

# **RESEARCH AND DEMONSTRATION**

## **INTRODUCTION**

Unlike economic and social cohesion or even intermodality, research, technological development and demonstration (RTD or R&D) is not a policy target in itself but simply an instrument through which the Community seeks to meet its objectives. Rarely, for example, does a specific action programme not include RTD projects of one sort or another. Nevertheless, the Community's R&D effort is important enough to warrant a separate discussion. Like regional development and agriculture, it is one area in which the EC's Member States have been willing to pool huge resources for mutual benefit.

The bulk of the Community's research is managed under the provisions of the EC Treaty. A radical evolution began with the Single European Act which introduced a Title on R&D and, in particular, the concept of the multiannual Framework Programme (FP). The general objectives of transport research are to assist in developing new policy options, by helping to quantify European transport trends and assessing the likely impacts of different policy options, and to facilitate the development of new forms of technology. Under the Second FP, the first ever transport policy R&D programme - Euret - was set up. It ran from 1990-93, and overlapped the start of the Third FP.

Among the Treaty changes agreed at Maastricht, the Member States consented to base future FPs on the new codecision process (although they retained the requirement of unanimity within the Council, when most other codecision policies only required a qualified majority). For the Fourth FP (1994-98), the first under the codecision procedure, the Commission introduced a new structure of four so-called Activities based directly on the Treaty specifications, and, within the First Activity, a much expanded transport programme. The Fourth FP's budget was twice increased, once to take account of the three new Member States, and once because of pressure from the Parliament.

During 1997, the institutions began work on the Fifth FP. The Commission's proposal again made substantial structural alterations, this time substantially reducing the number of programmes. The Council and the Parliament, although deeply divided over the budget, agreed with the main thrust of the proposed restructuring. Both institutions also called for an extra programme to be devoted to energy and environmental concerns, thus leaving the Commission's proposed 'Growth' programme heavily biased towards transport issues.

This chapter, although unable to go into much detail because of the enormous scope of the EU's RTD activities, gives an overview of Euret and the Fourth FP, with a focus on the transport policy programmes, and of the direction being taken for the Fifth FP.

## **EURET - THE FIRST EC TRANSPORT RESEARCH PROGRAMME**

Although the European Community had sponsored transport-related technological RTD in the 1980s, especially with regard to the vehicle and the aerospace industries, research linked to the Community's transport policy did not start until December 1990 when the Council took a Decision, under the Second FP, for a specific research and technological development programme in the field of transport. It was given the acronym 'Euret' and a budget of Ecu25m (later increased to Ecu26.8m) for the 1991-94 period.

Euret had three main objectives: optimum transport network exploitation, logistics, and reduction of harmful external effects; however, this latter objective was tackled only in a limited way and only with regard to road safety. There were 10 projects. Three of these were on air traffic management, which took about a third of the budget, reflecting the need for one European system with more capacity and compatible to international norms. One large project, taking a quarter of the total budget, focused on a European rail traffic management system (ERTMS) for high-speed rail. There were also several projects in the maritime sector, such as one on the optimisation of manpower, and another to design and assess a vessel traffic management system, and one on intermodal transport.

*Euret's three objectives and 10 projects*

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An evaluation of the Euret programme in the mid-1990s, carried out by a small independent panel, concluded that, given the small budget available, it had been correct to limit the programme's activities to a few projects chosen for being central to the aims of the Common Transport Policy. In concrete terms, it said, Euret had initiated and given focus to the link between research policy and transport policy at EC level. A relatively high level of the programme's budget (13%) was absorbed by the Transport Directorate-General's administration costs, the report noted, but this was justifiable "in view of the tasks involved during the launch and monitoring of a new programme".

*A generally positive evaluation of Euret*

In terms of the air sector, the report concluded that the projects had led "in the right direction of positive synergy with Eurocontrol and extended this organisation's research brief". Of ERTMS, it concluded that the project "may have helped to shorten the lead time to a future single European command and control system", and that it had helped establish "a ground for cooperation among companies which rank among the most important R&D performers in their respective fields". In terms of the maritime RTD, the report said the traffic management and high-tech ship components projects proved that "a technology-push effect is relevant with regard to EC responsibilities for harmonisation, for direct regulations and for the transfer of best practices". The intermodal project had shown, the report also concluded, "how difficult the subject is, and how important it is to take initiatives at the EC level".

