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**RESEARCH AND TECHNOLOGICAL
DEVELOPMENT ACTIVITIES OF THE
EUROPEAN UNION**

ANNUAL REPORT 1996

(Presented by the Commission)

SUMMARY

This is the second Annual Report by the Commission on research activities. The requirement for an annual report was introduced by Article 130p of the EC Treaty, which stipulates that each year the Commission should send a report to the European Parliament and the Council. This report includes information on research and technological development activities and the dissemination of results during the previous year, and the work programme for the current year.

With this annual report an overview is provided of the whole spectrum of Community research activities. Part One of the report offers the reader a "snapshot" of the situation at the end of 1995 as well as an account of the work programme and milestones for 1996. Part Two covers more detailed information on the research activities undertaken in 1995, mainly under the Fourth Framework Programme (1994-1998) (but also including the projects which were still continuing under the Third Framework Programme (1990-1994)) grouped in "Activities in 1995" and "work programme for 1996" respectively.

* * *

For Community research policy, 1995 was again an active year. It was the first full year of implementation of the Fourth Framework Programme (1994-1998). The presentation and processing of calls for proposals and the establishment of project contracts continued throughout the year.

As a result of the enlargement of the European Union at the beginning of 1995 through the accession of Austria, Finland and Sweden, the Commission proposed an adjustment to the budget of the Fourth Framework Programme (both European Community and Euratom). The final adoption of the proposals by the Parliament and the Council was completed in March 1996.

In 1995, the Commission presented its concept of research-industry Task Forces, a joint initiative of three Commissioners, to improve consultation and the coordination of research activities. The Task Forces focus on the following areas: *New-generation aircraft, Educational Software and Multimedia, The car of the Tomorrow, Transport Intermodality, Environment - Water, Vaccines and Viral Diseases, The train and Railway Systems of the Future, Maritime Systems of the Future*.

In 1995, a new programme monitoring and evaluation scheme was introduced. The monitoring of the 18 specific programmes of the Fourth Framework Programme and Framework Programme monitoring was carried out by independent external experts.

In May, the Commission presented its communication on scientific and technological cooperation with the New Independent States of the former Soviet Union. In October, the Commission presented its communication on perspectives for international cooperation in research and technological development, on which a Council resolution was adopted in March 1996. Furthermore, the European Union continued discussions on scientific and technological cooperation with Mediterranean countries as well as with the associated countries from Central and Eastern Europe. The negotiations on bilateral scientific and technical cooperation agreements with Canada and Israel were concluded.

In December, the Commission published a Green Paper on Innovation, the aim of which was to initiate widescale consultation on the problem of innovation in Europe. The Green Paper considers the different factors involved in innovation, analyses the existing situation and makes proposals for future action.

In addition, the Commission has further strengthened its activities both to promote economic and social cohesion in Europe through research and training, and to improve coordination of national RTD policies through cooperation. In June 1995, the Research Council adopted conclusions on the coordination of Member States' science and technology policies emphasizing the importance of regular exchange of information on national RTD activities.

The scope of research activities in 1995 - and the importance of the Community's research efforts in general - can be illustrated in a few figures relating to the Fourth Framework Programme activities, covering Member States plus the countries of the European Economic Area and of EFTA: 2 660 new projects involving 12 185 participants were launched in 1995; a total of 10 695 projects were running at the end of 1995, corresponding to ECU 2 037 million in total payments. 74 874 transnational collaborative links in multi-partner shared-cost action between research teams spread throughout the Community have been counted. The number of collaborative research links between Member States and third countries was 3 237.

* * *

In 1996, the Commission will continue its work to ensure efficient implementation of the specific programmes of the Fourth Framework Programme.

In January 1996 the Commission presented its proposal for a financial supplement to the Fourth Framework Programme (EC and Euratom) amounting to ECU 700 million, based on the provisions in the decisions adopting the Fourth Framework Programme in April 1994.

In 1996, the Task Forces will continue their work and discussions on the concept will continue so as to capitalize on the experience of this new approach.

During 1996, the Commission will launch discussions on preparation for the Fifth Framework Programme by publishing a strategic policy document by summer 1996. The need is to concentrate research efforts so as to ensure the continued efficiency and effectiveness of the research and technological development activities of the European Union, as well as to help to stimulate the competitiveness and growth of European industry and to promote employment and the quality of life of Europe's citizens.

Other major topics which the Commission plans to address this year include further discussion on the innovation process; international scientific and technological cooperation; coordination of national RTD policies; evaluation and management of programmes, including also an assessment of Community research activities during the five preceding years; and further simplification of management procedures.

* * *

It is the Commission's hope that readers will find this annual report convenient and informative, both for those already involved in Community research and for those who discover it through this report. It is the aim that it should be seen as a useful reference document, a common knowledge base for researchers, enterprises, research organizations, research policy planners, politicians and indeed all those who have the competitiveness of the European Union and the welfare of its citizens close to their hearts.

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PART ONE

THE COMMUNITY'S RESEARCH AND TECHNOLOGICAL DEVELOPMENT POLICY IN 1995-96

I. FRAMEWORK AND LINES OF ACTION FOR THE COMMUNITY'S RTD POLICY IN 1995-96

Introduction

The European Union's research and technological development (EU RTD) policy aims to strengthen Europe's scientific and technological bases and thus to contribute to the development of the competitiveness of European industry and to promote the quality of life of Europe's citizens. EU RTD policy complements Member States' national research efforts and supports other Union policies such as on agriculture, cohesion, transport, environment, health, education, energy, etc.

The European Union's RTD policy is implemented by means of research programmes which associate companies - including SMEs - universities and research centres from various European countries in joint research projects. The research themes covered by EU RTD are defined in multiannual Framework Programmes (FP). The current Fourth Framework Programme (1994-1998) has a total budget of ECU 13 100 million, respectively ECU 11 764 million for the EC Framework Programme and ECU 1 336 million for the Euratom Framework Programme. In January 1996 the Commission proposed that this figure would be increased by ECU 700 million of which ECU 595 million is allocated for the EC FP and ECU 105 million for the Euratom FP.

The Joint Research Centre (JRC) with its seven institutes is the Community's research centre, which carries out research directly, contributes to the implementation of the Framework Programmes and provides scientific support for other Union policies. A summary of its own 1995 annual report (COM(96)158 final) and major initiatives for 1996 figures in Part Two.

The Commission is assisted and advised in the development of RTD policy in particular by IRDAC, a committee composed of representatives from the highest levels of European industry and the European Science and Technology Assembly (ESTA), which comprises eminent representatives of the scientific and industrial research community.

In 1996 EU RTD activities are focused on the implementation of the specific programmes of the Fourth Framework Programme (1994-1998) and on experimentation with the new concept of Task Forces, which focus on important topics and encourage better coordination of research and use of its results. Also during 1996, discussions on the supplementary funding of the Framework Programme will be continued and the Commission will launch the preparation of the Fifth Framework Programme.

1.1 GENERAL OBJECTIVES AND ACHIEVEMENTS

Major political events

Adjustment of the budget for the Framework Programmes to enlargement of the EU

As a result of the enlargement of the European Union at the beginning of 1995 with Austria, Finland and Sweden as new Member States, the Commission proposed an adjustment to the budget of the Fourth Framework Programme by 7% (COM(95)145). This was in line with the financial perspectives of the Union adopted in November 1994, when EU institutions agreed on a 7% increase of the budget devoted to internal policies. It also incorporated within the FP the financial contributions which the three new Member States had previously made as associated States. The Commission proposal was to distribute this increase linearly between the specific programmes.

This proposal required co-decision by the Council and Parliament as regards the EC Framework Programme and the opinion of Parliament as regards the Euratom Framework Programme. The first reading by Parliament took place in July 1995 and the Council adopted a common position in November 1995. The common position stated that the operating funds for research activities will be raised linearly by 6.87% in line with the contributions already made by the three new Member States in 1994. Funds allocated for staff and administrative purposes will be increased by 4% maximum on average. Overall, the total budget for the Programmes will be increased by ECU 800 million (6.5%). The European Parliament approved the Council common position in January 1996. The final adoption of the proposals led to Decision No 616/96/EC of the European Parliament and the Council of 25 March 1996 and Council Decision No 96/253/Euratom of 4 March 1996.

Task Forces

Early in 1995, the Commission took a major initiative to boost the contribution of research to industry and to society at large, by setting up a series of Task Forces. The role of the Task Forces is to foster a closer and more productive relationship between industry and the research community by coordinating and focusing the Community's research resources on prominent industrial and social needs. By doing this, the Task Forces are also expected to add visibility to EU research and show that it has tangible benefits to citizens at large.

Eight Task Forces have been set up to date, in the following areas:

- New-generation aircraft
- Educational software and multimedia
- The car of tomorrow
- Transport intermodality
- Environment - water
- Vaccines and viral diseases
- The trains and railway systems of the future
- Maritime systems of the future.

The Task Forces are an essential part of the Commission's strategy to improve the impact and reduce the fragmentation of research across the EU. They serve to focus discussions with industry and other interested parties and are intended to concentrate resources both from Community research programmes and throughout the EU on prominent areas of future industrial and societal need, in line with other policies (such as on the environment, the information society, education and training, social and economic cohesion, regional development, transport and health).

They are organized and staffed by the Commission, but rely on inputs from all parties involved in strengthening the link between research and industry. They take account of the lessons of good practice that have emerged from the Framework Programme, in particular the avoidance of technology prescription, and they draw on the considerable experience which has been gained in research coordination within specific RTD programmes by means of clustering research projects, concertation activities, etc.

The Task Forces are pilot actions, designed to demonstrate the advantages of research and cooperation and of new approaches integrating different policy frameworks. They have a three-fold mission:

- to define research priorities and identify technology bottlenecks, in conjunction with industry - including SMEs - and users;
- to coordinate relevant activities around a nucleus of clearly identified objectives, beginning with relevant activities under the Fourth Framework Programme;
- to investigate other options - financial, regulatory - which will contribute to effective implementation by industry.

The Commission first presented the Task Force concept to the Council of Research Ministers in March 1995. Further accounts were later given to the Council of the activities of the Task Forces, as well as to the Parliament and the Economic and Social Committee and in October the Commission provided a summary report to the Council and Parliament on their state of implementation (SEC(95)1824) together with more detailed reports from the Task Forces themselves.

Positive opinions on the principles of the Task Forces, in particular their focus on wide consultation in identifying priorities for research and their potential role in coordinating research activities, have been given by ESTA, IRDAC and CREST, as well as a number of programme committees. Evidently a number of practical aspects remain to be settled.

The Task Forces are intimately linked to the Commission's proposal for supplementary funding of the Fourth Framework Programme and the Euratom Framework Programme. This proposal (COM(96)12) arises from the provision in the decisions taken in April 1994 adopting the Fourth (EC) Framework Programme and the Euratom Framework Programme for a financial supplement amounting to a total of up to ECU 700 million to be decided by June 1996. The proposal identifies the themes addressed by the Task Forces as priority areas for focusing and concentration of research. It advocates additional funding for five of these themes - *New-generation aircraft, Car of tomorrow, Educational software and multimedia, Transport intermodality and Environment-water* - as well as (for the Euratom Programme) *Nuclear safety*.

The Task Forces' proposals will help to coordinate research in these areas and on the three other Task Force themes, i.e. *Vaccines and viral diseases*, *Trains and railway systems of the future* and *Maritime systems of the future*. In all cases, however, the legal conditions for the implementation of the Framework Programmes will be respected. In particular, research will be administered through the specific programmes, in full respect of the established procedures.

Significant results have already been achieved by the Task Forces in consulting industry and users, in diagnosing the problems and challenges facing the EU and in developing action plans. They have already given a new visibility to the EU's research activities and caught the imagination of the industrial and research communities, allowing rapid mobilization of scientific and technical expertise and effective cooperation between the various services of the Commission.

IRDAC and ESTA activities 1995-96

Following the Commission decision of 7 September 1995, a new role was outlined for IRDAC (the Industrial R&D Advisory Committee of the Commission) and an increase in membership agreed. IRDAC will in future address more strategic issues (no longer purely RTD), and its membership now numbers 19 senior industrialists appointed in a personal capacity and 5 representatives of European associations: the Union of Industries of the European Community (UNICE), the European Centre for Public Enterprise (ECPE), the European Association of Contract Research Organizations (EACRO), the Federation of European Industrial Cooperative Research Organizations (FEICRO), the European Trade Union Confederation (ETUC) and the European Union of Crafts and Small and Medium-sized Enterprises (UEAPME).

In 1995 IRDAC published opinions in the following areas: international cooperation (scientific and technological cooperation with Central and Eastern Europe, developing countries, non-European industrialized countries), the Joint Research Centre and coordination of national policies. In addition, as a start-up of the discussions on the Fifth Framework Programme, IRDAC published the booklet "Let's talk Research" in which senior industrialists give their views on the future of research in Europe.

In 1996 IRDAC will organize round-tables on IPR, services, information and communications technologies, life science, industrial and materials technologies, environment and energy. Other round-tables will deal with the Green Paper on Innovation, regulation and research, and SMEs. A special working party will be set up on the "efficiency of European industry".

IRDAC will present its advice on the Fifth Framework Programme at the end of May 1996. The IRDAC plenum will be held on 24 October 1996.

The European Science and Technology Assembly (ESTA) was set up in 1994.

This Commission advisory body currently brings together 96 eminent academics and industrialists.

The Assembly holds plenary meetings twice a year. The 20-member Bureau elected by the Assembly meets about four times a year. A number of working parties provide support.

The topics discussed to date include evaluation of the projects and programme under the Fourth Framework Programme, issues concerning the coordination of national policies, such as the role of the research Councils or identification of the weaknesses or gaps in the development of Europe's scientific base and of ways of remedying them, the role of basic research in EU RTD activities, closer relations between academic and industrial partners in the research field, Europe's competitive position in science and technology and its implications for the Fifth Framework Programme, relations between Europe and Asia in connection with scientific and technological development and the options for inertial confinement for controlled thermonuclear fusion.

A progress report on these subjects was given at the Assembly's plenary meeting on 16 and 17 April 1996. This laid the foundation for rapid finalization of certain reports (on fusion, evaluation and basic research), which were formally submitted to the Commission in May 1996. The others will be finalized in the months ahead.

The efforts made to broaden the interface between the Commission and ESTA will continue, with greater involvement of the programme managers in the working parties and more regular interaction between ESTA and the Commission units concerned with general Community S&T policy in particular. In addition to finalization of the work in hand and the establishment of new working parties (to be discussed at the Bureau's meeting in July 1996), in 1996 ESTA will, in particular, be involved in the preparatory work on the Fifth Framework Programme.

Contracts signed and payments made in 1995: annual basis and Framework Programme

The 1995 economic and financial data in Part Three refer to the Fourth Framework Programme and the Euratom Programme (ECU 13 100 million).

The annual section (Tables 1 to 9) analyses only the indirect action started or already in progress in 1995: on 31 December 1995, a total of 10 695 projects were in progress.

The analysis by content (number of projects, participants, Member States, etc.) is based on the contracts signed in 1995 under the Fourth Framework Programme (Tables 1, 2, 5, 6, 7 and 9). A total of 2 660 new contracts, involving 12 185 participants and with a Community contribution of ECU 2 033 million, were signed. Analysing the shared-cost activities alone, the projects were generally substantial, with an average Community contribution of ECU 1 million and an average of four Member States and 6.5 participants per project (see Table 1). Generally, a greater effort was made on coordination to ensure that the different programmes apply a common basis for analysis. An analysis by type of participant has been provided for projects worth ECU 1 545 million.¹ The analysis by objective 1 regions (Table 6) covers projects accounting for a total of ECU 1 575 million. Finally, 74 874 collaborative links between European Union countries have been reported (Table 7). Tables 2, 5, 6 and 7 contain analyses by specific programme.

¹ Cf. Table 5A: out of ECU 1911.05 million, no breakdown by type of participant could be provided for the programmes on transport (ECU 64.58 million), dissemination (ECU 30 million), S/T support (ECU 20.08 million) and fusion (ECU 251.51 million), i.e. for a total of ECU 366.17 million. Consequently, ECU 1544.88 million (1911.05 - 366.17) was broken down.

All the projects not completed in 1995 (preparatory, monitoring and support measures, Second, Third and Fourth Framework Programmes and Euratom Programme) are included in the total Community research funding in Table 1. A total of ECU 2 037 million was paid in 1995, of which ECU 1 059 million was under the Third Framework Programme (Table 3A) and ECU 582 million under the Fourth (Table 3B). The contracts entered into under the Third Framework Programme in 1994 and signed in 1995 have not been analysed by content to simplify the analysis but account for less than ECU 100 million (96) for DG XII alone.

The launch of the Framework Programme called for extensive evaluation procedures (some 4 500 experts sat on the various evaluation panels). Commitments were made, up to the limits of the appropriations available, and the contracts signed in 1995 (ECU 2 033 million) reflect just part of the budget commitments entered into in 1995. For DG XII, for example, the difference between the commitments entered into under the Fourth Framework Programme in 1995 (ECU 1 350 million) and the contracts actually signed that year (ECU 710 million) was ECU 640 million.

In the multiannual section (Tables 10 to 12), Table 10 indicates the breakdown of the funding between the various specific programmes, indirect action and direct action by the JRC under the Fourth Framework Programme and the Euratom Framework Programme. Tables 11 and 12 indicate the amounts committed to Community research between 1984 and 1998 at current and 1992 prices.

1.2 IMPLEMENTATION OF THE FOURTH FRAMEWORK PROGRAMME

• Pattern of participation

Community research is carried out through transnational research projects. Proposals are invited in public calls for proposals and the projects are selected generally in accordance with the following procedure. Commission staff check conformity with objective criteria and eligibility of the proposals. Advice on the evaluation and grading of the proposals is provided by external experts. The Commission then prepares a list of projects to be funded and this list is submitted to the programme committee for opinion before the Commission adopts the final decision.

The external experts monitoring the specific programmes of the Fourth Framework Programme have noted that the research programmes strengthen existing links between participants in the research projects and encourage the establishment of new links. Programmes like Information and communication technologies and Industrial and materials technologies, for example, have substantial numbers of new participants.

However, rigorous assessment of the number of new links formed in the programmes is a complex exercise. On the one hand new links are formed already in the preparation phase of a proposal and therefore new links are created even when the proposal is unsuccessful. On the other hand, some new links may be the result of the mobility of a key person to another institute or enterprise.

• Impact on industry

There are various aspects to participation by industry in European research. First, by virtue of its role within the IRDAC, ESTA, Task Forces and also the CEN, industry plays a part in shaping research.

By participating in Community RTD projects, industrial firms collaborate with other companies and research teams and have access to the results of the joint research.

Finally, the first, second and third areas of activity in the Fourth Framework Programme enable European industry to benefit from the results of research conducted by others and from international openings.

The figures in Table 5a and 5b reveal a high level of participation by industry. Analysis of ECU 1 billion allocated in 1994 by type of participant shows that industry took 38% of the contributions made by the Community and 26% of the contracts awarded to European participants. Analysis of ECU 1 545 million granted in 1995 showed that industry accounted for 44% of the Community contributions and 40% of the European participants.

The number of SMEs participating in 1995 was 1 782, giving a relative share of 20% compared with 17% in 1994. In 1995 SMEs took 15% of the Community's contribution to RTD.

As regards the contribution to industrial competitiveness, in 1995 the RTD activities produced significant results, such as new and potential products and processes, patents, proposals for standards or transfers of technologies, from many programmes, notably on Information and communication technologies, Industrial and materials technologies, but also on Biotechnology, Agriculture and fisheries, and Non-nuclear energy. Hundreds of patents and new products and processes were reported under programmes like the Communication technologies programme.

Part Two of this report describes the procedures and technological and industrial development objectives for each programme.

As reported in the "Panorama of EU industry 1995",² RTD partnerships come first amongst the various forms of alliances formed between undertakings in the quest for greater industrial competitiveness.

- Measures to stimulate access to RTD by SMEs

The web of SMEs is an economic and social asset for the competitiveness of European industry as a whole and for employment. In sectors such as the aviation or car industries, but also in the information technology, mechanical engineering, clothing or leather sectors, they account for a significant proportion of production. Some 60% of the 7 000 undertakings in the aviation industry are SMEs. The motor vehicle parts and accessories sector employs almost as many workers (approximately one million) as the car industry which it supplies.³

This has raised awareness of the importance of RTD for SMEs on the part of the businesses⁴ and of the Commission alike.

² Cf "Panorama of EU industry 1995", pp 35 to 40 "A European approach to strategic alliances".

³ Cf "Panorama of EU industry 1995", section 11.20.

⁴ 70% of the participants in CRAFT projects gave international competitiveness constraints as their motivation for participation.

To promote and facilitate participation by SMEs in the Community's RTD programmes, the Fourth Framework Programme includes a package of technology stimulation measures targeted on SMEs with little or no research capacity of their own and on small high-technology firms.

These measures are of two types:

1. a two-stage submission procedure: Community "awards" are granted to help partnerships consisting of two SMEs to prepare a full research project. On the basis of an outline plan (stage 1), the Commission can grant the SMEs an award covering the "exploratory phase" so that they can complete a full proposal for submission in stage 2. The project itself will be carried out with other partners, either as cooperative research or as another type of research project;
2. cooperative research: this type of project (cooperative research action for technology - CRAFT) is designed specially for SMEs with little or no research capacity of their own. The SMEs proposing the project leave all or part of the RTD work to one or more research bodies.

In addition, a network of "focal points" (the CRAFT network) has been set up to provide SMEs with information and assistance with preparation of dossiers at national, regional or local level. The objective is to limit the time and formalities needed to prepare RTD projects and, in the final analysis, to enable SMEs to convert ideas into RTD projects and, possibly, technological innovations.

In the course of the Third Framework Programme, the CRAFT scheme tripled the number of SMEs⁵ participating in the research projects in the Industrial and materials technologies programme. Another 3 500 SMEs received exploratory or feasibility awards.

In the Fourth Framework Programme, the CRAFT formula has been extended to seven other programmes. Participation by small businesses has increased, particularly in the specific programmes on Telematics, Information technologies, Standards, measurements and testing, Environment and climate, Biotechnology, Biomedicine and health, Agriculture and fisheries, and Non-nuclear energy. Table 5a shows that 1 782 small firms participated in the shared-cost activities under the Fourth Framework Programme in 1995.

The current level of participation by SMEs in European research must be improved. A working party responsible for inter-programme coordination of implementation of the technology stimulation measures is working on this.

- RTD policy and economic and social cohesion

In line with the 1993 communication on cohesion and RTD policy,⁶ the Commission is ensuring that all involved in science and technology in the less-favoured regions of the European Union

⁵ From 600 at the start of the programme to 1800 by the end.

⁶ "Cohesion and RTD policy - synergies between research and technological development policy and economic and social cohesion policy", COM(93)203 final of 12 May 1993.

have an opportunity to participate fully in its RTD policy in order to establish lasting cooperation with all regions in Europe, particularly the less-favoured regions.

Table 6 provides a means of calculating the coverage of all objective 1 regions in terms of number of projects (46%),⁷ participation (14%)⁸ and value (17%).⁹ These figures can be compared with the proportion of the European population living in these regions (26.6%) or with the 6% of all the European Union's researchers there (full-time researcher equivalents based on the 1989 and 1991 Eurostat figures). These regions also receive aid for research from the Structural Funds, which will total ECU 3 775 million between 1994 and 1999.¹⁰ One of the roles played by the Fourth Framework RTD Programme in economic and social cohesion is to help researchers and laboratories from these regions to join the European research networks.

In the third area of activity of the Framework Programme (dissemination and optimization of results - innovation programme), on 15 September 1995 DG XIII and DG XVI issued a joint call for proposals¹¹ for the implementation of regional innovation and technology transfer strategies and infrastructures (RITTS), regional innovation strategies (RIS) and regional technology transfer (RTT) projects. A budget of ECU 21 million was allocated to the outcome of this call for proposals (of which ECU 15 million was from the European Regional Development Fund).

In the fourth area of activity under the Framework Programme (training and mobility of researchers), a working party of the programme committee has evaluated the initial impact of the general lines of action and specific measures adopted to promote cohesion: additional year's grant to help researchers from objective 1 and 6 regions to return to their region of origin, support for networking, in the form of funding for laboratory equipment, support for stays in these regions by experienced researchers and priority for young researchers from these regions for participation in Euroconferences.

At the same time, awareness-raising activities under the Framework RTD Programme in the less-favoured regions are continuing, in the form of studies,¹² seminars¹³ and conferences¹⁴.

⁷ Number of projects with at least one participant from an objective 1 region in relation to the total number of projects.

⁸ Number of participants from objective 1 regions in relation to total number of participants.

⁹ Value of projects involving at least one participant from an objective 1 region, in relation to the amount spent on all projects.

¹⁰ COM(96)109 final of 20 March 1996 "Community structural assistance and employment".

¹¹ OJ No C 240, 15.9.1995, p. 15.

¹² - "Research and technological development in the rural and island regions of the European Union", Josy Richez-Battesti, Dynmed, EUR 16643 FR/EN, 1995.

- "Technology management in enterprises/regional administrations in the less-favoured regions of the European Union", AYSE, 1995.

In 1996 the Commission will organize a conference in Brussels on comparison of the strategies on regionalization of RTD and innovation policies in different parts of the world, particularly in the Triad (Europe, USA and Japan).

The mobilisation activities in the less-favoured regions will continue, with three mobilisation seminars in Spain, Finland and Sweden, a conference in France on RTD in the rural regions of the European Union and symposiums in Italy, Ireland and Germany.

The European Commission is also planning a forward study to determine the impact of future enlargements on the Framework RTD Programme and on the parts of the regional policy of relevance to the scientific and technical capacity of the regions in potential Member States.

• R&D, growth and employment

The relationship between R&D, growth and unemployment has long been discussed by economists. Two ideas predominate: first, that in the long term R&D contributes to growth and employment by increasing the demand for and quality of products and also the productivity of the factors of production; second, that the link between R&D and the creation of new markets and jobs is neither simple nor direct and, under no circumstances, linear. In practice, innovation leading to changes on the markets and in production processes produces knock-on effects at various times and of many different forms between production, market creation and research.

Investment in European R&D contributes to growth and employment in four main ways:

- By establishing collaboration between teams (businesses, universities, research centres) from different countries, European research complements the research by companies and States and capitalizes on the external economies stemming from cost-sharing and networking; this allows exchanges of information and generates the critical mass required in order to reap the benefits of the large internal market. Indicators of the networking efforts include some 81 000 collaborative links established in 1995 or the equivalent of 20 000 researcher years supported by the Community.¹⁵
- Changes in employment and in the way work is organized have brought with them changes in the pattern of demand for labour: socio-economic research is being conducted at European level and in numerous countries to prepare the way for and support the necessary changes on the labour market, particularly with the aid of training. In the research sector, the fourth area of activity in the Fourth Framework Programme (training and mobility of researchers) aims at striking a better balance between supply and demand for researchers. Finally, the multimedia educational software Task Force

13	Mobilisation seminars:	-	03/02/95	Naples (I)
		-	21/09/95	Santa Maria Imbaro (I)
		-	12/10/95	Magdeburg (D)
		-	04/12/95	Stadtschlaining (A)

¹⁴ "Managing science and technology in the regions" - Fifth STRIDE conference, 8-10 June 1995.

