTD priorities: combustion and other thermochemical conversion processes (e.g. gasification, pyrolysis); generation of electricity and/or heat with reduced CO₂ emissions from coal, biomass, waste or other fuels; improving the efficiency of gas turbines, gas motors and diesel engines; combined heat and power.

- **Development and demonstration, including for decentralised generation, of conversion technologies for the main new and renewable energy sources, in particular, biomass, fuel cells, wind and solar technologies.** The aim is to enable the deployment of new and renewable energies in grid connected and 'stand alone' applications where there are prospects of a substantial contribution to energy supplies.

RTD priorities: fuel cells, for both stationary and transport applications; clean conversion and cost-effective use of biomass in the context of integrated energy generation systems; wind energy, in both on-shore and off-shore applications; solar technologies, photovoltaics and solar thermal technologies; other renewable energy options that can contribute significantly to programme objectives.

- **Integration of new and renewable energy sources into energy systems.** The aim is to overcome the problems associated with integrating new energy sources into established energy systems, develop new applications and overcome barriers to the greater uptake of renewable energies.

RTD priorities: overcoming the technical problems associated with the integration of renewable energy sources into energy grids and processes; hybrid systems, combining different renewables or renewables with conventional systems; improving acceptability of renewables e.g. reducing visual intrusion and noise; identifying, and seeking ways to remove, non - technical barriers to integration of renewables.

- **Cost-effective environmental abatement technologies for power production.** The aim is to reduce the environmental impact of power production focusing on the most polluting energy streams.

RTD priorities: emission abatement technologies for power stations (e.g. for reducing emissions of CO₂, SO_x, NO_x and other pollutants); hot gas cleaning; including understanding of basic scientific phenomena.

(vi) **Economic and efficient energy for a competitive Europe**

Objectives and RTD priorities

The aim of this key action is to provide Europe with a reliable, clean, efficient, safe and economic energy supply for the benefit of its citizens, the functioning of society and the competitiveness of industry. A more efficient use of energy is required with technologies capable of achieving substantial overall cost reductions and reduction of energy intensity. Action will need to be taken at all stages of the energy cycle - production, distribution and final use - to improve efficiency and reduce costs. Work will focus in order of priority on:

- **Technologies for the rational and efficient end use of energy.** The aim is to make a major step towards a sustainable energy system by substantially reducing the energy intensity of demand and making more effective, sustainable use of energy in the built-up environment, transport and industry (including agriculture). This requires the development and deployment of new technologies, improving existing technologies and dissemination and demonstration aimed at modifying user behaviour. RTD will focus on areas with the greatest potential to deliver sustainable use of energy.

RTD priorities: lighting, space heating and cooling and the integration of renewables into buildings; improved energy and environmental performance of vehicles and the corresponding infrastructure, including fuels, energy storage, conversion, combustion and transmission; reduction of energy intensity of industrial processes.

- **Technologies for the transmission and distribution of energy.** The aim is to achieve the full potential of intelligent energy networks in optimising the efficiency of the whole energy system through improving the flexibility, reliability and competitiveness of energy transmission and distribution systems whilst reducing costs, transmission losses and environmental impact. Emphasis will be given to facilitate the integration of new sources of supply into European energy networks and to contribute to management of, and support to, liberalised energy markets.

RTD priorities: intelligent energy transmission and distribution systems; long distance gas transmission; optimised network management and control systems; optimal system efficiency for electricity, gas, and district heating and cooling systems; superconductivity.

- **Technologies for the storage of energy on both macro and micro scale.** The aim is to improve the efficiency of energy storage; at the macro scale in order to optimise the benefits of intermittent sources of renewable energy, at the medium-size scale to permit the development of zero-emission vehicles and at the micro scale to enable further downsizing of electronic devices.

RTD priorities: reliable and cost efficient energy storage technologies, including liquefied natural gas and liquefied petroleum gas, H₂, advanced batteries, both macro and micro, for stationary and mobile applications.

- **More efficient exploration, extraction and production technologies for fossil fuels.** The aim is to allow more efficient identification of the energy resources available within the EU and to optimise their exploitation, reducing the costs and environmental impact of their production with the development of technologies which will be more competitive in global markets.