*The APAS bridging programme*

Following Euret, in 1994, the Parliament approved an Ecu8m allocation for a bridging programme of preparatory, accompanying and support actions (APAS) prior to the start of the Fourth FP. The aim was primarily to establish the existing state of the art in certain specific areas, and to assist both the Commission and contractors in preparing for the new and enlarged transport programme of the Fourth FP. All 31 studies, with the exception of three shared-cost projects in air transport, were 100% financed by APAS. A general five year assessment report said, in 1997, that the quality and quantity of proposals in the first call for proposals for the Fourth FP's transport programme "were lower in areas of the work programme that had not benefited from APAS".

## THE 1994-98 FOURTH RTD FRAMEWORK PROGRAMME

In April 1994, the Fourth FP was formally adopted jointly by the Council and the Parliament. The overall RTD budget was agreed at Ecu12.3bn, with a possible Ecu700m supplement to be decided in 1996. In fact, the budget was increased twice, once by Ecu800m in March 1995 to take account of three new Member States, and by Ecu115m in December 1997 (which was as much of the possible supplement that the Council would allow), thus making a final tally of Ecu13.215bn. The Maastricht Treaty not only introduced the codecision procedure for the RTD FPs but also adapted their structure by introducing four so-called Activities. Thus, the 1994-98 Fourth FP was divided as follows:

*Financial breakdown of the Fourth FP*

- First Activity (15 RTD programmes including one for transport) - Ecu11,496bn;
- Second Activity (cooperation with third countries) - Ecu575m;
- Third Activity (dissemination) - Ecu352m;
- Fourth Activity (training and mobility) - Ecu792m.

Council Decisions for the individual programmes were adopted between July and December 1994.

### **The Brite/Euram programme for development of industrial materials**

Several of the 15 specific programmes under the First Activity, other than the one for transport, contained important transport components. The large programme on industrial and materials technologies, Brite/Euram III (a successor to earlier Brite/Euram programmes), with an overall budget of Ecu1.833bn, including Ecu500m for transport, was aimed at:

- stimulating technological innovation;
- encouraging traditional sectors of industry to incorporate new technologies and processes;
- promoting multisectoral and multidisciplinary technologies;
- developing scientific and technological collaboration.

The programme consisted of three main areas, one of which one was devoted entirely to technologies for transport, and which itself was split into two areas: "aeronautics technologies", and technologies for "surface means transport". In each area the research priorities were divided into six: design and systems integration, production, improved efficiency, environmental technology, safety, and operation. In fact, the programme covered all the following: cars, aeroplanes, ships and trains; design and systems integration; technologies for improved efficiency and environmental protection; and technologies for safety and operation.

Recent successes of the Brite/Euram programme, which have been picked out in the Commission's annual RTD reports, include the following: a lubrication system for industrial applications, especially in the motor industry; the design of a new type of rail wagon with low distortion of passenger compartments; and the Brain project which has developed mathematical models for the soundproofing of aircraft cabins. In the 1999 annual report, the Commission highlighted two transport-related Brite/Euram projects: the development of a concurrent engineering platform to help reduce the design time for seats for next-generation cars; and the development, by a consortium of maritime classification societies and research teams, of a set of reliability rules for the structural design of ships.

*Examples of Brite/Euram transport-related projects*

**Transport in the telematics and energy programmes**

Another programme, for telematics applications, funded with Ecu913m, consisted of four themes, one of which contained a transport component (for which around Ecu220m was allocated). In part, this was a successor of Drive, an earlier and successful programme which, under previous Framework Programmes, had developed the idea of road transport infomatics. The transport telematics component of this programme, though, also covered air traffic control systems. The Commission's 1999 annual report on RTD highlighted the Promise project, which has created an interactive service to give personalised mobile travel information on traffic, route planning and weather so as to allow travellers to select the optimum means and times for journeys. Another project, nicknamed Emma, aimed to provide 24/48 hour air pollution forecasts so that traffic restrictions could be used to reduce the risks of accidents.

*The Promise and Emma projects*

Specific research programmes on non-nuclear energy, environment and climate, marine sciences and technologies, and within the Second, Third and Fourth Activities all contained some connection with transport, to a significant extent in the case of non-nuclear energy (about Ecu100m was devoted to energy efficiency in transport), but to a lesser extent in other programmes. All in all, the Commission estimates (although it is difficult to be exact) that around Ecu1.1bn of the Fourth FP funds went to transport projects (see chart).

