COMMISSION OF THE EUROPEAN COMMUNITIES

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WORKING DOCUMENT OF THE COMMISSION CONCERNING THE FOURTH FRAMEWORK PROGRAMME OF COMMUNITY ACTIVITIES IN THE FIELD OF RESEARCH AND TECHNOLOGICAL DEVELOPMENT (1994-1998)

EXPLANATORY MEMORANDUM

Introduction

1. The fourth framework programme for research and technological development (1994-1998), which is the subject of this document, is a direct and logical continuation of a number of developments in the Community's science and technology policy since the mid-1980s.

In 1984 the Community decided to improve the coordination of its research and technological development activities by bringing them within multiannual framework programmes. The first framework programme for research and technological development covered the period 1984 to 1987. The second covered the period 1987 to 1991 and the third, the current programme, the period 1990 to 1994.

In 1987 the Single European Act brought research and technological development within the formal competence of the Community, consolidated the rules and principles of Community action in this area, and established the basic machinery through which it was to act: adoption of multiannual framework programmes and their implementation through specific programmes. The second and third framework programmes were proposed and then adopted on the basis of the Single Act. The Treaty on European Union, signed in Maastricht in February 1992, clarified certain aspects of the Single Act relating to RTD, and also introduced a number of amendments, some of them major, into the rules governing this area.

In April 1992 the Commission published a communication entitled "Research after Maastricht: an assessment, a strategy". On the basis of an analysis of the state of research and industry in Europe at the beginning of the 1990s and a critical assessment of Community action to date, this document set out the Commission's guidelines for Community RTD policy for the next five years.

At the same time, the Commission published an evaluation report of the second framework programme (1987-1991) and the analysis of this which CREST has made at the request of the Council has just been finalised. At the end of April 1992, having considered these two Commission documents, the Council asked the Commission to let it have working proposals as soon as possible.

In July 1992 the Commission, in a bid to avoid any gap in RTD financing over the next two years, adopted a proposal for a financial supplement to the third framework programme (1990-1994).

2. What follows is an introduction to the fourth framework programme rather than the explanatory memorandum proper, which can be found in its entirety in the communication "Research after Maastricht: an assessment, a strategy". The latter contains the full analysis and grounds on which the fourth framework programme 1994-1998 should be based.

3. Against the background of diminishing competitiveness in Europe's high-technology industries since the beginning of the 1980s, this document's analysis of the state of RTD in Europe revealed the essential weakness of the European research system: lack of investment in industrial research and the inability of businesses to turn scientific and technological breakthroughs into commercial successes.

In addition to some very positive results, such as the creation, through the various programmes, of many transnational networks bringing together researchers, laboratories and businesses, the assessment of Community action also highlighted several weak points. These include the failure to take sufficient account of technological priorities and a certain tendency towards dispersal of effort.

4. The Commission is therefore proposing that in the years ahead RTD should be guided by a dual policy of continuity and novelty. While pursuing traditional programmes, with the necessary adaptations, it intends in future to increase the impact of Community RTD activity on European competitiveness by concentrating efforts on a small number of key technologies of major industrial interest. The fourth framework programme will give the JRC the means to maintain and consolidate its expertise and its research, but the major part of the increase proposed relates to RTD conducted under shared-cost actions, that is, to research conducted in Member States.

5. A study was also made of the likely impact on research of the central role assigned to subsidiarity in Community action under the terms of the Maastricht decisions. This identified a number of activities to which the principle of subsidiarity was intrinsic. First, 'big science' activities, often taking the form of 'mega-projects' with almost always an international character, require European efforts to be concentrated either in one large installation (for example, JET for controlled thermonuclear fusion) or in the form of a network to optimise and reinforce dispersed efforts (such as research on global climate change). The second case concerns priority technology activities benefiting a large number of industrial sectors, where considerable long term investments and cooperation between leading participants, including non-Community partners, require a stimulus at Community level. Third, common policies, old or new, contribute to the establishment of the single market, which is not as yet sufficiently integrated, and the definition and implementation of these policies require joint research to be done. Finally, prenormative research activities, in support of norms, standards and regulations, activities aimed at developing an integrated system of networks and stimulating measures for the European scientific community, equally constitute categories of activities where subsidiarity is intrinsic.

Attention was also drawn to the considerable potential for coordination of national research policies offered by the new Treaty. The active interface between national policies and Community policy, made possible by the new wording of Article 130h, means that such coordination is now a real possibility.

Finally, the new framework programme reflects the necessary coherence between RTD policy and economic and social cohesion as required by the Treaty. While it recalls that RTD policy should benefit the whole of the Community (Article 130 f), the Maastricht Treaty states indeed that the formulation and the implementation of Community policies and actions take into account the objectives of economic and social cohesion and contribute to their achievement (Article 130 b). The Commission has a communication on RTD and cohesion in preparation.

The technological backwardness of some Member States imposes a burden on the technological balance sheet of the Community as a whole and any progress which is achieved by these countries in the field of RTD and innovation will constitute net progress for the Community as a whole. There is no contradiction between the specific nature of RTD policy, notably with regard to the excellence which must characterise it, and the objective of cohesion; these two policies should mutually support each other. By pursuing the objectives proper to each of them, the Commission has engaged itself in a process of active coordination, which it will reinforce, in order to ensure the maximum of coherence and synergy between them.

6. With the Community enjoying greater responsibility in Europe and worldwide, the prospects for organizing international scientific and technological cooperation more rationally were also explored.

Lastly, it was shown that, in the years ahead, the budgetary aspects of Community action on RTD can, and must be, as fully in line with the contents of communication COM(92)2001 on the financial perspective (1993-97), as its content and objectives are with communication COM(92)2000.

7. The present communication is an extension of "Research after Maastricht: an assessment, a strategy" and of that document's analyses and conclusions. While the earlier document must be referred to for full details, the following paragraphs put the future fourth framework programme into perspective by summarizing a number of elements relating to three basic features: the legal aspects, the content and the financial aspects.

The legal aspects

The legal basis

8. From the legal point of view, the Commission is presenting this Communication at a time and in a context which are somewhat unusual. The Treaty on European Union (the Maastricht Treaty) was signed in February 1992. However, it will not enter into force until 1993, following ratification by the Member States. Until that time the legal basis of Community action in the field of RTD will remain the Single Act. In view of this situation, and as an illustration the recitals and articles of what could be the structure of a future proposal for a Decision on the fourth framework programme have been presented in a novel, two-column format. The left-hand column gives the text based on the Single European Act; the right-hand column contains the text based on the Treaty on European Union. Once this Treaty enters into force the text in the right-hand column could become the Commission's

proposal, to be adopted in accordance with the procedures laid down in the new Treaty. In order that the framework programme may be implemented in good time, however, it will be discussed before the Treaty enters into force within the framework of the interinstitutional Trialogue between the Council, the Commission and Parliament, which was set up in May 1992 and has been developing since then.

The reference period

9. The five-year period 1994 to 1998 is being proposed as the reference period for the fourth framework programme. One of the features of the sequence of the three framework programmes to date has been compliance with the "rolling programme" rule. This rule dictates that two successive framework programmes should overlap by one or two years. This formula can be justified by the need to avoid any hiatus in activities combining novelty and continuity and any forced interruption of work, and by a number of administrative constraints. The grounds on which the principle of the rolling programme was first adopted remain valid today, and the case for maintaining it is stronger than ever before. The Commission is therefore proposing to get the fourth framework programme under way in 1994.

The scope

10. The scope of the fourth framework programme has been determined on the basis of one of the most important new RTD provisions introduced in the Maastricht Treaty. Under this provision the framework programme is to include all the RTD activities covered by the Treaty. Thus all Community research and technological development activities, whatever their form and under whichever common policy they fall, are included within the framework programme. These activities include basic research, basic industrial research, applied research and technological development. Under the terms of the new Article 130f(3) they also include demonstration projects. However, all these activities are explicitly confined to the pre-competitive stage.

In keeping with the Maastricht Treaty the fourth framework programme will also include all research, technological development and demonstration activities carried out within the framework of the major common policies, such as agriculture, fisheries, energy or transport. In accordance with Commission's approach to the future of the ECSC Treaty, the coal and steel industries of the Community will increasingly find a response to their research needs, including those on social aspects, in the Community's RTD activities. The aim here is not merely a mechanical grouping of activities. The significance of this new provision is primarily political, namely consistency and mutual reinforcement between research policy and the other major common policies. What is needed to ensure such consistency and to allow for the greatest possible synergy in the definition and implementation of the various policies is the organized programming of all research activity. In administrative terms this means that the research activities concerned will be implemented through close cooperation between the Commission departments responsible for RTD policy and those responsible for the other common policies. Nothing could be further from the spirit of the Treaty than the idea of an administrative and managerial monopoly in matters of joint competence.

11. According to the provisions of the Maastricht Treaty, the measures which were implemented before outside the framework programme and named APAS ("Action de Préparation, d'Accompagnement et de Suivi"), will henceforth be included in the framework programme.

The most obvious case is international scientific cooperation. The measures which were until now executed on an annual basis without an overall and long term planning frame will now be subject to multiannual planning. They will form a coherent whole in the shape of the second activity.

The same will apply to other measures with a multiannual horizon, such as SPRINT, which are today executed on various legal bases. These measures will be brought together under the third activity of the framework programme.

Another group of measures which are currently outside the framework programme are the horizontal measures needed to define, implement and support RTD policy. They concern in particular: studies, exploratory and evaluation activities, promotion, support and coordination activities Those measures which can be planned on a multiannual basis, while keeping the appropriate flexibility, will be specifically provided for in the horizontal support measures.

However, some measures which are not significant in size, which are discrete and isolated and which are based on a demand that varies from year to year, cannot be planned on a multiannual basis. Included in this category are also the scientific and technical support services which the Joint Research Centre provides to other Directorates-General of the Commission on the customer-contractor principle. These measures, as they must be included in the fourth framework programme, will therefore be integrated and implemented with the procedural flexibility required so that the Commission maintains its power of initiative and execution for non-significant measures in accordance with Article 22 of the financial regulation.

The activities

12. The Maastricht Treaty removed all the ambiguity of the Single Act regarding the activities which go to make up the framework programme. There are four activities, clearly described in Article 130g:

(a) implementation of research, technological development and demonstration programmes, by promoting cooperation with and between undertakings, research centres and universities;

(b) promotion of cooperation in the field of Community research, technological development and demonstration with third countries and international organizations;

(c) dissemination and optimization of the results of activities in Community research, technological development and demonstration;

(d) stimulation of the training and mobility of researchers in the Community.

13. The description of the framework programme's contents, given in Annex II to this communication, is structured according to these four activities. For each of them, a clear indication is given of the nature of the activity, its particular objectives, the various aspects into which it may be broken down and the type of action to which it may give rise.

The contents of each activity are set out as a series of core thematic areas. This novel formula is a response to the need to confine the presentation of the framework programme to the main features of the activities in question, indicating priorities clearly as required. The technical details of the contents of the various activities will be given later in the specific programmes. This is also when the core themes will be regrouped.

The overall legislative framework

14. The proposal for the fourth framework programme (1994-1998) is but one stage in the larger decision-making process. The Treaty on European Union maintains the principle of the dual legislative procedure introduced by the Single Act, i.e. adoption of the framework programme as a whole followed by the adoption of the individual specific programmes. However, the Treaty introduces an important innovation compared with the Single Act. The provisions on the adoption of rules on the participation of undertakings, research centres and universities in Community programmes have been changed. In the past they were adopted at the same time as each of the specific programmes; in the future they should be the subject of a separate Council Decision. The same applies to the provisions on intellectual property, which are currently laid down in the specific programme on the optimization and dissemination of knowledge.

15. Once the Treaty of Maastricht has entered into force the legislative framework within which the fourth framework programme is to be implemented will comprise four different types of legal act:

(a) a Council Decision on the framework programme itself. In accordance with the provisions of the Maastricht Treaty it must be adopted by the Council, acting unanimously, under the co-decision procedure with the European Parliament (Article 189b);

(b) a Council Decision adopting each of the specific programmes. While the Maastricht Treaty procedure for the adoption of the framework programme is more cumbersome than the procedure laid down under the Single Act, the new procedure for the adoption of the specific programmes is more streamlined than before. Specific programmes will be adopted by a qualified majority in the Council after consulting the European Parliament;

(c) a Council Decision laying down rules for the participation of undertakings, research centres and universities in the framework programme, as well as rules governing the dissemination of research results. This Decision, referred to in the new Article 130j of the Treaty, is to be adopted in cooperation with the

European Parliament (under the terms of the new Treaty this is the procedure laid down in Article 189c);

(d) all the acts adopting Decisions concerning the creation of other, optional, instruments for the implementation of the framework programme: supplementary programmes, participation in research programmes undertaken by several Member States, cooperation with international organizations, and joint undertakings. These acts are covered by Articles 130k, 130l, 130m and 130n of the Treaty respectively.

The Content

A renewed thematic framework

16. The contents of the fourth framework programme were determined in accordance with two main objectives : strengthening the competitive position of our industry at international level and the improvement of the quality of life. These two main objectives are closely linked and interdependent. The allocation of any particular core theme to the one or the other of them has been made in the light of the principal characteristics of the proposed action.

As stated in Article 130f, the main aim of Community research policy is to strengthen the scientific and technological bases of Community industry and to encourage it to become more competitive at international level. Many of the core thematic areas put forward for the implementation of the first activity under the framework programme are related specifically to this objective of making Europe's industry more competitive, this being considered in a systemic fashion, that is, taking into account the organisational dimension and human factors: key elements for IT systems, image technologies, advanced manufacturing technologies, human-centered manufacturing, materials and their processing, non-food uses of agricultural products, etc.

17. With the new wording of Article 130f ("... promoting all the research activities deemed necessary by virtue of other Chapters of this Treaty") the purpose of Community research extends beyond the needs of industry. It is applied to a series of much broader issues focusing on Europe and society. This field includes all matters relating to the quality of individual and social life. The core thematic areas of the first activity which are linked more specifically to this field include science and technology for a new urban habitat, the struggle against social exclusion, science and technology for the preservation of European cultural heritage, global change, Europe's major health problems, nuclear safety activities, etc.