RTD priorities: improved tools for characterisation and management of fossil fuel reserves; production technologies for hydrocarbons, especially for hostile subsea locations; reduced environmental impact and improved recovery techniques for hydrocarbons, including those of wider application e.g. for geothermal energy; recovery of hydrocarbons from coal beds.

- **Improving the efficiency of new and renewable energy sources.** The aim is to achieve the widest possible deployment of renewable energies by reducing the costs of their use in energy production and by advancing our understanding of the availability of renewable resources in Europe, improving the efficiency of the technologies and reducing the costs of their manufacture.

RTD priorities: biomass exploitation and management of waste as a fuel resource; improving efficiencies of photovoltaic cells and wind turbines; reducing costs of production of renewables technologies (e.g. turbine blades, PV modules).

- **The elaboration of scenarios on supply and demand technologies in economy/environment/energy systems and their interactions, and the analysis of the cost effectiveness (based on whole life costs) and efficiency of all energy sources.** The aim is to develop strategies for the production and use of energy, for the introduction of new energy technologies and for policy development.

RTD priorities: long- and short-term scenario analysis at the global, Community, and regional level of supply and demand in the context of economic developments, social and environmental needs; modelling and policy impact analysis; overall assessment of energy markets and technology impacts taking into account the operation of liberalised energy markets.

(b) RESEARCH AND TECHNOLOGICAL DEVELOPMENT ACTIVITIES OF A GENERIC NATURE

• The fight against major natural and technological hazards

Objectives and RTD activities

The aim is, through a better understanding of processes, mechanisms and events generating natural and technological hazards, to develop technologies and methods for environmental impact assessment, risk forecasting, prevention, evaluation and mitigation. Support to improved decision-making systems, including evaluation and validation tools for assessing hazards and for emergency management would be provided.

RTD priorities: identification and analysis of factors which increase the level of natural risks; development and improvement of methods, models and tools for hazard vulnerability and risk assessment including quantification of the present and future levels of risk; development of effective tools and methods for information management; development of innovative methods and technologies to combat disasters and alleviate their consequences; improvement of the operational safety of hazardous installations.

• Development of earth observation satellite technologies⁸

Objectives and RTD activities

The strategic aim is to provide a sustainable European capability in operational services for monitoring the Earth from space, leading to improvements in our understanding of the planet, more effective conservation of our natural heritage, enhanced management of resources, and mitigation of major hazards. The RTD action will provide applications, products and services based on earth observation, linked to environmental monitoring and management of resources, land use and ecosystems. The focus will be on meeting the needs of a wide range of users, particularly those in Member State authorities. In this way, earth observation will naturally be integrated with other relevant technologies as required, such as airborne remote sensing, space telecommunications, navigation and global information systems.

The following research priorities will be implemented in line with the objectives of the Centre for Earth Observation initiative:

RTD priorities : innovative pilot applications and focused methodological research to improve the effectiveness of activities in priority areas for EU policies; investigations into technical, legal and economic aspects; requirement and feasibility studies to help

⁸ Space-related activities are subject to central coordination across the various programmes.

specify new services and mission; new scenarios to prepare for self-sustaining operational services; promotion, education and training to make better use of existing and planned earth observation data and information sources.

• **Socio-economic aspects of environmental change in the perspective of sustainable development**

Objectives and RTD activities

The overall aim is to develop a sound scientific basis for, and advance the application and use of, models for sustainable development and to facilitate the integration of sustainability considerations into key EU sectoral policies (industry, transport, tourism, etc.) and into the key actions of the fifth framework programme.

This integration is to be achieved by identification and assessment of the key interrelations between socio-economic driving forces of technological change, economic globalisation, societal behaviour and environmental change, and their socio-economic impacts. Effective utilisation of this knowledge in policy formulation depends upon the development and testing of improved methods and policy tools.