**The transport programme for policy and technology developments**

The main research instrument for transport policy within the Fourth FP, though, was the specific transport programme. This was formally adopted in November 1994 and allocated Ecu240m - ten times that of Euret. (The total was later increased to Ecu263m following the two supplements.) The indicative breakdown for the programme was as follows:

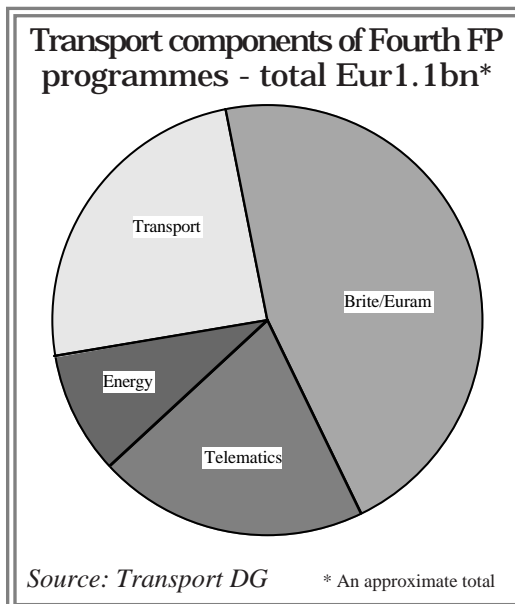
Strategic research for a trans-European multimodal network (definition, demonstration and validation) - 20%

Network optimisation - 80%,

of which

- rail transport - 16%
- integrated transport chains (ITC) - 7%
- air transport - 16%
- urban transport - 11%
- waterborne transport - 19%
- road transport - 11%

The Transport DG, which manages the programme, made four calls for proposals, each in December, the first in 1994 and the last in 1997. The first resulted in 111 projects, involving some 1,000 partners and an EU commitment of Ecu119m; the second resulted in 81 projects, 650 partners and Ecu52m in EU grants; the third resulted in 91 projects, 800 partners and Ecu59m in grants; and the fourth resulted in 25 projects with Ecu12m of grants. Furthermore, in December 1997, there was a joint call with the Research DG for proposals on intermodality, and Ecu12m was allocated to around 14 projects.



By mid-1999, about 100 of the programme's 300 or so projects had been completed. Many of these had not only fed into the preparation and decisions for the Fifth RTD Framework Programme, but had helped shape and develop the Community's transport policy.

**Chapter Fourteen Examples of strategic transport policy R&D schemes**

*The Possum project looking at alternative transport scenarios*

Possum and Meet are two projects within the area of strategic research which have already been completed. Possum, an Ecu888,000 study, largely funded by the EU, and involving eight partners (six Member States, Poland and Russia) was aimed at the creation of alternative transport scenarios using a technique known as 'backcasting'. Firstly, the partners identified seven policy targets for 2020 (derived from environmental, regional development and economic efficiency objectives), then they looked at the changing conditions that could affect transport policy (such as lifestyles, technological change and mobility patterns), and finally they constructed policy packages for 2020 to meet the targets. The project partners concluded that there was a need to decouple transport growth from economic growth, that technology alone would not achieve sustainable mobility targets, and that the costs of decoupling were not as great as was at first thought - economic growth with less transport at reasonable cost was achievable.

*The Meet project for estimating transport air pollution*

The objective of Meet, for which the Community provided Ecu500,000 of the total cost of Ecu807,000, was to develop models to estimate air polluting emissions from transport activities for use in strategic environmental assessments. More than half the Member States and Switzerland were involved in this two year study. It is worth noting that the Meet programme was developed out of a COST programme project (see below) which helped create a network of 200 scientists across Europe for monitoring emissions. The results have been beneficial to the Commission's auto-oil programme and for the European Environment Agency's activities.

**Network optimisation research examples - rail, intermodality, aviation**

*Developing rail traffic management systems*

As in the original Euret programme, research into rail interoperability was one of the dominant tasks of the Fourth FP, and, as such, was directly linked to the Commission's efforts to develop a harmonised and liberalised railway network, one in which delays and costs will be reduced, thus making rail a more attractive option for both passengers and freight. A number of different projects within the first and second call were aimed at the development of ERTMS. Spanish, French, Belgian and German companies collaborated on the ERTMS test preparation scheme, which absorbed some Ecu12m of Community funds, and which was designed to prepare for full scale trial tests. The Ecu13m Eurosig project, including some Ecu6.3m of Community funds, ran between 1996 and 1998 and studied the main industrial activities related to the development of a Europe-wide common concept for a railway safe signalling system.