The strategic role of generic technologies

18. The development of generic technologies will be given a prominent place in the implementation of the fourth framework programme. Generic technologies play a key role in the industrial economy. Their development often requires a

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multidisciplinary approach, as well as a large amount of capital and RTD. Their impact extends to all other technologies employed in the production system. Their cumulative nature, their ability to stimulate the emergence of further technologies and the speed with which they evolve make generic technologies one of the main factors in business competitiveness. The horizontal nature of the Community's approach and of its instruments in the field of RTD, is well suited to promoting their development.

In the fourth framework programme the generic technologies are to be tackled in a dual approach. First of all, they will continue to be covered by conventional programmes, as it were from the top down. The aim here is to provide businesses with the means of mastering the range of technologies to which they must have access if they are to become more competitive.

A second approach is also envisaged which involves a radically new type of action. Generic technologies will be at the core of a number of "technological priority" projects which will provide cross-sectoral support in areas of importance to the competitiveness of European industry. Proposed by businesses on their own initiative, these projects will bring into play a whole range of competences and disciplines, harnessing and coordinating the necessary expertise and integrating them through a coherent industrial approach. They will be implemented in such a way as to concentrate major resources on precise objectives, which will in turn determine the nature of their various components and the way these fit together. Projects of this type are likely to be implemented in areas corresponding to most of the core themes. The Community's role will be to ensure that the horizontal technologies they require are developed and available.

Research in the service of the common policies

19. As already stated, another central feature of the fourth framework programme (1994-1998) is the RTD activities relating directly to the implementation of the common policies. By extending the scope of Community research to include every area covered by the provisions of the Treaty, the new Article 130f establishes a formal and explicit basis for a whole range of activities to provide scientific and technical support for the major Community policies: environment, energy, agriculture, fisheries, health, culture, completion of the internal market and protection of the external frontier of the Community, development of major networks, external relations and development cooperation, transport, etc.

In particular, the reform of the Common Agricultural Policy must be supported by research work aimed at accelerating the development of new non-food markets for agricultural products, at ensuring better management of agricultural and forestry activities, at promoting rural development, and at facilitating the use of advanced technologies for monitoring agricultural production in relation to the new forms of support which will be given to it.

Similarly, Community transport policy must stimulate the scientific work and technical developments which are indispensable for the improvement of network safety and operation in an approach which is both paneuropean and multimodal.

Finally, during the last two years, and after a marked absence in the 1980s, the idea of a need for a European industrial policy has reappeared. This new horizontal approach implies that Community RTD activities contribute to the creation of the environment allowing the competitiveness of European industry to be maximised. A number of Commission communications which have applied this horizontal approach to sectors such as informatics and electronics, aeronautics, the motor, textile and maritime industries, have resulted in a further debate in Europe about industrial policy and the RTD activities needed.

The research activities concerned must, by definition, necessarily develop closely in line with the contents and objectives of the common policies, to whose definition they contribute, and be coherent with activities implemented under them. The various Commission departments concerned will therefore have to work in concert in preparing and managing them. Similarly, the inclusion of these research activities in the strategies of the common policies and their intrinsic links with the objectives and content of those policies will have to be taken into account when the Council and Parliament discuss the framework programme.

A system of better organized activities

20. The clearer structure of the new framework programme and the precise identification of the four activities it comprises will make for better organization of the content of initiatives which are supplementary to the research and technological development programmes proper. The implementation of the second, third and fourth activities displays the same combination of continuity and novelty which characterizes the first.

21. The second activity, the promotion of cooperation with third countries and international organizations, will continue to develop on three fronts: the non-European industrialized nations, the countries of Central and Eastern Europe and the developing countries. Alongside the development, within the framework of bilateral agreements, of information exchange, joint research activities of mutual interest and exchange of researchers, cooperation with the industrialized nations will be complemented by Community participation in multilateral initiatives and in collaboration on mega-projects on a global scale. A major effort will be made towards greater synergy with other European cooperative ventures, primarily Eureka. Advantage may be taken of the cooperation between Eureka and the Community to implement technological priority projects. It may be used to carry out strategic projects combining the development of key technologies with applied, market-oriented research. Community support would be provided for those activities relating to the development of generic technologies. For developing countries, the activities envisaged will be coherent with development support measures.

22. In addition to the development of technical support infrastructures, particularly the relay centre networks for the dissemination of Community research results, the third activity, dissemination and optimization, will include a number of initiatives to improve relations between the research system as a whole and society, as well as

assessment of the social impact of science and technology. A completely new financial engineering initiative designed with small businesses in mind will be set up to complement the SPRINT programme, currently integrated into the framework programme. This will ensure that small businesses receive additional help to exploit the results of their research activities.

23. Stimulation of training and mobility will continue to be carried out by means of mobility grants, mainly at post-doctorate level, and the creation of intra-Community networks of scientific and technical cooperation. In addition to the conventional cooperation networks, specific networks associating laboratories, universities and businesses will be set up to integrate academic research more effectively into the industrial fabric. Incentives for the European scientific community are also planned, such as the creation of European chairs enabling eminent researchers to supervise the work of young scientists in European research centres.

24. Lastly, the framework programme will for the first time, in accordance with the new provisions of the Treaty, include all significant horizontal support activities: activities to prepare, accompany and promote initiatives taken within the framework of the four framework programme activities. Thus a whole range of activities which in the past have been carried out in a fragmented manner will now be grouped together in a more organized fashion: prospective and analytical studies and technology monitoring, evaluation studies, relevant statistical data collection, feasibility studies, experimental and demonstration projects, activities promoting the dissemination of technologies, etc. Community RTD programme and policy evaluation will gain in credibility through the establishment by and for the Commission of a High Level Research Evaluation Committee whose independence and permanent character will be ensured. In the interests of applying the principle of subsidiarity effectively, an additional effort will be made to ensure the necessary synergy between Community activities and activities carried out at national level. One of the first areas to which this closer cooperation will apply will be RTD - linked activities carried out with help from the Structural Funds.

Financial aspects

The legal and budgetary framework

25. The legal and budgetary provisions of the fourth framework programme (1994-1998) will differ significantly from those which dealt with these aspects in the first three framework programmes. In this area too the Maastricht Treaty introduced an important innovation compared with the Single Act. Articles 130i and 130k of the Single Act included the notion of the "amount deemed necessary". The Maastricht Treaty, however, has introduced the notion of the "maximum overall amount" to determine the funding for the framework programme as a whole and for the various activities through which it is implemented. The framework programme and its four activities will therefore be funded within the bounds of the "maximum overall amount" set by the legislative authority.

However, recourse will still be had to the notion of the amount deemed necessary for setting the funding of the specific programmes. The Treaty states: "Each specific programme shall define the detailed rules for implementing it, fix its duration and provide for the means deemed necessary" (Article 130i(3)).

Forecast of expenditure

26. The fourth framework programme is in line with the financial perspectives (1993-97) set out by the Commission in COM(92)2001 of 10 March 1992.

Under the financial perspectives, Community expenditure for the period concerned is divided into six major areas: common agricultural policy, structural operations, internal policies, external actions, administrative expenditure and reserves for special expenditure. Research and technological development expenditure appears under the third of these headings: "Horizontal internal policies". RTD represents an important part of the overall funding allocated to this heading for the five-year period.

RTD is the only one of the policies included within the third heading to be given a separate figure within the total. In order to determine the room available for the implementation of research programmes, a series of annual expenditure figures is given for the five years of the reference period corresponding to indicative amounts for RTD policy. The maximum overall amount for the fourth framework programme and the sums allocated annually for its implementation have therefore been established in line with these indicative amounts as given for the years 1994 to 1997.

27. At this stage, the present document takes up the proposed allocation of resources which appears in its Communication COM (92) 2001 of 10 March 1992, and in particular the table given there which presents the breakdown for the financial perspectives (1993-1997). The final decision on the financial perspectives may lead to modifications of the financial scheme presented here. The principle of rolling programmes, with a year's overlap at the beginning and at the end of each five-year period, is taken into account in the table which appears in the financial sheet.

28. Finally, a breakdown of resources between the four activities of which the framework programme is composed is presented in Annex I.

This is based on an assessment which takes account both of the "historical" evolution of expenditure and of the new structure of the framework programme.

It is also evident that the final division of funding will depend on the overall amount decided for RTD in the framework of the financial perspectives and on an objective assessment of the contents of each action and of the priority accorded to the core themes. Therefore, at this juncture, it does not seem opportune to offer a more disaggregated breakdown. The Commission will, as appropriate, provide further facts and guidance with respect to the options to be considered as the legislative procedure progresses.

COUNCIL DECISION	EUROPEAN PARLIAMENT AND COUNCIL DECISION
concerning the fourth framework programme of Community activities in the field of research and technological development (1994 to 1998)	**concerning the fourth framework programme of Community activities in the field of research and technological development (1994 to 1998)**
THE COUNCIL OF THE EUROPEAN COMMUNITIES,	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN COMMUNITY
Having regard to the Treaty establishing the European Economic Community (the Treaty), and in particular Article 130q(1) thereof,	Having regard to the Treaty establishing the European Community, and in particular Article 130i(1) thereof,
Having regard to the Treaty establishing the European Atomic Energy Community (the EAEC Treaty), and in particular Article 7 thereof,	
Having regard to the proposal from the Commission,	Having regard to the proposal from the Commission,
Having regard to the opinion of the European Parliament,	
Having regard to the opinion of the Economic and Social Committee,	Having regard to the opinion of the Economic and Social Committee,
Whereas the Single European Act incorporated a Title VI (Articles 130f to 130q) into the EEC Treaty; whereas that Title constitutes a new legal basis for Community activities in the field of research and technological development; whereas, in particular, Article 130f of the Treaty assigns the Community the objective of strengthening the scientific and technological bases of European industry and encouraging it to become more competitive at international level;	Whereas Title XV of the Treaty establishing the European Community foresees a coherent framework of provisions for a common policy on research and technological development; whereas, in particular, Article 130f assigns the Community the objective of strengthening the scientific and technological bases of Community industry and encouraging it to become more competitive at international level, and of promoting the research activities deemed necessary under other common policies;
	Whereas Article 130 of the Treaty stresses that the action by the Community and the Member States must be aimed at fostering better exploitation of the industrial potential of policies of innovation, research and technological development; whereas Article 130h lays down that Member States should coordinate their research and technological development activities so as to ensure that national policies and Community policy are mutually consistent;
Whereas under Article 130i of the Treaty all the Community activities referred to in Article 130g of the said Treaty must be included in a multiannual framework programme; whereas Community activities for the development of research in nuclear fields can moreover be the subject of a multiannual framework programme and of specific programmes determined in accordance with Article 7 of the EAEC Treaty;	Whereas Article 130i of the Treaty lays down that a multiannual framework programme, including all the activities of the Community in the field of research and technological development, must be adopted jointly by the Council and by the European Parliament pursuant to Article 189b of the Treaty;
Whereas by Decision 90/221/Euratom, EEC the Council adopted a third framework programme for the period 1990 to 1994, which is in the process of being implemented;	Whereas by Decision 90/221/Euratom, EEC the Council adopted a third framework programme for the period 1990 to 1994, which is in the process of being implemented;

Whereas on 9 April 1992 the Commission presented a communication entitled 'Research after Maastricht: an assessment, a strategy' in which it assessed progress in implementing the third framework programme; whereas an evaluation of all the specific programmes carried out under the second framework programme was also presented;

Whereas, in view of the rapid pace of technological development, the new economic challenges which the Community must meet and the increased level of global competition, Community activities in the field of research and technological development must be intensified and augmented; whereas, in the light of these factors, it has been judged appropriate to adopt a new framework programme for the period 1994 to 1998 developing out of the current framework programme 1990 to 1994;

Whereas it is necessary for the Community to encourage enterprises, including small and medium-sized undertakings, research centres and universities in their research and technological development activities and, to that end, to support their efforts to cooperate with one another by appropriate measures;

Whereas the process of technological progress requires a continuum of interlinked activities, ranging from basic research through to the demonstration of the applications of new technologies; whereas, however, the precompetitive aspect must remain a central priority in Community research and technological development activities;

Whereas it is recognized that small and medium-sized undertakings are able to make a significant contribution to the innovation process and should play a substantial role in the implementation of Community research and technological development activities, thereby contributing to the improvement of industrial competitiveness on a broader basis; whereas, therefore, particular attention should be paid to the specific needs of these undertakings in order to facilitate their access to information, encourage them to take part in Community programmes and enhance their ability to exploit the results of Community research;

Whereas it is necessary to promote the overall harmonious development of the Community with a view to strengthening its economic and social cohesion; whereas it is intended that the implementation of the common policies of the Community and its strategy for research and technological development should contribute to this objective; whereas a Community framework programme should play its part, along with other Community instruments, in helping to strengthen scientific and technological infrastructure and potential throughout the Community;

Whereas on 9 April 1992 the Commission presented a communication entitled 'Research after Maastricht: an assessment, a strategy' in which it assessed progress in implementing the third framework programme; whereas an evaluation of all the specific programmes carried out under the second framework programme was also presented;

Whereas, in view of the rapid pace of technological development, the new economic challenges which the Community must meet and the increased level of global competition, Community activities in the field of research and technological development must be intensified and augmented; whereas, in the light of these factors, it has been judged appropriate to adopt a new framework programme for the period 1994 to 1998 developing out of the current framework programme 1990 to 1994;

Whereas it is necessary for the Community to encourage enterprises, including small and medium-sized undertakings, research centres and universities in their research and technological development activities and, to that end, to support their efforts to cooperate with one another by appropriate measures;

Whereas the process of technological progress requires a continuum of interlinked activities, ranging from basic research through to the demonstration of the applications of new technologies; whereas, however, the precompetitive aspect must remain a central priority in Community research and technological development activities;

Whereas it is recognized that small and medium-sized undertakings are able to make a significant contribution to the innovation process and should play a substantial role in the implementation of Community research and technological development activities, thereby contributing to the improvement of industrial competitiveness on a broader basis; whereas, therefore, particular attention should be paid to the specific needs of these undertakings in order to facilitate their access to information, encourage them to take part in Community programmes and enhance their ability to exploit the results of Community research;

Whereas Article 130b of the Treaty lays down that the formulation and implementation of the Community's policies and actions must take into account the objectives related to economic and social cohesion; whereas, in accordance with this principle, the framework programme must contribute to the harmonious development of the Community; whereas within this framework each common policy should fully preserve its characteristics and specific features, in particular the policy on research and technological development, which will continue to be founded on scientific excellence; whereas it is therefore necessary to strengthen the synergy between research activities and the action undertaken by the Community via the structural funds;