RTD priorities : identification and evaluation of the key relationships between socio-economic development and environmental change; driving forces and impacts are to be assessed in terms of policies, institutions, demography, production and consumption, technological development, distribution, security, culture and ethics. Development and application of methods and tools for the integration and promotion of economic, social and environmental objectives; descriptive and performance measures of sustainable development, development of sustainable development indicators and analysis of ecological footprints. Design and comparative assessments of various approaches to eco-efficiency, including rational use of resources and industrial ecology; sustainable consumption; environmental governance principles for sustainability.

• **Socio-economic aspects of energy within the perspective of sustainable development (the impact on society, the economy and employment)**

Objectives and RTD priorities

The aim is to develop and apply tools for assessing and monitoring the socio-economic aspects of energy technologies, systems and services using a "technology assessment" approach at the project level and a "global systems analysis" approach at a much more general level.

RTD priorities: for technology assessment - the social dimension (e.g. behaviour, acceptance), the innovation dimension, including the "command and control" measures and the impact of other policies, the assessment of the externalities and their internalisation and, finally, comparative assessment; for systems analysis - the understanding of the relationship between energy, environment, technologies and economic growth taking into account societal values and natural and human resources.

(c) **SUPPORT FOR RESEARCH INFRASTRUCTURE**

Objectives

- **To encourage the transnational use of public or private facilities** which address critical needs in order to further improve their exploitation while avoiding unnecessary duplication, and to cover emerging priority needs.

Activities

In order to reinforce the European added value and optimise the efforts made, the Community support will be directed towards:

- **Transnational coordination**, integrated management of specific aspects of operation, access to and improvement of existing facilities;
- **Coordination and complementarity** of national or multinational initiatives to support facilities needed at the European level;
- **Networking** of communities of researchers and users through research projects and specific training activities centred on appropriate infrastructures, or cooperation of several partners to form an integrated service provider;
- **Increasing the compatibility** of dispersed systems aiming to provide rapid and effective integration of facilities and resources.

Infrastructure

Supporting infrastructure for assessing and observing the earth systems (e.g. ocean), in order to improve prediction of natural hazards and global changes will include more specifically:

- **Climate and global change research facilities.** Centres for climate prediction, super-computer facilities; archiving facilities; centres for integrated assessment; climate and global change databases; simulation chambers; ground-based stations and aircraft for the observation of atmosphere; devices and networks for observation of palaeo-environmental information; support to taxonomy.
- **Marine research facilities.** Marine databases; collection of marine samples, support to taxonomy; test basins; research vessels; platforms and centres for forecasting of ocean state; manned, robotic, and automatic observation systems.
- **Natural hazards research facilities.** Facilities and key operational networks for data on earthquakes, floods, tidal waves and storms, landslides, volcanoes and forest fires.

ANNEX III

SPECIFIC RULES FOR IMPLEMENTING THE PROGRAMME

The specific programme will be implemented through the indirect RTD actions defined in Annexes II and IV to the fifth framework programme. In addition, the following rules specific to this programme will apply:

1. Accompanying measures

The accompanying measures will comprise in particular:

- studies in support of the specific programme, including the preparation of future activities,
- the exchange of information, conferences, seminars, workshops and scientific and technical meetings,
- recourse to external expertise, including access to scientific data bases, in particular for the purposes of the monitoring of the specific programme provided for in Article 5(1) of the fifth framework programme, the external assessment provided for in Article 5(2) of the fifth framework programme and the evaluation of indirect RTD actions and the monitoring of their implementation,
- dissemination, information and communication activities, including scientific publications, activities for the exploitation of results and the transfer of technologies,
- training schemes related to RTD activities covered by the specific programme, other than the "Marie Curie" fellowships,
- support for schemes to provide information and assistance for research players, including SMEs, and including the development of closer international scientific cooperation,
- support for promotion of common data structures and for data compatibility, standardisation, processing, management and exchange,
- recourse to external capacities for the establishment of and access to services and networks for information, assistance and promotion of research and innovation.

2. Financial participation rates

In the specific case of RTD projects, demonstration projects and integrated projects, the costs of use of research vessels, off-shore platforms and airborne platforms will be eligible costs. Details of these costs are set out in the work programme.

3. Additional rules for participation and dissemination

This programme is also open to legal entities established in third countries and international organisations which may participate on a project by project basis provided their participation contributes effectively to the implementation of the programme.

