COUNCIL DECISION

of 25 January 1999

adopting a specific programme for research, technological development and demonstration on competitive and sustainable growth (1998 to 2002)

(1999/169/EC)

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],

(1) Whereas by Decision No 182/1999/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 20002 setting out the general outlines and scientific and technological objectives of the activities to be carried out in the field of competitive and sustainable growth;

(2) 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;

(3) 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 arranged for an external assessment to be 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;

(4) Whereas, in accordance with Article 130j of the Treaty, Council Decision 1999/65/EC of 22 December 1998 concerning the rules for the participation of undertakings, research centres and universities and for the dissemination of research results for the implementation of the fifth framework programme of the European Community (1998 to 2002) [6] (hereinafter referred to as 'the rules for participation and dissemination') applies to this specific programme; whereas these rules allow the participation of the Joint Research Centre in the indirect actions covered by this specific programme;

(5) 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;

(6) 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 (SMEs), and activities to stimulate the mobility and training of researchers;

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(1) OJ C 260, 18.8.1998, p. 33.
(2) Opinion delivered on 15 December 1998 (not yet published in the Official Journal).
(3) OJ C 407, 28.12.1998, p. 123.
(4) OJ L 26, 1.2.1999, p. 1.
(5) OJ L 126, 18.5.1994, p. 1. Decision as last amended by Decision No 2535/97/EC (OJ L 347, 18.12.1997, p. 1).
(6) OJ L 26, 1.2.1999, p. 46.

(7) Whereas it is important that the scientific, industrial and user communities should contribute substantially to the definition of activities to be undertaken and should be involved, as appropriate, in the implementation of this programme;

(8) Whereas research activities under the fifth framework programme should also be geared towards innovation in order to contribute, *inter alia*, to the objectives of the first action plan for innovation;

(9) Whereas special emphasis should be placed on encouraging the participation of SMEs;

(10) Whereas the equal opportunities policy of the Community must be taken into account in the implementation of this programme;

(11) Whereas efficient and transparent management contributes to a more effective and user-friendly programme;

(12) Whereas administrative expenditure should be included in the Community budget in a transparent fashion;

(13) 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;

(14) Whereas the Scientific and Technical Research Committee has been consulted on the scientific and technological content of the specific programmes,

HAS ADOPTED THIS DECISION:

Article 1

In accordance with Article 3(1) of the fifth framework programme on competitive and sustainable growth (hereinafter referred to as the specific programme) is adopted for the period from 25 January 1999 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 is EUR 2 705 million, including a maximum of 6,5 % for the Commission's administrative expenditure.

An indicative breakdown of this amount is given in Annex I.

2. Of the amount in paragraph 1

— EUR 646 million is for the period 1998 to 1999,

and

— EUR 2 059 million is for the period 2000 to 2002.

In the case referred to in Article 2(1)(c) of the fifth framework programme, the Council shall adapt the latter figure in accordance with Article 2(1)(c), second indent of the fifth framework programme. Pending a decision by the Council, this specific programme shall not be implemented beyond the provision of the first indent.

3. 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 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.

In addition, any participation of industrial entities in industrially-orientated shared-cost actions should, as a general rule, be appropriate to the nature and purpose 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. The detailed rules for financial participation by the Community in the specific programme are those referred to in Article 4 of the fifth framework programme.

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 to this Decision.

Article 4

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

(a) shall monitor, with appropriate assistance from independent external experts, the implementation of the specific programme and, where appopriate, submit proposals to Council for adapting it, in accordance with Article 5(1) of the fifth framework programme;

(b) shall arrange for the external assessment provided for in Article 5(2) of the fifth framework programme to be 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 specifiying:

(a) in greater detail, the objectives and RTD priorities of Annex II;

(b) the indicative timetable for the implementation of the specific programme;

(c) the coordination arrangements set out in Annex III and arrangements to secure the objectives, related to innovation and the participation of SMEs, of the third activity of the fifth framework programme;

(d) where necessary, the selection criteria and the arrangements for applying them for each type of indirect RTD action.

2. The work programme shall take account of relevant interests, in particular the scientific, industrial and user communities. It shall serve as a basis for implementing the indirect RTD actions according to the procedures set out in the rules for participation and dissemination.

3. The work programme shall be updated where appropriate and be made available by the Commission to all interested parties in a user-friendly form, including in electronic form.

Article 6

1. The Commission shall be responsible for the implementation of this specific programme.

2. The procedure laid down in Article 7 shall apply for the adopting of the following measures:

— the drawing-up and updating of the work programme referred to in Article 5(1), including regarding the content of calls for proposals,

— approval of RTD actions proposed for funding, including participation by entities from third countries, where the estimated amount of the Community contribution under this programme is equal to or more than:

  — in the case of key actions (i), (iii) and (iv) EUR 1,5 million,

  — for all other actions EUR 0,75 million,

— 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 Commission shall be assisted by a programme committee (hereinafter referred to as 'the committee') composed of reprsentatives of the Member States and chaired by the representative of the Commission.