Intermodality remains a key aspect of the Community's transport policy, and of the RTD programme. One three year project, Impulse, which cost nearly Ecu5m (with half granted by the Community) and which ended in mid-1999, was aimed at the design of an efficient, seamless system of fast loading, unloading and storage of intermodal transport units crossing between different modes of transport. Involving companies from France, Germany, Italy, Greece, the Netherlands and Switzerland, it set up demonstrations at five test sites.

*The Defamm project for more efficient airport movements*

Air transport research at the Community level has tended to focus on air traffic management (ATM), such as with the Aegis project under Euret, but it has also looked at the efficiency and safety of airport operations as well. The three year Defamm project, for example, used Ecu4.4m of Community funds to demonstrate airport movement guidance control and management functions with real facilities in near-operational environments. Some 15 EU companies were involved and

**EU funds devoted to RTD under the Fourth FP transport programme (Ecu m)**

	No. of projects	1st call	2nd call	3rd call	4th call	Joint call*	Total
Air	46	20.34	5.8	8.13	3.49		37.75
ITC	28	5.01	5.65	6.09	0.72	4.26	21.73
Rail	21	29.02	6.10	4.29	0.89		40.30
Road	41	12.40	10.01	5.38	1.68		29.45
Strategic	49	19.72	11.11	8.49	3.63	0.50	43.46
Urban	37	12.76	5.42	7.54	1.77	2.16	29.66
Waterborne	55	22.72	7.11	17.11	0.35		47.29
Acc. measures	2			3.39			3.39
<b>Total</b>	<b>279</b>	<b>121.97</b>	<b>51.21</b>	<b>60.43</b>	<b>12.5</b>	<b>6.92</b>	<b>253.03</b>

\* A joint call with the Research DG - 14 contracts (EC contribution of Ecu12.18m) - only the Transport DG's share is shown.

Source: Transport DG

test sites included the airports at Malpensa, Paris Orly and Cologne/Bonn. Patio, another, similarly-sized project with mainly French and UK partners, was aimed at developing an evolutionary and adaptable experimental platform to support the tools for integration and validation activities of the ATM authorities, industry and R&D community.

### **Network optimisation research examples - urban transport, waterways, road**

Two key projects in the urban transport area were Isotope and Quattro, set up by the first and second calls respectively. Both involved close to 20 partners. Isotope, which cost Ecu1.1m and used Ecu630,000 of Community funds, was aimed at comparing and appraising the legal and organisational structures for public transport in different Member States with a view to their improvement. The objective of Quattro, a project marginally more costly than Isotope, was to propose best practices and guidelines for tendering/contracting of urban public transport operations. Both projects provided input to the Commission's policy paper on the Citizens' Network.

*Isotope and Quattro*

The Atomos II project, dominated by Danish companies but with partners from Italy, Greece the UK, Germany, Spain and the Netherlands, cost nearly Ecu6m (Ecu3.3m from the EC), was one of the largest projects in the waterborne transport area. The aim of Atomos II, which built on the Atomos I project from the Euret programme, was to improve ship safety and efficiency, through better integration of the human-machine interface in the ship control centre, and to enhance the interoperability of central control system modules from different suppliers. Five Norwegian, French and Belgian companies cooperated on the maritime black box project, costing Ecu1.7m with half provided by the EC, which aimed to develop and demonstrate a voyage data recorder for maritime vessels.

*The Atomos II project for ship safety and efficiency*

Road transport projects included Eurotoll, which investigated 13 case studies of road pricing and evaluated the issues and policy options, and Force, which developed work already done on the RDS-TMC (Radio Data System - Traffic Message Channel) services. The Community contributed approximately Ecu1.4m and Ecu1.7m respectively to these two schemes, which provided input into the Commission's policy work on fair and efficient pricing and electronic fee collection.

Although an attempt to develop the concept of Concerted Actions was made during the Euret programme, it did not really take off until the Fourth FP. Through the Concerted Actions, the Transport DG organised regular meetings of experts in specific technical areas. By discussing best practices, guidelines for demonstration projects, and common user requirements, the Concerted Actions were able to help the Commission with setting priorities for future studies, projects and policies. An early Concerted Action was that for short sea shipping, which held a preliminary meeting in June 1995, and regularly continued to bring together 50 European experts from 14 Member States. Other Concerted Actions launched under the Fourth FP covered the following topics: transport information systems, pricing, emissions and air quality, logistics, ATM, airports, inland navigation, and casualty analysis in waterborne transport. (The Concerted Actions later reemerged as Thematic Networks in the Fifth FP - see below.)