Such entities and international organisations may exceptionally receive financial support where their participation is beneficial and offers added value for achieving the objectives of the programme.

4. Coordination arrangements

The Commission will endeavour to ensure complementarity between the indirect RTD actions within the programme, in particular by grouping them around a common objective, and to avoid duplication, while respecting the legitimate interests of proposers of indirect RTD actions.

Coordination will also be ensured between actions under the specific programme and those carried out in:

- other specific programmes implementing the fifth framework programme,
- the research and training programmes implementing Council Decision .../.../Euratom of ... concerning the fifth framework programme of the European Atomic Energy Community (Euratom) for research and training activities (1998-2002),⁹
- other European research frameworks such as Eureka and COST,
- other Community research-related instruments such as PHARE, TACIS, MEDA, the EIF, the Structural Funds and the EIB and the programmes on the environment and energy.

It will comprise:

- (i) the identification of common themes or priorities, resulting in particular in:
 - the exchange of information,

⁹ OJ No L

- the carrying out of work decided upon jointly, entailing in particular the joint initiation of one of the procedures referred to in Article 9 of the rules for participation and dissemination,
- (ii) the reassignment of proposals for indirect RTD actions between specific programmes or between a specific programme and a research and training programme.

FINANCIAL STATEMENT

1. TITLE OF OPERATION

Proposal for a Council Decision adopting a specific programme for research, technological development and demonstration on "Preserving the ecosystem" (1998 to 2002).

2. BUDGET HEADING INVOLVED.

Sub-section B6, heading B6-6141 "Preserving the ecosystem".

3. LEGAL BASIS .

Article 130i of the EC Treaty.

European Parliament and Council Decision No ... of ... on the Fifth Framework Programme of the European Community for research, technological development and demonstration (1998-2002) (OJ No L ..., ..., p. ...).

4. DESCRIPTION OF OPERATION.

4.1 General objective of the operation

The strategic goal is to contribute to sustainable development by focusing on key activities crucial for social well-being and economic competitiveness in Europe. Promoting environmental science and technology will improve our quality of life, decouple economic growth, including resources utilisation, from environmental degradation and contribute in the short and longer term to European competitiveness and employment. Developing sustainable energy systems for Europe and contributing to a more sustainable development world-wide will lead to increased security and diversity of supply, improved industrial competitiveness and reduced environmental impact.

An **innovative approach** based upon two main elements will make it possible to address complex societal-driven issues: integrated multidisciplinary and multisectoral activities involving wherever possible the principal stakeholders - private-public sector partnerships, and end-users from the business, industrial and policy-making sectors - and concentrating on finding solutions to strategic problems, and supporting only proposals which are of substantive regional, European and global significance.

The research activities will concentrate on:

- Socio-economic needs;
- European added value;
- European competitiveness.

This programme takes the form of key actions, research and technological development activities of a generic nature and support for research infrastructure.

4.2 Period covered by the operation.

1998 to 2002.

The arrangements for renewal of the operation are provided for in Article 130i of the EC Treaty.

5. CLASSIFICATION OF EXPENDITURE OR REVENUE.

5.1 NCE

5.2 DA

5.3 Type of revenue involved.:

Certain Associated States will contribute to the financing of the specific programme.

In accordance with Article 27 of the Financial Regulation, certain revenue may be available for re-use.

6. TYPE OF EXPENDITURE OR REVENUE

The implementation arrangements for the specific programme are as follows:

6.1 Indirect RTD actions and rate of financial participation

The indirect RTD actions will comprise: shared-cost actions, "Marie Curie" fellowships, thematic networks, concerted actions and accompanying measures.