Whereas the Community's activities of research and technological development must, in accordance with Article 130 g of the Treaty and Article 4 (1) of the EAEC Treaty, complement the activities undertaken in member states and thus bring added value to them;

Whereas this is the case when the objectives of actions can be better carried out at Community level; whereas this applies for, first, 'big science' activities, involving international initiatives and often taking the form of 'mega-projects'; secondly, activities involving priority technologies, including generic technologies which can have a bearing on a number of industrial sectors; thirdly, activities designed to organize the single market, particularly in the sectors covered by the various common policies; fourthly, prenormative research in cases where the acquisition of scientific and technological data is necessary for the preparation of standards, norms and regulations; fifthly, activities to assist the European scientific community to develop Community-wide integrated systems of networks and mobility programmes;

Whereas, with regard to the structure of the fourth framework programme, reference should be made to the four activities mentioned in Article 130g of the Treaty which can serve equally as guidelines for Euratom activities;

Whereas the first of these activities involves the implementation of research, technological development and demonstration programmes, by promoting cooperation with and between undertakings, research centres and universities; whereas the formulation of these programmes requires a renewed thematic framework to prevent the self-perpetuation of certain projects; whereas, within such a framework, a minority of RTD activities may be considered to have reached completion and will not be continued; whereas, on the other hand, most of these activities, which are constantly being updated, may be continued; whereas, lastly, a small number of new thematic areas should be introduced to reflect the new perspectives and requirements generated by industrial innovation and the development of European society;

Whereas the principle of subsidiarity is set out in detail in Article 3b of the Treaty; whereas, according to that principle, subsidiarity is deemed to exist and the Community is empowered to act in cases where a proposed action, by reason of its scale or effects, is better carried out at Community level;

Whereas this is the case when the objectives of actions can be better carried out at Community level; whereas this applies for, first, 'big science' activities, involving international initiatives and often taking the form of 'mega-projects'; secondly, activities involving priority technologies, including generic technologies which can have a bearing on a number of industrial sectors; thirdly, activities designed to organize the single market, particularly in the sectors covered by the various common policies; fourthly, prenormative research in cases where the acquisition of scientific and technological data is necessary for the preparation of standards, norms and regulations; fifthly, activities to assist the European scientific community to develop Community-wide integrated systems of networks and mobility programmes;

Whereas Article 130f of the Treaty indicates the horizontal nature of Community research and technological development activities and their transversal relationship with the various common policies, and also lays down that the scientific and technological aspects of these common policies should be brought together within a single group under Title XV of the Treaty; whereas, accordingly, Community research and technological development activities, whatever their form and whatever common policy they support, must be included within the framework programme;

Whereas Articles 130g and 130i of the Treaty lay down the mandatory structural elements of the framework programme; whereas the Treaty defines, in particular, four types of Community activity and foresees for each the determination in the framework programme of their respective shares of the maximum overall amount for the framework programme;

Whereas the first of these activities involves the implementation of research, technological development and demonstration programmes, by promoting cooperation with and between undertakings, research centres and universities; whereas the formulation of these programmes requires a renewed thematic framework to prevent the self-perpetuation of certain projects; whereas, within such a framework, a minority of RTD activities may be considered to have reached completion and will not be continued; whereas, on the other hand, most of these activities, which are constantly being updated, may be continued; whereas, lastly, a small number of new thematic areas should be introduced to reflect the new perspectives and requirements generated by industrial innovation and the development of European society;

Whereas the second of these activities involves the promotion of cooperation in the field of Community research, technological development and demonstration with third countries and international organizations; whereas in this field of activity it is necessary to take account of the Community's greatly increased international responsibilities; whereas scientific and technical cooperation must be developed or stepped up on a broad front encompassing the industrialized nations, the countries of Central and Eastern Europe and the developing countries; whereas account must be taken of the new opportunities offered, in respect of the EFTA countries, by the Agreement on the European Economic Area; whereas the complementary relationship between Community activity and Eureka projects should be systematically reinforced; whereas it would be expedient to step up COST activities relating to multilateral research projects;

Whereas the third of these activities involves the dissemination and optimization of the results of activities in Community research, technological development and demonstration; whereas it would be useful to renew the thematic framework of this activity in order to strengthen the mechanisms which allow the effective transfer of results to socio-economic operators; whereas, in this respect, an optimization and technological transfer fund should be set up to enable SME's to make the most of their innovative capacity;

Whereas the fourth of these activities involves the stimulation of the training and mobility of researchers in the Community; whereas work should be pursued on the initiative launched under the third framework programme to increase human RTD capital and to improve the mobility of persons working in research, inter alia on the basis of networks of laboratories and research teams, both public and private, in Member States, throughout the Community; whereas this activity is intended to strengthen the scientific bases of the Community though the use of instruments of a horizontal nature;

Whereas provision should be made in the framework programme for joint activities needed to prepare the ground for and to back up the research and technological development and demonstration activities;

Whereas the Joint Research Centre is called on to contribute to the implementation of the framework programme, particularly in those fields in which it can offer an impartial and independent expert opinion and in which it can take a lead in encouraging the implementation of Community policies;

Whereas the framework programme is to be implemented through specific programmes and may also be implemented through supplementary programmes within the meaning of Article 130l, participation within the meaning of Article 130m or may take the form of joint undertakings or other structures within the meaning of Article 130o of the Treaty;

Whereas the second of these activities involves the promotion of cooperation in the field of Community research, technological development and demonstration with third countries and international organizations; whereas in this field of activity it is necessary to take account of the Community's greatly increased international responsibilities; whereas scientific and technical cooperation must be developed or stepped up on a broad front encompassing the industrialized nations, the countries of Central and Eastern Europe and the developing countries; whereas account must be taken of the new opportunities offered, in respect of the EFTA countries, by the Agreement on the European Economic Area; whereas the complementary relationship between Community activity and Eureka projects should be systematically reinforced; whereas it would be expedient to step up COST activities relating to multilateral research projects;

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Whereas the framework programme is to be implemented through specific programmes and may also be implemented through supplementary programmes within the meaning of Article 130k, participation within the meaning of Article 130l or may take the form of joint undertakings or other structures within the meaning of Article 130n of the Treaty;

Whereas, in accordance with Article 130i(1) of the Treaty, it is necessary to make an estimate of the Community financial means necessary for the realization of the research and development activities envisaged; whereas this amount is compatible with the financial perspective included in the Interinstitutional Agreement of ..... for the years 1993 to 1997;

Whereas as regards the implementation of the framework programme in 1998 provision should be made for the amount deemed necessary and the continuity of research activities should be ensured;

Whereas the Scientific and Technical Committee (Crest) has been consulted;

Whereas the Scientific and Technical Committee referred to in Article 7 of the EAEC Treaty has been consulted by the Commission and has delivered its opinion,

HAS DECIDED AS FOLLOWS:

Article 1

1. A framework programme for Community activities in the field of research and technological development, hereinafter referred to as the "fourth framework programme", is hereby adopted for the period 1994 to 1998.

2. The fourth framework programme shall include all Community activities as set out in Article 130g of the Treaty.

3. The amount deemed necessary for Community financial participation in the fourth framework programme as a whole shall be ECU ... million, of which ECU ... million shall be for the years 1994, 1995, 1996 and 1997 and ECU ... million for 1998.

4. The latter amount shall be intended for the financing in 1998 of activities begun in the period 1994 to 1997. If this amount is covered by any financial perspective fixed for 1998 it shall be deemed to be confirmed. In any other circumstances, the Council should, as soon as possible and in accordance with Article 130i(2) of the Treaty, take the decisions deemed necessary to ensure the continuity of the present framework programme.

5. The breakdown of the amount deemed necessary for the period 1994 to 1998 between the four activities referred to in Article 130g shall be as follows: activity (a) ECU ... million, activity (b) ECU ... million, activity (c) ECU ... million, activity (d) ECU ... million. This breakdown is given in

Whereas, in accordance with Article 130i(1) of the Treaty, it is necessary to fix the maximum overall amount and the detailed rules for Community financial participation in the framework programme and the respective shares in each of the activities provided for;

Whereas the Scientific and Technical Committee (Crest) has been consulted,

HAVE DECIDED AS FOLLOWS:

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1. A framework programme for Community activities in the field of research and technological development, hereinafter referred to as the "fourth framework programme", is hereby adopted for the period 1994 to 1998.

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4. The latter amount shall be intended for the financing in 1998 of activities begun in the period 1994 to 1997. If this amount is smaller or larger than that foreseen in any financial perspectives fixed for 1998, the decisions deemed necessary to make adjustments are to be taken as soon as possible in accordance with Article 130 i (2) of the Treaty.

5. The breakdown of the maximum overall amount for the period 1994 to 1998 between the four activities referred to in Article 130g shall be as follows: activity (a) ECU ... million, activity (b) ECU ... million, activity (c) ECU ... million, activity (d) ECU ... million. This breakdown is given in

Annex I.

6. The scientific and technological objectives (thematic content) of the four activities referred to in Article 130g of the Treaty are described in Annex II.

7. The selection criteria to be applied in the implementation of the fourth framework programme are laid down in Annex III.

8. The detailed rules for Community financial participation are laid down in Annex IV.

Article 2

1. The fourth framework programme shall be implemented through specific programmes in accordance with Articles 130k and 130p of the Treaty. For activities covered by the EAEC Treaty, programmes shall be adopted in accordance with Article 7 of the said Treaty.

Each specific programme shall determine its precise objectives and provide for an evaluation of the results achieved as compared against those objectives and against the criteria laid down in Annex III.

2. The implementation of the fourth framework programme may also give rise, as necessary, to supplementary programmes within the meaning of Article 130l of the Treaty, participation within the meaning of Article 130m and to joint undertakings or any other structure within the meaning of Article 130o.

3. If a decision is taken in implementation of Article 1(4), the various specific programmes or other decisions for implementing the framework programme shall be adjusted to take account of that decision.

Article 3

The detailed rules for financial participation by the Communities in the fourth framework programme as a whole shall be those provided for by the Financial Regulation applicable to the general budget of the European Communities.

Article 4

1. During the third year of execution of the fourth framework programme the Commission shall assess its progress by reference to the criteria set out in Annex III. It shall examine in particular whether the objectives, priorities and financial resources are still appropriate to the changing situation.

Annex I.

6. The scientific and technological objectives (thematic content) of the four activities referred to in Article 130g of the Treaty are described in Annex II.

7. The selection criteria to be applied in the implementation of the fourth framework programme are laid down in Annex III.

8. The detailed rules for Community financial participation are laid down in Annex IV.

Article 2

1. The fourth framework programme shall be implemented through specific programmes in accordance with Article 130i(3) and (4) of the Treaty.

Each specific programme shall determine its precise objectives and provide for an evaluation of the results achieved as compared against those objectives and against the criteria laid down in Annex III.

2. The implementation of the fourth framework programme may also give rise, as necessary, to supplementary programmes within the meaning of Article 130k of the Treaty, participation within the meaning of Article 130l and to joint undertakings or any other structure within the meaning of Article 130n.

3. If a decision is taken in implementation of Article 1(4), the various specific programmes or other decisions for implementing the framework programme shall be adjusted to take account of that decision.

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The detailed rules for financial participation by the Community in the fourth framework programme as a whole shall be those provided for by the Financial Regulation applicable to the general budget of the European Communities.

Article 4

1. During the third year of execution of the fourth framework programme the Commission shall assess its progress by reference to the criteria set out in Annex III. It shall examine in particular whether the objectives, priorities and financial resources are still appropriate to the changing situation.

2. The Commission shall communicate the findings of this examination and evaluation to the Council together with its comments. After the Council has examined this communication, the Commission shall submit to it the necessary proposals for decisions.	2. The Commission shall communicate the findings of this examination and evaluation to the Council and the Parliament together with its comments. After the Council and the Parliament have examined this communication, the Commission shall submit to them the necessary proposals for decisions.
3. When implementation of the fourth framework programme has been completed the Commission shall make a new evaluation of that programme.	3. When implementation of the fourth framework programme has been completed the Commission shall make a new evaluation of that programme.

ANNEX I

4th FRAMEWORK PROGRAMME 1994-1998	
	MECU (1992 prices)
First Activity	11 600
Second Activity (1)	1 400
Third Activity (2)	700
Fourth Activity	1 000
TOTAL	14 700

N.B. Resources allocated to horizontal support measures, which cover the preparatory, accompanying actions as well as incentives for promotion and enabling activities, are set at MECU 1 600. This amount, which is already included in the above figures, is distributed proportionally amongst the four activities and should remain clearly identifiable.

(1) The share of resources allocated to the second activity, which enters for the first time in the Framework Programme, increases relative to the period 1990-94. This implies a substantial rise in international cooperation in science and technology with both Central and Eastern European countries and developing countries.

(2) The share of resources allocated to the third activity increases relative to the period 1990-94. This activity includes the valorisation fund for SMEs as well as all the dissemination actions which will raise the impact of Community RTD on economic and social cohesion.

ANNEX II

FIRST ACTIVITY

Implementation of research, technological development and demonstration programmes, by promoting cooperation with and between undertakings, research centres and universities.

This activity covers a major part of Community activities in the field of research and technological development. The basic approach is the participation of transnational groupings of organisations, research centres, universities and enterprises with the Joint Research Centre (JRC) also participating where it has specific competences. It will develop in the fourth framework programme along the following lines.

GENERAL OBJECTIVES: Three fundamental objectives form the basis of the fourth framework programme: support for the competitiveness of European industry; the contribution of science and technology to the satisfaction of society's needs; support for the various common policies. In addressing these three objectives, an appropriate combination of continuity and novelty will be sought. Moreover, research activities currently scattered either in common policies or in the category of activities currently carried out outside the framework programme, will be unified in the single scheme of the framework programme.

THE THEMATIC FRAMEWORK: The breadth of Community activities lends itself to a presentation structured around core themes. This method responds to the need to limit presentation, at the level of the framework programme, to the main lines of the envisaged activities, as well as to indicate clearly the priority themes which will be later defined technically and entrusted to the specific programmes. It is at the level of specific programmes that the necessary regroupings between core themes will be effected.

THE MAIN TYPES OF ACTION AND THEIR CHARACTERISTICS: The various core themes correspond essentially to three types of activity: traditional RTD activities (with a reinforcement of their cooperative research character); priority technology activities (addressing generic technologies with a broad application which play a key role for the competitiveness of the European industrial system: the Eureka scheme may be used to carry out these projects; the Community will finance the precompetitive research part, the rest being developed in the Eureka framework or with other appropriate forms of finance); pluridisciplinary activities (optimisation of the plurality of approaches and of interactions between different administrative areas).