*The role of Concerted Actions*

### **The failure of the Task Force concept to take off**

When the Commission put forward its proposal, half way through the Fourth FP, to use the potential Ecu700m supplement (of which only Ecu115m was ever agreed - see above), it also suggested focusing the extra money on five new "Task Forces": new-generation aircraft, multimedia education software, car of tomorrow, transport intermodality and interoperability, and environment (water and nuclear safety). It also said it would set up three other Task Forces - vaccines and viral diseases, trains and railways systems of the future, and maritime systems of the future - to reinforce inter-programme coordination.

The Commission said the Task Forces would have the following objectives:

- *To define research priorities better in close consultation with industry, including SMEs and the users of results, taking greater account of needs of society;*
- *to ensure that the means available under the Fourth Framework Programme are more efficiently coordinated and targeted towards the identified priorities, and thereby to coordinate national activities in these fields more effectively;*
- *to ensure a better match between supply and demand where research and technological development are concerned and to promote an environment favourable to innovation by providing additional funding and facilitating inter-firm cooperation, especially where the legal aspects are concerned."*

*The objectives of the Task Forces*

In fact, the Council and the Parliament declined to accept the proposed focus on Task Forces, and

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simply allocated the Ecu115m pro rata according to the original division of funds for the Fourth FP. The Commission, nevertheless, used the Task Force concept to reorganise the management of some of its projects during the latter years of the Fourth FP. A similar idea reappeared as the “Key Action” of the Fifth FP proposal (see below).

### THE FIFTH RTD FRAMEWORK PROGRAMME

Very few of the Fourth FP projects were completed by the time the Commission began its detailed preparations for the Fifth FP, and many had not even begun. Nevertheless, an important and independent five year evaluation of the transport programmes (Euret, Apas, and the start-up phase of the Fourth FP) took place in 1996 and provided input for the transport elements of the Fifth FP proposals. Among its key recommendations were that:

*Recommendations  
of an independent  
evaluation*

- transport remain a distinct programme, and that it should include transport-related aspects such as technology development, energy efficiency and land use;
- selected tasks should be those effectively handled at European level, and especially those with an importance for EU transport policy;
- there should be scope for selected risk taking and long range research that spans successive FPs;
- there was a need for more flexibility in programming of the budgets;
- there was a need for dedicated in-house staff with specific responsibility to facilitate dissemination;
- Concerted Actions and Task Forces have proved very effective in enhancing cooperation and coordination.

Most of these recommendations were indeed embraced by the European Commission in its Fifth FP proposals.

### **The Commission’s preparatory policy papers and discussions**

In February 1997, a high-level panel of experts, headed by Etienne Davignon, a former Research Commissioner, published a general five year assessment of the Community’s RTD FPs (based on the more specific sectoral assessments). It pulled no punches. It said the FP was not fulfilling its promise - “it lacks focus and is underachieving” - and it called “for a leap forward as qualitative and fundamental as the creation of the FP itself”. The Fifth FP should be based on the twin pillars of scientific excellence and social and economic relevance, accompanied by European added value, the experts said. They pointed to large-scale facilities which no individual Member State would develop and sustain, pan-European standards, and the promotion of internationally competitive R&D communities. The report also said the Council should act by qualified majority (rather than unanimity) in its codecisions with the Parliament on the FPs, and that the Commission should be given greater control over implementation of the programmes.

*The answers  
to many major  
problems have to  
be found in science*

The Commission summed up the need for change in its first working document on the Fifth FP as follows: “*There is no denying that the world has become increasingly complex. In order to understand it better and to feel more at home in it, individuals require more knowledge. However, the answers to many of the major problems now facing society - growth and unemployment, and also health, the environment and mobility - have to be sought in science and technology. This is the purpose behind European research. It is now time to change direction slightly in order to put it in its new context. Hitherto research has been based largely on technical achievement. The aim now is to make research more efficient and increasingly directed towards meeting basic social and economic needs by bringing about the changes which each individual citizen desires.*”

In a further preparatory document, the Commission identified the major structural changes it wished to propose for the Fifth FP. The Programme would need to have a simple structure, it argued, in order to make it easier to achieve the major social and economic objectives and to guarantee efficient operation and transparency. It proposed managing the Fifth FP through three thematic programmes: unlocking the resources of the living world and the ecosystem, creating a user-friendly information society, and promoting competitive and sustainable growth; and through three vertical programmes reflecting the Second, Third and Fourth Activities, as in the Fourth FP; i.e. international cooperation, dissemination of results, and training/mobility of researchers.