The rate of financial participation of the fifth framework programme in these actions is as follows:

Indirect RTD action	Rate of participation:
RTD projects	50% of total eligible costs ^{1,2,3}
Demonstration projects	35% of total eligible costs ^{1,2,3}
Combined RTD/demonstration projects	35% to 50% of total eligible costs ^{1,2,3,4}
Support for access to research infrastructures	Maximum of 100% of additional eligible costs
"Cooperative research" projects	50% of total eligible costs ¹
Exploratory awards	75% of total eligible costs
Training grants	Maximum of 100% of additional eligible costs ^{1,5}
Thematic networks	Maximum of 100% of additional eligible costs
Concerted actions	Maximum of 100% of additional eligible costs
Accompanying measures	Maximum of 100% of total eligible costs

6.2 The coordination arrangements for research actions within the same area consist of identifying common themes or priorities, leading, *inter alia*, to the exchange of information, the performance of jointly agreed work and/or the reassignment of indirect RTD actions between specific programmes or between a specific programme and a research and teaching programme.

7. FINANCIAL IMPACT

7.1 Method of calculating total cost of operation.

The estimated amount required is ECU 2320 million for the period from 1998 to 2002.

¹ These rates will perhaps have to be adjusted in particular cases to comply with the Community framework on State aid for research and development and Article 8 of the WTO Agreement on subsidies and countervailing measures.

² In the particular case of legal bodies which do not keep analytical accounts, the eligible additional costs engendered by the research are financed 100%.

³ The costs of use of research vessels, off-shore platforms and airborne platforms are eligible costs.

⁴ 35% for the "demonstration" part and 50% for the "RTD" part.

⁵ In the case of grants for traineeships in companies this amount will normally be around 50% of the eligible total costs.

7.2 Itemised breakdown of cost

Type of activity	Total (%)
(a) Key actions	89.7
(i) Sustainable management and quality of water	15.1
(ii) Global change, climate and biodiversity	17.2
(iii) Sustainable marine ecosystems	6.5
(iv) The city of tomorrow and cultural heritage	8.6
(v) Cleaner energy systems, including renewables	19.4
(vi) Economic and efficient energy for a competitive Europe	22.9
(b) Research and technological development activities of a generic nature	6
(c) Support for research infrastructure	4.3
Total :	100

7.3 Operational expenditure included in Part B of the Budget

Administrative expenditure: ECU 146.2 million, or 6.3 % of the estimated amount required.

7.4 Indicative schedule of appropriations

The schedule is established on the basis of the breakdown of the maximum overall amount and the indicative schedule of appropriations for the period 1998-2002 for the proposal for the 5th framework programme.

Commitment appropriations		Payment appropriations				Total.
		1999	2000	2001	2002 and subsequent years	
1999	440	64.6	154	88	133.4	440
2000	581		205.4	174	201.6	581
2001	673			188.1	484.9	673
2002	626				626	626
Total	2 320	64.6	359.4	450.1	1 445.9	2 320

The final amounts will be laid down by the Budgetary Authority.

8. FRAUD PREVENTION MEASURES

There is a wide range of administrative and financial checks at all stages, from signature to completion of research contracts, including the following:

- Prior to conclusion of the contract:
 - Selection of proposals on the basis of the scientific value of the project and of an assessment as to whether the research costs are realistic in relation to the nature of the research, its duration and its potential impact;
 - Analysis of the financial data transmitted by the proposers on their contract negotiation form.
- After the contract has been signed:
 - Scrutiny of statements of expenditure prior to payment, carried out at two levels (by the scientific officer and the financial officer);
 - On-the-spot checks enabling the detection of errors or other irregularities through an examination of the supporting documents. In order to make these checks more effective, the Commission's departments have set up an audit unit which coordinates the results of all the checks performed. These checks are either carried out by members of the audit unit or entrusted to auditing companies with which the Commission has concluded contracts, under the supervision of officials from the audit unit;
 - Internal audit by the Financial Controller;
 - On-the-spot inspections by the Commission's Financial Controller and by the Court of Auditors of the European Union.

9. ELEMENTS OF COST-EFFECTIVENESS ANALYSIS

9.1 Specific and quantified objectives; target population

This specific programme consists of:

(a) Key actions with the following objectives:

(i) Sustainable management and quality of water

The overall goal of this key action is to meet one of the major demands of European citizens, namely the provision of affordable high quality water, in particular drinking water, in sufficient quantity, while maintaining the integrity of ecosystems. Research will focus on:

- Development of integrated approaches for the management of water resources and wetlands and treatment and purification technologies.
- Technologies for monitoring and prevention of pollution, protection and management of groundwater and surface water resources.
- Surveillance, early warning and communication systems.
- Technologies for the regulation of stocks and technologies for arid and semi-arid regions and generally water-deficient regions.