Information and communication technologies

1. KEY ELEMENTS FOR IT SYSTEMS : The objective is to enable the broad spectrum of European industry to produce and use electronic systems competitively. The R & D effort will comprise key component technologies (CMOS), system elements (microprocessors and microsystems) and basic IT research. Together these aim to ensure timely access to the building blocks of complex systems for this and future technology generations. The next generation of advanced CMOS-based circuits of lower feature size, higher speed and increased complexity will be developed under the close guidance of industry and in conjunction with the new phase of the Joint European Submicron Silicon (JESSI) project. Microprocessor systems based on RISC architecture, along with supporting open system software will be developed aimed at European systems integrators, while the development of microsystems incorporating sensors, actuators and logic circuitry will involve different disciplines, from semiconductor processing technology, optics and other sensing technologies to robots. The basic research effort in this, as in other interdisciplinary areas, will be complemented by thematic networks of excellence.

2. SOFTWARE ENGINEERING AND BEST PRACTICE: Priority action by the Community in software aims, on the one hand, at supporting the development of productivity-enhancing software methods and tools and, on the other, it aims to ensure the best use of these methods and tools by users, who account for 70% of all software produced. Particular emphasis in both actions will be placed on middleware, a new concept which, being the intermediary between users and system software, allows users a new flexibility in building their information environments. R&D efforts will be concentrated on achieving wide-scale reuse of software through aids that support portability and heterogeneity in distributed systems, as well as on the efficient integration of a wide variety of software based components, supporting a wide range of application system types, such as for example statistical information systems. At the same time, Community action will focus on users through: applications experiments in the use of advanced methods and tools in real industrial contexts; establishment of a specialised electronic database forming a common pool of knowledge contributed to and equally accessible by all; training and awareness actions focusing on managers wishing to assess the potential benefits to be gained and the approaches to be adopted.

3. HIGH PERFORMANCE COMPUTING AND NETWORKING: The objective is to exploit High Performance Computing and Networking capabilities for the benefit of a broad range of users while, at the same time, developing further the capabilities of High Performance Computing and Networking in order to meet increasingly demanding user requirements; from non-destructive simulations of car-collisions through advanced imaging for earth observation and exploration to simulations advancing medical or nuclear fusion research. Community action will be along three axes. A common system architecture based on R&D for new simulation techniques, algorithms for parallelism, visualisation techniques as well as hardware and software demonstrators for high performance and their associated test beds will be established in parallel with the development of applications simulating effectively complex reality through R&D that brings together leading edge users with High Performance Computing and Networking suppliers. At the same time, support will be given to the emergence of a fully distributed architecture through the development of computer-to-computer and computer-to-network interfaces, including their operational protocols and the associated demonstration and validation.

4. IMAGE TECHNOLOGIES: The objective of this new technology priority action is to advance the chain of technologies which are required for improving the processing of digitalised images for several types of applications (eg. HDTV, office, automotive, avionics) and their integration with other media. The R&D will address advanced display technologies, with liquid crystal displays as a major technology option. Display features such as surface area, portability, power consumption and high image quality will be in the focus of the efforts. Image storage, processing and transmission technologies will be developed. The work includes multimedia systems and communication means which integrate image, text and sound and make them available and accessible over heterogeneous networks. Emphasis will be placed on the establishment of international standards in conjunction with the standards for HDTV, for satellite and terrestrial transmission.

5. ELECTRONIC NETWORKS AND LINGUISTICS: The objective is to develop a networking infrastructure facilitating the flow of information amongst entities providing services of public interest. The R&D will aim at providing adequate networking in terms of speed capacity, quality service and ease of access to information through standards. This infrastructure will support the development of distance learning techniques and tools, will enable complex information exchange amongst various groups such as researchers, hospitals and medical research centres, and libraries. Special attention will be paid to the requirements of rural areas. The language diversity of Europe will be accommodated by means of R&D enhancing both spoken and written language interfaces for interaction, enabling multi-lingual exchanges across the network. This R&D will focus on tools and common reusable language resources such as text and speech corpora and access to information services.

6. ICT SUPPORT FOR FUNCTION INTEGRATION IN MANUFACTURING: The objective is to develop advanced information and communication-based techniques, tools and equipment which have broad applicability across a range of industrial sectors. This entails the development of common standards, interfaces and protocols to support open systems multisupplier operations. The R&D work will focus on the development of ICT devices and methods in themselves before concrete application to a specific manufacturing technology. Emphasis will be put on two aspects: first, the development and testing of ICT-based platforms for the integration of different functions in a manufacturing enterprise, notably for multisupplier and multi-site operations; second, the development of integrable advanced robotics systems, capable of handling a wide range of complex tasks, and encompassing autonomous and semi-autonomous modes of operation. In particular, sensor-based coordination as well as advanced vision systems will be developed.

7 ADVANCED COMMUNICATIONS: Following the completion of the RACE programme, the objective of this new activity is twofold, first, to enable, through the use of "intelligence" in the networks, flexible and robust network services allowing ease of use, multistandard support and low costs. These networks services will be capable of evolving with changing user demand; they allow access through portable terminals. The second is to lay the foundations of the communication networks of year 2000 and beyond, which will be capable of handling very high-speed data exchange and systems and high-volume multimedia services. The R&D will aim at developing "intelligent agents", to provide for fault-tolerance and user transparency; "communication servers" to allow multistandard connectivity; "service managers" providing for flexible integration of modular services; technologies permitting efficient frequency and energy use; low weight terminals; security issues being addressed as well; optical transmission techniques, including work on lasers and amplifiers for high speed transmission; architectures for high speed networks; exploiting the faster switching capabilities and higher capacities offered by photonic switching; addressing the issue of access of the customers to the network; and providing guidance for future standardisation work.

8. INFORMATION EXCHANGE BETWEEN ADMINISTRATIONS: The objective is to achieve a common communication infrastructure that enables administrations to fulfil the needs for information interchange among themselves and with firms and the public at large. This includes the continuation of earlier R&D activities initiated under the 3rd Framework Programme as part of application experiments in key areas, e.g. those related to free movement of persons, goods, services and capital, those related to the protection of the external frontier of the Community, those related to fraud control and those providing social services for people, involving administrations, vendors, operators/service providers and the public (the so-called "European nervous system"). It entails using advanced communication and information processing technologies while taking account of operational and public procurement aspects. There will be emphasis on common functional specifications for interworking at the application level and on R&D aimed at future innovative solutions.

9. TECHNOLOGIES FOR INTEGRATED AND OPTIMISED TRANSPORT SYSTEMS: The general objective is to contribute to the sustainable mobility of freight and passengers through the optimisation of network exploitation under the best environmental, energy efficient and social conditions. An integrated approach will be adopted, directed towards a multimodal transport system, focusing on developing scenarios and analyses at the urban, regional and transeuropean level and the interrelationship between human factors and technology. Telematics systems will be developed and integrated across different transport modes to ensure the improved functioning of the transport systems, their interconnection and interoperability. This will include dynamic traffic control, logistics, monitoring and communication and advanced public transport systems. In particular R&D must continue and be accelerated with the aim of defining specifications for a single European unified Air Traffic Management (ATM) system, train communication control and command, vessel traffic management and road and traffic management systems also for multimodal and urban transport. In this context, particular attention will be paid to the development of the European ATM in order to overcome current congestion problems in airports and the air space. This system will incorporate satellite communications, advanced safety critical computing and high integrity aircraft to ground control communication. Additionally, a Common Control and Communication System (CCCS), which includes signalling and train to control centre communications, is probably the most important research field for the future European rail network because of the great diversity of practice across Europe, which currently prevents inter-network penetration.

Industrial technologies

10. ICT MANUFACTURERS AND INDUSTRIAL USERS: COOPERATIVE APPROACHES AND OPPORTUNITIES: While information technologies on the one hand and industrial technologies on the other each separately represent important fields of R & D activity, specific actions are indispensable to cover the area which is opening up for the interaction and direct collaboration between information technology manufacturers and industrial users. Using the enabling techniques developed under information technologies, the goal is to achieve new levels of quality and functionality in industrial applications by maximising the synergy between BRITE and ESPRIT through R&D defined to meet user needs in manufacturing industries. The R&D work will involve suppliers and users and will integrate flexible and reliable information based systems in sector specific industrial applications, such as avionic instrumentation, on-line inspection systems for the textile and clothing industry or the use of microprocessors in automotive engineering.

11. ADVANCED MANUFACTURING TECHNOLOGIES: The objective is to develop and integrate advanced manufacturing technologies to secure industrial excellence and competitiveness across a wide spectrum of industrial sectors and thus to support the modernisation of traditional industries. This will embrace all manufacturing technologies aimed at improving quality, reducing costs, and speeding time to market, thereby promoting manufacturing systems which are more responsive to customer needs. Use will be made of state of the art in information technology, in particular Computer Aided Design, Engineering and Manufacturing, telecommunications and critical process technologies such as laser processing, sensors and micromanufacturing. Particular emphasis will be given to the development of clean manufacturing processes and techniques, such as industrial scale bioprocessing, which will increase industrial competitiveness, through major improvements in safety and reduction in energy consumption and environmental impact. This will include integrated processes, making use of renewable materials and energy sources, waste minimisation, recycling and disposal, whole life cycle handling and improved safety and environmental assessment, management and protection techniques.

12. HUMAN CENTERED MANUFACTURING: The objective is to stimulate, on a European scale, research and diffusion of best practice in respect of human centered and flexible manufacturing and organization. Emphasis is to be given, within a lean production approach, to interdisciplinary research and demonstration activities aimed at optimal use of human resources; developing new concepts for skill-generating and skill-sharing within the organization focused on team work, interdepartmental and interprofessional collaborative practices, new approaches to the management of customer-driven production processes; interfirm networks, involving in particular SMEs; methodologies of stockless and just-in-time production; and new management techniques for integrating the human, organization and technology aspects of the enterprise.

13. MATERIALS AND THEIR PROCESSING: The objective is to develop the capability of industry to exploit new and improved engineering materials in innovative products, processes and structures. The emphasis will be on improving ceramic, natural and synthetic polymer, and metallic materials, with attention to widening the applicability of engineered composites and the development of innovative and cost-effective processing techniques for mass commodity materials. Recycling and the recovery of materials will be addressed, including the renewal of components, and the quality assurance necessary to meet the standards for re-use. Close links will be maintained with design and application technologies to ensure their widest application. Attention will be directed to the classification and characterisation of structural, functional and mass commodity materials to optimise their applicability and to minimise their impact both on health and on the environment. Prenormative aspects will be included. For functional materials, ranging from high temperature superconductors to biomaterials, the emphasis will be on their industrial and medical applications.

14. MEASUREMENT AND TESTING: The objective is mainly to contribute to the implementation of Community policies and directives by developing the required methods and standards of measurement, including prenormative development of testing methods for industrial products when necessary to issue new European Standards. Emphasis will be placed on developing, in laboratories of Member States, test methods and techniques leading to mutual recognition of calibration, metrology and reference materials. Prenormative studies related to safety in the handling of dangerous products, in explosive environments, in industrial and other areas, and in developing new methods of evaluating hazards of dangerous chemicals, will be included.

15. TECHNOLOGY FOR TRANSPORT MEANS: The objective is to contribute to the development and management of safer, more efficient and cleaner transport means. The RTD activities in this sector should benefit from generic technologies developed in other areas such as advanced manufacturing technologies, materials and their processing and information technologies, promoting synergies with industries which interface with transport. Emphasis will be placed on the development of a wide spectrum of generic technologies which should be applied in solving the major problems facing the automotive, shipping, rail and aeronautic industries. For the automotive sector the goal is the development of cleaner, efficient and safer vehicles based on advanced propulsion, improvements in weight reduction, recycling techniques, and advances in vehicle design and manufacture. This will extend to safer and environmentally acceptable technologies to improve the infrastructure. For aviation the emphasis should be put on reduction of emissions, improved safety, expedition and economic operation. For rail the research will include high speed and safer rolling stock. For the maritime sector efforts will be concentrated on faster, automated and safer ships for passengers and freight including short sea shipping. Finally, special attention will be given to innovative technologies and a common organisational approach which will improve complementarity, efficiency and quality of services of all modes and which are adapted to the needs of an integrated transport and distribution system.

16. SCIENCE AND TECHNOLOGY FOR A NEW URBAN HABITAT: The objective is to contribute to the solution of acute problems of life in cities, in particular with regard to communications, work, the environment and health, and to promote, through the integration of related RTD work, the emergence of a new urban habitat in Europe. Profoundly innovative from the point of view of the multidisciplinary approach which is followed and of the diversity of the actors who will participate, the research and demonstration activities foreseen will cover urban planning technologies; rehabilitation, transport and pollution, infrastructures, teleports, the "intelligent" building; distance work, security and communications; city networks; as well as the sharing of experience in the field of urban management and construction, while promoting human and social integration.

17. SCIENCE AND TECHNOLOGY FOR THE PRESERVATION OF EUROPEAN CULTURAL HERITAGE: The objective is to provide scientific and technological support for the discovery, evaluation, preservation and study of European cultural heritage. This includes architectural resources, archaeological sites and artifacts, and movable cultural property such as paintings, sculptures and ancient paper. R&D will be carried out on advanced techniques for the discovery of archaeological sites and archaeological dating methods. Technologies will be developed to support environmental conservation, restoration and maintenance of the various types of cultural heritage.

18. SCIENCE AND TECHNOLOGY FOR THE STRUGGLE AGAINST SOCIAL EXCLUSION: Specific multidisciplinary research activities, drawing on the human, social and economic sciences on the one hand and technology on the other, will strengthen efforts to reduce the phenomenon of social exclusion afflicting significant sectors of society. The aim is to break down barriers and to harmonise opportunities. Research efforts will focus, first, on ways of ensuring that all have ready access to information which concerns them as citizens through the simplification and decentralisation of administration. Second, they will focus on developing instruments for implementing provisions on European citizenship. Third, pilot projects will be launched to improve the efficiency of public services in areas such as housing, health, education, training, job opportunities and leisure services. Fourth, research will focus on ways of rehabilitating and integrating areas of social exclusion arising from poverty, disability, age, illness and differences of race, language and culture.