### **The Commission’s formal proposals for a reduced number of programmes**

Not long after, in April 1997, the Commission’s formal proposal was presented to the Council and the Parliament. Each of three thematic programmes would comprise certain elements, the Commission said: a series of Key Actions, activities for R&D into generic technologies, and

activities in support of research infrastructures. The aim of the Key Actions would be to concentrate resources and skills of all relevant disciplines, technologies and people on well-defined socio-economic problems. The generic R&D activities would be aimed at helping maintain and improve scientific capability and at supporting the work within the Key Actions. As for the third element, the Commission observed that the responsibility for construction and operation of research infrastructures lay principally with the Member States, but that Community support was necessary to ensure optimum use of existing infrastructure, and to ensure cost-effective and rational transnational cooperation.

The other major change to the Fifth FP proposed by the Commission, compared with earlier FPs, concerned the management structure. The Commission said the committees, which are made up of national experts and which monitor operations of the specific programmes, should only take decisions on measures of a legislative and general nature (definition of work programmes, indicative allocation of funds to the various actions making up the programme) and no longer on individual measures (i.e. the selection of projects and their financing).

*Changes proposed to the way the RTD committees work*

In July 1997, the Commission proposed the Council and the Parliament should allocate Ecu16.3bn to the five year programme. This, it said, would be a 3% increase based on GNP forecasts. Each of the three thematic programmes should be funded with Ecu3.925bn; the three horizontal (Second, Third and Fourth) Activities should be funded with Ecu0.491bn, Ecu1.405bn, and Ecu0.815bn respectively.

**Council-Parliament dispute over the Fifth FP budget**

Neither the Council nor the Parliament were overjoyed at the Commission’s proposals and they worked hard throughout 1997 to reach agreement on how to change them, the Parliament adopting its Opinion in December, and the Council agreeing its Common Position in February 1998. Although they both separately decided there should be four thematic programmes rather than three - with one extra programme (sub-divided in two) focused towards energy and the environment - there was a wide divergence of views on the budget.

The Parliament, in its first reading, said the budget should be increased to Ecu16.7bn. The Research Council, by contrast, decided on a budget of Ecu14bn. The European Commission objected strongly to this latter amount, and told ministers that if such a figure were accepted it would be the first time the budget for a Framework Programme had fallen in real terms. In its second reading, the Parliament dropped its demands slightly, back to the Commission’s figure of Ecu16.3bn. It was not until November 1998, after months of wrangling through the conciliation procedure, that the two legislative institutions agreed on a figure of Ecu14.96bn for the 1998-2002 programme.

*The Parliament’s insistence on a high level of funding*

The Fifth FP Decision, which was formally adopted on 22 December, is thus made up of four thematic programmes and three horizontal programmes, with the following indicative budgets:

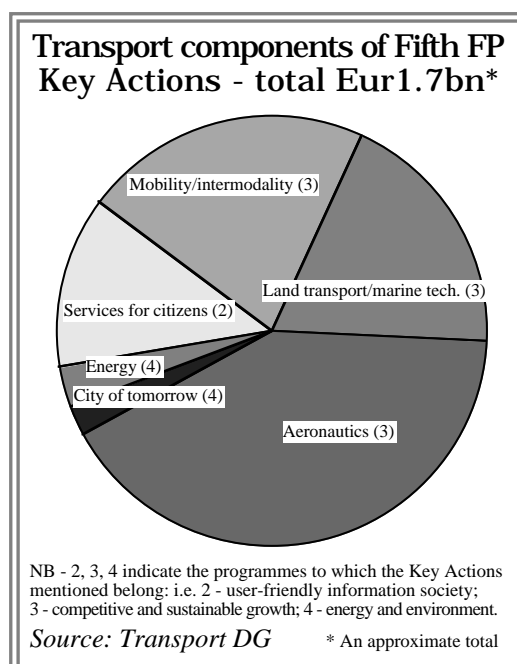
Thematic programmes

- “Quality of life and management of living resources” - Eur2,413m;
- “User-friendly information society” - Eur3,600m;
- “Competitive and sustainable growth” - Eur2,705m (the Growth programme);
- “Energy, environment and sustainable development” - Eur2,125m;

Horizontal programmes

- “Confirming the international role of Community research” - Eur475m;
  - “Promotion of innovation and encouragement of SME participation” - Eur363m;
  - “Improving human research potential and the socio-economic knowledge base” - Eur1,280m.
- (The remaining part of the total budget is allocated to a programme for the EC’s own Joint Research Centre, and for nuclear energy, which falls under a separate legal procedure.)