¹⁵ One researcher year costs an estimated total of ECU 100 000. On this basis, the indirect action under the Framework Programme (ECU 2 000 million in 1995) would fund the equivalent of 20 000 researcher years.

is aiming at providing new skills for the workforce, particularly in SMEs.

- In order to target research more effectively on innovation, the European Union encourages interactions between producers of research and users of the results. The third area of activity in the Fourth Framework Programme (dissemination and optimization of results) sets out to increase the number of meetings and exchanges. In addition to the funding provided for the third activity, 1% of the total budget for the Fourth Framework Programme is allocated to dissemination and take-up of results under the first activity. Finally, the Green Paper on Innovation unveiled a package of measures to convert the scientific and technological potential into profitable innovations, while the contribution of the Task Forces responds to the demand for strategic guidelines.
- The quality of its R&D and the training and education of its workforce (intangible infrastructure) make Europe attractive for investors and create comparative advantages for its companies. The programmes on Information and communication technologies or Biotechnology focus on the high-technology sectors creating the most jobs, while the Industrial and materials technologies programme, for example, targets on industries where high quality research could help to save jobs in industries which are particularly big employers (1.7 million jobs in the car industry, 9 million jobs in the construction industry, 1.6 million in the textile sector, etc.).

- Management

Simplification and speeding-up of evaluation, selection and funding procedures for RTD projects are the Commission's constant concerns. In 1994 a first simplification measure was taken in the form of the decision to publish calls for proposals on set dates (15 March, 15 June, 15 September and 15 December).

In July 1995 the Commission adopted a new model contract for RTD projects. The objective of the new contract is to increase competitiveness and to ensure that the project results and technology transfer opportunities made possible by the Fourth Framework Programme are exploited to the fullest extent possible, whilst still respecting the legitimate commercial interests of all participants. This new model contract is shorter and simpler than the former model contract. It also gives increased protection in the area of intellectual property rights (IPR). Furthermore, the new model contract ensures better dissemination and exploitation of research results by requiring the submission of a technology implementation plan before the end of the project and the publication of results enabling interested third parties to request licenses for the technology developed. Significant progress has also been made in the administrative domain, which will among other things make it easier for SMEs to participate in research programmes.

At the end of 1995 a working party on evaluation of proposals was set up with the objective of producing a code of practice providing the common terms of reference, on which each programme will base its own code.

As part of the constant examination of its management procedures, the Commission will organize a seminar in 1996 with representatives of the European industrial and research communities. The seminar will focus on the various stages of programme implementation and will seek views on ways to improve the quality, efficiency and transparency of RTD programme management.

Information and communication are key aspects of the Community's research and development policy. Every year the Commission organizes numerous conferences, seminars, etc. In addition to the events funded by the contracts themselves (1 275 in 1995), the Commission directly supports over 200 conferences and seminars, particularly:

- 1995 European week for scientific and technological culture (8/11)
- European Union contest for young scientists (5/9 and 13/9)
- Conference on public understanding of science and technology (30/11 - 2/12 1995).

In addition to the scientific publications directly connected with the specific programmes (13 000 in 1995), the Commission awards special grants for specific publications.

The Commission is extremely active in publishing general information brochures on RTD, with 6 000 copies ordered every month. Internet is playing an increasingly important role in disseminating them.

In 1995 the Commission continued its efforts to improve access to the Framework Programme. In particular, on 24 July 1995 the Commission launched its own EU RTD home page on the World Wide Web (Internet) under the European Commission's EUROPA site, which is the Commission's main server on WWW. The objective of the service provided by the Commission is to operate as an up-to-date and reliable source of information on all RTD activities of relevance to outside users.

Finally, the Commission conducts studies ranging from evaluations to economic and budgetary analyses.

As regards staffing, 99 new posts were created in 1995, bringing the research management staff up to 1 453 authorized posts by 1 January 1996, of whom 812 are Category A staff. Given the number of joint multinational projects in progress, the number of teams involved and, more generally, the nature of the Commission's organizational, administrative and management role in the research, this total is reasonable.

Table 9 demonstrates the importance of small projects (50% of the projects take just 15% of the budget and 80% just 50%) in all the activities. The average value of the contracts varies widely from one programme to another, from ECU 0.2 million for Dissemination and optimization of results to ECU 1.6 million for all three programmes on Information and communication technologies.¹⁶

• Monitoring and evaluation

A new programme monitoring and evaluation scheme was introduced in 1995. It is based on the legislative requirements of the Fourth Framework Programme and its specific programmes and on the advice from CREST on monitoring and evaluation of May 1995. It involves independent external experts, provides a quick response to programme developments and gives

¹⁶ Cf. Table 9: For all three programmes (Telematics, Communication technologies and Information technologies), the total amount available was ECU 808.29 million (220.85 + 208.10 + 379.34) for 516 projects (182 + 109 + 225), i.e. an average of ECU 1 566 000 per project.

advice on key issues.

The general principles will be explained in a communication from the Commission concerning independent external monitoring and evaluation of Community activities in the area of research and technological development.

The monitoring of the 18 specific programmes of the Fourth Framework Programme was launched in 1995 and has been carried out by 18 panels, each composed of three independent external experts with industrial, academic and evaluation experience. In December 1995 a high-level Framework Programme Monitoring Panel was established which based its work on the reports of the specific programme monitoring panels. All the monitoring panels completed their work at the beginning of 1996.

The Commission has carried out national impact studies to complement the evaluation of the specific programmes. A synthesis report on the national impact studies assessing the effects of Community RTD policy on the national research landscape in each Member State and examining the interactions between Community and national RTD policies has been published as well as programme evaluation reports:

- Philippe de Montgolfier & Jean-Pierre Husson : National impact studies synthesis final report. May 1995;
- Evaluation of the ECLAIR and FLAIR programmes (1988-1993 & 1989-1993), EUR 16192 (1995);
- Evaluation of the STEP and EPOCH programmes (1989-1993), EUR 16207 (1995);
- Mid-term evaluation of the MAST II programme, EUR 16610 (1995);
- Evaluation of the BRIDGE programme (1990-1994), EUR 16650 (1995);
- Final evaluation of the centralized action for dissemination and exploitation of RTD results (VALUE II) (1991-1994);
- Final evaluation of the strategic programme for innovation and technology transfer (SPRINT) (1991-1994).

The Commission organized an international conference on the evaluation of research, technology and development in April 1995 in Thessaloniki. This conference brought together more than 200 evaluation experts from different European Union and non-EU countries.

At the end of 1995 a steering group consisting of representatives of industry and the managers of the specific programmes was set up to guide the discussions, under the third activity, to establish a common methodological basis for monitoring the results of the projects in the RTD programmes.

In 1996, the Commission will carry out another monitoring exercise similar to that of 1995 and will evaluate the management and the progress of the Community action during the five preceding years. The Commission will communicate the conclusions of this five-year evaluation to the other institutions of the European Union before presenting its proposals for the Fifth Framework Programme.

II. INTERNATIONAL COOPERATION

Introduction

During the past year, international scientific and technological cooperation has become an even more significant aspect of the European Union's research and technological development policy. A wide range of activities within the INCO programme has been implemented by the Commission and also concrete initiatives have been undertaken to establish relations or expand existing cooperative arrangements with a number of countries. Detailed information on the INCO activities is set out in Part Two. Some important points are highlighted here.

2.1. Commission communication on perspectives for international cooperation in research and technological development

International scientific and technological cooperation has become an important and integral part of the European Union's research and technological development (RTD) policy during recent years. In October 1995 Mrs Cresson presented to the Research Council the Commission's proposed guidelines on international scientific cooperation (COM(95) 489 final). In order to respond to the important developments taking place in recent years, the Commission is seeking to reinforce industrial participation in this context and to strengthen the external dimension of RTD policy. The use of additional instruments to fund RTD projects, such as PHARE, TACIS, Meda or the EDF will be promoted when necessary.

The Commission's communication was discussed by the Council, European Parliament and CREST between October 1995 and March 1996. The Council adopted a resolution on international RTD cooperation in March 1996. The resolution approves the five global objectives given in the Commission communication, which aims to strengthen international cooperation according to the following measures:

- strengthen European competitiveness and develop technologies for future markets;
- develop partnerships in science and technology, in particular with third countries of strategic interest to the Community;
- share responsibility and conduct RTD on economic and social challenges;
- promote RTD relevant to the needs and priorities of developing countries for fostering their sustainable growth;
- share S&T information and contribute to large-scale and cross-frontier science and technology.

2.2. European Union and R&D cooperation with Eastern Europe

In May 1995 the Commission presented a communication on scientific and technological cooperation with the New Independent States (NIS) of the former Soviet Union (COM (95) 190 final), which presents the future guidelines for scientific and technological cooperation with the former Soviet Union. This communication forms an integral part of the general international RTD strategy. The emphasis in cooperation with NIS should be on larger RTD projects. These projects should involve industry and should be nearer to the market than the activities under the previous PECO and COPERNICUS programmes. The discussions on these guidelines with the Member States will be continued during 1996.

The International Association for the Promotion of Cooperation with Scientists from the New Independent States of the former Soviet Union (INTAS) was set up in June 1993. In October 1995, the Council approved the extension of Community participation in INTAS until the end of 1998 and strengthened the Commission's role in the Association.

In 1995 the Community continued its support for the International Science and Technology Centre (ISTC) created in November 1992 by the European Union, the United States, Japan and Russia in order to encourage military scientists and engineers from the former Soviet Union to retrain for civilian occupations and speed up the disarmament process.

2.3. European Union and cooperation with Mediterranean countries

Discussions on the further development of scientific and technological cooperation with the Mediterranean countries were initiated under the French EU presidency in 1995. The French Ministry of Higher Education and Research and the Commission organized a seminar on "Europe of Research and the Mediterranean" which took place in March 1995 in Sophia-Antipolis. The Euro-Mediterranean Conference in Barcelona in November 1995 underlined the importance of science and technology in EU-Mediterranean cooperation policy. The main actions include strengthening of the research capacity of Mediterranean third countries, promotion of joint research activities and support to technology transfer. A monitoring committee has been set up to follow and advise on future developments. In 1996, discussions are continuing under the Italian EU presidency and the Commission plans to present a communication on scientific and technological cooperation with Mediterranean third countries.

III. INNOVATION AND DISSEMINATION OF R&D RESULTS

Generally, intellectual and industrial property in Europe is being discussed to examine whether companies are suffering from conditions less favourable than those enjoyed by their counterparts in the USA or Japan in order to protect their research results and, if so, what the solutions could be to remedy the situation.

Green Paper on Innovation

By publishing a Green Paper on Innovation (COM(95) 688 final) in December 1995, the European Commission has initiated a widescale consultative process on the problem of innovation in Europe. The Green Paper considers the different factors involved in innovation, the existing situation is analysed and proposals for future action are suggested.

It is one of the paradoxes of the European Union that despite its internationally acknowledged scientific excellence, it launches fewer new products, services and processes than its main competitors. This paradox has received much attention during recent years as innovation has become one of the main driving forces in economic competitiveness.

There are numerous obstacles to innovation identified by the Green Paper. First, inadequate research and development input in Europe. For example, in 1993 the European Union devoted 2% of its GDP to research and development, compared with 2.7% in the United States and Japan. In addition, in 1992 industrial research financed by businesses represented 1.3% of GDP in Europe, compared with more than 1.9% in the United States and Japan. Furthermore,

European RTD covers a wide range of areas, while the United States and Japan concentrate their efforts on a number of priority areas. There are also a number of structural obstacles to innovation like complex legal and administrative procedures, unsuitable financing systems, low level of use of industrial property rights and the insufficient mobility of students and researchers in the European Union between private and public entities.

The Green Paper spells out 13 lines of action each containing a number of concrete proposals, almost 130 in all, with which to fuel the debate. But in accordance with the principle of subsidiarity, there is a need to distinguish clearly between responsibility at Community, national and local levels.

The Commission plans to draw up a synthesis report in June 1996 based on the consultation process with interested parties, together with, if necessary, an action plan.

IV. TRAINING THROUGH RESEARCH

Human resources are a key factor in the development of the future learning society, which will be based on the simultaneous development of the information society, the impact of the scientific and technological world and the internationalization of the economy.

There is a clear link between research, and education and training. The development of multimedia educational software, which the Commission is supporting through the creation of the Task Force on educational multimedia software, is a particularly important example. Furthermore, the ability to renew and innovate will depend on the links between the development of knowledge in research and its transmission through education and training. Therefore, action which strengthens the links between research and education should be encouraged in order to develop students' aptitudes to invent and to promote innovation.

In the Fourth Framework Programme two specific programmes, on Training and mobility of researchers and Targeted socio-economic research, include action which specifically supports these targets. Also, all other specific programmes in the Fourth Framework Programme include a training component giving a possibility for transnational cooperation to hundreds of researchers.

- White Paper on Education

The White Paper on Education and Training (COM(95) 590 final), which the Commission presented in November 1995, discusses future developments in this field. The White Paper is based on the ideas of the White Paper on Growth, Competitiveness and Employment, which stressed the importance of education and training for the competitiveness of European industry. Among the main problems addressed in the White Paper on Education and Training are employment and social exclusion, particularly among young people. The White Paper focuses on two main objectives: (a) to give everyone access to a broad base of knowledge and (b) to build up everyone's qualifications for employment and economic life.

V. COORDINATION BETWEEN EUROPEAN AND NATIONAL POLICIES

In 1995 the Commission communication entitled "Research and technological development: achieving coordination through cooperation" (COM(94)438) was followed by a wide-ranging debate by the Community institutions, leading to a number of resolutions and opinions.

For example, on 9 June 1995 the Council adopted conclusions on the coordination of research and technological development policies,¹⁷ which emphasized exchanges of information on national RTD activities and the key role of the programme management committees in this connection. On 28 September 1995 the Council adopted a resolution on CREST¹⁸ supporting the Commission's proposal to reinforce this Committee's role. Now its mandate focuses, essentially, on coordination of RTD policies and on the strategic guidelines for Community RTD.

On 15 June 1995 the European Parliament adopted a resolution on the coordination of RTD policies. In particular, this stressed the need to target CREST's mandate and to extend the role of the programme committees by means of systematic exchanges of information and greater trans-programme coordination. Parliament also endorsed the Commission's proposal to start debates on topics of general interest which could improve coordination.

On 26 October 1995 the Economic and Social Committee adopted an own-initiative opinion on the coordination of research policies (Doc. CES 570/95). This emphasized, in particular, the Task Force concept and establishment of a system for prior exchange of information.

On 18 July 1995 IRDAC adopted an opinion on the coordination of RTD policies, in which it stressed the importance of coordination in order to make more efficient use of public resources allocated to research.

The principal measures taken in 1996 will follow up the abovementioned conclusions, resolutions and opinions, which the Commission is now implementing by taking specific measures such as:

Establishment of a system for exchanges of information on national RTD activities

In line with the Council conclusions of 9 June 1995, the Commission has set up *ad hoc* advisory committees for systematic exchanges of information on national RTD activities. Information is exchanged regularly, targeted on preselected areas in which greater coordination proves necessary. This also provides an early warning of the new activities started in the Member States. Each *ad hoc* committee will submit an annual report to CREST. Discussions and work have started on the 18 specific programmes concerned. The first annual reports will be available at the end of 1996. They will focus on a limited number of fields for coordination and, possibly, make recommendations. These reports will be discussed and analysed by CREST, which could make recommendations to contribute towards deciding the strategic objectives and priorities of the Community's RTD policy.

¹⁷ Council conclusions of 9 June 1995 on the coordination of research and technological development policies.

¹⁸ Council resolution of 28 September 1995 on CREST, OJ No C 264, 11.10.1995, p. 4.

Discussion on topics of common interest for coordination

The Commission will encourage, prepare (in collaboration with the Member States) and monitor discussions on topics of common interest, such as indirect support for RTD and large-scale facilities. These discussions will be held within CREST in particular, which has included these subjects in its work programme. As regards the indirect support for RTD, the Commission has ordered a comparative study on the measures taken in the Community countries and in non-Community countries such as the USA and Japan.

Implementation of the Council resolution of 28 September 1995 on CREST

The work started at the end of 1995 to implement this resolution will continue in 1996. In particular, this will entail defining and implementing the Committee's work programme, which targets on activities such as coordinating RTD policies and defining the Community's strategic priorities.

VI. PROSPECTS FOR 1996

In 1996, meetings of the Council of Research Ministers are scheduled on 7 October and 5 December.

In January, the Commission presented its proposal for supplementary funding of the Fourth Framework Programme (COM(96) 12 final) by ECU 700 million, based on a provision in the 1994 decisions on the Fourth Framework Programme. The Commission proposes focusing research on key areas of interest to the whole Community. The Commission hopes for adoption of its proposal during 1996.

The research-industry Task Forces will continue their work to develop consultation with external bodies, to improve links between research and industry as well as to coordinate Community and national RTD activities in selected areas. It is helpful that experience of their work can be gained before the launch of the Fifth Framework Programme.

During 1996, the Commission will launch preparatory discussions on the Fifth Framework Programme among the Member States and all other interested parties by issuing discussion documents which aim to address the key issues of future research policy of the European Union. The Commission intends to publish a strategic policy document on the Fifth Framework Programme by summer 1996. In its future strategy the Commission will concentrate its efforts on issues which will help to improve the efficiency and effectiveness of EU research and technological development activities as well as to stimulate the growth and competitiveness of European industry and to promote employment and the quality of life of Europe's citizens.

The Commission will pay particular attention to further improvements in management efficiency through simplifying procedures and by increasing flexibility and transparency of administration. The evaluation and monitoring exercises will also be continued.

In the field of international cooperation, three new communications on scientific and technological cooperation will be addressed, i.e. those concerning the emerging economies, Mediterranean countries as well as Central and Eastern Europe. Negotiations of the bilateral cooperation agreements on research and technological development will be continued with Switzerland and with South Africa and will be started with the United States too. The Commission will support the evaluation of COST activities during 1996.

Mrs Edith Cresson, the Commissioner responsible for research, education and training, has decided to associate training activities of the European Union with those of research activities, namely with the present TMR programme and its predecessor the Human capital and mobility programme, and to name this activity after Madame Curie in order to raise its profile and make it more identifiable with the beneficiaries. This new scheme, called "Marie-Curie grants", will be officially launched in Brussels in a conference scheduled for the second half of 1996.

The information society is developing quickly and the Commission will be active in many ways. The specific RTD programmes of the Fourth Framework Programme contribute to the development of the information society. The Commission will present communications and organize conferences on this important topic and provide the electronic highways with information on many aspects of the EU's policy. The Commission Action Plan of July 1994 ("Europe's way to the information society") set out the priorities for the measures for 1995-1996.

The Intergovernmental Conference launched in March 1996 is scheduled to discuss the institutional reforms required to reinforce political union and to prepare for further enlargement. In its opinion, the Commission has, among other things, expressed hope for changes in the decision-making procedures that would bring greater flexibility and efficiency, *inter alia* in the area of research policy.

PART TWO

RTD ACTIVITIES IN 1995 AND WORK PROGRAMME FOR 1996

FIRST ACTIVITY OF THE FOURTH FRAMEWORK PROGRAMME OF COMMUNITY RTD ACTIVITIES AND EURATOM FRAMEWORK PROGRAMME

INFORMATION AND COMMUNICATIONS TECHNOLOGIES

1. TELEMATICS APPLICATIONS OF COMMON INTEREST

Activities in 1995

1995 was the pivot year between the Third and Fourth Framework Programmes. The specific programme Telematics applications of common interest (1991-1994) ended with the signature of the last contracts. The specific programme Telematics applications of common interest (1994-1998) entered its active phase with the launch and evaluation of the first two calls for proposals.

The Telematics applications programme of the Third Framework Programme comprised 311 projects, concerted actions and accompanying measures in seven areas: trans-European networks between government departments, transport services, health care, flexible and distance learning, libraries, linguistic research and engineering, telematics systems for rural areas. Most of the projects yielded significant technical and economic results (establishment of reference data bases, filing of patents, proposals for standards, marketing of products, etc.). In the health care field, for example, one-third of the 60 activities launched led to the marketing of new products that are now widely used or exploited by health professionals. In the transport sector, a total of 4 000 man-years deployed involving 500 partners, 30 towns and 13 transport "corridors" led to improved technological know-how (27 "best practice" and 439 end products), the approval of functional specifications by users and manufacturers (42 new specifications), the validation of 67 prototypes through 38 demonstration projects, the proposal of interoperability standards (via Technical Committee 278 of the CEN) and the conduct of socio-economic impact assessments (environment, energy, safety, efficiency, comfort). In the area of flexible and distance education, more than 200 organizations, one third of them SMEs, engaged in 34 projects and 14 concerted actions designed to improve access to teaching resources via networks dedicated to specific groups of learners (European network linking 15 technology training resource centres, plan for a European open university network, multimedia school disseminating distance education courses, etc.), to create new learning paradigms with the aid of pilot applications, to integrate hardware and software products and communication systems on prototypes and to develop software tools for the more efficient design and production of multimedia training resources. The 29 activities launched in the administrations sector helped to create a user-friendly, efficient working environment between a wide range of actors: 200 partners, associated partners and subcontractors, 53 national administrations, 21 telecommunications operators and 69 businesses including 35 SMEs. The 51 projects and 3 concerted actions in the libraries sector established a culture of cooperation in advanced information and communications technology applications,

which contributed to better use of library resources, the strengthening of European industry and the reinforcement of Europe's cultural identity.

The TIDE activity (Technology initiatives for disabled and elderly people), which began with a pilot phase in 1991, continued in its bridge phase in 1995 with 55 projects covering the period 1993-1997.

The specific programme on Telematics applications of common interest ("Telematics applications") is the focal point of Community activities in the field of information and/or communications technology applications in the Fourth RTD Framework Programme. This programme has a budget of ECU 912 million, 5% of which has been earmarked for activities in support of SMEs and over 2% for the dissemination and utilization of the research results.

The first two calls for proposals evaluated in 1995 showed the extent of the interest in the Telematics applications programme, but at the same time highlighted the budgetary constraints: of 1 706 proposals received, only 371 could be selected after the Commission decided to increase the available budget (ECU 478.5 million compared with ECU 423 million originally stated in the OJ). The success rate in terms of numbers of proposals was thus 22% and the "oversubscription" ratio (Community funding granted/total funding requested) was 1:10.

The programme effectively contributes to the three objectives assigned to Community research and technological development policy by the Treaty (Article 130f): to strengthen the scientific and technological bases of Community industry, to develop the international competitiveness of Community industry (notably through support measures to enhance the technological and industrial potential of Europe on the emerging markets of third countries in, for example, South America, South Africa or China) and to promote the research activities considered necessary to the other Community policies (transport, training, health, environment, etc.). Furthermore, the research activities should help to satisfy society's needs by generating telematics solutions for areas of common interest.

Approximately half of the RTD actions in progress, i.e. about 160, concern the emerging information society as reflected in the ten priority applications announced in the Bangemann report and the 11 pilot projects supported by the G7. The projects relating to urban and rural areas, health, traffic management, research networks, government departments, education and training and libraries have an important role in this respect.

Apart from SMEs, 21% of participants are non-industrial organizations of fewer than 500 persons (hospitals, schools, government departments, libraries, etc.). Of the 371 projects selected in 1995, 24 concerned the specific needs of SMEs in terms of awareness-raising or connection to networks. The target of 5% of the programme budget dedicated to measures in support of SMEs was reached by the first call for proposals (ECU 42.805 million).

Two projects in the field of international cooperation, one on the environment and the other on health care, are funded by the second activity of the Fourth Framework Programme to the tune of ECU 101 000 and ECU 70 000 respectively. Three other projects, one in the health sector and two in the area of education and training, contribute to the utilization of the programme's activities and results in South Africa, Central and Eastern Europe and South America respectively, with Community funding of ECU 1.1 million.

The Telematics applications programme runs a number of projects in cooperation with other specific programmes; for example, one of the projects in the Telematics for research sector,

which is designed to test a high-speed trans-European telecommunications network between laboratories and research centres, is co-funded and co-piloted by the Information technology and Telematics applications programmes. There is also close cooperation between the various sectors of the programme and the Directorates-General concerned (such as transport or education and training).

Several of the first projects launched offer interesting prospects in such diverse fields as driver assistance and automatic decision-taking in accident or emergency situations, integrated validation of telematics applications at regional level and their socio-economic impact, validation of telematics applications for urban development in a network of European cities, the establishment of an employment agency for teleworkers, the delivery of community services to improve the quality of service provided to citizens and reduce their cost, cyberspace training for young people or coordination and continuity of primary health care services.

Work programme for 1996

A third call for proposals launched on 15 September 1995 was evaluated in the first quarter of 1996. It concerns activities relating to disabled and elderly persons; health; education and training; linguistic research and engineering networks. Evaluation of the 413 proposals received resulted in 67 new projects, no fewer than 32 of which concern activities to help the disabled and elderly people. The Community contribution to all of these projects amounts to ECU 64.435 million.

A fourth call for proposals is scheduled for December 1996 concerning both RTD work in the sectors and validation and demonstration projects for integrated and transsectoral telematics applications at test sites, notably cities. The aim in the case of the sectoral activities will be to boost existing projects or select new projects for tasks inadequately covered by the on-going projects. In the case of integrated applications, the aim will be to mobilize user sites and suppliers in major projects with a view to verifying the technical relevance and the socio-economic impact of applications from the various sectors.

The Telematics applications programme actively contributes to the work of the research-industry Task Forces, particularly in the areas of educational software, multimedia services and transport.

2. COMMUNICATIONS TECHNOLOGIES

Activities in 1995

S & T achievements

The RACE programme was brought to a successful conclusion in 1995. It has been the framework for European cooperation in advanced communications technology development since 1988 and has involved all major European network operators and telecommunications equipment and software developers.

The second phase, from 1991 to 1995, was part of the Third Framework Programme and involved over 600 participating organizations in over 130 projects.

The Advanced communications (ACTS) programme of the Fourth Framework Programme was launched in 1995, following a call for proposals in September 1994. Over 100 projects started

work in 1995, involving over 600 organizations. The launch phase is documented in ACTS'95¹⁹ and in an independent monitoring report.

Examples of results

The main achievements of RACE to 1995 are described briefly below, and are fully documented in the final report, separately published.²⁰

- Contribution to industrial competitiveness

The RACE Programme has made a major impact on Europe's world position in mastery of advanced communications technologies and advanced service deployment. About 70 % of participating companies report an improved competitive position in Western Europe and over 50 % report improved competitiveness with respect to the USA and the rest of the world. 44 % report an improved competitive position with respect to Japanese competitors as a result of RACE work. 568 companies have expressed their intention to develop new products and advanced services; in about 22 % of these cases, plans already exist or are in preparation. For advanced services, there are 281 expressions of interest and commercial plans already exist or are in preparation for 20 % of these. About 140 new patents have been registered and a further 48 are planned within the next 3 years.²¹

The consensus development through RACE "concertation" and cooperation has reduced investment risks, accelerated product and service development, improved economies of scale and scope, helped companies to better focus business strategies, and reduced costs. Over 750 cases of positive impact in the above areas were identified by commercial companies involved in RACE.