2. In the cases referred to in Article 6(2), the representative of the Commission shall submit to the committee a draft of measures to be taken. The committee shall deliver its opinion on the draft measures referred to above 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.

3(a) The Commission shall adopt the measures envisaged if they are in accordance with the opinion of the committee.

(b) 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 nine weeks from the referral of the matter to the Council, the Council has not acted, the proposed measures shall be adopted by the Commission.

4. The Commission shall regularly inform the committee of the overall progress of the implementation of the specific programme, and shall in particular provide it with information about the progress of all RTD actions funded under this programme.

Article 8

In accordance with Article 5(4) of the fifth framework programme, the Commission shall regularly inform the Council and the European Parliament of the overall progress of the implementation of the programme, including on the participation of SMEs and the simplification of admininistrative procedures.

Article 9

This Decision is addressed to the Member States.

Done at Brussels, 25 January 1999.

For the Council
The President
J. FISCHER

ANNEX I

INDICATIVE BREAKDOWN OF THE AMOUNT DEEMED NECESSARY

(million EUR)

Type of activity	Amount
(a) Key actions	
(i) Innovative products, processes and organisation	731
(ii) Sustainable mobility and intermodality	371
(iii) Land transport and marine technologies	320
(iv) New perspectives for aeronautics	700
(b) Research and technological development activities of a generic nature	546
(c) Support for research infrastructures	37
Total	2 705

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 technologal 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 an exclusive 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, technological development and demonstration activities will focus on clearly identified needs and on improving the information available to policy-makers about the implications of technological and organisational change. 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.

Answering socioeconomic 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 and consumer friendly processes, products and services will contribute to improving quality of life and working conditions.

Stimulating European added-value. Activities to solve the cross-border problems rising 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 fifth framework programme.

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.

Particular effort will be undertaken to ensure coordination within this thematic programme and with other thematic programmes, in particular on transport research topics. 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 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 themes of common interest with the framework programme may be developed in the context of the key actions in conformity with the selection criteria and procedures of the framework programme. 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 'Promotion of innovation and encouragement of SMEs participation',

— improving the know-how, skills and qualifications of European researchers and the understanding of the socioeconomic impact of research in the fields covered by this programme is essential to ensure sufficient availability of appropriate expertise and to establish tangible and lasting impacts. Training and socioeconomic research will therefore form an integral part of this programme complemented by appropriate links with the horizontal programme 'Improving the human research potential and the socioeconomic knowledge base'. Training activities in this programme will include support to fellowships, which will take the form of Marie Curie fellowships following the definitions and rules set out in the horizontal programme.

(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 production [1], including innovation in and modernisation of traditional industries, 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 socioeconomic, 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 in particular the specific programme 'User-friendly information society', and/or implemented in cooperation with international initiatives (IMS, Eureka).

— *Efficient production including design, manufacturing, and control for improved product/service combinations including micro- and nano-scale technologies and engineering*

The aim is to improve competitiveness through increased industrial added-value, quality and responsiveness to market, reduced time-to-market and material intensity.

RTD priorities: technologies for integrated product-service design and development, multi-technology integrated products (including production equipment and facilities) and related manufacturing and production processes; advanced production and construction techniques and equipment for higher process accuracy and reliability; manufacturing and processing 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 development, integration and application of information society technologies in production and related logistic systems.

[1] The term 'production' encompasses all industrial activities from extraction of raw or recycled materials to the processing and manufacture of components and end-products. It covers all industrial sectors and associated services, including construction.

RTD priorities: intelligent and reconfigurable production systems, machinery, and equipment; on-line control using advanced actuators and 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,

— *Eco-efficient processes and design*

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 and reduction and valorisation of waste.

RTD priorities: clean and eco-efficient processing technologies including, where appropriate, use of renewable raw materials; 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 unused resources and 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, virtual networks, agile customer-driven networked industrial and related service enterprises, including SMEs, with multi-skilled highly motivated labour force, working in efficient, safe and pleasant workplaces and taking into consideration the diversity and specificity of European society and manufacturing tradition.

RTD priorities: study of human, organisational, socioeconomic 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 covering also work organisation, skill needs and worker's protection; studies on the impact and acceptance of new business ideas, new forms of work and new industrial production patterns, compatible with the concept of sustainability including the interface between society and enterprises.

(ii) **Sustainable mobility and intermodality**

Objectives and RTD priorities

The overall aim of this key action is to achieve a better reconciliation of the growing demand for mobility with the need to respect sustainable use of resources and 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. Activities supported in this key action will be coordinated with activities carried out within other transport-related key actions.