Environment

19. GLOBAL CHANGE: The aim is to provide a major Community research contribution to world-wide efforts of increasing understanding of global environmental change. The nature and magnitude of change will be predicted by evaluating the effects of human activities on key processes which govern climate, the atmosphere, atmospheric chemistry and physics, circulation in the oceans, biogeochemical cycles as well as ecosystems functioning and diversity. The consequences of global change on renewable and non-renewable resources, as well as on plant, animal and human life will be assessed. Techniques, sensors, instruments and new statistical tools to study key phenomena will be developed, including applications of earth observations from space, ice core studies, as well as advanced regional and global models to address the relationships between energy, environment and the economy. The relationships between environmentally sustainable development, economic growth and society will also be studied. Within this global and multidisciplinary framework, particular attention will be given to assessing the impacts of environmental change on the population and environment within the Community, e.g. elucidation of the causes of desertification in the Mediterranean area and of ways of combating

it, and to a synthesis at Community level with respect to problems affecting other geographical areas, notably, in the light of the Community's undertakings at the Earth Summit in Rio de Janeiro, those of the developing countries. To this end, generic technologies will be developed to monitor, assess and manage vital land and water resources. This will include forecasting the availability of water and increasing the supply of fresh water, including through desalination and decontamination. Scientific criteria for soil quality will be established, as well as methods for mitigating erosion and for soil rehabilitation.

20. ENVIRONMENTAL QUALITY AND HUMAN HEALTH: The objectives are to advance understanding of the relationships between environmental quality and human health and to improve the evaluations of the health risks of technological, economic and societal development. The basic mechanisms through which environmental factors affect human health will be studied. Early warning and prevention of health hazards are to be improved by development of environmental monitoring and chemical screening systems as well as of human biomonitoring techniques; methods to identify population groups and individuals at greatest risk from environmental stresses will be established. Quantitative risk assessments will be performed for major pollutants. Environmental epidemiological studies and environmental health surveillance systems will be advanced. The scientific basis of environmental health policies and regulations will be improved.

21. NATURAL HAZARDS: The objective is to provide the scientific basis for risk management in all phases: alert, protection, prevention, etc. and for the development of suitable methodologies and technologies such as vulnerability analyses and engineering research, for the protection of human lives and property, natural and man made structures, power lines and communications, buildings of social and cultural importance. This should lead to the reduction of the risks threatening human populations and sectors of socio-economic importance such as agriculture, transport, human settlements, etc. The natural hazards to be studied are earthquakes, volcanic eruptions, wildfires, and extreme events such as storms, floods, landslides and avalanches.

22. INNOVATIVE TECHNOLOGIES AND INFRASTRUCTURE FOR MARINE AND POLAR RESEARCH: The overall objective is to develop approaches and technologies in order to describe, monitor, forecast and protect the marine environment. Priority will be given to innovative instrumentation and generic technologies for automated and long-term measurements, both in the water column and on the sea floor, and especially under extreme conditions with respect to sea state, sea ice and pressure. These developments will be used for multidisciplinary process studies in the various disciplines of marine science in areas of the European seas extending from the coastal zone to the deep sea. Multidisciplinary research will also be carried out to elucidate the dynamics of polar and sub-polar seas and their exchange processes with the world oceans. Support will be given to innovative concepts in coastal engineering. A European infrastructure will be promoted for ocean data management, for modelling and ultimately forecasting the oceans, and for the logistics of marine research e.g. oceanographic platforms and other large scale facilities.

Life sciences and technologies

23. GENOMES: The long term objective is to determine the genetic heritage of man and to understand genetic variation. This requires complementary studies of the human genome and of genomes of species important to man. In particular, research is to be pursued to understand how genetic information is stored, replicated and transcribed. A detailed analysis of coding and non-coding DNA is required to improve our understanding of gene expression. In addition, the biological functions directed by the genetic messages so unravelled will be identified, primarily in organisms of agricultural or industrial importance. A multidisciplinary dialogue on the ethical, social and legal aspects of human genome analysis and its implications and applications will be continued. This knowledge will lead to new and responsible applications in medicine, e.g. somatic gene therapy. Germ-line gene therapy is excluded.

24. MOLECULAR GENETICS OF PLANTS AND BIODIVERSITY: The objective is to design the genetic make-up of agricultural species using molecular surgery. By a combination of molecular biology, in particular through initiatives to use Advanced Molecular Genetics for Community Agriculture, and the established sciences of crop production, breeding and protection, new options will be developed to create plant varieties or microbial strains beneficial to agriculture and to the environment. Agriculturally relevant traits and their corresponding genes will be characterized systematically. The biological cycling of matter in the environment and the diversity of living species will be further elucidated, inventoried, protected, restored, and safely exploited. Cost-effective methods for the preservation of genetic resources, based on genetics, immunology, automation and information technology, will be developed.

25. THE CELL FACTORY: The objective is to understand the physiology and the genetics of microorganisms, plants and animal cell lines which play an important role in the production of substances with high industrial or medicinal interest. The biological routes through which the cell communicates with other cells, with other parts of organisms, or with its changing environment are to be described in molecular detail. The elucidation of the signalling and sensing capacities will tell how cells regulate their growth, survival, and complex chemistry. At the same time, and through the knowledge accumulated in this manner on the structure and functions of essential biomolecules, new genetic, physio-chemical and information technologies will be promoted with a view to designing substances which can be tailor-made to the needs of

man. Major importance is also attributed to the optimization of enzymatic and cellular processes yielding biomolecules at an industrial scale.

26. AGRICULTURE, FORESTRY AND RURAL DEVELOPMENT: These areas will be supported through research and technological development in accordance with the reformed CAP. Priority areas will include environmentally compatible and cost-efficient agricultural production systems and higher quality and value agricultural products (for food and non-food uses) to improve the efficiency and competitiveness of Community agriculture. Research will also address management of abandoned and set-aside lands, conservation of agricultural resources and the countryside, and appropriate inputs, such as material and equipment and information technologies. Research on improved plant and animal health and welfare will be addressed. The scientific basis for the sustainable multifunctional management of Community forests and afforestation in line with Community policies will be provided. For rural development, work will concentrate on socio-economic assessments, telematic systems for small businesses, regional specialities, on-farm added-value and complementary activities. Promising results of the above activities will be tested through demonstration projects.

27. MONITORING OF AGRICULTURAL PRODUCTION: The aim is to develop a dedicated infrastructure utilising observational networks and agro-meteorological models coupled with Geographic Information Systems in order to monitor agricultural production in Europe, in support of the CAP. This interdisciplinary activity will address such topics as updating of cadastres using satellite and airborne data, control and monitoring of farmers' declarations and other administrative data, assessment of the impact of the CAP on production, environmental impacts of new directives and the assessment of foreign crops. Such projects require the use of advanced techniques of remote sensing including space and airborne systems. In addition, new techniques and methodologies for agro-meteorological data validation and analyses will be developed.

28. INDUSTRIAL NON-FOOD USES OF AGRICULTURAL PRODUCTS; BIOENERGY: The production of market relevant "natural" chemicals, high value added products and energy from agricultural raw materials will be developed as foreseen in the new orientation of the Common Agricultural Policy, CAP, thus improving the strategic competitivity of related European industries. Multidisciplinary R&D on adapting raw material supply to the demands of industry in terms of quality, quantity and supply logistics and projects on the sustainable, cost-efficient and environmentally friendly production and processing of biological raw materials will be carried out, including work on closed-cycle production systems, combined food and non-food products, biopesticides and seeds. Special emphasis will be placed on technical problems related to security of supply, processing variable quality, and the up-scaling of technically and economically feasible innovative processes providing products such as biodegradable materials, specialty and fine chemicals and energy. Large-scale applications will be promoted by demonstration projects, including the further testing of the biorefinery concept. New technical developments for up-grading biomass for energy production, including electricity and liquid fuels, will be developed.

29. FISHERIES AND AQUACULTURE: With a view to supporting the evolution of the Common Fisheries Policy (C.F.P.), ensuring a sustainable and balanced exploitation of fisheries and aquaculture resources, this theme will be oriented along four main axes: assessment of fish resources and management of fisheries, including socio-economic analysis; interactions between the environment, fisheries and aquaculture including the development of environmentally friendly technology; genetics of exploited marine populations and aquacultured species with special emphasis on pathological issues; and extending knowledge of the characteristics, safety and quality of fish-derived products.

30. DEVELOPMENT OF HARMONIZED PROTOCOLS FOR CLINICAL AND PHARMACEUTICAL PURPOSES: The aim of this research is to develop harmonized protocols to rationalize, optimise and decentralize clinical and pharmaceutical research. The research will focus on the standardization of medical records, on the harmonization of protocols for clinical research and on the definition of new, cheaper, faster and more significant tests for drug development. This will improve the framework conditions within which the European pharmaceutical industry operates. The emphasis is on the development of a system for multicentre clinical trials, based on a large population, to obtain more meaningful drug evaluations, and on the development of harmonized drug surveillance networks for early detection of undesired effects on new drugs, within an appropriate regulatory framework. Attention will also be given to the misuse of drugs.

31. ADDRESSING EUROPE'S MAJOR HEALTH PROBLEMS: To raise standards of health care in Europe by adding to medical knowledge is the main objective. The focus will be on AIDS, cancer, cardiovascular diseases, and on age-related degenerative conditions. Particular attention will be given to research on health services, namely prevention, occupational health, care delivery systems, health care organisation and health technology assessment. Research into biomedical ethics will continue. Studies of how the human brain works in health and disease will be part of the international effort in the "Decade of the Brain".

Energy

32. ELECTRICITY AND HEAT FROM RENEWABLE SOURCES: The objectives are to develop components and systems which reduce the dependence on conventional energy sources and to reduce emissions of pollutants and CO_2 by stimulating the application of renewable energies. The emphasis will be on research, development and demonstration activities on selected, promising renewable energy technologies for the generation of electricity and heat, in particular through large projects. Priority will be given to technologies which make renewable forms of energy competitive with other energy sources and to projects where the economic break-even point is within reach, in particular in the field of solar energy, including process heat and chemicals, wind power and hot dry rock technology. The work will include storage technology, prenormative research in the European Solar Test Installation at JRC, Ispra, and standards for the integration of decentralized renewable-based power systems in conventional systems.

33. BETTER AND CLEANER PRODUCTION AND USE OF ENERGY: The objectives are to continue research, development and demonstration on more efficient production and conversion techniques for fossil fuels and on more efficient energy consumption in industry, agriculture, buildings, transport and other final consumption in order to improve living conditions and to reduce emissions of greenhouse gases and other pollutants. As far as energy production is concerned, the emphasis will be on electricity production from solid fuels, improved exploration and use of crude oil and natural gas, deep geology, fuel reformulation, conversion of natural gas and storage and disposal of CO_2 and on more efficient conversion and storage technologies such as fuel cells and advanced batteries. As far as consumption and use are concerned, in industry the emphasis will be on technology for energy efficient equipment and processes such as stationary combustion and electricity saving techniques; in agriculture on agricultural engineering, such as energy efficient irrigation, small, medium or rural process industries etc.; in transport on components and systems in particular for the electric vehicle and the use of biofuels; and in buildings on components and systems, their integration as well as prenormative aspects.

34.* SAFETY ASPECTS OF NUCLEAR ACTIVITIES: The objective is to improve the safety of nuclear activities. Radiation protection aims to improve protection and to furnish data for the Community Basic Safety Standards; key items are protracted low dose exposure, medical and occupational exposure, countermeasures and environmental restoration. In order to intensify European cooperation on major aspects of reactor safety, priority will be given to severe accidents and their prevention, to the reinforcement and adaptation of the methodologies available in the Community to meet the needs of Eastern reactors, and to new concepts of safety functions of innovative reactors. Research in the nuclear fuel cycle will be focused on nuclear fuel, safe handling of radioactive materials and basic scientific knowledge of actinides, and on effective solutions ensuring safety and protection in the field of disposal of radioactive waste and decommissioning of nuclear installations. Research activities on safeguards will be focused on new automated industrial nuclear facilities, and on new challenges posed to safeguards by the Revision of the Non-Proliferation Treaty.

35.* CONTROLLED THERMONUCLEAR FUSION: The long term objective is the joint creation of safe, environmentally sound prototype reactors. The immediate objective is to complete the engineering design of the Next Step after JET in the ITER frame, with supporting R&D in physics and technology. The participation of European industry will be fostered. Early qualification of a European construction site for the Next Step will be a priority; construction could start in 1998, possibly in the ITER frame. The JET Joint Undertaking will be terminated in 1996; transfer of expertise will be ensured. Research on JET's decommissioning could be performed in the context of the Next Step activities. Underlying Tokamak research will concentrate on concept improvements; if appropriate, a specialized Tokamak may be built, possibly internationally. The reactor potential of configurations akin to the Tokamak will continue to be investigated; subject to an in-depth examination, an advanced Stellarator would be built. Efforts to demonstrate the safety and environmental feasibility of fusion power will be expanded. The JRC's tritium laboratory will be operated to demonstrate safe tritium handling. Keeping-in-touch with other approaches to fusion will continue, in particular with inertial confinement.

* These themes relate to the decision based on the EAEC Treaty.

SECOND ACTIVITY

Promotion of cooperation in the field of Community research, technological development and demonstration with third countries and international organisations.

This second activity covers various related forms of Community intervention. Scientific and technical cooperation will be developed and intensified at the same time with industrialised countries, central and Eastern European countries and developing countries. Such cooperation can be on a bilateral or a multilateral basis; it can take place directly or through international organisations. The objectives of such cooperation are both to reinforce European capacities in the fields of science and technology and to support the implementation of Community policies vis-à-vis third countries and it will be based on the principle of mutual benefit. Three categories of Community activities are foreseen:

- Cooperation implying the participation of third countries or of organisations and enterprises from third countries in the activities of the framework programme. For this purpose the possibility of concluding international agreements is foreseen. In particular, the Agreement creating the European Economic Area provides for full participation of the EFTA countries in the framework programme. In this category of activities, the Community finances only the part of the expenditure corresponding to its R & D activities.

- Other forms of cooperation with third countries and international organisations where the relevant provisions under the RTD title of the Treaty do not apply. Research activities with industrialised countries, COST scientific and technical cooperation activities, activities concerning Central and Eastern European countries, participation in other European cooperation schemes, in the first place in Eureka, are all foreseen according to the specific rules of the various schemes.

- Cooperation in which Community intervention is essentially a financial contribution to pilot projects, "workshops", and study grants. This is notably the case for a part of cooperation activities with developing countries.