Pilot applications of advanced communications services have involved approximately 500 organizations and sites, and over 7000 individual users. The business sectors involved include manufacturing, retail and distribution, publishing and advertising, the liberal professions and public service provision. The reported benefits from trials include cost reduction, time savings, easier access to information, increased flexibility, and new job creation, particularly in remote and rural areas.

- Industrial participation (and for SMES)

The 123 R&D projects involved the participation of 574 different organizations and companies, including all the major European telecommunications actors. In addition, 49 different organizations from EFTA countries participated in the work. The programme has therefore provided a framework for concertation between all of Europe's main industrial interests and the resulting consensus in functional specifications has become the major source of technical input to European and world-wide standardization bodies. The programme has paved the way for the creation of Trans-European Broadband Communications Networks as provided for in Chapter

¹⁹ ACTS' 1995. Advanced communications technologies and services. An overview of the programme and projects. Ref. AC - 950 568.

²⁰ RTD in advanced communications technologies for Europe (Race). Final report on phase II 1991-1994 - ISB N°92.8269553.

²¹ This number is based on the survey of 1000 RACE participants.

XII of the Treaty on European Union.

Despite the high cost of R&D in advanced telecommunications, the second phase of RACE attracted strong participation from small and medium-sized enterprises (SMEs). Organizations with less than 500 staff represented 41% of the participation in Phase II projects, compared with 28 % for Phase I, and 16,5 % for the Second Framework Programme as a whole.²² Small organizations, whether enterprises or research organizations, participate in over 70 % of Phase II projects, compared with 60 % in Phase I, and provide 33 % of the total effort.

- Cooperation with third countries (COPERNICUS)

18 projects in the field of advanced communications technologies and services brought together organizations in Central and Eastern Europe and the European Union. These projects were covered by the PECO/Copernicus budget, but were managed in association with the RACE programme, including technical audit assessments. The projects range from "stimulation of networks" for science and technology between East and West, to technology development projects in a number of subject areas:

- . communications technologies; including mobile and satellite communications;
- . multimedia applications and technology development;
- . high-speed networks;
- . development/dissemination of standards in advanced communications.
- . interprogramme coordination

RACE projects capitalize on the results of projects developing generic technologies, eg. ESPRIT (microelectronics components, software tools, AIP²³ for network management, etc.); similarly, the telecommunications requirements of telematics applications programmes draw heavily on the techniques addressed by the current RACE projects.

There are also ongoing links with the VALUE Programme for dissemination and exploitation of results.

Strong links have been established with research in the COST²⁴ framework. Joint workshops have been organised with COST projects in the areas of optical communications and mobile communications, and COST project coordinators were invited to the RACE project concertation meetings.

With the EUREKA Initiative, the strongest interaction was in the field of audiovisual technologies. Part of the work relating to the promotion of HDTV (EUREKA project 95) was complemented by work under a Phase I RACE contract; and EUREKA project 256 on video-coding was associated with the RACE integration activities.

²² Evaluation of the second Framework programme of RTD report from CREST to Council, September 1992 - CREST/1212/92

²³ Advanced information processing.

²⁴ Cooperation in Science and Technology.

Work programme for 1996

The first annual technical audit of projects in the ACTS programme²⁵ was held in early March 1996. This independent technical review of each project identified reorientations necessary for the optimum use of EU funding.

The second call for proposals closed on 1 March 1996. Over 90 % of proposals were submitted electronically and DG XIII-B will continue to pioneer electronic communications and proposal submission developments for the European Commission during 1996. The technical evaluation of new proposals took place from 13 - 17 March 1996. Consultation on the results with other services of the Commission and with the Management Committee during April 1996 allowed a favourable opinion and a Commission Decision on the selection and funding of new proposals in early June 1996. This completes the implementation of the ACTS programme.

In 1996, based on the involvement of the sector's actors, ACTS projects and concerted actions will prepare guidelines for the deployment of ATM infrastructure, the provision of the third generation of mobile communications services (UMTS) and the development of generic applications, in particular in the field of teleworking. The guidelines will aim at reducing uncertainties and risks for public and private investment.

Coordination between programmes, notably with the IT programme and the Telematics application programme will be reinforced on the basis of joint funding (ACTS + Telematics) of high-speed interconnections between National Host infrastructures and through the National Host infrastructures themselves which support service and application trials for all three ICT programmes.

In wider international cooperation, ACTS projects and actions play a key role in the G7 initiatives for global interoperability of broadband networks (GIBN project), for multimedia access to cultural heritage in museums and galleries (for which a Memorandum of Understanding was signed in May 1996), and the creation of a global marketplace for SMEs through development of electronic commerce.

A strategic audit of advanced communications developments in Europe was completed in June 1996. It includes the 5-year retrospective assessment of EU RTD in this area, as well as a forward assessment of future requirements which might be addressed in the Fifth Framework Programme.

The second independent monitoring exercise will be carried out in September 1996 and will focus on progress in broadening participation notably in trials, by SMEs and by organizations in Central and Eastern Europe. It will also address the level of visionary research in the ACTS programme.

²⁵ RTD in the area of advanced communications technologies and services.

3. INFORMATION TECHNOLOGIES

Activities in 1995

1995 was dedicated to the monitoring of the ESPRIT III projects, implementation of the IT programme and activities relating to the information society.

1. Three hundred and forty nine of a total of 719 ESPRIT III projects were completed in 1995 while 281 projects will continue beyond 1995. Although the ESPRIT III programme only ended in December 1994 and it is too early to draw conclusions, 1995 yielded many interesting results. Some of them have been exploited commercially, showing that the objectives set in 1991 are being achieved. Although the overall impact of the programme results from all the research and technological development projects (RTD) and other activities, only a few prominent examples can be presented here.

Examples of developments in *microelectronic applications* include: an accelerometer to improve the safety of vehicle air bags; in medicine, a miniaturized intelligent sensor that is one of the first in the world to permit *in vivo* blood testing; an inexpensive, intelligent circuit for domestic energy saving applications; a high-resolution, flat-panel display for TV. In addition, the on-going activities under ESPRIT in combination with EUREKA have enabled Europe's semi-conductor industry to close the technological gap; it has strengthened its position in the international markets, realized profits and made industrial investments. The accompanying measures launched in some Member States have helped the industry to participate more effectively in the activities of the sector and have visibly stimulated the use of microelectronics by local industrialists.

Activity in the field of *software technologies* has been twin-track: the ESSI initiative to promote best software practices and the RTD projects. On the basis of experience with the 60 ESSI projects completed in 1995 (out of a total of 109), the ESSI partners - mainly SMEs and users - consider they have made progress on productivity and, above all, quality. Apart from some 10 activities to disseminate experience gained, a network has been set up covering 17 countries of Europe which has already provided training to some 6 500 persons. Intermediate results have been obtained from a number of RTD projects that are still in progress; these have been exploited and led to substantial productivity gains for applications of clear interest to society (e.g. a system to aid decision-making in crisis situations, used to combat forest fires in Southern Europe). SMEs are steadily developing their ability to use the results of ESPRIT projects to capture international markets: O2 Technologies and IONA Technologies in the field of object-oriented systems are an example.

The approach adopted in the field of *distributed high-performance computing* (HPCN: High-Performance Computing and Networking) is centred on users. It comprises awareness activities in respect of industrial innovations deriving from HPCN technologies and applications in real work environments, for example the production and processing of animated images, fine modelling of pharmaceutical substances, predicting the effects of lightning on aircraft, automation of postal sorting and tolerant ballbearings. There have been commercial successes in all cases, sometimes at the international level. One such example is the adoption by CRAY Research (USA) of CHORUS technology for the operating systems of its new supercomputer, and the portage of 38 commercial software products for aeronautics and the motor industry on the new generation of parallel processing systems. This is widely cited in the USA as a reference model.

In the area of *advanced home and professional systems*, a new multimedia sales instrument has been developed for products ranging from financial services to cars, furniture and property; it has been awarded a prize in the UK. A number of projects have been launched in close cooperation with Eurostat which should improve the processing of statistical data in the Member States through the use of more sophisticated and better adapted software.

The *open microprocessor systems* initiative (OMI) has been successful internationally in areas such as standardization of interconnection buses, the ST20 processor for multimedia systems and the ARM processor for professional electronics.

Considerable progress has been made in *computer-integrated manufacturing and engineering* in the following areas: modelling of products and processes and their standardization; validation of open systems architecture in the motor industry, machine tools and aluminium industry; informatics environments for design and manufacture; integrated communications software for complex networks between production sites; intelligent robots for highway and wall construction; microsystems, in particular the development of a library of design modules; and new-generation microsensors. In addition, the following have been commercially successful: robots for washing aircraft and 3D inspection of printed circuit boards; a PC operating system for communications between production machines.

In *basic research*, results have been obtained and published in the main journals and at conferences. These have rapidly led to several industrial applications, e.g. traffic optimization, vision and safety.

2. Since its launch in the 1980s, ESPRIT has advanced RTD. The objective of the IT programme today in the evolving information society is to contribute to the development of the information infrastructure. The emphasis is on ease of access to information, services and technologies for all categories of enterprises, government departments and individuals. RTD choices are above all based on the assessment of their impact on the competitiveness of European industry as a whole and on improvement of the quality of life; they are driven mainly by consideration of the needs of users and of the market. The programme's activities concern the utilization of the technologies and their user-friendliness, best practice, crucial RTD areas in this respect and the development of the information infrastructure.

The implementation arrangements and technical content of the programme have been renewed. The accompanying measures are now central rather than marginal to the programme strategy. The number of *thematic networks of excellence* has been increased to 15; they are a link-up of about 600 teams from industry, research centres and universities. By forming transfrontier links, they play an essential role in training, access to know-how and technology transfer. *User-supplier collaboration* in the RTD projects is highly encouraged; the users are involved in determining the direction of the work, the validation of results and their acceptability with a view to subsequent commercial exploitation. *Procedures* have been simplified to make the programme more accessible; the period for submission of proposals is now three months; there has been one call for proposals per quarter (15 December, 15 March, etc.) at common dates for the different programmes, which greatly facilitates coordination. Furthermore, joint calls for proposals with other programmes have been launched. Where necessary (e.g. for certain accompanying measures and exploratory awards), submissions are accepted on a continuous basis. In order to reduce the cost of preparing proposals, a two-stage procedure has been tested (in long-term research and for HPCN). Specific procedures have been introduced for SMEs regarding cooperative RTD projects and exploratory awards. These new instruments will probably be used much

more frequently in future. The focused clusters concern a specific objective; they coordinate RTD projects relating to various technologies and networks of excellence, working groups, cooperation with other initiatives (Community, national and international activities, EUREKA), training activities, dissemination of information and transfer of technology.

The 1995 work programme comprised activities for basic technologies (software technologies, technologies for IT components and subsystems, multimedia systems), focused clusters (technologies for business processes, integration in manufacturing, HPCN, OMI) and long-term research.

In the area of *software technologies*, 142 ESSI projects were launched in 1995, together with RTD projects focusing on safety problems and projects involving applications and trials for full-scale validation of promising technologies that have not yet become established. The RTD projects in the field of technologies for *IT components and subsystems* are focused on flat-panel displays, signal processing, technologies below 0.2 μ and equipment; 104 projects have been launched in the context of FUSE to promote best practice and to facilitate access to and utilization of the new technologies for new users and SMEs. Action in the new *multimedia systems* field has been taken in close collaboration with the other DGs concerned (DG X, DG XIII, DG XV); in addition to the RTD projects on new technologies and intellectual property rights, coordination measures have been launched and a network of centres of competence set up, the aim of which is to provide concrete support in particular to SMEs in the use of the new multimedia technologies. In the other new field of *technologies for business processes* which is of particular interest to SMEs, the projects represent sectors as varied as the glass industry, public works, the postal service and "customized" manufacture of public transport vehicles. They include the establishment of a network of around 60 organizations charged with the task of disseminating information and technology transfer. In the field of *integration in manufacturing*, in addition to the RTD projects, "reference user group" projects have the objective of developing detailed specifications for new needs, drafting common standards and assuming coordinating tasks. The HPCN projects cover several industrial sectors and mobilize users as well as SMEs, whose participation is set to increase. The OMI projects relate to new sectors such as the motor industry, telecommunications and interactive television, and concern the integration of design tools, whereas previously the effort was concentrated on their development; 50% of the partners are new participants. A number of projects are dedicated to information dissemination, consensus-finding on interface standards and the exchange of know-how in the area of systems design for the benefit of SMEs in particular. The *long-term research* is designed to be open to ideas and researchers, to be capable of responding to economic and social needs and to anticipate future technologies. As regards the first objective, proposals are received on a continuous basis and projects have been initialled for the feasibility phase which necessarily proceeds a possible full-scale launch. It is worth noting that the two-step procedure applied to the projects for the second objective has enabled several proposals too close to the downstream work to be eliminated at the first stage. Two initiatives have been launched for the third objective: the first concerns advanced research on microelectronics (optoelectronic interconnection - nanometric integrated circuits will be considered in 1996); the second concerns intelligent information interfaces which should define the work programme for the September 1996 call. Furthermore, the procedures relating to the objectives of "openness" and "responsiveness" will be continued in 1996.

In connection with the information society, pilot projects have been launched outside the ESPRIT context in areas such as digitized cities, community kiosks, remote distribution of

multimedia information, electronic transfer of funds, distribution of medical images, standardization of DNA representation. These projects complete some 70 projects which through ESPRIT, TELEMATIQUE and ACTS form a *de facto* inter-programme focused cluster for the development of international exchange systems such as W3 (World Wide Web). A joint EU and PECO Information Society Forum was held in Brussels in June 1995 and will be followed by another in Prague in September 1996.

The European IT Conference (EITC 95) was held in Brussels in November 1995, as was the IT Forum; it took place in conjunction with an exhibition of the results of the projects and their utilization, and attracted several thousand participants. In association with EuroCASE, the 23 ITEA awards (Information Technology European Awards) were made on this occasion. In addition, the use of the Internet and CD-ROMs (development of Multimedia Encyclopedia of Results of the IT programme) for the dissemination of information was the object of thorough validation tests; the lessons were put to use in the call for proposals, which should lead to the establishment of a full-scale service.

Work programme for 1996

The participation of the Central and Eastern European countries in the RTD projects, already operational in 1995, could acquire a new dimension in 1996 as a result of the funding of research infrastructure under the PHARE programme. In addition, an information campaign will be directed at the Mediterranean countries.

Two calls for proposal are scheduled for 1996, one in March and the other in September. The work programme has been updated: tasks well represented in the 1995 projects have been dropped, others have been introduced to take account of the emergence of new priorities, e.g. in the field of electronic trading or W3. The presentation of the work programme has been improved to make access easier for new participants and users, whose needs are expressed in terms of solutions rather than technical tasks. The accompanying measures have been regrouped to improve readability and consistency. A new work programme will be drawn up in 1996 for the following period.

INDUSTRIAL TECHNOLOGIES

4. INDUSTRIAL AND MATERIALS TECHNOLOGIES

Activities in 1995

S & T achievements

1. Industrial RTD projects

The key activity has been the evaluation of the proposals following the first call for proposals under BRITE-EURAM III (final date: 15 March 1995) and the start of the contracts. This call was characterized by:

- the large number of proposals (1180), which may be explained by the two-year lapse since the previous call (26 February 1993);
- the high eligibility rate of the proposals (98%), undoubtedly due to the constant increase in quality of the proposals and the establishment of the prescreening service (verification

by the Commission departments of the main characteristics of the project before final submission of proposals);

- the cover of the three areas (production technologies, materials and technology for product innovation, technology for transport media) is satisfactory, although in certain subsectors very few projects have been selected: human and organizational factors of production systems (area 1.5) and production of vehicles (area 3B.2);
- the ECU 402 million (= MECU) available for this call will be sufficient to envisage the funding of 218 projects.

2. Thematic networks

In response to the continuously open call for proposals, the pilot phase has resulted in 41 proposals being accepted for an exploratory phase and 3 for an implementation phase. 60% of these proposals have been selected and granted funding of 0.78 MECU.

3. Technology stimulation measures for SMEs

The response rate to the open call is satisfactory, except for area 3 (transport) which is under-represented (4%). Of 465 proposals received for phase 1 and 118 for phase 2, 212 and 51 respectively have been accepted for a total budget of 27.5 MECU, of which 17 MECU was committed in 1995.

Contribution of the programme to the main RTD objectives:

- reinforcement of economic and social cohesion: an average of 8.8 participants per RTD project from 4.8 different countries, 71% of which are new participants, would appear to augur well for the target of reinforcement. 10% of the participants are from "objective 1" regions. All the participants in the stage 1 CRAFT ("Cooperative Research Action for Technology") projects are new (= eligibility condition) and 213 participants are new in stage 2. The CRAFT projects involve 5.1 partners on average;
- SME participation: 20% of the participants in the RTD projects are SMEs, more than in the Third Framework Programme (17%); they share 19% of the budget. 17% of the projects are coordinated by SMEs. 73% of the participants in the CRAFT projects (stage 2) are SMEs;
- international cooperation: 3% of the participants are from countries outside the European Union;
- industrial participation: the projects concluded were evaluated in 1995 with the aid of independent consultants. The evaluation was based on interviews and on the analysis of indicators such as management, collaboration, research performance, economic benefits, SME participation, impact on society and the environment and the strategy for utilization of results. The data obtained were as follows:
 - * 41% of the results obtained may lead to five applications at least and 62% of the results could be applied in three different industrial sectors at least;
 - * 45% of the projects analysed should lead to financial gains of at least 5 MECU in the next five years (2% of which in excess of 100 MECU);
 - * 76% of the results are likely to be "in the market" in three years time (47% in one year's time);
 - * 64% of the results have a potentially positive impact on the environment;
 - * the projects are increasingly well prepared at the exploitation phase: 40% of them (28% in 1994) are considered "autonomous" (no additional assistance required) for exploitation purposes;
 - * with regard to employment, 36% of the projects have already proved to have a

positive impact for the partners.

From a qualitative point of view, experience since the launch of the Brite-Euram programme indicates that the exploitation of results will not become a reality unless there is a clearly defined entrepreneurial strategy and unless the exploitation details have been agreed by the partners from the outset. For this reason, the projects selected following the 1995 call were subjected to rigorous selection procedures and will be closely monitored as to management and progress of the work. In the course of the year, the indicators used in the annual evaluation reports and the various analyses referred to above demonstrated the rigor of the intermediate and final evaluations.

Success stories

The analysis of projects in 1995 revealed a number of success stories:

A group of four SMEs (F, D) and one laboratory have developed a *new paper-based substrate* to replace PVC in all decorative applications in the furniture industry. The consortium includes all the links of this industrial chain, which enabled them to exploit the technology without delay. By the end of the project, 170 million tonnes had already been produced and sold. The economic gain for the period 1995-99 is put at 55 MECU for an R&D investment of 2.5 MECU. PVC, a chlorine-based compound, is subject to increasing criticism of its impact. Any replacement product is certain to be environmentally beneficial.

The *footwear industry* represents an important market, albeit one in difficulty, primarily as a result of competition from South East Asia, like the textile industry. It is also a rapidly moving market owing to the dictates of fashion. A rapid adaptation of manufacture and a capacity to anticipate and initiate these effects of fashion are indispensable if the European footwear industry is to maintain its competitive advantages.

Three industrial undertakings, two of them SMEs, have developed together with two research centres a CAD/CAM design system for shoes (including all their components), and the related moulds. At the end of the project, two of the industrial partners had begun to use this design tool in their production chain. Economic gains have already been made and the prospects for the five coming years are of 24.5 MECU for an R&D investment of 2.8 MECU. This innovation is available for technology transfer to the industries of the sector which are almost exclusively SMEs. Furthermore, the latter are mainly situated in the regions whose development is lagging behind, so that the project clearly contributes to European cohesion and the maintenance of employment in a sector in difficulty.

Where a project is constructed around clearly defined market demand and the industrial undertakings involved are working at the heart of their strategic area, success is normally assured. This is the case of the consortium composed of two industrial partners and two universities which has developed *new rare earth oxides* from which materials with greatly enhanced luminescent properties can be prepared. Industrial tests on different types of lamp have been a success. The industrial and commercial exploitation has developed in symbiosis with research, and already produced an effective gain of 20 MECU and the prospective of direct and indirect gains on the market for lighting equipment of 330 MECU over five years, for an initial investment of 1.9 MECU.

Problems encountered

The members of the group responsible for the annual evaluation of the programme mentioned in their 1995 report the excessive time lapse between the closing date of the call and contract signature, both for the RTD projects and for CRAFT. They suggest that the procedures following the evaluation period should be speeded up.

Some sub-areas of the programme are not particularly attractive, particularly to SMEs. The SME stimulation network has been informed and measures have been taken in 1996 to try to remedy this.

Work programme for 1996

The 1996 work programme will first of all involve an evaluation process following the second call for proposals with a closing date of 17 April 1996. The budget available is 400 MECU.

Furthermore, three evaluation exercises will take place in the framework of CRAFT for a budget of 32 MECU, and another three for the thematic networks for a budget of 9 MECU.

Two other lines of work will also be supported: the implementation of accompanying measures (3% of the budget) following the call for proposals published on 15.12.1995, which is to remain open until the end of 1997; secondly, reflection and study workshops will prepare the ground for the fifth framework programme.

5. STANDARDS, MEASUREMENTS AND TESTING

Activities in 1995

S&T achievements

I.1 Industrial RTD projects

1995 was devoted, firstly, to funding the RTD projects selected from the submissions for the call for proposals for area 1 and the targeted call in support of Community policies and European standardization and, secondly, to evaluating the proposals received for areas 2 and 3 and the second targeted call.

The call for proposals for area 1 was open to all sectors of industry. Of 177 proposals received, 44 projects (i.e. 1 in 4) were selected, 17 of them directly concerning standards required by industry. All the projects were funded in 1995 with a budget of 22 MECU.

For the first time, a targeted call comprising 25 priority subjects was launched for the implementation of Community policies and for European standardization in the context of CEN/CENELEC. Only 16 proposals were received, of which 7 were funded in 1995.

The first call for proposals scheduled in the work programme for areas 2 and 3 was launched in June 1995. It primarily concerned the second part of the programme, namely the development and implementation of standards, measurements and tests in support of the economic and socio-cultural aspects of European policies. The call aims to resolve the technical difficulties involved in the implementation of regulations and directives in

the agri-food, environment and public health sectors in particular, to which two new themes have been added: protection of the cultural heritage and forensic checks by laboratories approved by the judicial authorities. A particular effort is directed at official laboratories and bodies, including the customs laboratories, charged with fraud prevention checks and analyses.

Of 464 proposals received in these different areas, about 80 projects could be funded in 1996 (1 in 6). The budget provided for the call in areas 2 and 3 amounts to 24 MECU.

2. CRAFT and thematic networks

In addition to the RTD projects, 6 proposals for technology stimulation measures in support of SMEs and 6 proposals for thematic networks received a Community contribution. The budget allocated to these activities in 1995 was 1.1 MECU.

Success stories

The 43 projects completed in 1995 have produced some interesting results:

- Measurement and testing procedures have been developed to verify the compliance of domestic boilers with the classification criteria laid down in the European directive.
- The results of the quality measurements on the networks used by the measurement and testing laboratories in applying the electromagnetic compatibility Directive have been validated.
- A method for testing the fire behaviour of upholstered furniture has been developed thanks to the collaboration of 11 industrial and official laboratories and 8 Member States.
- A set of methods for determining the microbial contamination of bathing waters by faecal matter has been developed and tested by 34 laboratories in all the Member States.
- A miniaturized system for measuring lactate levels in the blood of critically ill people and in athletes, and glucose levels in diabetics in a comatose state, has been developed and will be marketed shortly.
- Finally, certified reference materials for the classification of wheat flours have been produced and made available to laboratories along with methods for determining the quantity of soft wheat in pasta products. The results of these two projects are destined to the quality control laboratories and the campaign to combat fraud in the agri-food sector.

Work programme for 1996

The 1996 work programme has the following objectives:

1. to improve the competitiveness of all sectors of European industry;
2. to promote research facilitating the implementation of European policies in the industry, agriculture, energy and services sectors by developing and improving

- accepted measurement and testing methods, recognized not only in Europe but in the whole world;
3. to promote research in support of the activities of CEN, CENELEC, ETSI and other European bodies;
 4. to support the future development of the European measurement infrastructure;
 5. to promote the dissemination and application of good measurement practice in Europe, particularly in the less-favoured regions.

Following evaluation and examination of the results of the targeted calls launched in 1995, the opportuneness of a new targeted call in June 1996 will be discussed together with the Programme Committee.

In view of the positive results obtained from the first call in the area of measurements for quality European products, the call scheduled for 15 June 1996 will take account of the following priorities:

- industrial innovation
- dissemination of industrial know-how towards the less-favoured regions through the organization of practical training courses
- benefit to sectors characterized by a strong presence of SMEs.

ENVIRONMENT

6. ENVIRONMENT AND CLIMATE

Activities in 1995

S & T achievements

For the most part, the research activities of the Third Framework Programme have been concluded or entered their final phase. The broad spectrum of these activities on the level both of applied and strategic research and more basic research has enabled the Environment programme to contribute both to the objectives of competitiveness and stimulation of economic growth and to the definition and implementation of other Community policies, particularly on the environment. This two-pronged approach was confirmed on the launch of the Fourth Framework Programme, for which the first projects were selected on the basis of calls for proposals staggered throughout 1995.

While industry participation remains low in the programme areas relating to the understanding of the basic processes underlying environment and climate change and their implications for man, the environment and society, it has picked up in areas with a more technological orientation such as the development of environmental technologies for sectors such as water, wastes, decontamination, risk management, etc. and space research.

The end of the third and transition to the Fourth Framework Programme has also been marked by the strengthening of S&T cooperation in the Community. The establishment of networks of research institutions engaged in Community projects is progressing, both through the continuation and deepening of previous activities and the launch of new activities. The scope of these activities occasionally extends far beyond the frontiers of the European Union, since they form part of major research programmes on global

change (research on climate, ecosystems, etc.).

Europe's participation in the world-wide research effort provides an opportunity to exploit the Union's full R&D potential and to share in world leadership of research into global change, as well as to build up the scientific basis required to solve a variety of environmental problems with which the Union is confronted.

International cooperation has also developed through strong participation by the countries of Central and Eastern Europe in the new projects selected under the Fourth Framework Programme, mainly in the areas covered by the Environment and climate programme (except for the "Earth observation" area). The developed countries, particularly Norway, Switzerland and Canada, have also expressed a desire to participate in the Union's environment R&D programmes, although the Canadian research institutes, for example, are not strongly represented in the projects in response to the first call for proposals. There are indications that the calls to be published in 1996 will result in higher participation by Canada and intensive cooperation with Israel.

Inter-programme coordination has also improved in all areas where the Environment programme has an interface with other specific programmes. This was the case, for example, in research on coastal ecosystems in cooperation with MAST III; forest ecosystems, in cooperation with the specific programme on Agriculture, fisheries and forestry; and technologies for the environment and aeronautic pollution, in cooperation with the Industrial and materials technology programme.

Community support to space technology applications for Earth observation and environmental monitoring has developed and two calls for proposals have led to the selection of five concerted actions on methodological research. The Commission has also completed the preparatory work on the implementation of a planned Centre for Earth Observation (CEO), which should bring the users and the space agencies supplying the data closer together. Finally, the Commission has signed an agreement with French, Belgian, Italian and Swedish partners on the joint implementation of a space-based sensor for vegetation monitoring. This instrument is to be launched on the SPOT 4 satellite in 1997.