— *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 navigation [1] 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,

— *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, national, regional and local networks; innovative infrastructure concepts and operations; relationship between transport, land use, regional planning, environment and health; reduced congestion, resource and energy consumption, pollution, and infrastructure degradation; integration of vehicles and public transport in the transport system; innovative concepts and operations for urban, interurban and rural mobility and intermodality; safety covering all modes of transport, 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,

— *Socioeconomic 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 encourage, while preserving the environment and improving safety, the development and integration of knowledge and technologies for products, vehicles and vessels, specific to land transport and sea-based activities taking also into account human and operational factors. The aim is also to meet the technological challenges needed to develop efficient interfaces for logistic infrastructures, including loading units.

Research, technological development and demonstration activities should lead to validated advanced concepts capable of meeting all public and user demands for sustainable mobility and improved safety, while reducing the environmental impact, improving sustainable use of resources 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, systems and services for the citizen, economic and efficient energy for a competitive

[1] Space-related activities are subject to an overall coordination across the various programmes.

Europe, cleaner energy systems, including renewables, city of tomorrow and cultural heritage and sustainable marine ecosystems,

— *Critical technologies for road and rail vehicles*

The aim is the acquisition of technologies to support the improvement of transport vehicles, equipment 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 advanced powertrain concepts and auxiliary systems, characterised by high efficiency, reliability, reduced emissions, environmental friendliness and cost effectiveness; for noise, vibration and electromagnetic reduction; lightweight 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 urban and the long-distance transport of passengers and/or goods. The activities will be closely coordinated with the 'City of tomorrow and cultural heritage' key action.

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, including alternative fuel 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 vessels*

The aim is the validation and demonstration of advanced technologies for the development of vessels and offshore structures complying with safety of persons and installations, 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 subsystems, covering safety concepts, environmental protection, efficiency, design, 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 and port infrastructure concepts with maximised performances and interoperability, guided by safety, environmental and economic aspects while fulfilling user requirements. This will include new technological solutions for cargo handling, fast intermodal facilities, for port, inland waterways and marine infrastructures.

RTD priorities: integration of technologies, advanced equipment and systems for innovative vessel concepts and for port infrastructure; integration of technologies for efficient, safe and environmentally friendly transhipment 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. Development of critical technologies which are safe, efficient and competitive in order to increase the accessibility and exploitation of the marine energy and mineral resources. These activities will be focused on: autonomous and remote-controlled vehicles; safe and efficient submarine technologies for sensing, control, and data transfer; 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, including SMEs, while assuring the sustainable growth of air transportation. In this context, enabling technologies will be developed and integrated for new generation aircraft. The medium-term targets of research, technological development and demonstration activities, involving all research actors including universities and research centres, are to substantially reduce development time and costs of new aircraft, improve efficiency (fuel consumption, maintenance costs, longer life cycles) 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).

— *Acquisition of critical technologies*

The aim is to contribute to the long-term competitiveness of the European aeronautics industry, including its supply chain, from a strategic perspective by stimulating the development of enabling technologies. Critical technologies will, in particular, address design and manufacturing of new generation of aircraft, including aircraft concepts 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 multidisciplinary 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 lifetime. This will involve a multidisciplinary approach, including technology platforms and the required validation activities, 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 multisite 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 and validation 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 and repair 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 multisectoral 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 and improved 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 of America, China) and developing foresight, socioeconomic 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 materials; catalysts; new and improved structural and light materials, for instance used in extreme conditions, 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, including natural 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 unavoidable waste; research supporting new applications of renewable raw materials, for example for the production of organic chemicals,

— **New and improved 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 CO_2 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

Activities will focus on the development of instrumentation, methodologies for measurements and testing and certified reference materials to help achieving the three objectives described below [1]:

— *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 in collaboration with standardisation bodies and other stakeholders.

[1] Research on certified reference materials will give support to the other specific programmes implementing the fifth framework programme.

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: 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 users 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 organisations and enterprises, including SMEs, and for measuring user 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 of high scientific and technological standard and in very close relation to the key actions. Pooling of resources and transnational access for example 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. The existing facilities must be encouraged to cooperate for the mutual benefit of their operators and the European RTD and user communities in order 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 is aimed at improving the information about the existing possibilities and improving transnational access to research infrastructures for the benefit of:

(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,

(iii) and 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 transnational access to facilities to which researchers would not normally have access. This will also encourage and facilitate transnational cooperation in the rational and cost-effective development of research infrastructures in response to emergency needs.

  Support activities will stimulate access to facilities related to the various key actions, in particular to computing centres and large scale experimental facilities 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, organisations and users (including SMEs) 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; support for the improved use by SMEs and for the implementation of the abovementioned agreements and quality 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 provided for 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,

— 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,

— the exchange of information, conferences, seminars, workshops or other scientific and technical meetings, including for international cooperation schemes,

— 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; encouragement of innovation financing and assistance with the protection of intellectual property,

— 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.

As far as possible, 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 1999/64/Euratom of 22 December 1998 concerning the fifth framework programme of the European Atomic Energy Community (Euratom) for research and training activities (1998 to 2002) [1],

— other European research frameworks including Eureka and COST,

— other Community research-related instruments.

[1] OJ L 26, 1.2.1999, p. 34.

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 on 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.