1. S&T COOPERATION WITH NON-EUROPEAN INDUSTRIALISED THIRD COUNTRIES: The objective is to strengthen the Community's scientific and technological capacity through promoting the access, on a reciprocal basis, to current knowledge and RTD activities as well as through the development of a favourable environment for synergies in the field of advanced science and technologies. Cooperation operates in the context of ad hoc agreements or arrangements linked to priority themes, notably in the form of information exchange, promotion of mobility and of scientific and technical networks, and of joint research activities of mutual interest. This cooperation is adapted to the specific situation of the partner countries, notably the USA and Japan, including the newly industrialised countries. Also part of this framework are multilateral activities such as the "Intelligent Manufacturing Systems", "New Information Processing Technology", "Human Frontier Science Programme" initiatives as well as the concertation, in liaison with the OECD, concerning megaprojects dealing with problems of a global dimension. Similarly, participation in prenormative research, the development of international standards, their diffusion and their application are included in this context.

2. S&T COOPERATION WITH CENTRAL AND EASTERN EUROPEAN COUNTRIES: The activities envisaged aim at contributing, in the mutual interest and on the basis of bilateral cooperation agreements, to the preservation of the scientific and technological potential of these countries in order to contribute to the rehabilitation of their productive systems as well as to the improvement of the quality of life in their societies. The emphasis will be on the mobility between scientists from the countries of Central and Eastern Europe (CEEC), the Republics of the Former Soviet Union (FSU) and the Community, the development of paneuropean scientific networks and the joint organisation of conferences, seminars and joint research projects, including standardization aspects. Synergy between these activities and the participation of CEEC and FSU organisations in projects covered by the Community RTD programmes which are open to them as well as in COST actions is also to be considered in this context.

3. S&T COOPERATION WITH DEVELOPING COUNTRIES: The objective is to develop and to make best use of the participants' respective capacities for research and to maximise the resulting benefits for social and economic development. The research carried out should reflect the priorities identified for each country and complement the Community's other activities in the area of development, taking account, notably, of the Community's undertakings at the conclusion of the Earth Summit in Rio de Janeiro. Priority will be given to joint research and the development of human capital, to enhancing the quality of life and to fostering economic development through an emphasis on agricultural production, protection of the environment, renewable natural resources, energy, health and through improvements of key enabling technologies. Full account will be taken of the Community's relative strengths in research, infrastructure and qualified personnel, while sharing the benefits of the special and sometimes unique opportunities for research which are to be found in developing countries.

4. STRENGTHENING SYNERGIES WITH OTHER S&T COOPERATION FRAMEWORKS IN EUROPE: The objective is to establish closer relationships with the main S&T cooperation schemes which are developing in Europe. Cooperation between Eureka and the Community, based on political commitments made in the Vienna, The Hague and

Tampere Ministerial Conferences, will be reinforced by the realisation of projects of a strategic nature implying simultaneously the development of key generic technologies and applied close-to-the market research activities. The Eureka scheme can constitute an interesting and mutually useful, even if non-exclusive, approach for carrying out such projects. Projects presented to the Commission by industrialists according to a bottom-up procedure, will have the possibility to be transformed, after concertation between the two frameworks and common agreement, into Eureka projects of which the activities concerning the development of generic technologies could be financed by the Community according to its rules, the rest having to find other appropriate sources of finance. Moreover, the close cooperation existing between the Community and cooperative frameworks such as the European Space Agency and CERN should be continued.

5. COOPERATION THROUGH COST ACTIONS: The Community is playing a central role in European cooperation in the field of scientific and technical research (COST) and is exploring ways to strengthen this role in the future. These actions are complementary to the projects undertaken in the context of the specific research programmes of the European Community, since this cooperation involves no central funding and operates through a "bottom-up" and "à la carte" procedure. The Community will support the expansion of COST both in scope, such as exploration of new fields such as social sciences and chemistry, and in number of participating countries (at the ministerial meeting of 1991, Poland, Hungary and Czechoslovakia were welcomed as new members) thus reinforcing it as an important mechanism to further pan-European research.

THIRD ACTIVITY

Dissemination and optimisation of the results of activities in Community research, technological development and demonstration.

This third activity includes actions which are not linked to any single aspect of research and technological development. Rather it concerns the totality of Community RTD activities. The objective is to ensure that these activities will have beneficial consequences in terms of the improvement of the competitiveness of industry and the achievement of other objectives of the Treaty. This activity includes:
- technical support in the form of infrastructure, in particular the development of a network of relay centres for the dissemination and optimisation of RTD results;
- mobilising around RTD activities the resources of different scientific disciplines under the four-fold headings of research institutions, communication of research, economy of research and management of research;
- actions to improve the relationship between the entire RTD system and society and to evaluate the impact of science and technology on society (technology assessment).
Within the overall framework of this activity certain specific initiatives will also be developed to support the improvement of the environment for RTD activities. On the one hand, this will include action to stimulate the development of incubators and science parks and to support innovation and the transfer of technologies. On the other, it will include a totally new financial initiative specifically dedicated to SMEs. The use of this instrument will provide SMEs participating in specific RTD programmes with supplementary support for the exploitation of the results of their research activities. This facility is the downstream element in an overall package for SMEs - extending from assistance in devising the research project to the promotion of result exploitation - which aims at upgrading the effectiveness of SMEs' participation in RTD activities. Particular attention will be given to dissemination, the optimisation of results and innovation in the least favoured regions (regions coming within objective 1 in the context of Structural Fund mechanisms) in a manner coherent with the Community's regional policy and with the Commission's Aid Framework for SMEs.

1. THE RESEARCH-INDUSTRY INTERFACE: It is vital to increase efforts aimed at the more effective translation of research results into successes in the industrial marketplace. These efforts are at present below the necessary critical mass and there is a consequent failure of industry - in particular SMEs - to capitalise adequately on the potential which Community RTD activities offer for gaining competitive advantage. An electronic information service and networks of national/regional relay centres, coordinated and assisted by a central unit, will provide access to the results and supply information on matters related to Community programmes and participation thereto. It will also provide for expertise notably in techno-economical assessment of RTD results, intellectual property and market studies. Financial support will be granted to trans-sectoral exploitation projects, which integrate the use of results of different RTD programmes. A separate Council Decision will deal with intellectual property rights.

2. THE RESEARCH-SCIENTIFIC COMMUNITY INTERFACE: The objective is to improve the interface between Community RTD and the Scientific Community. To this end the interdisciplinary reflection, initiated in the 3rd Framework Programme, will be continued and broadened. It will address the general context of research, management of research and corporate strategy, synergy between research and production, communication between the scientific

community and the users of research results and economics of research. The activity will include general and targeted diffusion on Community RTD activities by conventional and advanced means (off line tools e.g. CD ROM, electronic databases, multimedia publication systems, etc.) and pilot communications activities (scientific journals, workshops, multimedia studies).

3. THE RESEARCH-SOCIETY INTERFACE: The objective is to evaluate the impact of technology on society, life and working patterns. It includes technological risk assessment and addresses social acceptability. This activity will contribute to a European Technology Assessment infrastructure and enable EC RTD programmes to take better account of societal needs. It involves a wide variety of players including policy makers, opinion leaders, representatives of the education system as well as the social partners. An inventory on the expertise existing and the work already done at national or international level will be established. As a consequence, and also building upon the studies and workshops actually being undertaken within the 3rd Framework Programme, a network and a clearing house for Technology Assessment in Europe will be supported. Pilot actions will be launched to improve the dialogue between researchers and society.

4. TECHNOLOGY TRANSFER: The objective is to stimulate the integration of technologies by industry, in particular SMEs and whenever appropriate, by public bodies, such as local authorities in the case of energy technology. The absorption of new technologies will be promoted; technology audits, quality design and value management, lean production and specialised financial schemes play an important role in this context. Networking of technology transfer and innovation support organisations including science parks, contract research organisations, sectoral or regional technology centres and energy organisations experienced in the promotion of energy technology (OPET) will be supported in view of their European orientation. Transnational projects aiming to illustrate absorption of new technologies with emphasis on traditional industries and socially relevant sectors will be carried out. The activities include a systematic analysis and coordination of mechanisms of technology transfer in the Community and its Member States. User-suppliers-fora, technology and investment brokerage events, technological conferences and other appropriate measures will accompany the activities.

5. VALORISATION FUND FOR SMES: The objective is to provide an incentive for SMEs to participate to Community research decreasing the financial risks incurred by them during operations (technological development, transfer and innovation) between the completion of research carried out within Community RTD programmes and the generation of return. The new facility would consist of an appropriate range of instruments, so as to be fully adapted to the situation in the different Member States, going from an interest rate subsidy or grace period on bank loans extending over the period of no return and a guarantee financed out of the research budget, to more classical forms of venture capital supported by managerial and technical assistance. The Community contribution will consist of a fund, that should be designed so as to maximise the leverage on resources committed by the financial intermediaries to whom the management of the fund will be entrusted. In the design of the new facility, the synergy with other financial proposals elaborated in the framework of the Delors II package will be pursued.

FOURTH ACTIVITY

Stimulation of the training and mobility of researchers in the Community

The specific objective of this activity, which makes it different from the others, is to promote the development at Community level, while respecting the principle of subsidiarity, of a factor representing a key variable for the scientific and technological system: human resources. Mobility is not a zero sum operation: it leads to a net increase in productivity. The activity includes the following elements:
- stimulation of training and mobility, in particular for young researchers through a Community system of grants;
- promotion of the mobility of human resources in networks, constituting not only the logistic and operational basis of exchanges but also an important tool for developing the Community dimension of research.
The implementation of this activity will take into account, on the one hand, the situation within the Community, through specific measures directed towards the least favoured regions (so-called objective 1 regions in the sense of the Structural Funds), on the other, the situation outside the Community, in particular in EFTA and Central and Eastern European countries, through the most appropriate synergies with the actions foreseen under the second activity

1. TRAINING AND MOBILITY OF YOUNG RESEARCHERS: The objective is to increase quantitatively and qualitatively the human resources available for research and development in the academic world, in research centres and in industry. This objective will be achieved by increasing the mobility of young scientists at the post-doctoral level, or exceptionally during the course of their doctorate (in emerging areas of science and technology), to research centres of high quality in a country of the Community other than their own. They will be able in this way to develop their training through research. All areas of the exact, natural, economic and management sciences will be covered, as well as human and social sciences of relevance to Europe's competitivity. Particular attention will be given to the interface between the

basic and the applied sciences. For the implementation of this activity, recourse will be had to decentralised management in research centres or in networks of research centres of high quality which accept young scientists in order for them to take part in research and development activity. Appropriate action will be taken to avoid the phenomenon of the "brain drain".

2. SCIENTIFIC AND TECHNICAL NETWORKS: The objective is threefold. In the first place, it is to support and develop intra-community networks for scientific and technical cooperation, notably in emerging sciences and technologies. These networks will, moreover, ensure the mobility of researchers, as well as of the dissemination of ideas and results in a scientific community which covers the large internal market. The objective, finally, is to promote cohesion within the Community by introducing researchers from less favoured regions into an optimal scientific environment. All the areas covered by the action "training and mobility of young researchers" are included. This activity will be implemented by the grant of financial assistance to the networks selected, Community assistance being designed essentially to cover the costs of mobility within the network, of a contribution to the costs of research, as well as of the reception of young researchers from outside the network.

3. INDUSTRY-ACADEMIA INTERWORKING: The objective is to ensure the integration of academic research into the fabric of industrial R&D through improved cooperation between industry and academia. The aims will be achieved by encouraging academic R&D funded and monitored by industrial consortia, by creating the opportunity, on the one hand for academic researchers to become leading-edge users of new or pilot industrial developments, on the other for industrialists to use the latest developments arising from university research, and by enhancing the mobility of people between academic and industrial laboratories. Existing and emerging thematic groupings to encourage cooperation between industry and academia will be used where possible to coordinate mobility and joint research.

4. INCENTIVES FOR THE EUROPEAN SCIENTIFIC COMMUNITY: Three actions will be implemented to contribute to the development of new skills, in particular in the less favoured regions of the Community or in new scientific and technological areas with a strongly multidisciplinary character. The first will be intended to facilitate the access of young researchers to large scientific facilities as well as to permit them to participate in series of high level scientific conferences. The second consists of making it possible financially for research centres to receive, for stays of several months and through the award of "European chairs", eminent researchers who will come to supervise the research work of young scientists at these centres. The third concerns the organisation of "scientific prizes" for young researchers as well as for promising post-doctorate researchers. All the areas covered by the action "training and mobility of young researchers" are included.

HORIZONTAL SUPPORT MEASURES

For the first time, this framework programme includes horizontal support measures, that is the ensemble of initiatives directed towards the provision of the humus which is indispensable for the effective development of all the above activities. They include, successively, preparatory, accompanying and promotion initiatives and actions. Their common field of application covers the whole spectrum of issues addressed in the framework programme. Certain such measures can be planned in advance on a multiannual basis; others, which are non-significant and discrete, cannot be. In the latter case, the procedures for their implementation must respect the Commission's power of initiative and execution for such non-significant measures in accordance with Article 22 of the financial regulation.

STUDY AND EXPLORATORY ACTIVITIES: The objective is to develop at Community level instruments to support decisions in the field of RTD policy. This includes, first, the promotion and organisation of studies: long term forecasting activities, notably the creation of global scenarios and the forecasting of scientific and technological change, short and medium term analyses and technology monitoring; secondly, the coordination of studies carried out by the specialised Directorates responsible for the various RTD programmes, in order to avoid overlaps and to ensure the necessary synergies; third, specific tasks in the field of studies and analyses concerning science and technology in support of common policies and responding to their requirements. Moreover regular and systematic exploratory activities need to be carried out in order to identify new lines which can lead to proper R&D initiatives; in particular, feasibility studies, experimental demonstration project, pilot actions, etc. The aim is to reorganise in a more structured manner an important part of the activities currently carried out in a fragmented and intermittent manner, while respecting the need for flexibility.

EVALUATION ACTIVITIES: The objective is Community RTD programme and policy evaluation. The main features of this evaluation activity will be the uniformity of its methods and criteria, its independence from the structure of programme management, and its efficiency in terms of policy adjustments. To strengthen the credibility of the evaluation process, which must necessarily apply to Community research activities at all stages of their implementation, it will be centralised and carried out under the authority of an independent, permanent Committee set up by the Commission. In addition to final programme evaluations and those during the course of their execution, the work will concern particular

transverse issues: the effects on economic and social cohesion, on industrial competitiveness; benefits for SMEs; as well as the overall impact of Community activities on Member States' scientific and technical capital.