Finally, the Environment and climate programme has made a significant contribution to defining the scientific content of the Task Forces, in particular the "Aeronautics" and "Water" Task Forces, most of the strategic themes of which are strongly anchored in the programme.

Success stories

- Recent technological developments in biosensors show considerable promise for environmental monitoring. A new generation of instruments has been developed in the framework of the BIOPTICAS project for the detection of very low concentrations of pesticides in water. These instruments have several advantages such as high sensitivity and selectivity. They permit a rapid response in off-line or on-line monitoring and in remote analysis.

- Although the ozone-depleting CFCs and halons are no longer manufactured in Europe, there are still considerable stocks of these products which, if released to the atmosphere, could delay for several decades the repair of the stratospheric ozone layer. Work done under the Environment Programme has contributed to the development of the process for destroying stocks of many halogenated compounds in environmentally safe conditions and at affordable cost.
- At the initiative of industry, the NICOLE network (Industrially Contaminated Land in Europe) has become operational. Its objective is to disseminate and exchange scientific and technical knowledge on industrial contamination of soils and groundwater. The initiative is also aimed at promoting coordinated and multidisciplinary research which should enable Europe's manufacturing industry to identify contaminated sites, evaluate the risks this presents to man and the environment and efficiently manage their decontamination.
- The EUPHORE European photoreactor was inaugurated in April 1995 in Valencia in Spain. This is a smog chamber with a total volume of 200 m³ for the study in optimum experimental conditions of the complex chemical reactions implicated in ozone formation in the troposphere. This instrument can be used to consolidate knowledge about a form of air pollution particularly toxic to man and the environment.
- The APHEA project has provided conclusive proof of the links between air pollution in several cities of the European Union and the incidence of certain respiratory diseases; EUPHORE et APHEA open the door to new research in the key areas of epidemiology, environmental toxicology and ecotoxicology, disciplines which constitute a basis for environmental legislation.
- The second European ozone measurement programme in the Arctic and at medium latitudes, partly funded by the Environment and climate programme, has revealed a significant decline in stratospheric ozone concentrations. The implications of this phenomenon in terms of human health and environmental stability plead for the continuation of research effort in this area.
- A number of important contributions were made to the evolving policies on the promotion of sustainable development; in particular, the proceedings of a workshop on "Global Environmental Change and Sustainable Development in Europe" were published, and the first European conference on economic aspects of sustainability focusing on green accounting held in 1995 will be followed up by a second conference on "Ecology, Society, Economy" in mid-1996.

Problems encountered

A substantial part of the Environment and climate programme has the objective of improving competitiveness and stimulating economic growth consistent with sustainable development, either by helping businesses to innovate in technologies that improve utilization of resources, or helping them to internalize environmental standards and constraints. In this context, while participation by industry in the project is continuing to rise, SMEs are still unfortunately under-represented. The "CRAFT system" has proved fairly ineffective so far in this respect.

Work programme for 1996

1. Review of the work programme

In parallel with the work of implementing, coordinating and monitoring the projects selected on the basis of the first calls for proposals, the Commission is reviewing the work programme in the light of the calls to be published during the second half of 1996. The objective of this review is basically (a) to remedy the problems encountered in implementing the first phase of the programme (see section 1.3 above) and (b) to concentrate the research effort on the aspects of the initial work programme that were inadequately covered by the first calls for proposals. The review is also intended to identify those aspects of the programme best suited to tackle the basic environmental problems with which the Union's citizens and economic actors are confronted in a context of sustainable development.

2. Review of the Framework Programme

The Environment and climate programme provided significant input to the preparation of the proposal for supplementary financing for the Fourth Framework Programme.

The Commission expressed its intention of (a) concentrating research effort on a number of priority themes, above all by improving coordination to ensure efficient implementation of the programme in those areas and (b) of stepping up the activities of the programme relating to the Task Forces "Water" and "Aircraft of the future" by increasing the budget provision.

3. Preparation of the Fifth Framework Programme

1996 will be devoted to the preparatory work for the Fifth Framework Programme. A number of accompanying measures have been planned to this end.

7. MARINE SCIENCES AND TECHNOLOGIES

Activities in 1995

1995 was marked by a transitional period in marine science research with the research activities under the Marine science and technology programme (MAST-II) of the Third Framework Programme (1990-1994) entering their final stages or being completed, and the activities under the Fourth Framework Programme (1994-1998) entering their implementation phase (MAST-III).

During 1995, EU RTD activities have continued to promote the emergence and enhance the international profile of a European marine science community. Added impetus to this trend is expected following the establishment in October 1995, under the joint auspices of ESF and of the Commission (DGXII), of the "European Marine Board".

MAST-supported research has continued to provide much information on processes occurring in the seas, especially in relation to operational oceanography; biological productivity, ecosystem properties, or science and engineering in the coastal zone. Much

effort is invested in large multidisciplinary projects (in the range of 8 to 10 MECU of EU contribution) on regional seas, 2 of which (on the Mediterranean and the North Eastern Atlantic shelf edge) were initiated under MAST-II, and 2 others will actually start in 1996 (on the Baltic Sea and the Canary-Azores region).

Both MAST-II and MAST-III provide opportunities to carry out research developing new instruments for measuring and sampling the seas and the sea-floor, platforms for deploying observation equipment, remotely operated underwater vehicles, and a number of related technologies (acoustics, imaging and viewing etc.).

International cooperation has become more marked under MAST-III, in particular with organisations from Australia, Canada, USA and Mediterranean third countries expressing a strong interest in the programme and participating in projects of mutual benefit.

In the 1995 round of calls for MAST-III, over 11% of the proposers were from industry. An increase is expected in the second call foreseen for early 1996 with the effective opening of more opportunities for proposals in the area dealing with marine technologies.

Proposals of projects for coastal zone science were evaluated jointly with a number of projects on the coastal zone submitted to the Environment and climate programme.

Examples of results

As MAST-III projects only commenced in 1995, it is too early to identify specific results.

For MAST-II, however, the following projects and activities are particularly relevant :

- The North Atlantic Targeted Project (NATP), involving 110 scientists from 32 institutions in 10 EEA countries has come close to completion. As a result, the previously much neglected research on the continental slope is now ensured by a well integrated scientific community. This should shortly lead to substantial breakthroughs in our understanding of fluxes and exchanges at the edge of the continental shelf.
- The pilot phase Mediterranean Targeted Project (MTP), involving some 180 scientists from 70 organizations out of 14 EEA Member States, has been successfully brought to near completion. The most important results include some 40 peer reviewed articles, a handbook of analytical methods and protocols, cooperation with scientists from third Mediterranean countries and large amounts of data on the Mediterranean ecosystem. The MTP has led to the creation of a well-identifiable community of scientists involved in Mediterranean research.

The activities of the MTP and NATP will be continued in follow-up regional seas projects in MAST-III.

- The projects ERSEM and MEICE, both concerned with the modelling of ecosystems, have led for the first time to modelling of biological interactions from the microorganism level up to fish and seabirds. New concepts related to factors which control coastal plankton community assemblages and a revision of ecological theory concerning marine food webs have been established. These two projects have already produced 29 peer reviewed publications and 29 more in preparation.

- The successful technology developments include improved generic communications, new sensors to measure substances in the oceans, technologies to determine the 3D structure of the oceans or to determine near-bottom velocities in shallow waters. The SAMI project has shown that the acoustic synthetic aperture antenna allows mapping in the oceans similar to mapping land with SAR radars on satellites. Although further developments are needed, all these are marketable products.
- In order to ensure the future of the extremely labour-intensive taxonomy, two new instruments have been developed to automatize the classification of phytoplankton.
- Feasibility studies for fully automatic, long-term deep ocean stations have shown that such stations are now feasible and that on site interventions are possible. A successor project for seafloor laboratories is being funded in the new MAST-III programme.
- The concerted action MMARIE on modelling coordination, studying applications of high-performance computing techniques to marine modelling, has brought together mathematicians and marine scientists and has gained a high profile.
- The MAST data policy has resulted in strong cooperation on oceanographic data management between Member States, international organizations and the Commission and has led to better services to the user groups and a better dissemination of project results and data products.
- In addition to 50 fellowships, well over 260 Ph. D. candidates and 175 post.docs have been trained in projects.
- The Second MAST Days, combined with the EUREKA/EUROMAR Market, were held from 7 to 10 November 1995 in Sorrento, Italy. Some 500 people attended the 18 scientific sessions and the exhibit showing progress of the MAST-II projects and the 7 running EUREKA/EUROMAR projects.

In addition, several thematic workshops attracting up to 160 persons were organized throughout 1995.

Work programme for 1996

Whilst continuing to implement and manage the RTD projects selected following calls for proposals in 1995 the Commission services will carry out work on focusing the priorities of the work programme for MAST-III with a view to a further call for proposals to be launched in the first half of 1996. This focusing will take account of the outcome of the 1995 calls and evolving developments in Commission policies affecting RTD.

Focusing and concentration is also reflected in the contribution of MAST-III to the Commission's proposal adapting the Fourth Framework Programme and MAST-III will make significant inputs to the Task Force on Maritime Systems of the Future.

1996 will also see preparatory work for the future of marine science research within the Fifth Framework Programme.

LIFE SCIENCES AND TECHNOLOGIES

8. BIOTECHNOLOGY

Activities in 1995

S & T achievements

1. Biotechnology (1992 - 1994)

The programme had a budget of ECU 186 million, of which ECU 158.11 million were contributed to support 133 transnational research projects in total. These projects had a more fundamental and strategic orientation and were partly prompted by industry. The overall industrial penetration, i.e. the number of projects having at least one industrial partner, was 25%, however this percentage was significantly different according to the research nature of the areas of the programme. In addition, the Commission facilitated the development of seven industrial platforms as an additional mechanism of coordination and communication between the contractors and the potential users.

During the year 1995, 1651 publications were produced from the 133 projects and 6 patents were generated and filed. In this programme, 22.5% of these were joint publications indicating the intensity of the cooperation between the participating laboratories.

The results from these publications contributed to:

- * the completion of the sequencing of the entire yeast genome; (world first)
- * the assurance of safety when using living cells in the production process; (several publications in scientific journals as well as in layman brochures)
- * the contribution to agriculture (transgenic plants, biopesticides), medicine (vaccines) and environmental protection (microbial ecology)
- * the opportunities for bio-industries (lactic acid bacteria, extremophiles)

2. Biotechnology (1994 - 1998)

The first call for proposals was launched on 17 January 1995 and most of the contracts were concluded by the end of 1995. This first call attracted 315 transnational proposals of which 60 were accepted for financial support. The industrial penetration was at the level of 56.67 %. The increase in industrial penetration shows that the Biotechnology programme is moving in the right direction of reinforcing the science base for improving industrial competitiveness at international level.

With their statutory transnational dimension and the involvement of industry, the projects supported by the Biotechnology programme are ideally placed not only to mobilize the research potential in the countries involved but also to strengthen the links between basic research and applied research, which is one of the characteristics of modern biotechnology.

This programme has been selective in choosing three approaches, each one with a specific goal and restricted to identified scientific areas.

- For the highest potential returns on R&D in the medium term, four scientific areas benefited from concentration means.
- For an effective coordination and building upon national research programmes, four scientific areas benefited from concertation efforts.
- For an effective linking of academic institutions, research laboratories and industry (particularly SMEs), four horizontal activities complement the programme mainly on issues related to public understanding.

3. Interprogramme Coordination

The nature of the two last specific programmes on Biotechnology emphasizes the fact that this domain is both crucially dependent on basic science and on new applications at the crossroads of biological disciplines, industrial developments, health and environmental promotion, and social expectations. Programmes such as Biomedicine and health, and Agriculture and fisheries aim to promote the streamlining of biotechnology applications within their respective sectoral activities linked to the provision of products and services. Based on the nature of the topics of the first call and on the selected projects, an interprogramme coordination has been developed between the specific programme on Biotechnology and the specific programmes of Biomedicine and health, Agriculture and fisheries. Contacts have also been established with the programmes on Environment and climate, Dissemination and exploitation of results and Stimulation of the training and mobility of researchers.

Work programme for 1996

Two calls for proposals of the specific programme on Biotechnology (1994 - 1998) will have their closing dates in 1996. The second call which was launched on 15 September 1995 had its closing date on 10 January 1996. The third call will be launched on 15 June 1996 having its closing date on 18 October 1996. It is expected that before the end of the year all contracts related to the second call will be negotiated and concluded.

9. BIOMEDICINE AND HEALTH

Activities in 1995

S&T achievements

Third Framework Programme: the 400 research projects presently ongoing were monitored by the project review board which evaluated the yearly reports presented by each project coordinator. The general conclusion of the review board was that the programme was progressing very well.

Fourth Framework Programme: 1709 research proposals were submitted by the end of March 1995 following the first BIOMED 2 call launched in December 1994. The

evaluation of these proposals was performed in May 1995 by some 400 independent evaluators. 307 projects have been selected, coming up to a budget of 153,7 MECU. The negotiation of contracts took place at the end of 1995 in order to start all projects as early as possible in 1996.

The Task Force on Vaccines and Viral Diseases has been set up in order to improve European and global welfare, by taking full account of the opportunities arising from scientific advances and new technologies. Vaccination is widely recognized as one of the most efficient tools of public health policy showing evident cost-benefit advantages for all the target populations involved. Prevention through vaccination makes it possible to avoid the illness.

Examples of results

In the field of bioengineering, a concerted action led by Prof. F. Grandori from Milan (I) has brought together the majority of the active centres in Europe. The discovery of active mechanisms in the internal structure of the ear is currently producing a revolution in the theory of hearing and in practical management of hearing assessment.

New approaches in cancer therapy are being funded under BIOMED 2. Some of these techniques are based on stimulation of the anti-tumour directed immune response. New techniques for antibody selection allow the rapid development of very specific antibodies with the ability to identify particular cell types. Specific cytotoxic agents or genes can be coupled to these antibodies and thus tumours can be directly targeted by these antibodies, thereby inducing tumour regression in vivo.

EUROGEM, the European Gene Mapping Project, includes 23 laboratories. This network enabled European researchers from all Member States, in particular those without national programmes, to organize human genome research at European level and to come up with a European Genetic Map based on the CEPH reference families. At the international scale the work on chromosomes 11 and 21 was particularly successful.

From a broader health perspective a meeting was held in 1995 under the auspices of the Biomed programme in Delft (NL) on "Individual responsibility for health; moral issues regarding life style and a just distribution of medical resources", gathering experts from different Member States in the fields of public health, sociology and ethics.

Work programme for 1996

Two calls for research proposals will be launched in 1996. One call to be published on 15 March will cover the following areas:

1. Pharmaceuticals research
2. Biomedical technology and engineering
3. Brain research
- 4.2 Research on AIDS, tuberculosis and other infectious diseases
5. Human genome analysis.

The deadline to submit proposals will be 17 June 1996; the evaluation will take place in September.

The other call to be published on 17 September 1996 will cover the remaining areas:

- 4.1 Cancer research
- 4.3 Cardiovascular diseases
- 4.4 Research on chronic diseases, ageing and age-related diseases
- 4.5 Research on occupational and environmental health
- 4.6 Rare diseases
- 6 Public health research, including health services research
- 7 Research on biomedical ethics
- 8.1 Ethical, legal and social aspects.

The deadline will be 17 December 1996.

Action has been taken to increase industrial involvement in the programme, especially the participation of SMEs through technology stimulation measures. As of March 1996, 47 proposals for exploratory awards had been submitted and three evaluation sessions were organized, which resulted in 21 proposals being selected for funding. Fifteen of these fall within the scope of area 2, one in area 3 and five in area 4. Regular meetings are organized with the BIOMED SME Focal Points nominated by the Member States to plan activities aiming at stimulating the interest of SMEs in the European R&TD programmes and also to encourage a better understanding of their needs.

10. AGRICULTURE AND FISHERIES (including agro-industry, food technologies, forestry, aquaculture and rural development)

Activities in 1995

S & T Achievements

Projects within the FAIR, ECLAIR, FAR, CAMAR and FOREST programmes were coming to a close in 1995, whereas within the AIR programme, co-managed by DG VI, XII and XIV, a total of 407 projects are now under way, many now reaching their midway point.

The FAIR programme adopted in November 1994 launched its first call for proposals on 15 December 1994, closing on 15 March 1995, and 937 proposals for RTD actions were submitted to areas 1, 3.1, 3.2., 4, 5 and 6. In 1995, forty-two of those proposals were the subject of contracts by DG VI, forty-six by DG XII and twenty four by DG XIV. Following the second call for proposals which closed on 15 September 1995, 233 proposals for RTD actions were submitted to areas 2, 3.3 and 3.4. An evaluation decision for these proposals is due in early 1996. The programme is running on the basis of two calls per year. Within the continuously open call for technology stimulation measures in favour of SMEs, 95 proposals for exploratory awards and 5 proposals for cooperative projects were submitted in 1995. Thirty five of those proposals were the subject of an Evaluation Decision in 1995 which led to 7 exploratory award contracts and 2 cooperative project contracts. An evaluation decision for 60 proposals submitted in 1995 is due in early 1996 and the success rate is expected to be significantly higher than in 1995. Nineteen research training grants were also awarded.

Responding to the need for an extensive and as direct as possible dissemination of research results in the field of forestry and forest products accomplished within the framework of the FOREST and AIR programmes, DG XII E.2 sponsored an international conference on "Progress in Forest Products Research" in Göttingen, Germany from 19 to 22 September 1995. Significant breakthroughs were reported in four specific areas of forestry/forest products research, namely the link between silvicultural strategies and wood quality, progress in timber processing products and quality, new technologies and products for wood composites and finally, wood preservation in an environmental context.

In the non-food sector, the pursuit of new industrial outlets for the abundant biological resources available in the EU was extensively addressed in 1995. Diversification for the farming community, and an increasing demand by governments, industry, and the consumer for renewable raw materials and environment-friendly products are all factors which have driven the research interests in this area.

The main emphasis has been upon adapting and processing the biological raw materials available, such as oils, sugars, fibres, and secondary metabolites, from new and existing crops and agro-industrial waste, and their utilization as bulk or fine commodities for industrial usage as a renewable energy source, or as a chemical feedstock. Both of these end-uses involve an extensive and diverse range of end products and processes. Five new oil crops, and over twelve new fibre, sugar, and pharmaceutical crops have been investigated and evaluated as potential new sources for raw materials. Genetic manipulation of the existing and new crops has also been investigated with a view to increasing the raw material yield and performance. Almost every source of agro-industrial waste from the food industry and farm practices are being processed to produce a wide range of higher added value components. High industrial involvement in improving the harvesting, extraction, processing, and market applications of the raw materials has dramatically increased and is resulting in a wide range of products now coming on-stream.

New food technologies are being developed by strong European partnerships of industry, research and academia in fields such as high pressure food processing, new dairy technologies, microwave and thermal processing technologies. A new three-dimensional X-Ray inspection system for detection of minute metal and glass fragments in food products will be developed, unique to Europe. A project concentrating on Southern European dry cured ham production will improve the production technology but also involve significant transfer of technology between the partners from different Member States. Much of the research on food concentrates, on food nutrition and the role of food in disease prevention, and new functional foods or ingredients will result, eg. oligosaccharides, dietary fibres, etc. The FLAIR-FLOW action (co-funded by DG XII and XIII) is successfully disseminating food and fish processing research results each month in 17 countries and organised 24 specialised workshops in 1995.

The industrial participation in selected proposals in FAIR within the agro-industrial area is quite encouraging with a participation rate of 26% to 36% in selected projects, and almost equal balance between SMEs and large company participation.

Support to the Common Agricultural Policy : The research tasks detailed in the FAIR programme in the field of agriculture, forestry and rural development have helped to target the RTD submissions of the very large number of scientists wishing to participate. The best submissions, of high scientific and technical merit, have also responded well to

the needs of the Common Agricultural Policy and rural development.

Agriculture, forestry and rural development projects evaluated and selected in 1995 are well directed to a range of priorities of EU importance :

- agro-environmental preoccupations
- animal health and welfare problems
- plant health and crop protection issues
- forestry matters

There are fewer projects on some other topics which are as vital and where future submissions are expected in greater numbers :

- quality policy for agricultural products
- diversification, especially non-food
- rural development RTD

At the same time as major new projects are being launched many promising results are coming from the two earlier specific RTD programmes, the one on "Competitiveness of agriculture and management of agricultural resources" (1989-1993), the other linking Agriculture, Agro-Industry and Fisheries (1990-1994). These results are attracting the interest of a wide spectrum from research to administration, to advisory services, farmers and those industries ancillary to agriculture. These results are being widely diffused and efforts made to encourage their utilization.

Projects in agriculture, forestry and rural development have responded well to Community needs. For example, a concerted action involving most Member States has succeeded in producing insects for use in biological control to explore ways of replacing chemical pesticides. Guidelines have been developed to produce beneficial insects such as mites, flies and wasps to agreed standards. In animal health, a complete epidemiological study was carried out on African Horse Sickness. This project, a model of cooperation and technology transfer, has been the key for eradication of the outbreak of the disease in Spain. New diagnostic assays that have been developed are now in use at the European and FAO Reference Centres for this disease and available for world-wide delivery. In the non-food sector, a number of on-going research projects aim to improve utilization of primary raw material to increase farm income. Of these trials, some deal with crops, to be adapted to a Mediterranean climate, which might be more important in future. An example is the work on *Cynara Cardunculus*, a perennial herbaceous species which can be used in the paper pulp industry and as solid fuel. Other research concerns Quinoa and Lupin for processing into high value-added pharmaceutical or chemical products. Some of the species being examined are characterised by the fact that they require low levels of inputs and are therefore more environment-friendly. Making animal production systems more environment-friendly has been the aim of a project with pigs. The plan was to reduce the amount of dietary nitrogen excreted as liquid and solid wastes and as gaseous ammonia. The results included a model to calculate nitrogen excretion from easily available farm records, feeding systems with less dietary nitrogen and reductions in the amounts of slurry from pig production and its polluting potential.

Support to the Common Fisheries Policy (CFP): several projects funded within the first call for proposals have relevance for the implementation of the CFP, especially those concerning the socio-economic aspects of the fishing industry. In particular, the project "Foreign trade and seafood prices: implications for the CFP" is expected to be especially relevant for the market issues, whereas Concerted Action "A social science network for

fisheries management" constitute a first step in the inclusion of social aspects related to fisheries through a multinational approach.

Moreover, some of the environmental projects selected under subarea 5.1 and 5.2 are likely to elucidate mid-term problems (recruitment estimates, predator-prey relationships, etc.) presently affecting the implementation of the conservation policy. Finally, the project "Assessment and reduction of the by-catch of small cetaceans" constitutes a highly sensitive subject from a political point of view regarding the impact that this problem has on public opinion.

In aquaculture, all the proposals selected for funding will contribute greatly to the viable development of the European Aquaculture Industry, which is another of the objectives of the CFP. A particular project, "Common dented, a prime new species for aquaculture. Development of methods for reliable egg production", will have an important economic impact since it will contribute to the diversification in the production of Mediterranean fish farms helping them to keep their economic viability, which is affected by market problems.

There is a need to control diseases and to reduce their negative impacts which are, economically and environmentally, very relevant in aquaculture. The research project "Molecular basis of fish immunity for disease resistance" aims to study, at the molecular level, the mechanisms of trout defence against pathogens by assembling molecular geneticists, immunologists and virologists. The project also intends to create an industrial platform on fish genetics and diseases.

Work programme for 1996

In 1996, an evaluation of the Agriculture and Agro-Industry (including Fisheries) programme (1991-1994) will be carried out according to Council Decision 91/504/EEC. A significant number of projects funded by this programme will come to an end in 1996. An evaluation of the impact of Agro-Industrial projects on the competitiveness of the Agro-Industrial sector will be initiated.

Contract negotiations for selected projects following the second call will take place between March and June 1996. 794 proposals have been submitted in response to the third call for proposals (areas 1, 4, 5 and 6) of the Agriculture and fisheries programme that closed in March 1996. They will be evaluated by scientific experts in April and May and a Commission Evaluation Decision is expected for September 1996. Contract negotiations will take place between September and November 1996. The fourth call for proposals (areas 2 and 3 open) will close in mid-September and approximately 300 proposals are expected. They will be evaluated in October and a Commission Evaluation Decision is expected for mid-December 1996. Contract negotiations will take place in 1997. In the context of the open call for technology stimulation measures in favour of SMEs, three evaluations of proposals are expected in 1996. Considering the importance attached to the participation of SMEs to commit RTD programmes and to innovation in the Agro-Industrial sectors, efforts will be made to increase the participation of SMEs to technology stimulation measures, particularly in areas 4 and 5. To this end, awareness campaigns will be initiated in collaboration with the programme committee and the members of the CRAFT Network of Focal Points.

Following the recommendations of the annual monitoring report for 1995, a revision of the work programme is under way.

ENERGY

11. NON-NUCLEAR ENERGY

Thermic (Demonstration)

Activities in 1995

1995 was the first year in which energy technology demonstration activities were carried out within the RTD Framework Programme. Previously they had formed part of the THERMIE programme for the promotion of innovative energy technology (1990-1994).

The transition to the Fourth Framework Programme structures and procedures was a major challenge to the Commission staff responsible. As a result of delays, no new contracts could be signed in 1995, but contracts were signed in the first quarter of 1996 for:

- 147 projects in the areas of Rational Use of Energy, Renewable Energy Sources and Fossil Fuels for total Community support of 111 MECU.
- 250 actions to disseminate new technologies, to encourage the involvement of SMEs and to work towards a global energy RTD strategy were also selected, representing Community support of 28 MECU.

The structure of the Fourth Framework Programme led to new and fruitful collaboration between THERMIE and JOULE (R&D phase of the Non-nuclear energy specific programme). Although the management of the two programmes remained separate, several initiatives were undertaken jointly, including the strategy initiatives.

With the end of the THERMIE programme (1990-1994) came the end of the OPET network (Organisation for the Promotion of Energy Technology). Therefore new collaboration was established with the Innovation programme, under which a call for proposals for a new OPET network was launched.

THERMIE is also collaborating with other programmes of the Framework Programme in the context of the Task Forces. It is active in the Car of Tomorrow Task Force.

THERMIE's close and constructive relationship with industrial actors, its main participants, continued, although it should be noted that the requirement for all projects to include participants from more than one Member State appears to have been a handicap for SME's. Their share in THERMIE, earlier in the order of 60%, has fallen in some sectors, notably renewables.

Work programme for 1996

The priority for 1996 will be to avoid the transitional delays experienced in 1995 to

ensure that contracts following the September 1995 call for proposals are signed promptly.

The third call for proposals under the new programme will take place in September 1996.

New integrated targeted projects will be launched as a result of the call for proposals in the Rational Use of Energy (buildings and transport) sectors. Further, several strategy studies are being launched in order to work towards a comprehensive and relevant framework for RTD actions at the Community level, taking into account Member State and third country activity. As far as demonstration is concerned, market actors, including industry, from all Member States are participating in order to develop a strategy for each non-nuclear energy sector.

As well as collaboration with JOULE, Innovation and other specific programmes, collaboration with the INCO programme will be intensified. There will be a call for proposals under the INCO programme which will include non-nuclear energy demonstration and associated measures.