In addition to the Decision concerning the



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Fifth FP, the Council also adopted, in December 1998, a complementary law concerning the rules for participation of undertakings, research centres and universities in the Fifth FP, and for the dissemination of the results.

*Council Decisions  
on the individual  
programme*

Shortly after, in January 1999, the Council adopted the Decisions required to launch each individual programme. The Commission's aims with regard to reducing the role of the programme committees were, however, not realised, and, for the life of the Fifth FP at least, the Member States' experts will continue to exercise a significant degree of control over the day-to-day management of the programmes through the committees established by each Council Decision. The Decision for the Growth programme confirmed the budget at Eur2,705m, with Eur646m to be

## Details of first call for proposals under RTD programme Competitive and sustainable growth

### **Key Action: Innovative products, process and organisation**

#### Efficient production, including design, manufacturing and control

Integrated 'product service' design; Advanced production and construction technologies; Safe and reliable extended life of products and industrial systems

#### Intelligent production

Design of products and production-service systems; Intelligent manufacturing and processing; Monitoring and optimal use of industrial systems

#### Eco-efficient processes and design

Eco-efficient design of products and processes; Cleaner processes, products and eco-efficient technologies; Product recovery and waste recycling

#### Organisation of production and work

New methods of organisation, work and human capital improvement; Adaptation of enterprises and human oriented production; Knowledge, learning and management of change

*Priorities in this Key Action are presented as "Targeted Research Actions (TRA)" aiming at stimulating and coordinating research projects around strategic priority areas, in particular:*

TRA: Customer oriented and high-tech production; TRA: Towards new and miniaturised products and processes; TRA: Machinery, production equipment and systems for manufacturing; TRA: Towards zero-waste in manufacturing and processing promoting eco-efficient industries

### **Key Action: Sustainable mobility and intermodality**

#### Socio-economic scenarios for mobility of people and goods

Quantitative tools for decision-making; Driving forces in transport; Policies for sustainable mobility

#### Infrastructures and their interfaces with transport means and systems

Infrastructure development and maintenance; Environment; Safety; Security; Human factors

#### Modal and intermodal transport management systems

Traffic management systems; Transport and mobility services; Second generation satellite navigation and positioning systems

### **Key Action: Land transport and marine technologies**

#### Critical technologies for road and rail transport

Efficient, clean and intelligent road and rail transport vehicle technologies; Innovative and safe road and rail transport vehicle concepts; Human/vehicle interaction

#### Critical marine technologies

Efficient, safe and environmentally-friendly ships and vessels; Maximising interoperability and vessel performances; Innovative technologies for the monitoring, exploration and sustainable exploitation of the sea

*This Key Action has identified the following Technology Platforms (TP) for technology integration and validation::*

TP: New land transport vehicle concepts; enhanced systems efficiency; TP: Advanced concepts for ships and vessels; competitive shipbuilding

### **Key Action: New perspective in aeronautics**

#### Reducing aircraft development cost and time to market

Advanced design systems and tools; Manufacturing; Product quality control

#### Improving aircraft efficiency

Aerodynamics; Structures and materials application; Propulsion; Systems and equipment; Configurational and interdisciplinary aspects

#### Improving environmental friendliness of aircraft

Low pollutant emissions; External noise; Cabin environment

#### Improving operational capability and safety of aircraft

Air traffic management related airborne systems; Operational maintenance; Accident prevention; Accident survivability

*This Key Action has identified the following TPs for technology integration and validation:*

TP: Low-cost, low-weight primary structures; TP: Efficient and environmentally-friendly aeroengine;

TP: Novel rotary-wing aircraft configuration; TP: More autonomous aircraft in the future air traffic management system

Source: OJ/99/C72



spent in the period 1998-99, and Eur2,059m in 2000-02, and the amounts for each of the four Key Actions, three of which are dedicated to transport issues:

- “Innovative products, processes and organisation” - Eur731m;
- “Sustainable mobility and intermodality” - Eur371m;
- “Land transport and marine technologies” - Eur320m;
- “New perspectives for aeronautics” - Eur700m.