(ii) Global change, climate and biodiversity

The main goal of this key action is to develop the scientific, technological and socio-economic basis necessary to underpin implementation of Community policies relating to changes in the environment, and to support the research obligations arising from international commitments in the context of sustainable development. Aiming for an integrated approach, the priorities are:

- To understand, detect, assess and predict global change processes.
- To foster better understanding of ecosystems (terrestrial and marine).
- To develop scenarios and strategies for the prevention and mitigation of, and for possible adaptation to, the effects of global change, climate change and loss of biodiversity.
- To support the development of the European component of the global observation systems for climate, terrestrial systems and oceans.

(iii) Sustainable marine ecosystems

The goal of this key action is to promote sustainable integrated management of marine resources and to contribute to the marine aspects of environment and sustainable development policies of the EU.

This action will contribute to better coordination of national marine policies, and therefore a continued commitment is required, all the more so because the European seas are among the most heavily used in the world. The research targets are:

- To develop the scientific knowledge on marine processes, ecosystems and interactions.
- To analyse causes, consequences and solutions of the present anthropogenic impact on marine ecosystems.
- To develop the capacity for monitoring and managing coastal processes.
- To enable operational forecasting for offshore activities.

(iv) The city of tomorrow and cultural heritage

The overall goal of this key action is to support sustainable economic development and competitiveness, improved urban management and integrated planning policy, and help safeguard and improve the quality of life and cultural identity of citizens. It will focus partly on the provision of an integrated socio-economic knowledge-base, and products, services, tools and technologies for better city management and partly on the environmental challenges, particularly in relation to reducing energy consumption and CO₂ emissions from urban transport.

- Integrated approaches to urban sustainability and optimal utilisation of essential resources.
- Protection, conservation and enhancement of European cultural heritage.
- Development and demonstration of technologies for safe, economic, clean, effective and sustainable preservation, renovation, construction, dismantling and demolition of the built-up environment, in particular for large groups of buildings.
- Comparative assessment and cost-effective implementation of strategies for sustainable transport systems in an urban environment.

(v) Cleaner energy systems, including renewable energies

The aim of this key action is to develop technologies which will help minimise the environmental impact of the production and use of energy in Europe. This will help preserve the ecosystem by reducing emissions at local and global levels and increasing the share of new and renewable energies. Accordingly action will be taken to investigate cleaner, most notably renewable, energy sources as well as to help reduce the environmental impact of existing fossil fuel use. Work will focus in order of priority on:

- Large-scale generation of electricity and/or heat with reduced CO₂ emissions from coal*, biomass or other fuels, including combined heat and power.

* In accordance with the conclusions of the Amsterdam European Council (June 1997), coal research must gradually be incorporated into the Framework Programme. The objective of this research is to cut costs and increase the value added, which should bring benefits to the end-users.

- Development and demonstration, including for decentralised generation, of conversion technologies for the main new and renewable energy sources, in particular, biomass, fuel cells, wind and solar technologies.
- Integration of new and renewable energy sources into energy systems.
- Cost-effective environmental abatement technologies for power production.

(vi) Economic and efficient energy for a competitive Europe

The aim of this key action is to provide Europe with a reliable, efficient, safe and economic energy supply for the benefit of its citizens, the functioning of society and the competitiveness of industry. A more efficient use of energy is required with technologies capable of achieving substantial overall cost reductions and reduction of energy intensity. Action will need to be taken at all stages of the energy cycle - production, distribution and final use - to improve efficiency and reduce costs. Work will focus in order of priority on:

- Technologies for the rational and efficient end use of energy.
- Technologies for the transmission and distribution of energy.
- Technologies for the storage of energy on both macro and micro scale.
- More efficient exploration, extraction and production technologies for fossil fuels.
- Improving the efficiency of new and renewable energy sources.
- The elaboration of scenarios on supply and demand technologies in economy/environment/energy systems and their interactions, and the analysis of the cost effectiveness (based on whole life costs) and efficiency of all energy sources.