JOULE (research)

Activities in 1995

1. 1995 was characterized above all by the evaluation of proposals received following the call of 15 December 1994. The first call registered a total of 938 RTD proposals. These were evaluated in 1995 and a priority list of 181 proposals selected for funding. These proposals resulted in 173 contracts, of which 155 were concluded in 1995 and the remaining 18 in 1996.

The first exploratory awards for SMEs were granted and a study launched to identify the potential for SME participation in the JOULE programme.

A call for expressions of interest was published on 15 June 1995 (95/C 148/16) in order to establish a list of experts to assist with the accompanying measures of the programme.

2. The most significant activities in 1995 in each of the four programme areas were as follows:

- RTD strategy:

Research effort concentrated primarily on :

- the first applications of the new generation of Energy-Economy-Environment models developed under the JOULE II programme;
- the links between technological innovation (energy-linked) and employment;
- the environmental costs of energy technologies;
- the establishment of methods for the definition of a Community RTD strategy taking account of possible synergies with national programmes and other Community policies.

An international workshop was organized jointly with the OECD and the IEA on the subject of energy externalities. This workshop and the related publications presented advances in Community research in this area.

- Fossil fuels:

The new contracts funded are heavily oriented towards environmental protection and short-term industrial applications. As a corollary, security of supply has attracted less attention.

An expanding area is the use of new types of solid fuels neutral in impact on the natural CO₂ cycle in order to reduce CO₂ and methane emissions. This involves combined combustion of coal and biomass/organic wastes, which was the subject of the final report of the APAS "Clean Coal Technology" (1992-1994) report published in 1995. This project confirmed not only the technical feasibility of the process, but also its economic and ecological benefits, so justifying the new JOULE-THERMIE projects launched in 1995.

The projects in the "new fuels" area concern more specifically a better understanding of the relationship between fuel composition and harmful emissions, the use of natural gas and clean combustion of heavy fuel oils.

The new projects in the "hydrocarbons" area concern techniques for improved exploitation of oil reservoirs, including decision-making processes, risk evaluation and environmentally beneficial procedures.

- Optimization of energy systems:

The projects selected at the first call for proposals mainly concern minimizing energy use and facilitating the use of renewable energy sources. The most significant work includes:

- CFC-free heat pumps using solar energy;
- the development of low-temperature fuel cells for stationary and/or mobile use;
- the definition of criteria for the development and testing of battery systems for the motor industry;
- energy-environment-transport modelling to produce scenarios of future transport demand.

- Renewable energy:

The efficiency of windpower is constantly improving with the development by European industry of a range of innovatory plant in terms both of the technology and its size (1.5 MW), resulting in the creation of about 30 000 jobs over the last 3-4 years.

In the photovoltaics sector, support to European industry to reduce the cost of mono- and polycrystalline cells has continued. Research in the bioclimatic architecture sector has made enormous strides with the development of intelligent windows, and in particular the completion of the multifunctional facade (30 KW) of the Mataró library. In addition, the development plan for the historic centre of Regensburg and the reconstruction of Potsdamer Platz in Berlin have provided an

opportunity to integrate solar technologies in urban planning.

The APAS activities in the renewables area were launched in 1995 and the results should become available before the end of 1996. Measures to accelerate the integration of renewable energy sources in society were implemented and the non-technical aspects of integration are under study.

Work programme for 1996

The principal research effort in 1996 will concentrate on:

- funding of the remaining 18 projects from the priority list selected in 1995,
- preparation of the launch of the second call for proposals in September 1996,
- implementation of a renewable energy action plan in three parts:
 - 1/ funding of additional projects on the reserve list,
 - 2/ launch of an additional call for proposals concentrating on three priority areas,
 - 3/ a decentralized information campaign in the Member States.

Coordination of Community and national RTD policies will be stepped up through a joint Commission/Member State exercise focusing on two priority themes: solar photovoltaics and clean coal technologies.

There will be a drive in 1996 to enhance the exploitation of 100 projects carried out under JOULE II. The results of this exercise will help to improve programme management and utilization of the results of the individual projects.

Directorate F is responsible for the Task Force *The car of tomorrow*, created in March 1995 at the initiative of Commissioners Edith Cresson, Martin Bangemann and Neil Kinnock.

Its objective is to contribute to the R&D effort needed for the development of a competitive vehicle that is clean, safe, efficient and intelligent.

The Task Force's mandate, adopted on 1 June 1995, sets two priorities:

- to take stock of the current situation in the European Union and identify existing activities;
- to define the research priorities and technological objectives and propose a regrouping of the projects selected under the Fourth Framework Programme.

An action plan has been drawn up on the basis of the terms of reference and information gathered through consultation with representatives of public and private user organizations and vehicle manufacturers.

One of the Task Force's activities is to improve coordination of the overall RTD&D work conducted by the Commission and within the national and industry research programmes. The JOULE III programme makes a significant contribution to the RTD work of the Task Force. Work in the area of hybrid and electric vehicles included extension of battery life, definition of performance and characteristics of available traction batteries.

12. SAFETY OF NUCLEAR FISSION

Achievements in 1995

Most research contracts relating to the safety of nuclear fission from the Third Framework Programme have been completed and the results published. This particularly concerns the following areas: reactor safety, management and storage of radioactive waste, decommissioning of nuclear installations, TELEMAR and radiation protection. In addition, various conferences were organized in order to present the results obtained in these areas to a wider audience.

The new programme focuses on innovation and the definition of priorities while at the same time maintaining continuity. New orientations have been added, such as new reactor designs and the consequences of the Chernobyl accident. The research topics relating to the latter are those initially figuring in the APAS-COSU programme, extended to take account of other contaminated sites.

A call for proposals was launched in January 1995 with two closing dates: 20 March 1995 and 28 February 1996. At the first closing date, 253 proposals for research and training activities had been submitted, involving 1 360 partners with an average of 5-6 partners per proposal. The evaluation led to the selection of 109 proposals, including 102 research and training projects and 7 proposals for concerted action. 3/4 of the contracts were concluded by the end of the year. The remainder will be signed in the first half of 1996.

In December 1995, a modified call for proposals was published in light of the results of the evaluation of the first call. As a result, proposals may continue to be submitted until 28 February 1996 in all the research areas involving shared-cost actions, with the exception of area A "*Exploring innovative approaches*", which was fully covered by the proposals received and selected in response to the first call. In addition, certain themes have been given priority at the expense of research areas covered by the proposals received and selected following the first call.

Work programme for 1996

By the close of the second call on 28 February 1996, 148 proposals had been received involving 780 partners. Evaluation of these proposals is scheduled in March and April and selection in July. Contracts will be ready for signature by the end of the year.

The call for proposals for concerted actions is to remain open until 1 November 1997.

Two major conferences will be held during the first quarter of 1996, one in Minsk on the radiological consequences of the Chernobyl accident, the other in Luxembourg on the results of the programme *Management and storage of radioactive waste (1990-1994)*.

Working groups covering several research projects in a given area will be set up and meetings held in the second half of the year to exchange information on progress.

13. CONTROLLED THERMONUCLEAR FUSION

Long-term objective and strategy of the programme

The long-term objective of the fusion programme is "the joint creation of safe, environmentally sound prototype reactors"²⁶. Safety and environment issues will be central to the construction of the large devices which, after JET (Joint European Torus), are included in the strategy leading to the prototype commercial reactor:

- an experimental reactor ("*Next Step*"), the overall objective of which is to demonstrate the scientific and technological feasibility of fusion energy for peaceful purposes. The engineering design activities (EDA) of the Next Step reactor, a tokamak named *ITER* ("International Thermonuclear Experimental Reactor"), are conducted in the framework of the quadripartite cooperation agreement between Euratom, Japan, Russia and the United States;
- a demonstration reactor (DEMO), capable of producing significant quantities of electricity.

In parallel with the "*Next Step*" activities, the programme decision provides for activities on *concept improvement* and *long-term technology*.

Implementation

Unlike the other R&D programmes of the European Union, there are no calls for proposals and the programme decision does not provide for the establishment of a work programme by the Commission. This is due to the nature of the programme, which covers all the activities by Member States (plus Switzerland) in the area of controlled thermonuclear fusion by magnetic confinement, and its very long-term objective (over several decades), which implies continuity of R&D activities over successive framework programmes.

The projects are the subject of shared-cost research and technological development contracts in the framework of contracts of Association with Member States (plus Switzerland) or organizations in the Member States, the JET Joint Undertaking, the NET Agreement, which takes account of Euratom participation in ITER-EDA, and other contracts of limited duration, in particular with organizations in the Member States which do not have Associations. Community financial participation in the running expenditure of the Associations and contracts of limited duration is normally at a uniform rate of about 25%. After consulting the CCFP,²⁷ the Commission may finance the investment costs of priority projects at a uniform rate of about 45% and certain tasks (which can only be carried out by industry) at a rate of up to 100%.

²⁶ Council Decision adopting a specific programme of research and training in the field of controlled thermonuclear fusion (OJ L 331, 21.12.1994).

²⁷ Consultative Committee of the Fusion Programme.

Achievements in 1995

Next Step activities:

R&D in plasma physics and engineering in support of ITER-EDA was carried out on JET and the specialized devices in the Associations. Following an intensive experimental phase, JET was modified in the second half of 1995 to install a new type of divertor. In addition, the Commission submitted to the Council a proposal for a Decision²⁸ extending JET until the end of 1999 (adopted by the Council on 7 May 1996²⁹), the objective being to furnish additional data for ITER, in particular ITER EDA, before entering the final phase of deuterium-tritium operation. In July, collaboration on fusion between the Commission and Canada, particularly regarding Canada's participation in the Euratom contribution to ITER, was formalized.³⁰ The interim report on the ITER engineering design was sent in July to the four ITER partners for evaluation: the Research Ministers generally approved the convergent opinions of the CCFP and the CST³¹ at their October meeting, having noted that good progress is being made in establishing the ITER engineering design. The ITER Council approved the interim report in December. It considers that a Next Step device such as ITER is a necessary stage in progress towards fusion power. In order both to make the Union more competitive for the construction of ITER and to maintain the possibility of proceeding towards a European Next Step should cooperation on ITER prove too difficult, the Commission launched a new qualification procedure in December for European firms/groups of firms with a view to their participation in the specific 15 technologies of the Next Step (in particular the ITER-EDA).

Concept improvements:

In the Associations, work on specialized devices has contributed to improving knowledge of the physics and technologies required for the Next Step. Research on concept improvements - for the tokamaks and similar configurations - is also being continued for the definition, in the longer term, of DEMO. This research should also help finalize the engineering design of the Next Step and prepare its operation. New plasma diagnostic methods have been developed in support of these studies. The modernization of existing tokamaks has been launched (ASDEX-Upgrade, D, and TORE-SUPRA, F). The design of a large stellarator (Wendelstein 7-X, D) has qualified for priority Community funding. In synergy with the experimental activities, the activities in theoretical physics have focused on the interpretation of the experimental results, the modelling of thermonuclear plasmas and the development of innovative concepts. Negotiations were conducted with Ireland, Austria and Finland with a view to including their fusion activities in an Association contract: a contract was signed in March with the Technology Development Centre of Finland (TEKES, which is now a member of the JET Joint Undertaking¹⁷). Sweden has had an Association since 1976. Negotiations with Ireland and Austria are making good progress.

²⁸ COM(95) 234 final.

²⁹ OJ L 117, 14.5.1996, p. 9.

³⁰ OJ L 211, 6.9.1995.

³¹ Scientific and Technical Committee.

Long-term technology:

The long-term technology effort has been expanded in the associated laboratories and industry, and concentrated on a restricted choice of options for the reactor components. In particular, the choice of materials has focused on martensitic steels, and there are two options only for the tritium breeding blanket. Euratom has participated in the framework of an IEA³² Implementing Agreement in a design study on a neutron source based on deuteron acceleration. Finally, the evaluation of the safety and environmental aspects of fusion power has resulted in the drafting of a report (SEAFP)³³ at the request of the Council³⁴ and Parliament. This detailed study confirms the advantageous properties of fusion power from the point of view of safety and the environment.

Work programme for 1996

Improvements to existing devices will be studied in the laboratories. Work will begin on the construction of the large stellarator Wendelstein 7-X to be located in Greifswald, D) and of a tokamak (MAST, Culham, GB), which has recently been qualified to receive priority Community funding. Following the decision to extend JET until the end of 1999, divertor tests for ITER will be carried out on JET; towards the end of the year, study experiments with D-T fusion plasmas are planned.

In the technology sector, the use of martensitic steels as structural materials will be evaluated, particularly with a view to building blanket modules for DEMO, which will be tested in ITER. With regard to the neutron source, a design study report will be produced in the course of the year. Finally, certain safety, environmental and economic viability aspects of the fusion reactor will be considered.

On the issues of choosing a site for ITER, authorizations and the contribution of the host party, the Commission will draw up technical and financial framework hypotheses to facilitate the submission of possible applications for an ITER site in Europe. In keeping with the programme decision, the Commission will carry out an independent, rigorous evaluation of fusion, in particular with regard to management and activities of the programme, the prospects for fusion power (compared with other energy sources) and the strategic options relating to the Next Step, international collaboration (in particular ITER), the individual parts of the programme, the role of industry and the other approaches to fusion. This assessment should provide the necessary data to determine the objectives of controlled thermonuclear fusion for the next Euratom framework programme.

TRANSPORT

Activities in 1995

In the Transport programme, the first call for proposals closed on 15 March. 333 proposals, seeking financial support of 489.6 MECU, were received. 109 proposals (plus two bids for SME exploratory awards) were accepted for funding, with a Community

³² International Energy Agency of the Organization for Economic Cooperation and Development (Paris).

³³ Safety and Environmental Assessment of Fusion Power.

³⁴ OJ L 115, 6.5.1994.

contribution of 117.18 MECU. The breakdown of proposals by programme sector was as follows :

<i>Sector</i>	<i>Proposals received</i>	<i>Proposals to be funded</i>	<i>Community contribution MECU</i>
<i>Strategic</i>	81	28	17.315
<i>Rail</i>	18	9	27.950
<i>Integrated transport chains</i>	18	3	5.000
<i>Air</i>	45	20	20.250
<i>Urban</i>	66	15	12.700
<i>Waterborne</i>	71	21	21.960
<i>Road</i>	32	13	11.920
<i>SME exploratory awards</i>	2	2	0.086

The breakdown of the demand for funds approximately matched the percentages fixed in the Council Decision for each sector. A second call for proposals was issued on 15 December (with a closing date of 15 March 1996).

Examples of the type of research being financed as a result of the first call for proposals are:

Development of the European Rail Traffic Management System (ERTMS)

Rail traffic is currently characterised by delays and hindrances at national borders. One of the main reasons for this is the different and often incompatible national signalling and management systems. There are, for example, currently thirteen different cab signalling systems in Europe. The research, currently being carried out in the Transport RTD Programme, will develop a new common Rail Traffic Management System for Europe - the European Rail Traffic Management System- (ERTMS). This will ensure that, over time, the signalling and management systems throughout Europe become compatible and that the European railway systems are fully interoperable. As a consequence, delays due to incompatible systems will be eliminated. The reduction in such delays and associated costs will help improve the attractiveness of rail transport, particularly international transport, and contribute to increasing the competitiveness of rail transport in an open transport market.

Improved Safety of Maritime Transport

Aircraft have for a long time been equipped with a black box, which in the case of an accident allows investigators to quickly analyse the causes of the accident and take measures to prevent a similar occurrence in other aircraft. The research will, on the basis of this technology, develop a similar tool for the maritime sector, thus enhancing the safety of maritime traffic. The research will not only provide the set of basic technical specifications which obviously differ considerably from the black boxes traditionally used in aircraft, but will also analyse the necessary legal and institutional framework required for successful implementation. Any solution will be both cost-effective and conform to international regulations. The results of the research will go a long way to helping avoid

similar catastrophes to those recently witnessed and will allow the safety of the maritime sector to be further improved.

Strategic research

The strategic transport research will provide answers to key questions such as how policies, including for example pricing, influence mobility and modal split, the impact that the Trans-European Transport Network will have on Europe, both in terms of its impact on the transport system, but also on the environment and the general quality of life of the European citizen. The scenarios to be developed will consider the future technological prospects of the transport system, the changes in travel and distribution patterns due to changes in society and in industry and the effect that any future expansion of the European Union will have upon the transport networks of the EU. The development of methodologies which will lead to a European database and information system will allow for the first time a comprehensive strategic overview of the European transport system as a whole. All of these tools will have one single aim - an improved understanding of the European transport system, allowing decisions affecting transport to be made in an informed manner and with a full awareness of their impact.

In December 1995 the three independent experts who form the DG VII Monitoring Panel presented their first report on the Transport programme, covering the period January - December 1995. Their attention was focused primarily on assessing the way in which the programme had been implemented and managed. Their overall impression was of "a generally well-executed programme, being run by highly professional and dedicated staff, with integrity and a growing awareness of the need for vision; but who are unable to take all the management initiatives that they recognise to be needed because they are operating well below authorised staffing levels." The Panel made eight recommendations concerning the structure of any future programme, evaluation and project selection procedures, staffing levels, and more flexibility in funding arrangements.

Research/industry Task Forces "Trains and Railway Systems of the Future" and "Transport Intermodality" were established under the presidency of Commissioner Kinnock. The Task Forces conducted wide-ranging consultations with transport users, operators, supply industries and trade unions. On 29 September terms of reference and action plan guidelines for both Task Forces were endorsed at high-level meetings with representatives of the various interests, chaired by Mr Kinnock. Two brochures giving details of the Task Forces were published in November. The following areas of work were identified as being important:

Trains and Railway Systems of the Future

- the modular high-speed train;
- the urban rail network of the future;
- a European-wide system for traffic management and integrated passenger/freight logistics;
- the "virtual factory" - a cooperative network for railway vehicle and assemblies production;
- the train cargo-liner - a contribution to integrated freight transport chains;
- accompanying measures.

Transport Intermodality

- intermodal freight terminal 2000 +;
- intermodal freight network 2000 +;
- transport town 2000 +;
- intermodal traveller 2000 +;
- passenger interchange 2000 +;
- research studies and support activities.

Work programme for 1996

Work on the proposals accepted under the first call will be carried out; in the main, results are not expected before 1997.

An information day concerning the second call, on 30 January, was attended by over 600 researchers. Proposals submitted under the second call, for which a Community contribution of some 48 MECU is foreseen, will be evaluated and, subject to the approval of the Transport Research Committee, contract negotiations for successful proposals should be complete by the end of the year. A third call is to be issued in December.

The work of the research/industry Task Forces, which have been brought together under one priority theme entitled "Transport Intermodality and Interoperability", will be taken forward to the extent allowed by supplementary funding within the Fourth Framework Programme.

TARGETED SOCIO-ECONOMIC RESEARCH PROGRAMME

Activities in 1995

1. The TSER programme, which was launched in December 1994, explicitly introduces the socio-economic dimension in the Framework Programme for the first time. The programme aims to develop new knowledge to support future decision-making by local, national or Community authorities in the following three areas:

Area I Evaluation of science and technology policy options

Area II Research on education and training

Area III Research into social integration and social exclusion in Europe.

Following a first call for proposals in March 1995, 548 proposals were received of which 38 were selected for funding of ≈ 20 MECU, ≈ 12 MECU of which was committed in 1995. Over the next two or three years, these proposals will examine problems such as:

- research and innovation systems in Europe; technology and employment (including knowledge-intensive services); methods to design, pilot and assess S&T policies, restructuring of S&T and cooperation with third countries (area I);
- best practice in pre-school education, new learning techniques and the role of new technologies, assessment of the institutional efficiency of universities, education and training for work (area II);
- the description and analysis of exclusion situations and best practice to remedy them (area III).

Contract negotiation will be concluded in 1996 and the first results of this work are expected towards the end of 1996.

The ETAN network (European Technology Assessment Network) was launched in November 1995 in order to complete the activities of the first area and is entering its initial phase.

An interdepartmental group was set up in February to ensure the exchange of information and the coherence and complementarity of the activities of the TSER programme with the socio-economic activities of the other specific programmes of the Framework Programme. Following a preliminary analysis, a summary report of the socio-economic measures conducted under the Fourth Framework Programme is being prepared.

Close links have been established in the Commission between the activities of area I and the ITPS (Institute of Prospective Technological Studies), DG XIII-D (R&TD activities: dissemination and utilization of the results of RTD research activities, technology transfer and innovation) and EUROSTAT, which regularly takes part in the ETAN meetings. DG XXII (Education, Training and Youth) is closely associated with the area II activities. Some area II activities are conducted in the framework of the multimedia Task Force (a working group has begun its activities). Finally, DG V (Employment, industrial relations and social affairs) is closely associated with the area II activities as regards social exclusion aspects and with the other areas on employment matters. A collaboration protocol between DG V and DG XII-H is being considered.

Problems encountered

No particular problems have been encountered in implementing the programme. However, the poor success rate of the first call for proposals (38 accepted out of a total of 548 received) means that the second call scheduled for 1996 must be better targeted. Participation by industry is marginal, due to the special nature of the subjects dealt with by this programme. By contrast, user participation, already envisaged in some projects, should increase in future.

Work programme for 1996

The keen interest generated by the first call produced a large number of proposals compared with the available resources. In order to concentrate the limited resources of the programme more effectively on important areas not covered by the first call, the second call scheduled for summer 1996 will be targeted on the following subjects:

- Area I
 - innovation, employment and growth
 - new science and technology developments and the quality of life; the organization of society

- Area II
 - education and training, labour market and unemployment (life-long learning)
 - education and training and the emergence of the information society
 - access to education and training of disadvantaged groups

- Area III - causes of social exclusion, particularly unemployment
 - evaluation of the impact of social integration policies
 - horizontal activities and research infrastructure.

The research on some of the subjects should be placed in perspective in order to illuminate the problem of employment and the knowledge society from different angles.

In order to consolidate research work in progress, the networks linked to area I projects in particular have been mobilized this year to find answers to questions on future Community and national policies, such as:

- (i) What lessons can be drawn from the different approaches of the innovation systems?
- (ii) How can an S&T policy based on "demand" be achieved?
- (iii) What contribution can the various national long-range technology planning exercises make to EU S&T policy?

Summary papers will be prepared on completion of these activities, which may contribute to the preparation of the Fifth Framework Programme. Other subjects are being examined and may be dealt with in 1996, such as: dissemination and utilization of technology; lessons to be drawn from the different experience of mission-oriented research similar to the approach of the Task Forces.

SECOND ACTIVITY OF THE FOURTH FRAMEWORK PROGRAMME

INTERNATIONAL RTD COOPERATION

Activities in 1995

International cooperation is increasingly becoming an essential dimension of action by the EU in the field of research and technological development (RTD). The Fourth Framework Programme (1994-1998) introduced an innovatory specific RTD programme "Cooperation with third countries and international organizations" (INCO).

This programme, which was implemented for the first time in 1995, now integrates hitherto dispersed research cooperation activities (COST, EUREKA, PECO, COPERNICUS, ISC, STD) in a coherent framework.

Several factors are implicated in the growing importance of international scientific cooperation: the growth of new research centres throughout the world, the emergence of global problems (health, environment, etc.), the soaring costs of research, (energy, space, etc.), the desire to gain access to new markets through cooperation in the context of liberalization of world trade (WTO, NAFTA, MERCOSUR), the development of the information society, etc.

In addition, Europe has much to gain from S&T cooperation with partners in third countries: identification of themes important to the future, access to information sources, know-how, equipment, markets, improvement of its economic competitiveness, etc.

Based on the principles of "mutual advantage" and "subsidiarity", the structure of the INCO programme reflects the different nature of the objectives of cooperation depending on the partners, divided into four target groups: the other European science and technology cooperation frameworks (COST, EUREKA, international organizations); Central and Eastern Europe and the New Independent States of the former Soviet Union (PECO, NIS), the non-European developed countries and the developing countries (DCs).

The INCO programme was successfully launched in 1995 through the implementation of its various constituent instruments: dialogue, concerted actions, shared-cost actions, accompanying or support measures (studies, conferences, etc.) and, in certain cases, support to the participation of third countries in other specific programmes of the Fourth Framework Programme (PECO, NIS, DCs).

In the context of the European Economic Area, Iceland and Norway (members of the EEA since 1 January 1994) and Liechtenstein (a member since 1 May 1995) were closely associated with the specific programmes of the Fourth Framework Programme.

Action was directed towards the following main aims:

- *to strengthen the scientific and technological bases of the EU and enhance the "added value" of European research effort to mutual benefit :*

In this spirit, an active policy of negotiating cooperation agreements with various partners was conducted in 1995: Switzerland, Canada, USA, Africa, Israel, etc. Some of these agreements have already been signed, e.g. the agreement between the European Community and Canada or the R&D cooperation agreement on the monitoring of nuclear safety signed with the USA. The agreement with Israel is designed to associate that country in all the non-nuclear specific programmes of the Fourth Framework Programme.

In addition to these initiatives, a wide variety of contacts have been made: Task Force EC/USA on research in biotechnology; Mrs Cresson's visit to Tokyo resulting in intensified joint industrial and seismic research and an increase in the number of research fellowships for European scientists and engineers in Japan; participation in the eighth meeting of the Carnegie Group involving the Research Ministers of the seven main industrialized countries and the Commission.

At the same time, efforts to coordinate research funded nationally at European level were continued. 19 new COST projects started, bringing the total number in progress to 123 in 17 research areas. In addition, pragmatic coordination continued between the Community and the pan-European EUREKA initiative. The close links established between the Community MAST programmes (Marine Science and Technologies) and IMT (Industrial and Materials Technologies) and the EUREKA EUROMAR and FAMOS-FACTORY activities respectively are examples of effective coordination. In 1995 the Commission participated in 13 projects and nine "umbrella" EUREKA initiatives. In some cases, the Commission and more particularly the JRC is project leader. Furthermore, the Community's links with various European research bodies were strengthened (e.g. the European Centre for Nuclear Research - CERN, the European Space Agency - ESA). More precisely, an administrative arrangement was concluded between the Commission and the European Molecular Biology Laboratory (EMBL).

- *to contribute to the solution of regional problems of the PECO/NIS and prepare the accession of the associated PECO :*

On the margins of the Council meeting on research of 9 June 1995 a first informal meeting was organized between the EU Research Ministers and their counterparts from PECO and associated Baltic States. This first meeting in the "structured dialogue" initiative led to the identification of priority themes for those countries (environment, health, energy, biotechnology, etc.).

On these bases, and following an active information campaign in the countries concerned, a call for proposals was launched and the 2 000 proposals received are being evaluated. Participation in other programmes of the Fourth Framework Programme was also funded in 1995, even though the number was limited by the low budget available. Furthermore, a Communication on the prospects for RTD cooperation with the NIS was presented to the Council, while the Council agreed to continue Community participation in the Association for the Promotion of Cooperation with the Scientists of the New Independent States of the former Soviet Union (INTAS) until the end of the Fourth Framework Programme. At the end of 1995, the latter provided funding of 46 MECU to around 1 000 joint research projects, covering exact and natural sciences, economics and the humanities. On the other hand, the International Centre for Science and Technology (ICST) continued its action to reorient military scientists from the former Soviet Union towards civil activities (a total of 11 000 scientists and engineers involved since 1994, 3 000 of whom were part of the hard core of weapons research). In addition, a meeting of the EU/PECO Forum was held on the information society, which will be followed up in the years to come.