PROMOTION AND ENABLING ACTIVITIES: Cases where scientific and technical developments have been the subject of Community initiatives and are of special importance with regard to the objectives of common policies, will be provided with supplementary support, beyond the phase of research and technological development in the strict sense. This can take the form, while respecting the principle of subsidiarity and the rules of competition policy, of incentives and support for the diffusion of the technologies covered by the research activities.

COORDINATION AND CONCERTATION ACTIVITIES: This concerns, in the first place, a group of initiatives, not limited only to simple exchanges of information, geared towards ensuring coherence between Community and national policies, drawing on an improved and harmonised R&D statistical information system. This coherence must be ensured through permanent monitoring and continuous concertation with Member States, guided by the rigorous application of the principle of subsidiarity. Included in this category are activities in concertation with Member States to develop synergies between activities conducted at the Community and the national level in areas where the Community is pursuing other objectives. This includes primarily research and technological development activities conducted with the help of the structural funds with the aim of reinforcing the economic and social cohesion of the Community.

JRC ACTIVITIES FOR COMMUNITY POLICIES: This domain belongs to the specific competences of the Joint Research Centre for the part which goes beyond its participation in the tasks covered by the first activity described above. It concerns scientific and technological support services as well as research and technological development actions which the JRC carries out in order to satisfy the explicit demand expressed in relation to the various common policies, in particular the Common agricultural, environmental, energy, cooperation for development, and external relations policies.

ANNEX III

SELECTION CRITERIA

In general, Community actions of research, technological development and demonstration must, first, have the objective of strengthening the scientific and technological bases of Community industry and encouraging it to become more competitive at international level, contributing to the definition and implementation of Community policies and to meeting the needs of society.

Secondly, they must respect the principle of subsidiarity, whereby the Community takes action in accordance with the thematic content of this framework programme only if and in so far as the objectives of the action cannot be sufficiently achieved by Member States and can, therefore, by reason of scale or effects be better achieved by the Community.

Thirdly, they must respond to the public interest in terms of the excellence of the scientific and technological work to be undertaken, the importance of the objectives and the quality of the participants.

In particular, the following criteria justify Community RTD action:

- action to strengthen industry - including small and medium-sized undertakings - in areas of generic technologies of wide applicability;

- action which contributes to the strengthening of the economic and social cohesion of the Community and the promotion of its overall harmonious development, while being consistent with the pursuit of scientific and technical quality;

- action on a very large scale for which Member States could not, or could only with difficulty, provide the necessary facilities, finance and personnel;

- action on problems which, because of their large scale, particularly geographical, require significant research results to be obtained in the Community as a whole and which can thus often enhance the Community's overall contribution to the solution of international problems;

- action whose effects in terms of obvious financial benefits justify joint action even after taking account of the extra costs inherent in all international cooperation;

- action which is complementary to that being carried out nationally and whose effects are the reinforcement of the scientific and technological bases of the Community and the more effective use of the results achieved;

- action which contributes to the achievement of the single market and to the unification of the European scientific and technical area, and research leading, where the need is felt, to the establishment of uniform rules and standards.

ANNEX IV

CONDITIONS FOR FINANCIAL PARTICIPATION BY THE COMMUNITY

The conditions, which are in accord with the measures in the financial regulation applicable to RTD appropriations, are as follows:

1. Research and development projects carried out by outside contractors may be covered by one of the three following types of participation:

   - participation in research costs, with a ceiling of 50% of costs. This participation may be determined on the basis of conventional costs negotiated in advance. Universities and similar organizations will be able in certain circumstances to request funding of 50% of the overall cost or 100% of the additional costs;

   - for projects of a specifically industrial nature (demonstration projects, prototypes, etc.) the contribution will be linked to the research results and will be a predetermined amount within the ceilings determined by the Community for this type of project;

   - payment of a flat-rate contribution for small-scale projects not exceeding a ceiling set in each specific programme.

   Concerted actions consisting in the coordination of research and development projects may receive a contribution of up to 100% of the costs of concertation.

   Research activities carried out by the Joint Research Centre will in principle be fully funded.

2. Research and development projects and concerted actions carried out by outside contractors will be covered by:

   - as a general rule, calls for proposals published in the Official Journal of the European Communities followed, where appropriate, by invitations for participation. They will be carried out by at least two contractors, each independent of the other and established in different Member States or in states fully associated with the specific programme, on condition that at least one of the contractors is established in a Member State;

   - contracts detailing the relevant financial and administrative arrangements.

3. Exemptions to these rules may be made only under the conditions set out in each specific programme.

COUNCIL DECISION

concerning the fourth framework programme of Community activities in the field of research and technological development (1994 to 1998)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 130q(1) thereof,

Having regard to the Treaty establishing the European Atomic Energy Community (the EAEC Treaty), and in particular Article 7 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament,

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

Whereas the Single European Act incorporated a Title VI (Articles 130f to 130q) into the EEC Treaty; whereas that Title constitutes a new legal basis for Community activities in the field of research and technological development; whereas, in particular, Article 130f of the Treaty assigns the Community the objective of strengthening the scientific and technological bases of European industry and encouraging it to become more competitive at international level;

Whereas under Article 130i of the Treaty all the Community activities referred to in Article 130g of the said Treaty must be included in a multiannual framework programme; whereas Community activities for the development of research in nuclear fields can moreover be the subject of a multiannual framework programme and of specific programmes determined in accordance with Article 7 of the EAEC Treaty;

Whereas by Decision 90/221/Euratom, EEC the Council adopted a third framework programme for the period 1990 to 1994, which is in the process of being implemented;

Whereas on 9 April 1992 the Commission presented a communication entitled 'Research after Maastricht: an assessment, a strategy' in which it assessed progress in implementing the third framework programme; whereas an evaluation of all the specific programmes carried out under the second framework programme was also presented;

COUNCIL DECISION

concerning a framework programme of Community activities in the field of research and training for the European Atomic Energy Community (1994-1998)

THE COUNCIL OF THE EUROPEAN COMMUNITY

Having regard to the Treaty establishing the European Atomic Energy Community (the EAEC Treaty), and in particular Article 7 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament,

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

Whereas Community activities for the development of research in nuclear fields can be the subject of a multiannual framework programme and of specific programmes both determined in accordance with Article 7 of the Treaty in parallel with the programme of research provided for by the Treaty on European Union;

Whereas by Decision 90/221/Euratom, EEC the Council adopted a framework programme for the period 1990 to 1994 for research both within the scope of the EEC Treaty and in the nuclear area and which is in the process of being implemented;

Whereas on 9 April 1992 the Commission presented a communication entitled 'Research after Maastricht: an assessment, a strategy' in which it assessed progress in implementing the framework programme mentioned; whereas an evaluation of all the specific programmes carried out under the preceding framework programme was also presented;

Whereas, in view of the rapid pace of technological development, the new economic challenges which the Community must meet and the increased level of global competition, Community activities in the field of research and technological development must be intensified and augmented; whereas, in the light of these factors, it has been judged appropriate to adopt a new framework programme for the period 1994 to 1998 developing out of the current framework programme 1990 to 1994;

Whereas it is necessary for the Community to encourage enterprises, including small and medium-sized undertakings, research centres and universities in their research and technological development activities and, to that end, to support their efforts to cooperate with one another by appropriate measures;

Whereas the process of technological progress requires a continuum of interlinked activities, ranging from basic research through to the demonstration of the applications of new technologies; whereas, however, the precompetitive aspect must remain a central priority in Community research and technological development activities;

Whereas it is recognized that small and medium-sized undertakings are able to make a significant contribution to the innovation process and should play a substantial role in the implementation of Community research and technological development activities, thereby contributing to the improvement of industrial competitiveness on a broader basis; whereas, therefore, particular attention should be paid to the specific needs of these undertakings in order to facilitate their access to information, encourage them to take part in Community programmes and enhance their ability to exploit the results of Community research;

Whereas it is necessary to promote the overall harmonious development of the Community with a view to strengthening its economic and social cohesion; whereas it is intended that the implementation of the common policies of the Community and its strategy for research and technological development should contribute to this objective; whereas a Community framework programme should play its part, along with other Community instruments, in helping to strengthen scientific and technological infrastructure and potential throughout the Community;

Whereas the Community's activities of research and technological development must, in accordance with Article 130 g of the Treaty and Article 4 (1) of the EAEC Treaty, complement the activities undertaken in member states and thus bring added value to them;

Whereas this is the case when the objectives of actions can be better carried out a Community level; whereas this applies for, first, 'big science' activities, involving international initiatives and often taking the

Whereas, in view of the rapid pace of technological development, the new economic challenges which the Community must meet and the increased level of global competition, Community activities in the field of research and technological development must be intensified and augmented; whereas, in the light of these factors, it has been judged appropriate to adopt a new framework programme for the period 1994 to 1998 developing out of the current framework programme 1990 to 1994;

Whereas it is necessary for the Community to encourage enterprises, including small and medium-sized undertakings, research centres and universities in their research and technological development activities and, to that end, to support their efforts to cooperate with one another by appropriate measures;

Whereas the process of technological progress requires a continuum of interlinked activities, ranging from basic research through to the demonstration of the applications of new technologies; whereas, however, the precompetitive aspect must remain a central priority in Community research and technological development activities;

Whereas it is recognized that small and medium-sized undertakings are able to make a significant contribution to the innovation process and should play a substantial role in the implementation of Community research and technological development activities, thereby contributing to the improvement of industrial competitiveness on a broader basis; whereas, therefore, particular attention should be paid to the specific needs of these undertakings in order to facilitate their access to information, encourage them to take part in Community programmes and enhance their ability to exploit the results of Community research;

Whereas, the framework programme must contribute to the harmonious development of the Community; with a view to strengthening its economic and social cohesion; whereas within this framework each common policy should fully preserve its characteristics and specific features, in particular the policy on research and technological development, which will continue to be founded on scientific excellence; whereas it is therefore necessary to strengthen the synergy between research activities and the action undertaken by the Community via the structural Funds;

Whereas, according to Article 4 paragraph 1 of the Treaty, the Community is founded to carry out research and training activities when nuclear research in the Member States should be complemented at the Community level by virtue of the scale or the effects which this allows:

Whereas this is the case when the objectives of actions can be better carried out a Community level; whereas this applies for, first, 'big science' activities, involving international initiatives and often taking the

form of 'mega-projects'; secondly, activities involving priority technologies, including generic technologies which can have a bearing on a number of industrial sectors; thirdly, activities designed to organize the single market, particularly in the sectors covered by the various common policies; fourthly, prenormative research in cases where the acquisition of scientific and technological data is necessary for the preparation of standards, norms and regulations; fifthly, activities to assist the European scientific community to develop Community-wide integrated systems of networks and mobility programmes;

form of 'mega-projects'; secondly, activities involving priority technologies, including generic technologies which can have a bearing on a number of industrial sectors; thirdly, activities designed to organize the single market, particularly in the sectors covered by the various common policies; fourthly, prenormative research in cases where the acquisition of scientific and technological data is necessary for the preparation of standards, norms and regulations; fifthly, activities to assist the European scientific community to develop Community-wide integrated systems of networks and mobility programmes;

Whereas, in the application of the above criteria, research activities in the fields of nuclear safety and of controlled thermonuclear fusion should be pursued; whereas within these two fields it is also opportune to promote scientific and technical cooperation notably with industrialised countries, including the EFTA countries, to promote the dissemination and optimization of results and to promote training and mobility of researchers;

Whereas, with regard to the structure of the fourth framework programme, reference should be made to the four activities mentioned in Article 130g of the Treaty which can serve equally as guidelines for Euratom activities;

Whereas the programme of Euratom research-training activity can cover four activities: research and technological development, international cooperation as provided for in Chapter X of the Treaty, the dissemination and optimisation of results of the research in accordance with Chapter II of Title Two of the Treaty, and finally training;

Whereas the first of these activities involves the implementation of research, technological development and demonstration programmes, by promoting cooperation with and between undertakings, research centres and universities; whereas the formulation of these programmes requires a renewed thematic framework to prevent the self-perpetuation of certain projects; whereas, within such a framework, a minority of RTD activities may be considered to have reached completion and will not be continued; whereas, on the other hand, most of these activities, which are constantly being updated, may be continued; whereas, lastly, a small number of new thematic areas should be introduced to reflect the new perspectives and requirements generated by industrial innovation and the development of European society;

Whereas the first of these activities involves the implementation of research and technological development programmes, by promoting cooperation with and between undertakings, research centres and universities;

Whereas the second of these activities involves the promotion of cooperation in the field of Community research, technological development and demonstration with third countries and international organizations; whereas in this field of activity it is necessary to take account of the Community's greatly increased international responsibilities; whereas scientific and technical cooperation must be developed or stepped up on a broad front encompassing the industrialized nations, the countries of Central and Eastern Europe and the developing countries; whereas account must be taken of the new opportunities offered, in respect of the EFTA countries, by the Agreement on the European Economic Area; whereas the complementary

Whereas the second of these activities involves the promotion of cooperation in the field of Community research and technological development with third countries and international organizations; whereas in this field of activity it is necessary to take account of the Community's greatly increased international responsibilities; whereas scientific and technical cooperation must be developed or stepped up on a broad front encompassing the industrialized nations and the countries of Central and Eastern Europe;

relationship between Community activity and Eureka projects should be systematically reinforced; whereas it would be expedient to step up COST activities relating to multilateral research projects;

Whereas the third of these activities involves the dissemination and optimization of the results of activities in Community research, technological development and demonstration; whereas it would be useful to renew the thematic framework of this activity in order to strengthen the mechanisms which allow the effective transfer of results to socio-economic operators; whereas, in this respect, an optimization and technological transfer fund should be set up to enable SME to make the most of their innovative capacity;

Whereas the third of these activities involves the dissemination and optimization of the results of activities in Community research and technological development; whereas it would be useful to renew the thematic framework of this activity in order to strengthen the mechanisms which allow the effective transfer of results to socio-economic operators;

Whereas the fourth of these activities involves the stimulation of the training and mobility of researchers in the Community; whereas work should be pursued on the initiative launched under the third framework programme to increase human RTD capital and to improve the mobility of persons working in research, inter alia on the basis of networks of laboratories and research teams, both public and private, in Member States, throughout the Community; whereas this activity is intended to strengthen the scientific bases of the Community though the use of instruments of a horizontal nature;