Within this programme, a further Eur546m was earmarked for generic research and Eur37m for activities to support research infrastructures.

*Breakdown of funds for Growth programme Key Actions*

The Commission published its first call for project proposals under the Fifth FP in March 1999. The call for the Growth programme covered all four Key Actions and indicated a budget of Eur90m for “Sustainable mobility and intermodality”, Eur80m for “Land transport and marine technologies”; and Eur245m for “New perspectives in aeronautics” (see box). In one of several calls, at the same time, under the energy and environment programme”, the Commission invited proposals relating to the Key Action “City of tomorrow and cultural heritage”, and, in particular, to the “comparative assessment and cost-effective implementation of strategies for sustainable transport systems in an urban environment”.

A number of decisions for new RTD projects had been taken by autumn 1999. For example, under the Key Action for Sustainable mobility and intermodality, the Commission approved, in October, funds for several new Thematic Networks (which took over where the Concerted Actions left off). One of these will look at optimum urban freight solutions, one at policy and project evaluation methodologies, and a third at rail freight services. The largest of the four, however, for which just over Eur4m was allocated, will bring together experts connected with global navigation satellite systems (GNSS). This particular Thematic Network will have three main tasks: to monitor all GNSS research-related activities and thereby steer the Fifth FP’s projects in this area; to set up specialised task forces, bringing together European and even international experts, on key GNSS2 issues to provide more specific guidance; and to provide a permanent administrative support for the first two tasks and for the Galileo programme management board (Chapter Thirteen).

*Four new Thematic Networks under the Fifth FP*

## INTERNATIONAL ASPECTS - WIDENING COOPERATION OPPORTUNITIES

The EU is slowly widening its cooperative approach to RTD programmes, through the mechanism of bilateral accords, through strengthening ties on a regional basis, and through stronger links with the CEEC because of the accession process. Since the Fourth FP, the EU has also maintained the Second Activity programme of international cooperation (known as INCO) which provides grants for projects bringing European and foreign partners together; it also assists eligible partners to participate in First Activity programmes, such as transport. As part of the INCO programme, the Commission manages a number regional schemes. INCO-Copernicus, for example, covers scientific and technical cooperation with the CEEC and the NIS; INCO-DC is for cooperation with the developing countries (and includes the Mediterranean countries).

*Resolution on international RTD cooperation*

In autumn 1995, the Commission put forward a Communication on “Perspectives for international cooperation in RTD”. It outlined a fresh policy to help confront the major challenges of the 21st century through international scientific cooperation while maintaining a balance against increased competition from newly industrialised countries.

The following March, research ministers approved a Resolution on the subject and endorsed five objectives for cooperation with third countries:

- strengthening European competitiveness and developing technologies for future markets;
- developing partnerships with countries of strategic interest;
- sharing responsibility and conducting RTD on economic and social challenges;
- promoting RTD relevant to the needs and priorities of developing countries for fostering their sustainable growth;
- sharing information and contributing to large-scale and frontier science technology.

*RTD agreements with third countries*

The Resolution underlined the need for reciprocal access to be a condition of cooperation with industrialised countries, and for a differentiation of approach between third country partners for economic, political and geographical reasons.

All the members of the European Economic Area (i.e. Norway, Iceland and Liechtenstein) are associated with the Framework Programmes, as are, since autumn 1999, all the applicant countries (indeed RTD is the first EU policy area to be entirely open to the CEEC). Cooperation in research is one of the priorities of the Euro-Mediterranean partnership. Cyprus, Malta, Turkey and Israel all had access to the Fourth FP to one degree or another.

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The European Community has a number of specific R&D agreements with third countries which usually include transport. In November 1997, for example, a scientific cooperation agreement with South Africa was concluded; one with the US was extended in October 1998, and, in December 1998, one with Canada was also extended, and another with China was signed. Otherwise, most of the general trade and cooperation agreements that the Community takes part in with many parts of the world, also contain clauses on cooperation in RTD.

*The EU's active  
role in  
international fora*

Finally, it is worth noting that the EU plays an active role in other international scientific fora which involve the individual Member States as well other countries outside the EU. For example, the Council and the Commission provide the secretariat for COST (European cooperation in the field of scientific and technological research), an inter-state structure operational since 1971 and involving 28 European countries. Another organisation, Eureka, brings together 24 countries and the Commission. It aims to create partnerships between applied research teams. The EU also works closely with a number of large international R&D organisations such as the European Laboratory for Particle Physics and the European Space Agency.