- *to support the EU's development aid policy through scientific cooperation :*

The three main areas concerned by this cooperation (health, agriculture, management of natural resources) aim to cater to those countries' essential requirements. In 1995 approximately 800 contracts resulting from previous initiatives were still in progress - Science and Technologies for Developing Countries (STD3), International Scientific Cooperation (ISC) and the research initiative to promote cooperation between the EC and the Mediterranean countries (Avicenne). Following a new call for proposals for INCO-DC launched in March 1995 under the Fourth Framework Programme, over 20 research projects involving more than 150 partners were selected from among the 77 proposals eligible, and received 12 MECU from the 1995 budget. The two main subjects involved are animal health and, in respect of human health, vaccines. Another 821 eligible proposals were received in response to the second part of the first call, concerning primarily the agriculture/agri-food sector, the management of renewable resources, health and information and communication technologies.

Other activities in 1995 include: a Commission working paper on the European initiative for agricultural research for development, in preparation for a communication on the subject; the organization of 22 seminars on a wide variety of subjects (tropical medicine, fisheries, biotechnology) with the aim of disseminating the research results or defining priorities for future activity (e.g. the Sophia Antipolis seminar of March 1995 on "Europe of research and the Mediterranean", which contributed to the preparation of the Barcelona Euro-Mediterranean Conference in November 1995).

- *to stimulate overall reflection on international RTD cooperation :*

A general Communication on the "Perspectives for international cooperation in the field of research and technological development" was presented to the Council. This provides in particular for strengthening the external dimension of the EU's RTD policy based on different approaches: bilateral, multilateral, regional or global. The emphasis is on the need for greater industrial participation in international scientific cooperation activities or the importance of mobilizing other Community funds (PHARE, TACIS, MEDA, Lomé Convention, etc.) to support research by the PECO, non-EU Mediterranean countries, the NIS and the DCs. Reflection will continue on this important paper, which was the subject of a Council Resolution of 25.3.1996.

Work programme for 1996

The broad lines of action to be carried out in 1996 comprise primarily:

- *continued implementation of the specific programme on international cooperation and management of achievements hitherto :*

This will involve, for example, the monitoring of contracts in progress, the management of new calls for proposals concerning the DCs, the PECO/NIS or the Japan/Korea fellowships; coordination of national activities in the COST framework and continued support to the NIS through INTAS and ISTC.

- *expanding the scope of international cooperation in the long-term interest of European RTD :*

This will take place through the implementation of existing bilateral agreements and the negotiation of new S&T cooperation agreements (e.g. EU/Switzerland, EU/USA; EU/South Africa); the preparation of three new communications on RTD cooperation concerning: the associated PECO; the emerging countries; the Mediterranean countries; participation in various events: EUREKA Ministerial Conference, Second S&T Forum EU/Japan, meeting of the Megascience Forum and the Carnegie Group.

- *optimizing the cost-effectiveness of the specific programme on international cooperation :*

This will above all involve improved coordination of programme management, particularly through the Task Forces, including the development of international cooperation in the areas they cover; stronger links with other Directorates-General managing complementary activities (PHARE, TACIS, MEDA, Lomé Convention), in liaison with the external policy dimension of the RTD policy of Member States and the EU in the context of the recent Euro-Mediterranean, EU-USA and Euro-Asiatic summits.

- *strengthening coordination between the activities of the Union and those of the Member States in the field of RTD cooperation with third countries :*

This will be the subject of a study in progress entitled INCOPOL.

THIRD ACTIVITY OF THE FOURTH FRAMEWORK PROGRAMME

DISSEMINATION AND OPTIMIZATION OF RESULTS

Activities in 1995

The specific programme corresponding to the Third Activity (the "INNOVATION" programme) was adopted by the Council on 15 December 1994.³⁵

Because of the nature of its activities and its horizontal character this programme is central to the problems of competitiveness and directly contributes to the objectives of the Framework Programme as set out in Article 130f of the Treaty.

During 1995 implementation started of most of the activities mentioned in the work programme adopted at the beginning of the year. Among the most important ones are: the network of Innovation Relay Centres and the Community Research and Development Information and Dissemination Service (CORDIS).

As regards the Relay Centres, their mission has been widened with respect to the pilot scheme launched under Value and reoriented towards a demand-led approach taking into account the needs of the industrial fabric, to include and emphasize exploitation, technology transfer and innovation in addition to the provision of information on Community RTD.

Under this new mission the Relay Centres will become "poles" in a region which will provide access to the required expertise to support the exploitation, technology transfer and innovation activities of the SMEs in that region. As the result of the call for proposals³⁶ (deadline 15 March 1995), the network of Relay Centres was substantially strengthened and consisted at the end of 1995 of 52 such centres compared to 32 at the end of the Third Framework Programme, requiring a total commitment in 1995 of approximately 23 MECU.

As regards CORDIS, a call for tenders³⁷ for the continuous operation and further development of the system, which itself was already launched under the Third Framework Programme, was published in mid-1995. As a result, the system will evolve further during the next three years by improving the general quality and user interface of the databases, the use of new information channels and inclusion of gateways to other European RTD information sources.

Thus at the end of 1995 the two main elements of the European infrastructure for dissemination and exploitation were in place and ready to contribute to the further industrialisation of RTD results, Community as well as national ones, especially by SMEs.

In addition to the above a number of other activities have been launched in 1995 involving SMEs. An example is the technology transfer and validation projects. These

³⁵ OJ No L 361, 31.12.1994, p.101.

³⁶ OJ No C 12, 17.1.1995, p. 9.

³⁷ OJ No C136, 03.06.1995, p. 23.

projects aim to transfer modern technologies which are used in one sector or region of the Community to firms in another sector or region where they are not yet used, respectively to validate the innovation potential of RTD results particularly in other fields of activity than those in which they were initially obtained. A call for proposals for both types of projects published on 15 March 1995 resulted in the selection of 100 such projects, 60 of which are coordinated by SMEs, involving in total about 300 SMEs. These 100 projects will also be used as test-beds to demonstrate transnational technology transfer and validation mechanisms. The projects consist of a small definition phase and, if successful, a major implementation phase. The commitments in 1995 concerned only the definition phases of these 100 projects and amounted to approximately 7 MECU.

Another example is the audits of regional infrastructures to support innovation and technology transfer. The aim of such audits is to possibly improve the functioning of those infrastructures, in particular to attune them more to the needs of SMEs in their region. Currently about 65 regions, selected following calls for proposals, are carrying out such audits. They are supported in their efforts jointly by the Innovation programme and regional policy - under Article 10 of the ERDF.

Following the request by the Council and the European Parliament for close co-ordination of the dissemination and optimization activities carried out under the specific programmes³⁸ of the first activity with those carried out by activity three, an inter-programme co-ordination and planning mechanism was set-up during 1995 and is starting to yield tangible results.

One example is the joint development and testing of a prototype interactive multimedia presentation of Community RTD results to be eventually supported by CORDIS. This tool will enhance the dissemination and exploitation of Community RTD results beyond the undertakings and scientific Community that have been directly associated with the research work that generated them.

Another example concerns exploitation of Community RTD results by third parties. Attention will be focused on those RTD projects that achieve exploitable results but which, for whatever reasons, the consortium partners either cannot exploit themselves or not exclusively.

The Innovation programme also played a central role in developing the Green Paper on Innovation, which was adopted by the Commission in December 1994. The objective is to identify the factors that foster or obstruct innovation in the Community and to propose, at all levels of decision-making - regional, national and Community wide - concrete, short- and medium-term actions that will strengthen the innovation capacity in the European Union. The Green Paper therefore, in addition to research and technology, also tackles education and training, the mobility of individuals and ideas, the legal and regulatory environment and financing, especially venture capital.

Work programme for 1996

The implementation of the Innovation programme in 1996 will include calls for proposals

³⁸ A sum representing an average of 1% of the total budget of the Fourth Framework Programme is allocated to dissemination and optimization of results in the framework of the first activity.

in the area of financial actions, the promotion of innovation management techniques, increasing public awareness of research and technology and the continuation of the OPET (Organisations for the Promotion of Energy Technologies). The inter-programme co-ordination for the dissemination and optimisation of European Union sponsored R&D results will also be continued. In addition, *ad hoc* dissemination and exploitation services will be provided in support of all Community policies.

Finally, a study has been launched on the basis of guidelines drawn up by a pilot group to determine a common methodological basis for assessing the results of the RTD projects.

FOURTH ACTIVITY OF THE FOURTH FRAMEWORK PROGRAMME

TRAINING AND MOBILITY OF RESEARCHERS

Activities in 1995

1. Introduction

1995 was the year in which the Training and mobility of researchers (TMR) programme was implemented, which was adopted by Council Decision of 19 December 1994.

As the process of adopting the programme by Parliament and the Council was much faster than in the case of the previous Human capital and mobility programme (HCM), the budget will be spent over four years rather than in 30 months as was the case with the HCM programme.

The work programme for 1995 develops the text adopted by the Council and takes account of experience gained from implementation of the HCM programme. The main changes include:

- concentration of the "network" activity on a smaller number of contracts;
- the introduction for the first time in the "access to large-scale facilities" activity of joint research projects on improvement of the facilities;
- the establishment of a schedule (based on reimbursement of tax and social security costs in the Member States) for the payment of grants in the various Member States of the European Union;
- the funding of practical courses and summer schools under the "Euroconferences and accompanying measures" activity and the conduct of detailed analyses of the short-, medium- and long-term impact of the programme;
- increased industry participation and greater consideration of the cohesion objectives.

The TMR programme, like its predecessors Science, Large Installations Plan and HCM, is based on bottom-up research, i.e. oriented towards targets defined by the researchers themselves other than the objectives laid down at the launch of the programme. In this it differs from all the other Community R&D programmes under the Fourth Framework Programme.

Without changing this system, which utilizes researchers' powers of imagination to the full, new measures have been taken to facilitate greater participation by industry in the programme (increased presence of industry researchers in the scientific evaluation panels and opening of wider channels of communication with industry).

With regard to cohesion, the results of the selections made in 1995 show a significant growth in the representation of researchers from the less-favoured regions in the programme, which has been achieved without any changes to the requirements as to scientific quality on which Community research policy is based.

2. Activities relating to the training and mobility of researchers

Seven calls for proposals were published in 1995, which led to the evaluation of 91 research networks, the adoption of 84 projects designed to improve researchers' access to large-scale research facilities, the award of 582 grants for research through training (pre- and post-doctoral level) and the funding of 55 Euroconference contracts, practical courses and accompanying measures. Some 115 MECU were committed out of the 750 MECU envisaged for the whole duration of the programme.

The 91 *research networks* proposed for funding in 1995 account for 150 MECU and involve over 700 research teams (with 5 000 scientists), to which about 2 500 young researchers will be associated. The contract negotiations and corresponding commitments are in progress. The contracts will have an average duration of four years.

The 84 contracts for *large-scale facilities* account for 72 MECU. They will each run for three years and enable about 4 000 European researchers to gain access to large-scale European research facilities.

The budget for the 582 contracts for *training through research* amounts to 47.8 MECU, all of which was committed in 1995. These contracts of a duration of between three months and three years will enable young European researchers to acquire training through and for research in the best laboratories of the European Union. Of the 582 contracts, 146 benefit researchers from the less-favoured regions of the Union. About 10% of the budget for the training through research activity is dedicated to "return grants", which will enable researchers from less-favoured regions of the Union (objective 1 regions) who have been in receipt of a two-year TMR grant, to receive a grant for an additional year to ease their return to their region of origin and apply their newly acquired knowledge there. 58 recipients from less-favoured regions were selected by the Commission in 1995 and will return to laboratories in their region of origin during 1996. To the abovementioned 582 contracts will be added 720 new contracts evaluated and/or negotiated at the beginning of 1996.

The 55 contracts for *Euroconferences and accompanying measures* decided by the Commission in 1995 will enable about 140 Euroconferences, practical courses and summer schools to be held (an average of 2.5 meetings per contract), with the participation of more than 14 000 European scientists, a quarter of whom will be young scientists. The average duration of a contract of this type is three years. The proposals submitted in response to the call published on 15 June 1995 were evaluated in December 1995. Some 65 new contracts involving a budget of 5.4 MECU will be funded as a result.

3. Continuation of the activities of the previous Framework Programmes in the field of researcher mobility and basic research

Around 800 contracts were concluded under the specific Science programme of the Second Framework Programme, 150 of which are still ongoing and scheduled to end in 1996 and 1997. These ongoing contractual activities involve a great deal of management.

Directorate XII also continued in 1995 to manage the Human capital and mobility programme (1992-1994). Most of the contractual activities were still ongoing at the end of the year (639 contracts for research networks, 667 for institutional grants, 1 034 individual grants, 67 contracts for large-scale facilities and 310 Euroconferences) and are set to end in 1997 and 1998.

4. Coordination of overall Community training activities

This coordination work by the personnel responsible for the Training and mobility of researchers programme enables common or identical principles and mechanisms to be applied to the management of Community training through research activities:

- a set of common rules and procedures (calls for proposals, selection, decisions, contracts, data-processing, etc.);
- an information dossier comprising a single application form for all training grants;
- a single reception point for all proposals for training through research grants for the various specific programmes of the Fourth Framework Programme;
- a single dispatch point through which all the written procedures dedicated to the selection decisions are channelled;
- the organization at regular intervals of coordination and concertation meetings with the departments concerned.

The tax and social security costs to which the Community grants are subject vary considerably from one Member State to another. Under the previous programme (Human capital and mobility), this resulted in unequal and often unjust integration conditions in the host countries. At the Council's request, the Commission drew up interim arrangements for the TMR programme based on the legal, financial and social conditions in the host country which did much to iron out this inequality.

In addition, coordination between the DGs concerned (DG XII, DG XXII) of training activities other than training through research implies the organization of regular interdepartmental consultation and contribution to the preparation of guides and reports (e.g. "Citizen First", a Green Paper on the obstacles to mobility under preparation in 1996).

Work programme for 1996

All the activities described in the preceding paragraphs will be continued in 1996 on both the administrative and budgetary level and the scientific level. A catalogue of contracts and a first inventory of the results will be published towards the end of the year.

At the same time, 10 new calls for proposals will be launched for each of the four activities of the TMR programme (see Table 8 in Part 3 of this report for the details).

With regard to training grants, Mrs Cresson, the Commission Member responsible for RTD and the JRC, human resources, education, training and youth, has decided to group together in a new "Marie Curie" scheme the training through research activities of the TMR programme and those of the preceding Human capital and mobility programme, which will help to create a clear identity for the participants in the TMR activities. The "Marie Curie Grants" scheme is due to be officially announced by Commissioner Cresson at a seminar in Brussels, to which many of the TMR grant-holders selected hitherto will be invited. The organization of this event, which is planned for the second half of 1996, is in progress.

Finally, in the "institutional grants" area of the HCM programme, 600 new institutional grant-holders will be selected by the Commission in 1996 in the framework of contracts signed previously. Two further selection exercises will be held in May and September 1996, each involving about 200 grant recipients.

JOINT RESEARCH CENTRE

Activities in 1995

Orientations

1995 was the first year of a new approach for the JRC. In conformity with the Council conclusions of 26 April 1994 on the role of the JRC, the Centre in 1995 has engaged in institutional activities as well as competitive activities, the former covering institutional research and institutional scientific and technical support to Community policies. The competitive activities include participation in shared-cost actions under the Framework Programmes, competitive support measures for Commission services responsible for the various Union policies, competitive activities outside the Community Framework Programmes and contractual work performed for outside third parties. 1995 was, moreover, the year in which the newly appointed Commission launched initiatives for establishing better bonds between industry and research. Within this frame the Commissioner for research, Mrs. E. Cresson, strongly emphasised the need for further commercialisation of JRC research results and for improved communication of JRC activities.

New challenges : competitive activities : Following extensive preparations begun in 1994, the JRC responded to the challenge set by the new opportunities opened up in 1995 for competitive activities. Together with partners from industry, research centres and universities throughout the Union and associated countries, more than 300 proposals were made in response to the first call for proposals under the new Framework Programmes, with a success rate of 28%. The JRC also presented proposals for competitive support activities and for Community programmes outside the Framework Programmes, notably PHARE and TACIS, where contracts were won for nuclear safety work in the Central and Eastern European countries, Russia and other Newly Independent States (NIS). Taking up these new opportunities required intensive marketing by the JRC. They were made possible by a series of legal, financial, budgetary and administrative decisions by the Community institutions (Council, Parliament, Commission). These included the necessary amendments to the

Financial Regulation for the European Union budget, decided on in September 1995.

Visits by the Commissioner : On 20 July 1995 Commissioner Cresson, made her first visit to the JRC, starting with the Institutes at Ispra, followed by a visit to the Institute for Transuranium Elements (ITU) in Karlsruhe in September and the Institute for Prospective Technological Studies (IPTS) in Seville in December, where she inaugurated the new technological watch function of the Institute.

New directors : During the year, four new Directors of JRC Institutes, namely the Institute for Systems Engineering and Informatics (ISEI), the Environment Institute (EI), the Institute for Remote Sensing Applications (IRSA) and the Institute for Advanced Materials (IAM), took up their posts, after appointment by the Commission acting on the advice of the Board of Governors.

Communication initiatives : Links between the JRC and industry, research centres and universities were also reinforced through the organisation of Information Days in London, Athens, Copenhagen, Milan and Vienna, on the initiative of Members of the Board of Governors. JRC availability in support of Union policies was further publicised by information activities directed to other Commission services, including a Newsletter and targeted seminars.

Objectives and S&T progress :

Institutional activities : JRC specific research programmes: The major task of the JRC in 1995 was to contribute to the implementation of the JRC specific programmes under the Communities' Framework Programmes in their first year of existence. This contribution was carried out through institutional research activities and through institutional scientific and technical support activities for the services of the Commission.

Institutional research activities: In 1995, institutional research activities accounted for 73% of the JRC's institutional activities; they are carried out under the following programme lines:

1. *The Industrial and materials technologies* programme is carried out by the Institute for Advanced Materials (IAM) and encompassed research projects on advanced materials, on surface engineering, on new ecofriendly materials and on non-destructive evaluation techniques for the inspection of industrial structural components.
2. *The Measurements and testing* programme encompassed research projects on reference measurements and materials, carried out by the Institute for Reference Materials and Measurements (IRMM); and on the assessment of the reliability of structures, carried out by the Institute for Safety Technology (IST).
3. *The Environment and climate* programme consisted of research projects on atmospheric, soil, water and waste pollution, executed by the Environment Institute (EI); on the gradual setting up of the Centre for Earth Observation, a decentralised European data management and information system, and on applications of remote sensing techniques, carried out by the Institute for Remote Sensing Applications (IRSA); and on industrial hazards carried out by the Institute for Safety Technology (IST) and by the Institute for Systems Engineering and Informatics (ISEI).

4. *The Non-nuclear energy* programme consisted of research projects related to materials for clean technologies, carried out by the Institute for Advanced Materials (IAM), and to standardisation of photovoltaic devices, carried out by the Institute for Systems Engineering and Informatics (ISEI).
5. *The Nuclear fission safety* programme encompassed a number of research activities ranging from studies on reactor safety, carried out by the Institute for Safety Technology (IST), by the Institute for Systems Engineering and Informatics (ISEI) and the Institute for Advanced Materials (IAM), to research activities on nuclear safeguards and fissile materials management, executed by the Institute for Safety Technology (IST), the Institute for Systems Engineering and Informatics (ISEI), and the Institute for Transuranium Elements (ITU). ITU carried out research on nuclear fuels and actinides.
6. *The Controlled thermonuclear fusion* programme (Technology and safety) is carried out by the Institute for Safety Technology (IST), the Institute for Systems Engineering and Informatics (ISEI), and the Institute for Advanced Materials (IAM).
7. *The Targeted socio-economic research* programme includes the Science and Technology Observatory function and prospective work the activities of the Institute for Prospective Technological Studies (IPTS). The essential role of the Institute is to harvest the available contributions from experts, consultants, research organisations and institutes in Member States and when possible in third countries, in order to analyse, process and integrate them impartially and in depth and, more importantly, to distil clear trends or needs for action in a usable form for decision makers.

Institutional scientific and technical support for Community policies

The JRC provided scientific and technical support to Union policies at the request of the relevant Commission services, in conformity with the Council Decisions of 15 December 1994 (which adopted the actual specific programmes of the JRC). These Scientific and Technical activities accounted for 27% of the JRC's Institutional activities.

The support activities are customer-driven, in fulfilment of impartial and neutral scientific and technical requirements arising from EC directives, decisions of the Commission and the Council, or obligations stemming from the Euratom Treaty. The effective customer/contractor relationship between the requesting services of the Commission and the JRC Institutes is expressed in the elaboration and signing of inter-DG collaboration agreements.

General monitoring of such JRC services to the other Directorates-General of the Commission has been exercised by an official inter-DG Committee, established by a Commission decision. This group met twice in 1995, with a high attendance. Its role is twofold: monitoring the work performed, so as to ensure a smooth, mutual exchange of information on the activities (over 100 abstracts related to these support activities were communicated in 1995 to all DGs), and planning activities for the following year, taking into account priorities, new requests and budget limitations.

These scientific and technical support activities were related to the following Framework Programme lines: *Information technologies, Environment and climate, Agriculture and fisheries, Targeted socio-economic research and Nuclear safety and safeguards.*

In 1995, the support for environmental policy accounted for 46% of the total support budget. Support for the common agricultural policy accounted for 16,5% and support for

nuclear safeguards for 32%.

In 1995, the JRC published in total more than 1000 papers and 26 JRC patents were granted. The detailed lists of JRC publications and patents are published each year in the "Publications Bulletin".

JRC and competitive activities

Around 20% of the global JRC budget for 1995-1998 should be earned through competitive activities. As of 1 January 1995, JRC competitive activities included:

- Participation in shared-cost actions, where the JRC, in association with partners in the Member States, submits proposals in the context of calls for proposals, or contributes to proposals submitted by other laboratories under the Framework Programmes;
- Competitive scientific and technical support activities under the Fourth Framework Programme, where the JRC may respond to specific requests from Commission Directorates-General which are allocated on a competitive basis in the context of invitations to tender;
- Other competitive activities outside the Framework Programmes, where the JRC (alone or in a consortium arrangement) will be able to participate in various actions sponsored by the Community (e.g. PHARE, TACIS, assistance to developing countries, etc.) and in the context of a competitive approach, will seek Community funding in relation to those actions;
- Research under contract, the original third party work mode of operation mentioned above, now part of the overall JRC competitive portfolio.

As far as JRC participation in shared-cost actions is concerned, the JRC together with partners in the Member States submitted a total of 338 project proposals in response to the first calls for proposals from 15 specific programmes; by December 1995, the Commission had accepted 95 of those proposals for funding, bringing the overall success rate to 28%. The financial outcome for the JRC, although difficult to calculate precisely due to the ongoing contract negotiations on several outstanding projects, will be in excess of 10.5 MECU. In the area of competitive scientific and technical support activities, of the 128 MECU earmarked within the Fourth framework Programme for funding this activity over the 4-year period, 26.5 MECU were made available to the services of the Commission early in 1995, but only 20 MECU have been committed in 1995. Of these, the JRC Institutes have managed to win about 11.9 MECU of contracts, either alone or in a consortium arrangement.

Other competitive activities outside the Framework Programmes like TACIS, PHARE, etc., have seen a good 1995 level of activity on the part of the JRC institutes. In this highly competitive sector of the market, the JRC has won around 2.3 MECU.

The record for Third Party work shows, for 1995, new contracts (obtained on the market at large) in excess of 18 MECU. Considered in the context of the outstanding effort on the other fronts, this represents a remarkable hold on the previous positions. (third party work earned in 1994 amounted to 18 MECU).

As requested by the Council decisions on the JRC specific programmes 1995-1998 the Commission issues a detailed JRC Annual Report³⁹ accompanied by Observations of the

³⁹ Com(96) 158 final.

JRC Board of Governors.

Major initiatives in 1996

JRC strategy: In order to consolidate the new approach of the JRC as prescribed by the Council, the Parliament and the Commission, the Board of Governors and the JRC management have, during the year, discussed strategies for the eight institutes and the JRC as a whole, leading to an emphasis on customer-driven, high quality research of real utility for the European Union, executed in an efficient way with a flexible responsiveness to changing market needs. JRC activities have the effect of creating links between teams in Member States situated at different levels of scientific and technological development. They thus contribute to reinforcing cohesion between laboratories and research institutes in all the Community regions. Various work schedules define the single projects and make up the JRC work programme for 1996 as approved by the JRC Board of Governors.

1. Within the overall objectives of the JRC specific programmes, a stronger orientation towards industry collaboration, applications for industry and novel research-industry initiatives in line with Commission proposals has been proposed under relevant themes, notably industrial technologies and materials technologies, measurements and testing, non-nuclear energies. The environment and climate theme features novel clusterings on societal issues, on natural hazards: seismic and floods, whereas industrial reliability work is reduced. The support to the Union's policies on the same theme responds, as already reported to the Board of Governors, to new requests from the Commission services regarding work on anti-fraud measures and the contribution to the Alpine Observatory;
2. Within the nuclear themes, the reactor safety research and fuel cycle safety work is maintained; a concentration is proposed for nuclear safeguards research preserving the important support obligations in that field. The thermonuclear fusion work is restructured notably to illustrate the close links between the materials research and the tritium-related work.

Following the Commission decision of 16.1.1996 on reorganisation, the Joint Research Centre became an independent Directorate-General of the Commission on 10.4.1996, in order to give it the autonomy necessary for the proper implementation of its tasks.

COMPETITIVE SCIENTIFIC AND TECHNICAL SUPPORT ACTIVITIES

The Fourth RTD Framework Programme introduced competitive scientific and technical support activities in Annex IV on implementation arrangements. These activities cover the work that used to be performed exclusively by the JRC for the Commission's Directorates-General and which, since 1995, may be carried out by a research organization of a Member State or by the JRC (where the neutrality and independence of a Commission service is not required), and new projects planned by the Commission departments with effect from 1995. These support activities come within the first and third activity of the Fourth Framework Programme.

These activities are implemented in two stages:

- the allocation on an annual basis of resources to the different Directorates-General;
- the administration of these resources by each of the Directorates-General.

In order to guarantee appropriate conditions of transparency and to satisfy the needs of the different Directorates-General, the resources are allocated by an interdepartmental group representing all the Directorates-General concerned, convened and chaired by the Commission's Secretariat-General. It meets on an *ad hoc* basis, but at least twice a year.

This group examines the needs identified by the Directorates-General. It analyses requests, verifies compatibility with the objectives of the Framework Programme and decides on annual allocation within the limits of the available budget. Apart from the relevance of the projects to the objectives of the scientific and technical support programme, account is taken of the availability of funding from other programmes and scope for integration or convergence between several projects.

The Directorates-General whose proposals are selected are responsible for managing the funds allocated. They utilize competition between suppliers in order to achieve the best result in light of their requirements. The resources allocated are managed independently in application of the relevant rules in force, in particular the provisions of the Financial Regulation applicable to the General Budget of the European Communities.

The sums committed amount to over 80% of the amount available under the 1995 budget, which is more than satisfactory for the first year of activity of such a programme.