(b) Research and technological development activities of a generic nature

Efforts will concentrate on the following priorities:

- The fight against major natural and technological hazards.
- Development of earth observation satellite technologies.
- Socio-economic aspects of environmental change in the perspective of sustainable development.
- Socio-economic aspects of energy within the perspective of sustainable development (the impact on society, the economy and employment).

(c) Support for research infrastructure: to **encourage the transnational use of public or private facilities** which address critical needs in order to further improve their exploitation while avoiding unnecessary duplication, and to cover emerging priority needs.

The target population of this operation is the following: businesses, particularly small firms, research centres and universities.

9.2 Grounds for the operation.2. Grounds for the operation.2.
Grounds for the operation.2. Grounds for the operation

Research and technological development in the fields of energy, environment and sustainable development is essential for the social well-being of Europe's citizens and the implementation of Union policies. Making use of the knowledge and technologies

developed by this programme will make it possible to meet a wide range of social and economic needs so reconciling economic development with environmental sustainability. New markets will bring growth and employment; reliable and competitive supply of energy will be ensured and energy requirements will be met. The results will provide the basis for policies formulated at Community level or deriving from international environmental commitments - in particular, the implementation of the Kyoto Protocol requires urgent support for research on a number of issues.

This programme will encourage integrated multidisciplinary approaches seeking to solve problems with a European dimension for which scientific and technological developments are needed. People are a key interactive component of the ecosystem and, therefore, a fair balance between scientific and socio-economic disciplines must be found in project implementation.

Harnessing the full spectrum of these research activities - ranging from basic research to demonstration projects - and using all suitable instruments, including supporting proposals spanning the spectrum of RTD activities, are envisaged to tackle the major issues at stake, in order to meet the need for a better understanding of natural processes and patterns and the interactions with human activities through to the development of new technologies and instruments ensuring further steps towards sustainable development.

Under Article 130f of the EC Treaty, the Community will by this new action continue to strengthen European industry's science and technology base, foster the development of international competitiveness and promote research activity as deemed necessary under other chapters of the Treaty.

This continuation is proposed following an assessment, in line with the SEM2000 initiative, of the actions of the past five years.

This proposal for a new operation follows the conclusions of the five-year assessment panel, notably in proposing that efforts be concentrated on six key actions (see point 9.1).

9.3 Monitoring and evaluation of the operation

9.3.1 Monitoring of the projects

Ex-ante evaluation

In order to guarantee the quality of RTD projects, the Commission will evaluate all the proposals received, following calls for proposals, on the basis of the priorities indicated in the specific programmes and the work programmes. For this purpose, it will be assisted, *inter alia*, by independent experts.

Intermediate and final project evaluation:

It is the responsibility of the project coordinator to send the Commission, at regular intervals, the technical and financial progress reports; the detailed final (technical and financial) report covering all the work carried out, setting out the results obtained and the

objectives attained and summary reports for publication. These reports will be monitored by the Commission staff, possibly with the assistance of outside experts.

9.3.2 Monitoring and evaluation of the specific programme

Annual monitoring of the implementation of the specific programme:

The Commission will examine each year, with the help of appropriately qualified independent experts, progress with the implementation of the specific programme in the light of the criteria set out in Article 3(2) of the specific programme.

It will assess, in particular, whether the objectives, priorities and financial resources are still appropriate to the changing situation. Where appropriate, it will submit proposals to adapt or supplement the specific programme.

Five-year and/or final evaluation:

In addition, before submitting its proposal for a Sixth Framework Programme, the Commission will have an external assessment conducted by high-level independent experts on the management of, and progress made in, Community activities carried out during the five years preceding the assessment, in particular in the light of the criteria set out in Article 3(2) of the specific programme. The Commission will communicate the conclusions of this assessment, accompanied by its comments, to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions.

Furthermore, in accordance with Article 130p of the Treaty establishing the European Community, the Commission produces an annual report to the European Parliament and the Council on activities relating to research and technological development and the dissemination of results.

10. ADMINISTRATIVE EXPENDITURE (PART A OF SECTION III OF THE COMMISSION BUDGET).

Not applicable.

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