Whereas the fourth of these activities involves the stimulation of the training and mobility of researchers in the Community; whereas work should be pursued on the initiative launched under the previous framework programme to increase human RTD capital and to improve the mobility of persons working in research, inter alia on the basis of networks of laboratories and research teams, both public and private, in Member States, throughout the Community; whereas this activity is intended to strengthen the scientific bases of the Community though the use of instruments of a horizontal nature;

Whereas provision should be made in the framework programme for joint activities needed to prepare the ground for and to back up the research and technological development and demonstration activities;

Whereas provision should be made in the framework programme for joint activities needed to prepare the ground for and to back up the above activities;

Whereas the Joint Research Centre is called on to contribute to the implementation of the framework programme, particularly in those fields in which it can offer an impartial and independent expert opinion and in which it can take a lead in encouraging the implementation of Community policies;

Whereas the Joint Research Centre is called on to contribute to the implementation of the framework programme, particularly in those fields in which it can offer an impartial and independent expert opinion and in which it can take a lead in encouraging the implementation of Community policies;

Whereas the framework programme is to be implemented through specific programmes and may also be implemented through supplementary programmes within the meaning of Article 130l, participation within the meaning of Article 130m or may take the form of joint undertakings or other structures within the meaning of Article 130o of the Treaty;

Whereas the framework programme is to be implemented through specific programmes and may also be implemented through supplementary programmes or participations or may take the form of joint undertakings;

Whereas, in accordance with Article 130i(1) of the Treaty, it is necessary to make an estimate of the Community financial means necessary for the realization of the research and development activities envisaged; whereas this amount is compatible with the financial perspective included in the Interinstitutional Agreement of ..... for the years 1993 to 1997;

Whereas, without prejudice to the entry of the amounts needed to implement the programmes in the frame of the annual budgetary procedure in accordance with Article 7 third indent of the Treaty, it is necessary to make an estimate of the Community financial means necessary for the realization of the research and development activities envisaged; whereas this amount is compatible with the financial perspective included in the Interinstitutional Agreement of ..... for the years 1993 to 1997;

Whereas as regards the implementation of the framework programme in 1998 provision should be made for the amount deemed necessary and the continuity of research activities should be ensured;

Whereas the Scientific and Technical Committee (Crest) has been consulted;

Whereas the Scientific and Technical Committee referred to in Article 7 of the EAEC Treaty has been consulted by the Commission and has delivered its opinion,

HAS DECIDED AS FOLLOWS:

Article 1

1. A framework programme for Community activities in the field of research and technological development, hereinafter referred to as the "fourth framework programme", is hereby adopted for the period 1994 to 1998.

2. The fourth framework programme shall include all Community activities as set out in Article 130g of the Treaty.

3. The amount deemed necessary for Community financial participation in the fourth framework programme as a whole shall be ECU ... million, of which ECU ... million shall be for the years 1994, 1995, 1996 and 1997 and ECU ... million for 1998.

4. The latter amount shall be intended for the financing in 1998 of activities begun in the period 1994 to 1997. If this amount is covered by any financial perspective fixed for 1998 it shall be deemed to be confirmed. In any other circumstances, the Council should, as soon as possible and in accordance with Article 130i(2) of the Treaty, take the decisions deemed necessary to ensure the continuity of the present framework programme.

5. The breakdown of the amount deemed necessary for the period 1994 to 1998 between the four activities referred to in Article 130g shall be as follows: activity (a) ECU ... million, activity (b) ECU ... million, activity (c) ECU ... million, activity (d)

Whereas as regards the implementation of the framework programme in 1998 provision should be made for the amount deemed necessary and the continuity of research activities should be ensured;

Whereas the Scientific and Technical Committee referred to in Article 7 of the EAEC Treaty has been consulted by the Commission and has delivered its opinion,

HAS DECIDED AS FOLLOWS:

Article 1

1. A framework programme for Community activities in the field of research and training is hereby adopted for the period 1994 to 1998.

2. The framework programme shall include all Community activities regarding, research and technological development, international scientific/technical cooperation, dissemination and optimization of results as well as training and mobility in the nuclear field and particularly in the fields of
- nuclear safety
- controlled thermonuclear fusion.

3. Without prejudice to Art 7 (3) of the EAEC Treaty, the amount deemed necessary for Community financial participation in the framework programme as a whole shall be ECU ... million, of which ECU ... million shall be for the years 1994, 1995, 1996 and 1997 and ECU ... million for 1998.

4. The latter amount shall be intended for the financing in 1998 of activities begun in the period 1994 to 1997. If this amount is smaller or larger than that foreseen in any financial perspectives fixed for 1998, the decisions deemed necessary to make adjustments are to be taken as soon as possible in accordance with Article 130 i (2) of the Treaty.

5. The breakdown of the amount deemed necessary for the period 1994 to 1998 between the activities referred to in paragraph 2 above shall be as follows :
- research and technological development ECU....million

ECU ... million. This breakdown is given in Annex I.

- international scientific/technical cooperation ECU.... million.
- dissemination and optimization of results ECU.... million
- training and mobility ECU.....million.

This breakdown is given in Annex I.

6. The scientific and technological objectives (thematic content) of the four activities referred to in Article 130g of the Treaty are described in Annex II.

6. The scientific and technological objectives (thematic content) of the activities referred to in paragraph 2 above are described in Annex II.

7. The selection criteria to be applied in the implementation of the fourth framework programme are laid down in Annex III.

7. The selection criteria to be applied in the implementation of the framework programme are laid down in Annex III.

8. The detailed rules for Community financial participation are laid down in Annex IV.

8. The detailed rules for Community financial participation are laid down in Annex IV.

Article 2

Article 2

1. The fourth framework programme shall be implemented through specific programmes in accordance with Articles 130k and 130p of the Treaty. For activities covered by the EAEC Treaty, programmes shall be adopted in accordance with Article 7 of the said Treaty.

1. The framework programme shall be implemented through specific programmes. These programmes shall be adopted in accordance with Article 7 of the EAEC Treaty.

Each specific programme shall determine its precise objectives and provide for an evaluation of the results achieved as compared against those objectives and against the criteria laid down in Annex III.

Each specific programme shall determine its precise objectives and provide for an evaluation of the results achieved as compared against those objectives and against the criteria laid down in Annex III.

2. The implementation of the fourth framework programme may also give rise, as necessary, to supplementary programmes within the meaning of Article 130l of the Treaty, participation within the meaning of Article 130m and to joint undertakings or any other structure within the meaning of Article 130o.

3. If a decision is taken in implementation of Article 1(4), the various specific programmes or other decisions for implementing the framework programme shall be adjusted to take account of that decision.

2. If a decision is taken in implementation of Article 1(4), the various specific programmes or other decisions for implementing the framework programme shall be adjusted to take account of that decision.

Article 3

Article 3

The detailed rules for financial participation by the Communities in the fourth framework programme as a whole shall be those provided for by the Financial Regulation applicable to the general budget of the European Communities.

The detailed rules for financial participation by the Community in the framework programme as a whole shall be those provided for by the Financial Regulation applicable to the general budget of the European Communities.

Article 4

1. During the third year of execution of the fourth framework programme the Commission shall assess its progress by reference to the criteria set out in Annex III. It shall examine in particular whether the objectives, priorities and financial resources are still appropriate to the changing situation.

2. The Commission shall communicate the findings of this examination and evaluation to the Council together with its comments. After the Council has examined this communication, the Commission shall submit to it the necessary proposals for decisions.

3. When implementation of the fourth framework programme has been completed the Commission shall make a new evaluation of that programme.

Article 4

1. During the third year of execution of the framework programme the Commission shall assess its progress by reference to the criteria set out in Annex III. It shall examine in particular whether the objectives, priorities and financial resources are still appropriate to the changing situation.

2. The Commission shall communicate the findings of this examination and evaluation to the Council together with its comments. After the Council has examined this communication, the Commission shall submit to it the necessary proposals for decisions.

3. When implementation of the framework programme has been completed the Commission shall make a new evaluation of that programme.

FINANCIAL STATEMENT

Part 1: Financial implications

1. TITLE OF THE ACTION

Fourth framework programme of Community activities in the field of research and technological development (1994-1998)

2. BUDGET LINES CONCERNED

Chapter B6-7

3. LEGAL BASE

Article 130i of the EEC Treaty and of the Treaty on European Union as signed.

4. DESCRIPTION OF THE ACTION

4.1 Specific objectives

- Implementation of research, technological development and demonstration programmes through promoting cooperation with and between enterprises, research centres and universities;
- Promotion of cooperation in the field of Community research, technological development and demonstration with third countries and international organisations;
- diffusion and optimisation of results of Community research, technological development and demonstration activities;
- stimulation of the training and mobility of researchers in the Community.

4.2 Duration

1994-1998

4.3 Target population for the action

Industrial enterprises - including specifically SMEs -, research centres and universities in their research and technological development activities.

5. CLASSIFICATION OF THE EXPENDITURE AND RECEIPTS

5.1 DNO

5.2 CD

5.3 Type of receipts expected

The EFTA countries will contribute, in accordance with the EEA agreement and notably its Article 82 as well as its Protocol 31, to proportional additional financing of the activities of this framework programme. (At the present moment, their participation will be limited to the non-nuclear activities).

6. NATURE OF THE EXPENDITURE OR OF THE RECEIPTS

Research and development projects carried out by external contractors can come under one of the following three formulae for Community financial participation:

- participation in research costs, within a ceiling limited to 50% of costs. This participation may be determined on the basis of conventional costs negotiated in advance. As regards universities and similar organisations, they will have the possibility of requesting either funding of 50% of the overall costs or of funding of 100% of additional costs.
- in the case of projects of a specifically industrial nature (such as demonstrations, prototypes etc), contribution linked to the research results of a predetermined amount within ceilings determined by the Community for this type of project.
- payment of a flat-rate contribution for small-scale projects not exceeding a ceiling set for each specific programme.

Concerted actions which consist of the coordination of research and development projects may receive a contribution of up to 100% of the cost of the concertation.

Research activities carried out by the Joint Research Centre will, in principle, be fully funded.

7. FINANCIAL IMPACT

7.1 Method of assessing the total cost of the action

The framework programme has been defined so as not to exceed the total amount allocated to research in category 3 of the draft new financial perspectives.

This is in accordance with Article 130i of the Treaty which states that the framework programme determines the amount deemed necessary (maximum overall amount in the Treaty on European Union) together with its distribution between the activities envisaged.

The amounts shall cover scientific, technical, demonstration and related horizontal support measures as well as personnel costs and administrative, scientific and technical expenses directly linked to the execution of the activities and measures. As far as activities carried out by the JRC are concerned, these amounts shall cover the infrastructure for the institutes.

7.2 Indicative breakdown

The four activities correspond to the four objectives listed at 4.1 above.

4th FRAMEWORK PROGRAMME 1994-1998	
	MECU (1992 prices)
First Activity	11 600
Second Activity	1 400
Third Activity	700
Fourth Activity	1 000
TOTAL	14 700

N.B. Resources allocated to horizontal support measures, which cover the preparatory, accompanying actions as well as incentives for promotion and enabling activities, are set at MECU 1 600. This amount, which is already included in the above figures, is distributed proportionally amongst the four activities and should remain clearly identifiable.

7.3 **Indicative schedule of commitments**

MECU - 1992 Prices

YEARS	Paquet Delors II (1)	Adjustments (2)	Actual amounts 4th FP (3) (1-2)
1992	2 448		
1993	2 730		
	(a)		
1994	3 040	2 490 (b)	550
1995	3 380		3 380
1996	3 770		3 770
1997	4 200		4 200
1998	4 200	1 400 (c)	2 800
Total 1994-1998	18 590	3 890	14 700

(a) Hypothesis consistent with the amounts indicated in the document COM(92)2001.

(b) Residual balance of the 2nd FP and 3rd FP plus 1994 APAS prior to the adoption of the 4th FP.

(c) 1 400 Mecus is a third of the 1998 amount: it corresponds to the indicative level of the first year of a 5th FP.

The definitive yearly amounts will be determined by the budgetary authority in accordance with the financial perspectives agreed for 1993-1997 and with subsequent financial perspectives which may be adopted.

8. ANTI-FRAUD MEASURES FORESEEN UNDER THE ACTION

Audit programme of the Directorate General. Supervision by the officials formally responsible for the actions.

Part 2 : Basis for the analysis of costs/effectiveness

1. OBJECTIVES

The framework programme responds to the objectives established by the EEC Treaty and notably its Article 130f§1 which states: "The Community's aim shall be to strengthen the scientific and technological bases of European industry and to encourage it to become more competitive at international level." The four areas of activity selected reflect Article 130g.

2. JUSTIFICATION OF THE ACTION

The action is justified by the need for the Community to help strengthen the scientific and technological bases of Community industry and to encourage it to become more competitive at international level, while contributing to the definition and implementation of Community policies and to meeting the needs of society.

An analysis of the consequences in the research area of the central role played in Community action by the principle of subsidiarity, in the terms of the decisions adopted at Maastricht, has been carried out. This has made it possible to highlight a number of cases where the principle of subsidiarity applies in an intrinsic fashion: 'big science' activities; technology priority projects; RTD activities aimed at organising the single market; prenormative research; activities in support of the European scientific community.

3. MONITORING AND EVALUATION OF THE ACTION

The form and frequency of the process of evaluation will be such as to enable the Commission to respond to the requirements under article 4 of the draft decisions in the proposal above, and to evaluate Community RTD programmes and policies.

The principle factors of uncertainty which can affect the results of the action include any delay which may occur in the implementation of activities under the present proposal, the ability and readiness of private enterprises to take full advantage of the benefits which these activities will offer them, and the unavoidable difficulty in making a direct link, especially over the short term, between research expenditure on the one hand and industry's competitive success on the other, notably in the light of the fact that innovation is not a linear process from fundamental research, through applied research to commercial application.

The indicators, quantitative or qualitative criteria which make it possible to measure the results will be determined at the level of each specific programme.
During the third year of implementation of the fourth framework programme, the Commission will examine the state of its progress in relation to indicators. It will assess, in particular, if the objectives, the priorities as well as the financial means are still adapted to the changing situation (see article 4 § 1 of the draft decision). After the completion of the implementation of the fourth framework programme, the Commission shall undertake an evaluation of it (see article 4 § 3 of the draft decision).

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