The Directorates-General are showing increasing interest in this programme. Six further departments submitted an application for 1996 in addition to the 10 that received funding in 1995. The number of projects proposed in 1996 shows an increase of 40% compared with the previous year.

PART THREE

PROJECTS, CONTRACTS SIGNED AND PAYMENTS IN 1995

Annual basis and framework programme

- Tables 1 to 9 summarize Community RTD activities in 1995 in a quantitative form (number and nature of projects, participants, level of funding, etc.). The figures relate primarily to the activities of the Third and Fourth Framework Programme; they cover participation by Member States and the third countries (tables 5 and 7).

The abbreviation "n/a" used in these tables means "not applicable" or "not available".

Tables 5, 6, 7 and 9 concern only shared-cost actions.

- Table 10 relating to the Fourth Framework Programme and the Euratom programme takes account of the revised budget due to the enlargement of the European Union.

Tables 11 and 12 show the development of annual commitments for the framework programmes in current terms and in 1992 prices.

- List of main abbreviations or acronyms used.

RTD activities in 1995: New projects (contracts signed in 1995) and projects in progress

	New projects (RTD contracts signed in 1995)						All projects	
	Total EC contribution M ECU (1)	Number of projects	Number of participants	Average number of participants per project	Average number of MS per project (2)	Average EC contribution per project M ECU	Number of projects under way at 31.12.95 (3)	Total payments 1995 M ECU (4)
Shared-cost actions	1 659.54	1631	10548	6,47	4,12	1,02	7041	1 569.06
Concerted actions	16,46	50	84	1,68	1,12	0,33	783	30,89
Preparatory, accompanying and support measures	105,00	798	1354	1,70	1,38	0,13	2735	242,52
Controlled thermonuclear fusion	(5) 251.51	181	199	n/a	n/a	n/a	136	(6) 194.55
TOTAL	2 032.50	2660	12185	4,58	2,96	0,78	10695	2 037.02

(1) Sum total EC contribution for each new project, as stipulated in the contract (i.e. for entire project duration).

(2) MS = Member State.

(3) Projects under way at 31.12.95 = signed contracts with a completion date for research work after 31.12.95.

(4) Payments for projects which fall entirely or partly within 1995.

(5) An EC contribution of M ECU 30.48 from revenue must be added to this amount.

(6) Payments of M ECU 11.33 from revenue must be added to this amount.

Direct action - JRC (7)	228,06	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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(7) Only the 1995 commitments are shown for the direct actions.

RTD activities in 1995 : Specific programmes (EC FP4 + Euratom FP) - New projects (contracts signed in 1995)

Names of specific programmes (EC FP4 + Euratom)	Total new projects (Contracts signed in 1995)						Shared-cost actions	Concerted actions	Accompanying measures
	Total contribution EC (1) M ECU	Number of projects	Number of participants	Average number of participants per project (2)	Average number of MS per project (3)	Average EC contribution per project M ECU	Total contribution EC (1) M ECU	Total contribution EC (1) M ECU	Total contribution EC (1) M ECU
Telematics	246,85	218	2923	13,41	5,00	1,13	220,85	0	26,00
Communication technologies	208,10	109	1203	11,04	5,1	1,91	208,10	0	0
Information technologies	425,34	363	1640	4,52	4,22	1,17	379,34	0	46,00
Industrial and materials technologies	192,07	244	999	4,09	1,86	0,79	191,77	0	0,30
Standards, measurement and testing	17,43	47	188	4,00	2,70	0,37	16,32	0	1,11
Environment and climate	23,52	64	78	1,22	1,06	0,37	22,27	0	1,25
Marine sciences and technologies	7,16	20	40	2,00	1,52	0,36	6,23	0,50	0,43
Biotechnology	65,63	72	353	4,90	3,25	0,91	62,15	1,94	1,54
Biomedicine and health	33,72	81	237	2,93	2,15	0,42	23,46	9,82	0,45
Agriculture and fisheries	110,50	155	778	5,02	5,00	0,71	107,29	2,60	0,62
Non-nuclear energy	172,74	172	1029	5,98	3,60	1,00	172,45	0	0,28
Transport	66,05	47	420	8,94	4,83	1,41	64,58	0	1,46
Targeted socio-economic research (5)	0	0	0	0	0	0	0	0	0
International cooperation	23,06	267	467	1,75	1,11	0,09	16,26	0,90	5,90
Dissemination and optimization of results	37,20	271	842	3,11	2,50	0,14	30,00	0	7,20
Training and mobility of researchers	67,20	133	170	1,28	1,11	0,51	63,39	0	3,81
Competitive S/T support activities	20,08	134	152	1,13	1,12	0,15	20,08	0	0
Nuclear fission safety	64,35	82	467	5,70	3,61	0,78	55,00	0,70	8,65
Controlled thermonuclear fusion	(6) 251,51	181	199	n/a (4)	n/a	n/a	251,51	0	0
TOTAL	2 032,50	2660	12185	4,58	2,96	0,78	1 911,05	16,46	105,00

(1) Sum total EC contribution for each project, as stipulated in the contract (i.e. for the entire project duration).

(2) Because of computerized recording, the number of participants may have been underestimated.

(3) MS = Member States.

(4) n/a: Not available.

(5) No contract signed in 1995, although commitments (prior to signature) have been made.

(6) An EC contribution of M ECU 30.48 from revenue must be added to this amount.

*RTD activities in 1995: Specific programmes (FP3)-
Total projects (contracts signed)*

Names of specific programmes FP3	Number of projects under way at 31.12.95 (1)	Overall number of projects (2)	1995 payments total M ECU (3)	Overall EC contribution M ECU (4)
Information technologies	712	719	316,47	1 293,15
Communication technologies	0	123	77,85	521,60
Telematics systems of common interest	71	312	44,64	379,00
Industrial and materials technologies	647	1653	144,28	701,88
Measurement and testing	123	190	13,98	56,56
Environment	319	639	48,38	304,83
Marine sciences and technologies	77	145	24,70	107,72
Biotechnology	192	372	29,64	174,73
Agriculture and agro-industrial research, fisheries	394	399	58,01	281,39
Biomedical and health research	332	554	20,68	129,65
Life sciences and technologies for developing countries	223	353	22,15	115,09
Non-nuclear energy (5)	194	403	38,90	224,64
Nuclear fission safety	20	122	7,97	56,02
Controlled thermonuclear fusion	10	396	(6) 72,18	(7) 465,94
Human capital and mobility	1962	3456	122,68	547,74
Centralized action for dissemination and utilization of results	85	207	16,64	60,76
TOTAL	5 361	10 043	1 059,15	5 420,69

- (1) Projects under way at 31.12.1995 = signed contracts with a completion date for research work after 31.12.1995.
(2) Overall number of projects = total number of projects since the beginning of the specific programme FP3
(3) Payments for projects falling partly within 1995
(4) Overall EC contribution over the whole duration of the framework programme.
(5) Excluding the data on the 1990-94 Thermic programme, which was outside FP3.
(6) Payments of M ECU 7.5 from revenue must be added to this amount.
(7) An EC contribution of M ECU 26.6 from revenue must be added to this amount.

RTD activities in 1995 : Specific programmes (EC FP4 + Euratom FP) -
Total projects (contracts signed)

Names of specific programmes (EC FP4 + Euratom FP)	Number of projects under way at 31.12.95 (1)	1995 payments total M ECU (2)	Overall EC contribution M ECU (3)
Telematics	218	61,19	246,85
Communication technologies	109	84,69	208,10
Information technologies	363	84,71	425,34
Industrial and materials technologies	235	41,92	192,07
Standards, measurement & testing	34	5,81	17,43
Environment and climate	16	25,69	23,52
Marine sciences and technologies	16	21,79	7,16
Biotechnology	66	16,55	65,63
Biomedicine and health	61	8,15	33,72
Agriculture and fisheries	86	13,87	110,50
Non-nuclear energy	166	25,41	172,74
Transport (4)	n/a	12,23	66,05
Targeted socio-economic research	0	3,25	0,00
International cooperation	139	12,02	23,06
Dissemination & optimization of results	233	14,46	37,20
Training and mobility of researchers	143	14,47	67,20
Competitive S/T research activities	134	1,61	20,08
Nuclear fission safety	78	15,92	64,35
Controlled thermonuclear fusion	126	(5) 118,44	(6) 251,51
TOTAL	2223	582,18	2 032,50

(1) Projects under way at 31.12.1995 = signed contracts with a completion date for research work after 31.12.1995.

(2) Payments for projects committed in 1995.

(3) Overall EC contribution = total EC contribution to the contracts signed by all the partners in 1995 (cf. footnote (1) to Table 1).

(4) n/a = Not available.

(5) Payments of M ECU 1.5 from revenue must be added to this amount.

(6) An EC contribution of M ECU 30.48 from revenue must be added to this amount.

Table 4

Specific programmes (EC FP4 + Euratom FP)/Areas of work programme	OJ refs and dates of calls for proposals	Number of proposals received	Number of eligible proposals	Projects selected		
				Number	% of total number	EC contrib. M/ECU
TELEMATICS						
- Telematics applications	C357/08 (15/12/94)	1376	1356	304	22%	423,90
Technology stimulation for SMEs		144	24	24	17%	42,80
- Telematics applications	C64/03 (15/03/95)	336	330	67	20%	54,6
- Telematics applications	C240/14 (15/09/95)	413	413	67	16%	64,4
COMMUNICATION TECHNOLOGIES (ACTS)	C258/5 (15/09/94)					
- Interactive digital multimedia services		108	108	38	35%	114
- Photonic technologies		40	40	23	58%	84
- High-speed networking		54	54	12	22%	59
- Personal communication		46	46	17	37%	94
- Intelligence in networks		50	50	15	30%	66
- Quality, security and safety		16	16	3	19%	8
- Horizontal actions		9	9	6	67%	17
Technology stimulation for SMEs	C240/7 (15/9/95)	65	65	39	60%	0,1
INFORMATION TECHNOLOGIES		2307	2307	569	25%	666,5
Technology stimulation for SMEs		58	58	26	45%	1,1
INDUSTRIAL AND MATERIALS TECHNOLOGIES	C357/7 (15/12/94)	1180	1122	218	18,5%	402
Technology stimulation for SMEs	C357/7 (15/12/94)	Step 1 : 465 Step 2 : 118	364 98	212 52	45,6% 44%	7,6 22
STANDARDS, MEASUREMENT AND TESTING	C357/7 (15/12/94)	161	102	63	39%	32,7
Technology stimulation for SMEs	C357/7 (15/12/94)	14	10	6	43%	0,3
ENVIRONMENT AND CLIMATE						
- Research on the natural environment, environmental quality and global change, environmental technologies, space techniques applied to environmental monitoring and research, human dimensions of environmental change	C12/05 (17/01/95) closed 27/4/95	1607	1505	287	17,9%	205,2
Technology stimulation for SMEs	"open call"	18	17	5	29%	0,2

Specific programmes (EC FP4 + Euratom FP)/Areas of work programme	OJ refs and dates of calls for proposals	Number of proposals received	Number of eligible proposals	Projects selected		
				Number	% of total number	EC contrib. MECU
-Space techniques applied to environmental monitoring and research	C148/08 (15/06/95)	102	94	17	18%	12,7
-Space techniques applied to environmental monitoring and research	Closed 15/9/95 C271/12 (17/10/95)	15	13	6	46%	4,2
	Closed 15/12/95					
MARINE TECHNOLOGY AND SCIENCES						
- Marine sciences, strategic marine research, marine technologies Technology stimulation for SMEs	C357/19 (15/12/94) closed 15/3/95	287	273	46	16%	75,4
- Marine sciences, strategic marine research Technology stimulation for SMEs	C148/12 closed 15/6/95	48	46	12	25%	20,7
BIOTECHNOLOGY						
- Cell factories	C12/10 (17/01/95)	125	125	20	16%	27,8
- Genome analysis		24	24	9	38%	18,1
- Plant and animal biotechnology		51	51	8	16%	9,7
- Cell communication in neurosciences		7	7			
- Immunology; trans-disease vaccinology		58	58	6	10%	5,1
- Structural biology		7	7	2	29%	0,1
- Pre-normative research, biodiversity and social acceptance		2	2			
- Infrastructures		18	18	9	50%	10,9
- ELSA		8	8	3	38%	1,6
Technology stimulation for SMEs		15	15	3	20%	0,1
BIOMEDICINE AND HEALTH						
- SMEs	C12 (17/01/95)	1722	1709	307	18%	153,6
Technology stimulation for SMEs	C12 (17/01/95) "open call"	27	26	5	20%	
AGRICULTURE AND FISHERIES						
- Integrated production and processing chains, consumer nutrition and wellbeing, new and optimized nutritious food products and materials, agriculture, forestry and rural development, fisheries and aquaculture, objectives achieved by concertation	C357/19 (15/12/94)	937	918	112	12%	110
Technology stimulation for SMEs	C357/19 (15/12/94)	35	34	9	26%	0,6

Specific programmes (EC FP4 + Euratom FP)/Areas of work programme	OJ refs and dates of calls for proposals	Number of proposals received	Number of eligible proposals	Projects selected		
				Number	% of total number	EC contrib. MECU
NON-NUCLEAR ENERGY	15/11/94	938	885	181	19%	191.6
Technology stimulation for SMEs		18	18	7	35%	0.3
- Non-nuclear energy (THERMIE TYPE A)	15/12/94	393	393	147	37%	111
- Non-nuclear energy (THERMIE TYPE B)	15/12/94	662	662	250	38%	28
Technology stimulation for SMEs		70	70	42	60%	4
TRANSPORT	C357/12 (15/12/94)	333	333	109	32,7%	205,2
TARGETED SOCIO-ECONOMIC RESEARCH						
- Evaluation of science and technology policy options in Europe and ETAN	C64/05 and 09 (15/03/1995)	121	121	17	18.2	10
- Research on education and training	C64/09 (15/03/95)	197	193	10	6.2	4.7
- Research into social integration and social exclusion in Europe	C64/09 (15/03/95)	233	226	11	6.6	5,6
Technology stimulation for SMEs						
INTERNATIONAL COOPERATION						
- DCs (vaccines, animal health)	C64/06 (15/03/95)	89	77	26	29%	12
- DCs (health, agriculture, renewable energy)	C64/06 (15/03/95)	979	728			
- Training (Fellowships Japan, Korea)	C38/10 (15/02/95)	111	111	76	68%	4.4
- Training (Fellowships manufacturing technologies Japan)	C38/10 (15/02/95)	13	13	7	54%	0,3
- DCs	C64/06 (15/03/95)	58	57	11	19%	3,7
	C64/06 (15/03/95)	47	40	8	17%	2,8
DISSEMINATION AND UTILIZATION OF RESULTS						
- Network of relay centres	15/12/94	122	122	50	42%	22.5
- Technology transfer projects, validation projects	15/03/96	501	501	100	20%	7.5
- Science parks	15/06/95	82	81	39	48%	N.A
- Regional activity	15/09/95	59	58	26	44%	N.A

Specific programmes (EC FP4 + Euratom FP)/Areas of work programme	OJ refs and dates of calls for proposals	Number of proposals received	Number of eligible proposals	Projects selected		
				Number	% of total number	EC contrib. MECU
- Stimulation of public awareness	15/09/95	29	28	11	37%	N.A
- Promotion of innovation management technologies	15/12/95	N.A	N.A	N.A	N.A	N.A
- European networks and services for technology transfer and support for innovation	15/12/95	N.A	N.A	N.A	N.A	N.A
- OPET network - Organisations for the promotion of energy technologies	15/12/95	N.A	N.A	N.A	N.A	N.A
TRAINING AND MOBILITY OF RESEARCHERS						
- Fellowships	17/01/95	3039	2261	582	25.6	47,7
	15/06/95	2005	1728	350	20.2	29,3
	15/09/95	2210	1944			
- Networks	17/01/95	1448	1429	91	6.3	148,9
- Large-scale facilities	17/01/95	201	193	84	41.8	72
- Accompanying measures	17/01/95	270	219	55	25.1	4,8
	15/06/95	253	202	65	32.2	5,3
NUCLEAR FISSION SAFETY	17/01/95	253	246	79	31%	85

N.A. : not available

Table 5A

RTD activities in 1995: Specific programmes (EC FP4 + Euratom FP) - Shared-cost actions (SCA) - New projects (contracts signed in 1995)

Community contribution (in MECU) and participation (number) by type of participant

Type of participant Names of specific programmes (EC FP4 + Euratom FP)	LE (1)		SME (2)		RO (3)		HEI (4)		Other (5)		Int. Org. (6)		Third countries (7)		Total	
	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants	EC Contrib. MECU	Number of participants	EC contrib. MECU	Number of participants
Telematics	19.11	194	21.87	294	31.20	388	38.10	511	26.37	170	79.72	983	4.48	123	220.85	2663
Communication technologies	59.32	350	32.13	224	17.30	128	72.66	332	26.69	163	n/a	n/a	n/a	n/a	208.10	1203
Information technologies	197.59	492	70.37	289	48.36	169	44.66	220	6.85	67	1.35	4	10.16	64	379.34	1305
Industrial and materials technologies	76.18	292	41.25	302	32.12	163	38.87	188	0.59	4	0	0	2.76	32	191.77	981
Standards, measurements and testing	2.96	31	3.44	38	4.37	44	5.22	36	0.20	3	0	0	0.13	4	16.32	156
Environment and climate	0.35	2	0	0	19.76	5	2.11	11	0.05	1	0	0	0	0	22.27	15
Marine sciences and technologies	0.50	1	0	0	2.29	10	2.81	9	0	0	0	0	0.64	3	6.23	23
Biotechnology	2.28	15	2.34	21	20.60	105	31.96	145	0.76	7	4.07	7	0.14	14	62.15	314
Biomedicine and health	0.34	4	0.72	7	6.08	43	14.85	116	0.46	5	0.02	2	0.98	11	23.46	188
Agriculture and fisheries	4.64	36	6.31	63	48.90	310	42.03	264	2.00	21	0.25	1	3.16	35	107.29	736
Non-nuclear energy	46.96	209	29.95	179	45.50	285	39.19	240	7.13	41	0	0	3.70	52	172.45	1012
Transport	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	64.58	395
Targeted socio-economic research	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
International cooperation	0.69	7	0.51	7	3.99	34	6.24	69	0	0	0	1	4.83	81	16.26	199
Dissemination and optimization of results	n/a	44	n/a	260	n/a	79	n/a	75	n/a	196	n/a	2	n/a	9	30.00	668
Training and mobility of researchers	1.20	1	1.34	3	44.25	68	14.77	51	0.14	1	1.70	2	0	1	63.39	127
Competitive S/T support activities	n/a	7	n/a	50	n/a	20	n/a	13	n/a	23	n/a	27	n/a	0	20.08	152
Nuclear fission safety	3.79	40	5.63	34	29.60	197	13.67	91	1.99	20	0.32	1	0	24	55.00	407
Controlled thermonuclear fusion	n/a	0	n/a	5	n/a	123	n/a	12	n/a	42	n/a	3	n/a	9	(8) 251.51	199
TOTAL	415.90	1737	215.80	1782	354.32	2183	367.15	2392	73.25	764	87.42	1032	30.97	462	1 911.05	10747

(1) LE: Large enterprises.

(2) SME: Small and medium-sized enterprises with fewer than 500 employees.

(3) RO: Research organisations

(4) HEI: Higher education institutes

(5) Other: EIG, EEIG, non-profit-making bodies, etc.

(6) Int. Org.: International organisations. The figure for the telematics programme also includes non-identified institutions.

(7) Third countries: Countries not belonging to the European Union.

(8) An EC contribution of M ECU 30.48 from revenue must be added to this amount.

n/a = Not available

RTD activities in 1995: Specific programmes (EC FP4 + Euratom FP) - Shared-cost actions (SCA) - New projects (contracts signed in 1995) Table 5B

Community contribution (in MECU) and participation (number) by type of participant from the European Union (%)

Type of participant Names of specific programmes (EC FP4 + Euratom FP))	LE (1)		SME (2)		RO (3)		HEI (4)		Other (5)		Total	
	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants	EC contrib. MECU	Number of participants
Teleomatics	13.98%	12.46%	16.00%	18.88%	22.83%	24.92%	27.88%	32.82%	19.30%	10.92%	100.00%	100.00%
Communication technologies	28.51%	29.59%	15.44%	18.62%	8.31%	10.64%	34.92%	27.60%	12.83%	13.55%	100.00%	100.00%
Information technologies	53.72%	39.77%	19.13%	23.36%	13.15%	13.66%	12.14%	17.78%	1.86%	5.42%	100.00%	100.00%
Industrial and materials technologies	40.30%	30.77%	21.83%	31.82%	16.99%	17.18%	20.57%	19.81%	0.31%	0.42%	100.00%	100.00%
Standards, measurements and testing	18.29%	20.39%	21.24%	25.00%	26.98%	28.95%	32.23%	23.68%	1.25%	1.97%	100.00%	100.00%
Environment and climate	1.58%	10.53%	0.00%	0.00%	88.69%	26.32%	9.47%	57.89%	0.27%	5.26%	100.00%	100.00%
Marine sciences and technologies	8.86%	5.00%	0.00%	0.00%	40.94%	50.00%	50.19%	45.00%	0.00%	0.00%	100.00%	100.00%
Biotechnology	3.94%	5.12%	4.03%	7.17%	35.56%	35.84%	55.17%	49.49%	1.31%	2.39%	100.00%	100.00%
Biomedicine and health	1.51%	2.29%	3.19%	4.00%	27.08%	24.57%	66.16%	66.28%	2.06%	2.86%	100.00%	100.00%
Agriculture and fisheries	4.46%	5.14%	6.07%	9.00%	47.08%	45.14%	40.47%	37.71%	1.92%	3.00%	100.00%	100.00%
Non-nuclear energy	27.83%	21.77%	17.76%	18.65%	26.96%	29.69%	23.23%	25.63%	4.23%	4.27%	100.00%	100.00%
Transport	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Targeted socio-economic research	0	0	0	0	0	0	0	0	0	0	0	0
International cooperation	6.04%	5.98%	4.46%	5.98%	34.92%	29.06%	54.59%	58.97%	0.00%	0.00%	100.00%	100.00%
Dissemination and optimization of results	n/a	6.70%	n/a	39.57%	n/a	12.02%	n/a	11.87%	n/a	29.83%	n/a	100.00%
Training and mobility of researchers	1.95%	0.81%	2.16%	2.42%	71.73%	54.84%	23.94%	41.13%	0.22%	0.81%	100.00%	100.00%
Competitive S/I/ support activities	n/a	5.60%	n/a	44.80%	n/a	20.80%	n/a	10.40%	n/a	18.40%	n/a	100.00%
Nuclear fission safety	6.93%	10.47%	10.29%	8.90%	54.13%	51.57%	25.00%	23.82%	3.65%	5.24%	100.00%	100.00%
Controlled thermonuclear fusion	n/a	3.19%	n/a	2.66%	n/a	65.43%	n/a	6.38%	n/a	22.34%	n/a	100.00%
TOTAL	29.16%	19.61%	15.13%	20.12%	24.84%	24.64%	25.74%	27.00%	5.13%	8.62%	100.00%	100.00%

(1) LE: Large enterprises.

(2) SME: Small and medium-sized enterprises with fewer than 500 employees.

(3) RO: Research organisations

(4) HEI: Higher education institutes

(5) Other: EIG, EEIG, non-profit-making bodies, etc.

n/a = Not available

Activities in 1995: specific programmes (EC FP4 + Euratom FP) - Shared-cost actions (SCA) - New projects (contracts signed in 1995)
Objective 1 regions

Names of specific programmes (EC FP4 + Euratom FP)	Number of projects		Participation (Number)		Total EC contribution to the projects (M ECU)	
	Total	Objective 1	Total	Objective 1	Total	Objective 1
Telematics	182	128	2663	412	220,85	32,70
Communication technologies	109	58	1203	118	208,10	120,11
Information technologies	225	156	1305	248	379,34	41,94
Industrial and materials technologies	226	62	981	100	191,77	18,58
Standards, measurement and testing	24	9	156	16	16,32	1,11
Environment and climate	5	3	19	4	22,27	0,60
Marine sciences and technologies	3	1	23	1	6,23	0,09
Biotechnology	41	18	314	27	62,15	4,61
Biomedicine and health	32	13	188	16	23,46	1,68
Agriculture and fisheries	113	62	736	116	107,29	14,60
Non-nuclear energy	155	77	1012	144	172,45	16,66
Transport	41	n/a	395	n/a	64,58	n/a
Targeted socio-economic research	0	0	0	0	0,00	0,00
International cooperation	33	6	199	7	16,26	0,68
Dissemination and optimization of results	150	45	668	116	30,00	3,56
Training and mobility of researchers	90	12	127	13	63,39	5,76
Competitive S/T support activities	134	n/a	152	n/a	20,08	n/a
Nuclear fission safety	68	16	407	18	55,00	2,23
Controlled thermonuclear fusion	181	n/a	199	n/a	(1) 251,51	n/a
TOTAL DISTRIBUTED (2)	1 456	666	10 001	1 356	1.574.88	264,90
TOTAL RESEARCH	1812		10747		1 911.05	

(1) An EC contribution of MECU 30.48 from revenue must be added to this amount

(2) Taking account of non-available data: n/a

Activities in 1995: Specific programmes (EC FP4 + Euratom FP) - Shared-cost actions (SCA) -New projects (1)
Total intra and inter-country collaboration links (EC + EFTA+ PECO + REST OF THE WORLD) (2)

	Belgium	Denmark	Germany	Greece	Spain	France	Ireland	Italy	Luxembourg	Netherlands	Austria	Portugal	Finland	Sweden	United Kingdom	TOTAL	EFTA (3)	PECO (4)	Rest of the world	TOTAL
Belgium	241	112	532	187	253	539	106	356	29	254	69	154	109	161	415	3517	127	3	15	3662
Denmark	112	150	318	158	167	213	76	248	5	203	48	90	84	152	344	2368	110	15	24	2517
Germany	532	318	1437	589	821	1959	194	1254	16	743	389	320	269	594	1681	11116	430	26	36	11608
Greece	187	158	589	478	389	509	140	490	5	263	70	212	124	254	693	4561	226	15	19	4821
Spain	253	167	821	389	612	899	193	741	4	307	165	261	188	293	722	6015	188	6	24	6233
France	539	213	1959	509	899	1393	217	1325	28	662	278	284	265	491	1480	10542	333	2	34	10911
Ireland	106	76	194	140	193	217	193	207	7	163	49	97	89	103	422	2256	82	3	12	2353
Italy	356	248	1254	490	741	1325	207	787	8	390	197	278	276	406	1051	8014	219	15	21	8269
Luxembourg	29	5	16	5	4	28	7	8	16	10	5	4	5	5	10	157	8	0	3	168
Netherlands	254	203	743	263	307	662	163	390	10	357	78	138	194	266	888	4916	226	5	39	5186
Austria	69	48	389	70	165	278	49	197	5	78	103	37	62	63	201	1814	54	6	17	1891
Portugal	154	90	320	212	261	284	97	278	4	138	37	188	106	131	317	2617	83	7	15	2722
Finland	109	84	269	124	188	265	89	276	5	194	62	106	182	208	352	2513	92	6	15	2626
Sweden	161	152	594	254	293	491	103	406	5	266	63	131	208	272	629	4028	139	9	27	4203
United Kingdom	415	344	1681	693	722	1480	422	1051	10	888	201	317	352	629	1235	10440	370	35	96	10941
Total EUR15	3517	2368	11116	4561	6015	10542	2256	8014	157	4916	1814	2617	2513	4028	10440	74874	2687	153	397	78111
EFTA	127	110	430	226	188	333	82	219	8	226	54	83	92	139	370	2687	284	3	12	2986
PECO	3	15	26	15	6	2	3	15	0	5	6	7	6	9	35	153	3	25	22	203
Rest of the world	15	24	36	19	24	34	12	21	3	39	17	15	15	27	96	397	12	22	66	497
RAND TOTAL	3662	2517	11608	4821	6233	10911	2353	8269	168	5186	1891	2722	2626	4203	10941	78111	2986	203	497	81797

(1) Contracts signed in 1995 (Transport, Competitive Support, Fusion, Agriculture Programmes DG VI and DG XIV, INCO DG III and DG XIII, Competitive Support = n/a)

(2) Total collaborative links in each project.

(3) EFTA: Iceland - Lichtenstein - Norway - Switzerland

(4) PECO: Albania - Bulgaria - Estonia - Hungary - Latvia - Lithuania - Poland - Romania - Slovenia - Slovakia - Czech Republic

n/a = Not available.

Timetable for calls for proposals and the selection procedure; Budget

Names of specific programmes (EC FP4 + Euratom FP) and areas of work programme	Dates and OJ references of calls for proposals (or expressions of interest)	Technology stimulation (SME measures)	Deadlines/ dates for receipt of proposals	Selection procedures (period)	Contract negotiation (period)	Anticipated date of initial contract signature	Total 1995 Budget (MECU)
Telematics							
Handicapped and elderly people, health, research, education and training, language engineering	15/09/95 C240	n/a	15/01/96	02/96-03/96	05/96-06/96	09/96	24
All areas (telematics for improving employment and the quality of life, knowledge, services of public interest)	16/12/96	n/a	15/03/97	04/97-05/97	07/97-09/97	01/98	0
Integrated applications in digital sites	16/12/96	n/a	15/02/97 (1st stage) 15/05/97	02/97-03/97 06/97-07/97	10/97-11/97	01/98	0
Rolling open call for support actions	15/09/1995 C240	n/a	approx. every 3 mths				5
Communication technologies (ACTS)							
All areas (interactive digital multimedia services, photonic technologies, high-speed networks, personal communication, intelligence in networks, quality, safety and security, horizontal activities)	15/09/95 C240		1/03/96	03/96-04/96	04/96-05/96	1/07/96	120
Information technologies (ESPRIT)							
Software technologies, technologies for IT components and subsystems, multimedia systems, open microprocessor systems, technologies for business processes, integration in manufacturing	15/03/1996 C75	15/03/96	16/04/1996 (1st stage) 19/06/1996	07/96-08/96	09/96-11/96	10/96	35
	15/09/96	15/09/96	15/10/1996 (1st stage) 15/12/1996	97	97	1997	
Industrial and materials technologies							
Production materials and product innovation, means of transport (excluding aeronautic technologies)	15/12/95 C337	Open Call	17/04/96	10/96	11/96	11/96	400
Standards, measurement and testing							
All areas (measurements for quality European products, research related to standards and technical support to trade, measurements related to the needs of society)	15/06/95 C148	Open Call	15/11/95	05/96-10/96	06/96-10/96	09/96	51,6
Environment & Climate							
Applied space techniques for environmental monitoring and research: research on methods and pilot projects	15/06/1995 C148	Open Call	15/09/95	10/95-01/96	02/96-05/96	05/96	12,7
Applied space techniques for environmental monitoring and research: R&D for potential future operational activities	17/10/95 C271	Open Call	15/12/95	02/96-05/96	07/96-09/96	08/96	4,2

Names of specific programmes (EC FP4 + Euratom FP) and areas of work programme	Dates and OJ references of calls for proposals (or expressions of interest)	Technology stimulation (SME measures)	Deadlines/ dates for receipt of proposals	Selection procedures (period)	Contract negotiation (period)	Anticipate d date of initial contract signature	Total 1996 Budget (MECU)
Applied space techniques etc.: Centre for Earth Observation	15/03/97 C75	Open Call	15/06/97	07/97-09/97	09/97-11/97	11/97	18
Research on the natural environment, environmental quality and global change, environmental technologies, space techniques applied to Earth observation, human dimensions of environmental change	17/09/96	Open Call	16/01/97	02/97-05/97	06/97-11/97	09/97	
Training grants	15/12/95 C337		20/03/1996 + 20/08/96	04/96-11/96	05/96-02/97	07/96-12/96	2,4
Marine sciences and technologies							
Marine sciences, strategic marine research, marine technologies, support initiatives	15/12/1994 C357		15/03/95	09/95-11/95	09/95-11/95	1/01/96	36,3
			15/06/95	03/96-04/96	01/96-04/96	1/04/96	38
		Open Call					
Support initiatives	15/03/1996 C75		17/06/96	06/96-08/96	07/96-01/97	08/96-06/97	4
Marine sciences (research on marine systems, extreme marine environments, research on regional seas), strategic marine research, marine technologies	16/04/96 C 110		15/10/96	11/96-03/97			
Training grants	15/12/1995 C337		20/03/96 + 20/08/96	04/96-11/96	05/96-02/97		2,3
Biotechnology							
Genome analysis (research on functions, comparative analyses), molecular and cellular biology of plants, somatic gene therapy, immunological substances, structure/function relations, bioinformatics, prenormative research	15/09/1995 C240	15/09/1995 C240	10/01/96	15/03/96 - 31/05/96	01/06/96 - 15/09/96	15/09/96	233,6
Pharmatotoxicology in vitro, biotechnology for the environment, infrastructures, horizontal activities	15/06/96		15/10/96	07/01/97 - 31/03/97	01/04/97 - 15/07/97	15/07/97	134,00
Biomedicine and health							
Pharmaceutical research, biomedical technology and engineering, research on the brain, human genome, Aids, tuberculosis and other infectious diseases. Demonstration projects	15/03/96 C75		17/06/96	09/96-12/96	15/02/97	31/03/97	-
BIOMED 2 - 3rd call	not yet published		17/12/96	03/97-07/97	30/07/97	15/10/97	-

Table 8

Names of specific programmes (EC FP4 + Euratom FP) and areas of work programme	Dates and OJ references of calls for proposals (or expressions of interest)	Technology stimulation (SME measures)	Deadlines/ dates for receipt of proposals	Selection procedures (period)	Contract negotiation (period)	Anticipated date of initial contract signature	Total 1996 Budget (MECU)
Targeted socio-economic research							35
Science and technology policy options, research on education and training, research on social integration and exclusion (only certain sub-areas)	15/06/96	-	15/10/96	01/97	03/97	05/97	
International cooperation							
Developing countries (DG XII)	C 64		6/09/95	10/95-03/96	15/03/96-15/05/96	06/96-07/96	47,2
Fellowships Japan, Korea (DG XII)	15/02/1995 C 38		1/03/96	17/04/96 - 06/07/96	1/09/96	1/09/96	4,2
Developing countries (DG XII)	15/03/1996 C 75		12/09/96	15/10/96-02/97	15/11/96-15/05/97	07/97	
Cooperation with the countries of Central and Eastern Europe and the new Independent States (DG XII)	17/10/95 C 27		29/02/96	15/03/96-15/04/96	09/96-10/96	10/96-11/96	31,7
Training: fellowships Japan, manufacturing technologies (DG III)	15/02/95 C 38		1/03/96	17/04/96-06/07/96	1/09/96	1/09/96	
Developing countries (DG III)	15/03/1996 C 75						
Cooperation with the countries of Central and Eastern Europe and the new Independent States (DG XIII)	17/10/95 C 27			15/03/96-15/04/96	09/96-10/96	10/96-11/96	
Developing countries (DG XIII)	15/03/1996 C 75						
Cooperation with the countries of Central and Eastern Europe and the new Independent States (DG XVII)	17/10/95 C 27			15/03/96-15/04/96	09/96-10/96	10/96-11/96	
Dissemination and utilization of results							
Regional action (with DG XVI)	15/09/95		15/12/95	1/96 - 3/96	03/96	04/96	6
Stimulation of public awareness	15/09/95		15/12/95	1/96 - 3/96	03/96	04/96	2
Promotion of innovation management techniques	15/12/95		15/03/96	4/96 - 6/96	06/96	07/96	9
OPET network - Organizations for the promotion of energy technologies	15/12/95		15/03/96	4/96 - 6/96	06/96	07/96	4,4
European networks and services for technology transfer and innovation support	15/12/95		15/03/96	4/96 - 6/96	06/96	07/96	3
			16/09/96	10/96 - 12/96	12/96	01/97	-

RTD activities in 1996 : Work programme 1996 - Specific programmes (EC FP4 + Euratom FP)
Timetable for calls for proposals and the selection procedure; Budget

Table 8

Names of specific programmes (EC FP4 + Euratom FP) and areas of work programme	Dates and OJ references of calls for proposals (or expressions of interest)	Technology stimulation (SME measures)	Deadlines/ dates for receipt of proposals	Selection procedures (period)	Contract negotiation (period)	Anticipated date of initial contract signature	Total 1996 Budget (MECU)
Financial actions	15/05/96		16/09/96	10/96 - 12/96	12/96	01/97	1
Technology transfer projects, technology validation projects	15/09/96		15/12/96	1/97 - 4/97	12/96	05/97	-
European networks and services for technology transfer and innovation support	15/12/95		16/03/96	N.A.	N.A.	N.A.	N.A.
			18/09/97	N.A.	N.A.	N.A.	N.A.
Training and mobility of researchers							
Research networks	17/01/95		15/06/95	15/02/96	-	-	151,3
	16/09/96		3/02/97	09/97			
Training fellowships for research	15/06/95		15/09/95	29/02/96	-	05/96	84,9
	15/09/95		15/12/95	05/96	-	08/96	
	15/03/96		17/06/96	12/96	-	12/96	
	16/09/95		16/12/95	05/97			
Access to large scale facilities	16/09/95		16/12/95	05/97			11,1
Euroconferences, summer schools and practical training courses	15/12/95		1/04/96	06/96			12,8
	17/06/96		30/09/96	03/97			
	16/12/96		1/04/97	06/97			

RTD activities in 1995: Specific programmes (EC FP4 + Euratom FP) - New projects - Shared-cost actions
Total new projects (number and amount) classed according to the contractual value of the projects

Table 9

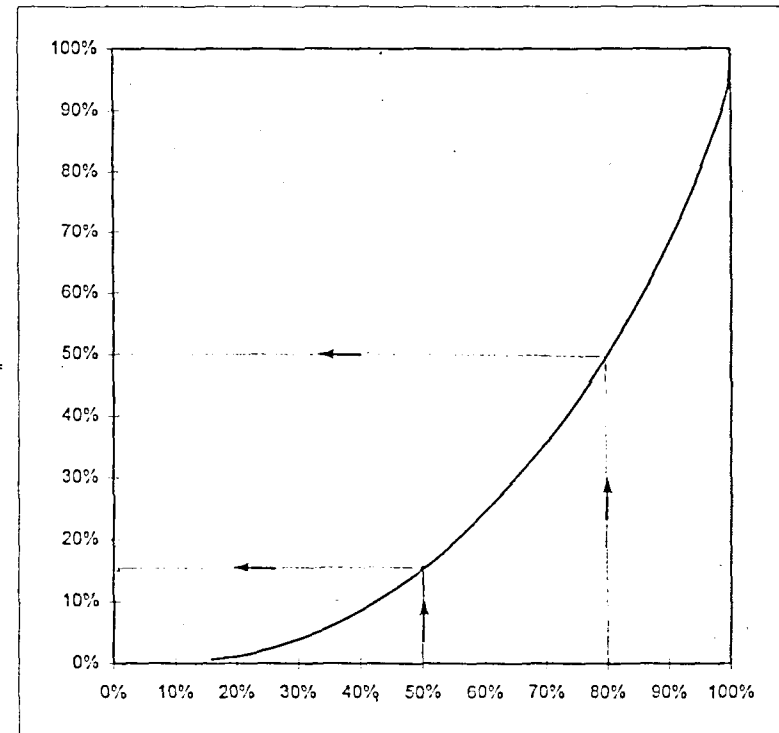
	Contribution EC Mecu	0<=0.1(1)	0.1<=0.25	0.25<=0.5	0.5<=0.75	0.75<=1.0	1.0<=1.5	1.5<=2	2.0<=10	>10	Tot. Distrib. (2)
Total distributed (2)	Project number	227	105	169	158	141	220	159	254	7	1440
Total distributed (2)	Project amount	10,00	17,16	64,01	99,04	122,45	261,14	256,50	637,33	97,32	1564,96

	Contribution EC Mecu	<0.1	<=0.25	<=0.5	<=0.75	<=1.0	<=1.5	<=2	<=10	Tot. Distrib. (2)
Overall total (2)	Project number	227	332	501	659	800	1020	1179	1433	100% = 1440
Overall total (2)	Project amount	10,00	27,15	91,17	190,21	312,66	573,80	830,30	1467,63	100%=1564,96

Name of specific programmes			Av. contrb.
Telematics	Project number	182	1,21
	Project amount	220,85	
Communication technologies	Project number	109,00	1,91
	Project amount	208,10	
Information technologies	Project number	225,00	1,69
	Project amount	379,34	
Industrial and materials technologies	Project number	226	0,85
	Project amount	191,77	
Standards, measurement and testing	Project number	24	0,68
	Project amount	16,32	
Environment and Climate	Project number	5	4,45
	Project amount	22,27	
Manne sciences and technologies	Project number	3	2,08
	Project amount	6,23	
Biotechnology	Project number	41	1,52
	Project amount	62,15	
Biomedicine and Health	Project number	32	0,73
	Project amount	23,46	
Agriculture and Fisheries	Project number	113	0,95
	Project amount	107,29	
Non-nuclear energy	Project number	155	1,11
	Project amount	172,45	
Transport	Project number	41	1,58
	Project amount	64,58	
Targeted socio-economic research	Project number	0	0,00
	Project amount	0	
International cooperation	Project number	33	0,49
	Project amount	16,26	
Dissemination and utilization of results	Project number	150	0,20
	Project amount	30	
Training and mobility of researchers	Project number	90	0,70
	Project amount	63,39	
Competitive S/T support activities	Project number	134	0,15
	Project amount	20,08	
Nuclear fission safety	Project number	65	0,81
	Project amount	55	
Controlled thermonuclear fusion	Project number	181	1,39
	Project amount	251,51	
Total Research	Project number	1812	1,05
	Projects amount	1911,05	

1565 Mecus = 100%

Concentration curve



1440 projects = 100 %

50% of the projects take 15% of the total budget.
 80% of the projects take 50% of the total budget.

- 1) The total contribution to a project is less than or equal to 0,1 MECU
- 2) Breakdown not available for the "Transport", "Dissemination and utilization" and "Fusion" programmes.

Table 10

Funding of the 4th Framework Programme and the Euratom Framework Programme

Amounts (increased by 6,5%) in MECU and distribution

	4th Framework Programme Decisions 1110/94/EC, 616/96/CE			Framework Prog.Decisions 94/268, 96/253/Euratom		TOTAL
	SCA	JRC	S/T Support	SCA	JRC	
FIRST ACTIVITY						
Information and communication technologies	3 604	11,5	10,5			
1. Telematics	898					898
2. Communication technologies	671					671
3. Information technologies	2 035	11,5	10,5			2 057
Industrial technologies	1 906	208,5	10,5			
4. Industrial and materials technologies	1 722	96				1 818
5. Measurement and testing	184	112,5	10,5			307
Environment	809,5	313	27,5			
6. Environment and climate	566,5	313	27,5			907
7. Marine sciences and technologies	243					243
Life sciences and technologies	1 592,5	50	31,5			
8. Biotechnology	588					588
9. Biomedicine and health	358					358
10. Agriculture and fisheries	646,5	50	31,5			728
Energy	1 030	21	16	1 016,5	319,5	
11. Non-nuclear energy	1 030	21	16			1 067
12. Nuclear-fission safety				170,5	270,5	441
13. Controlled thermonuclear fusion				846	49	895
Transport	256					
Targeted socio-economic research	112	35				
SECOND ACTIVITY						
Cooperation with third countries and international organiz	575				7	
THIRD ACTIVITY						
Dissemination and optimization of results	312		40			
FOURTH ACTIVITY						
Stimulation of training and mobility of researchers	792					
TOTAL	10 989	639	136	1 016,5	319,5	
MAXIMUM OVERALL TOTAL		11 764		1 336		13 100

Development of Community research commitments

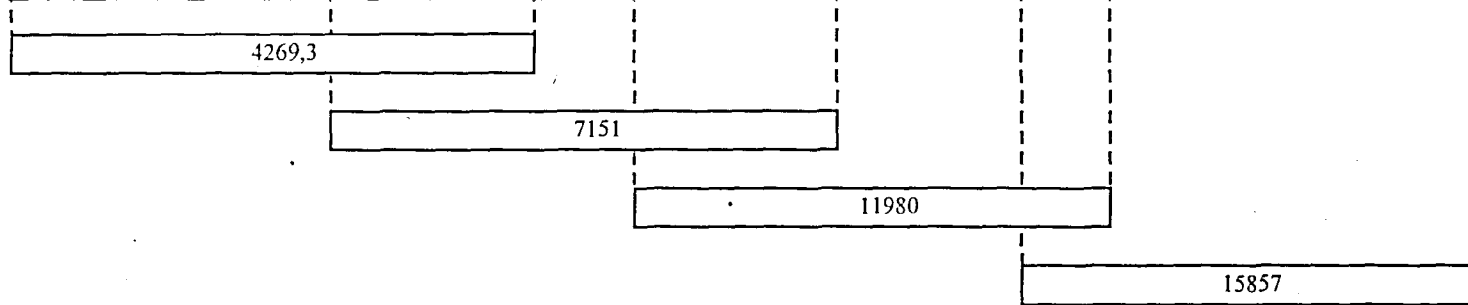
Table 11

Period 1984 - 1998

(current prices)

Situation at 08.05.96

YEARS	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	TOTAL
FP 1984-87	593,0	735,0	874,0	701,8	260,8	101,1	4,9									3270,6
FP 1987-91				188,1	810,6	1241,3	1596,9	1270,7	230,9	14,8	3,9	0,2				5357,4
FP 1990-94								296,0	2160,5	1929,5	1264,7	1,0				5651,7
Supp. finance FP 90-94										150,0	750,0					900,0
PCFP 1994-98 (*)											0,0	3017,5	3183,1	3450,0	3449,4	13100,0
RTD PROGRAMMES	593,0	735,0	874,0	889,9	1071,4	1342,4	1601,8	1566,7	2391,4	2094,3	2018,6	3018,7	3183,1	3450,0	3449,4	28279,7
APAS				49,4	56,6	69,8	113,1	168,8	308,4	440,2	571,8	2,1				1780,2
RTD+APAS	593,0	735,0	874,0	939,3	1128,0	1412,2	1714,9	1735,5	2699,8	2534,5	2590,4	3020,8	3183,1	3450,0	3449,4	30059,9
SPRINT							16,0	16,0	17,0							49,0
ECSC							17,5	17,5	17,5	17,5	17,5					87,5
80% of THERMIE							36,0	118,4	128,9	139,2	145,6					568,1
Total for all research (1)	593,0	735,0	874,0	939,3	1128,0	1412,2	1784,4	1887,4	2863,2	2691,2	2753,5	3020,8	3183,1	3450,0	3449,4	30764,5



EC BUDGET (current prices)	28905	29925	35842	38392	43080	42569	45057	56111	61232	67760	65929	78432	85094	91861	97069
Total research as % of budget	2,1	2,5	2,4	2,4	2,6	3,3	4,0	3,4	4,7	4,0	4,2	3,9	3,7	3,8	3,6
% with suppl. of MECU 700													3,9	4,1	3,9

(1) RTD + THERMIE + ECSC + SPRINT + APAS.

(*) The amounts of FP 1994-1998 are those of the EC proposal following EU enlargement.

Development of Community research commitments

Period 1984 - 1998

Table 12

(1992 prices)

Situation at 08.05.96

YEARS	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	TOTAL
FP 1984-87	848,4	991,9	1139,5	886,1	317,7	117,1	5,4									4306,1
FP 1987-91				237,5	987,3	1438,4	1770,4	1339,0	230,9	14,6	3,8	0,2				6022,1
FP 1990-94								311,9	2160,5	1901,0	1223,1	1,0				5597,5
Supp. finance. FP 90-94										147,8	725,3					873,1
PCFP 1994-98 (*)											0,0	2884,8	2966,5	3153,6	3077,1	12082,0
RTD PROGRAMMES	848,4	991,9	1139,5	1123,6	1305,0	1555,5	1775,8	1650,9	2391,4	2063,4	1952,2	2886,0	2966,5	3153,6	3077,1	28880,8
APAS				62,4	68,9	80,9	125,4	177,9	308,4	433,7	553,0	2,0				1812,6
RTD+APAS	848,4	991,9	1139,5	1186,0	1373,9	1636,4	1901,2	1828,8	2699,8	2497,1	2505,2	2888,0	2966,5	3153,6	3077,1	30693,4
SPRINT							17,7	16,9	17,0							51,6
ECSC							19,4	18,4	17,5	17,2	16,9					89,4
80% of THERMIE							39,9	124,8	128,9	137,1	140,8					571,5
Total for all research (1)	848,4	991,9	1139,5	1186,0	1373,9	1636,4	1978,2	1988,9	2863,2	2651,4	2662,9	2888,0	2966,5	3153,6	3077,1	31405,9

5539,7	
8163	
12145	
14748	

EC BUDGET (1992 prices)	41352	40385	46730	48475	52473	49327	49952	59126	61232	66759	63761	74983	79305	83968	86591
Total res.as % of budget	2,1	2,5	2,4	2,4	2,6	3,3	4,0	3,4	4,7	4,0	4,2	3,9	3,7	3,8	3,6
Deflators (**)	0,699	0,741	0,767	0,792	0,821	0,863	0,902	0,949	1,000	1,015	1,034	1,046	1,073	1,094	1,121
Annual inflation (%)		6,0	3,5	3,3	3,6	5,1	4,5	5,2	3,5	1,5	1,9	1,2	2,6	2,0	2,5
% with suppl.of MECU 700													3,9	4,1	3,9

(*) The amounts of FP 1994-1998 are those of the EC proposal following EU enlargement.

(**) The deflators used from 1995 take account of enlargement from 12 to 15 Member States (COM(96)65).

1. RTD + THERMIE + ECSC + SPRINT + APAS.

Main abbreviations and acronyms used

ACP countries	African, Caribbean and Pacific countries
ACTS	Advanced Communication Technologies and Services (Specific RTD programme)
AIR	Agriculture and Agro-industry, including fisheries (Specific RTD programme)
ALTENER	Alternative Energy programme
APAS	Preparatory, accompanying and support actions
AVICENNE	Scientific and technological cooperation with Maghreb countries and other countries in the Mediterranean region
BIOMED	Biomedicine and Health (specific RTD programme)
BRIDGE	Biotechnology Research for Innovation, Development and Growth in Europe (specific RTD programme under FP3)
BRITE-EURAM	Basic Research in Industrial Technologies for Europe - European Research in Advanced Materials (Specific RTD programme)
CAP	Common Agricultural Policy
CBR	Community Bureau of Reference
CCFP	Consultative Committee for the Fusion Programme
CEN-Cenelec	European Committee for Standardization/European Committee for Electrotechnical Standardization
CERN	European Centre for Nuclear Research
CIS	Commonwealth of Independent States of the former Soviet Union
COPERNICUS	Cooperation in Science and Technology with Central and Eastern Europe
CORDIS	Community Research and Development Information Service
COST	European Cooperation in the field of scientific and technical research
COSU	Cooperation with the Soviet Union in the Field of Nuclear Fission Safety
CRAFT	Cooperative Research Action for Technology
CREST	Scientific and Technical Research Committee (advises the European Commission and the Council)
CSTP	Committee for Scientific and Technological Policy (OECD)
DC	Developing countries
EAEC	European Atomic Energy Community
EC	European Community
ECE	Economic Commission for Europe (UN)
ECHO	European Commission Host Organization

ECSC	European Coal and Steel Community
EEA	European Economic Area
EFTA	European Free Trade Association
EMBL	European Molecular Biology Laboratory
ENRICH	European Network for Research on Global Change
ESA	European Space Agency
ESF	European Science Foundation
ESPRIT	European Strategic Programme for Research and Development in Information Technologies (specific RTD programme)
ESTA	European Science and Technology Assembly
ETAN	European Technology Assessment Network
ETSI	European Telecommunications Standards Institute
EU	European Union
EUREKA	European Research Coordination Agency
EURET	European REsearch for Transport (specific RTD programme under FP2)
FP	Framework Programme
HCM	Human Capital and Mobility (Specific RTD programme under FP3)
HFSP	Human Frontier Science Programme
IEA	International Energy Agency
IMS	Intelligent Manufacturing Systems
INCO	Cooperation with third countries and international organizations (2nd activity of the 4th FP)
INTAS	International Association for the Promotion of Cooperation with Scientists from the New Independent States of the former Soviet Union (INTAS)
IPTS	Institute of Prospective Technological Studies (JRC, Seville)
IRDAC	Industrial Research and Development Advisory Committee of the European Commission
ISC	International Scientific Cooperation
ISTC	International Science and Technology Centre (Moscow)
IT	Information Technologies
ITER	International Thermonuclear Experimental Reactor
ITER-EDA	ITER - Engineering Design Activities
JET	Joint European Torus

JOULE	Joint Opportunities for Unconventional or Long-term Energy supply (specific RTD programme)
JRC	Joint Research Centre
MAST	Marine Science and Technology (specific RTD programme)
MEDA	Measures accompanying the economic and social reforms in the Mediterranean countries
MERCOSUR	Common market of the south (S. America)
NAFTA	North American Free Trade Agreement
NIS	New Independent States of the former Soviet Union
OECD	Organization for Economic Cooperation and Development
OJ	Official Journal
OPET	Organizations for the Promotion of Energy Technology
PECO	Countries of Central and Eastern Europe
PHARE	Action plan for coordinated aid for PECO : Poland-Hungary
RACE	Research and development programme in Advanced Communications technologies for Europe (Specific RTD programme)
RIS	Regional Innovation Strategies
RITTS	Regional Innovation and Technology Transfer Strategies and Infrastructures
RTD	Research and Technological Development including Demonstration projects
SAVE	Special Action Programme for Vigorous Energy Efficiency
SMEs	Small and Medium-sized Enterprises
SPRINT	Strategic PRogramme for INnovation and Technology Transfer
STD	Science and Technology for Development (specific RTD programme)
	Technical Assistance to the Commonwealth of Independent States (CIS) and Georgia
TELEMAN	TELEMANipulation in dangerous and disturbed nuclear environments
TELEMANIP	Programme for the Promotion of Innovation in Energy Technology
	Telematics for the Integration of Disabled and Elderly people
	Training and Mobility of Researchers (specific RTD programmes under FP4)
	Targeted Socio-Economic Research (specific RTD programme)
	Utilization of research results for Europe
	World Trade Organization = ex.: GATT