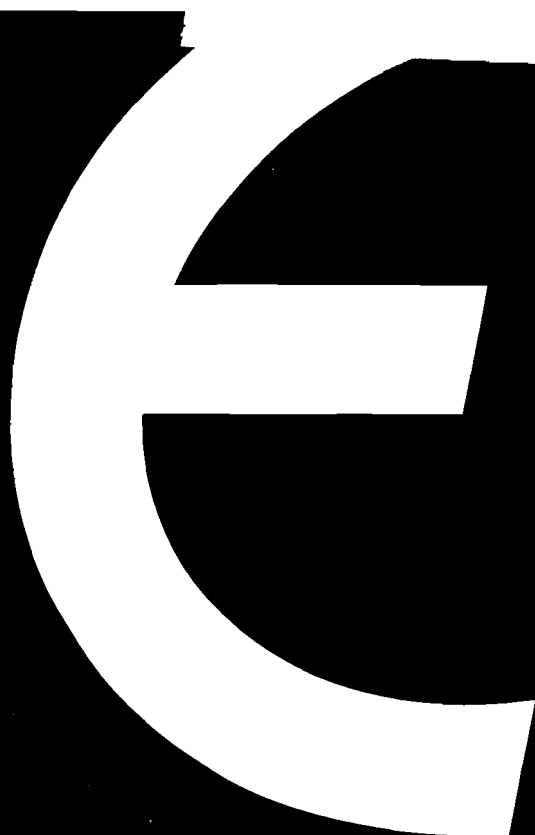


European research policy



European File

Mastering the new technologies is a fundamental precondition of improved international competitiveness, economic growth and the creation of jobs. The technological challenge thrown down by the United States and Japan is becoming stiffer. The United States, for instance, intends to devote 26 billion dollars to a five-year military research programme (the Strategic Defense Initiative) which will aid American firms to develop many forms of technology with civilian applications to fields ranging from computerization to space. To face up to this challenge, 18 European countries have rallied around the Eureka project devised by France which aims to combine the resources of European industry and research in large, civil, high-technology projects. At the same time, the countries of the European Community are redoubling their cooperation with the intention of creating a Community technology policy.

The groundwork for such a policy is already in place. A European research community is already in being. In 1984 the first Community framework programme for scientific and technical activities was launched. This was a significant milestone in scientific collaboration at Community level. The Esprit programme, devoted to information technology, is perhaps the best known example of this new common policy for research and development. Its ramifications are, however, much wider.¹

Why a common policy?

From its inception the European Community has taken an interest in research. Originally this was reflected in the Coal and Steel Treaty of 1951 and then the Euratom Treaty which led in 1958 to the creation of a Joint Research Centre employing 2 300 people at Ispra in Italy, Geel in Belgium, Karlsruhe in Germany and Petten in the Netherlands. From 1973 onwards new research projects were launched to support Community activities in areas such as industry, energy and the environment. The work was carried out either by the JRC or in national laboratories coordinated, and frequently partially financed, by the Community. Many useful results were achieved but these projects were decided on an *ad hoc* basis and remained largely of interest and value to particular sectors. With a few exceptions their scope was limited.

During the 1980s the need for a genuine common research policy became increasingly evident.

- The recession brought large and often painful economic upheavals. Faced with mounting unemployment and the decline of many industrial sectors, Europe found itself lagging in many crucial areas behind its major competitors: the United States, Japan, and to an increasing extent, the newly industrialized countries. Much has been said about the slowness of Europe's response to the electronics and computer revolutions. European industry must also rapidly pull up its socks in other areas, both new and traditional, such as biotechnology, chemicals and motor manufacturing.

¹ This file updates and replaces our No 8/83.

- To retain or sharpen its competitive edge Europe must innovate. This means placing a greater emphasis on research and, in particular, the creation of a common research strategy capable of outdistancing by far the efforts of individual countries and even occasional bilateral experiments. There is a disturbing gulf between the research potential of the Community and its achievements. Civil research budgets in Europe equal those of the United States but creative research is receding. The fragmentation and dispersal of European efforts across national boundaries go a long way to explain these failings. The human and financial resources available in Europe are often squandered on overlapping research or projects too skimpily financed to have much chance of success.

There is no question of Europeanizing research for its own sake. Fundamental realities must be recognized: the existence of the Community and its single trading market, the emergence of common needs through the common policies and strategies established for agriculture, industry, the environment, social affairs and overseas cooperation and development. Taken together with the institutional experience gained over 35 years, the above factors make the Community the best forum for the development of the scientific and technological cooperation Europe needs to remain the master of its own future.

It remained to establish the basic guidelines and precise criteria for a Community research strategy. To answer these questions, a first general framework programme for 1984-87 was drawn up by the European Commission and approved by the Council of Ministers in July 1983. The programme laid down seven key areas which provided a hierarchy of priorities for the Community's research efforts: the promotion of agricultural and industrial competitiveness, better management of raw materials, reducing energy dependence, overseas cooperation and development, improving living and working conditions and strengthening the overall effectiveness of scientific and technical potential in the Community. Extra cash was to be provided for work on agriculture, industry, development and raw materials. The proportion devoted to energy research was to be reduced from two-thirds to less than half. Within each of these areas, major scientific and technical goals were established, taking account of the needs of European society, Community policies and the scientific and technical, practical or financial advantages offered in the short, medium or long term by Community rather than national action. Areas identified included:

- Large-scale research beyond the easy reach of Member States in terms of cash and manpower;
- Research which is clearly cheaper to undertake jointly, even when the costs generated by international cooperation are taken into account;
- Research which yokes together complementary small-scale national projects and achieves results beneficial to the whole Community, especially where the work required is geographically extensive;

- Research which furthers the cohesion of the internal Community market, especially by establishing uniform norms and standards, and unifies European scientific and technical activities.

The framework programme lays down figures (nearly 4.5 billion ECU for 1984-87)¹ and allocations which serve as a guide by which Community research can be directed and, ultimately, evaluated. The programme has been gradually implemented since 1984, a year which saw the Council of Ministers approve a host of new research programmes. By mid-1985 it appeared that the cash allocated to these initiatives, and others already in operation, would total about 3.3 billion ECU for the period of the framework programme. Other projects have still to be agreed or are still being evaluated but it is possible to give a preliminary progress report on the implementation of the framework programme. The accompanying table shows to what extent the different options have been realized. It will be seen that there is considerable variation. The industrial and energy options are broadly being met but the agricultural and development options are faring less well.

There follows a brief account of the major Community research programmes. They have been grouped, for the sake of clarity, in broad sectors, following the pattern used for the options and objectives of the framework programme. It should be stressed, however, that work in one field, such as energy, for instance, can have spin-offs for industry, agriculture and other areas.

Agriculture and fisheries

An agricultural research programme worth 30 million ECU in the period 1984-89 will investigate the use and conservation of agricultural resources, the improvement of animal and crop yields, the improvement of quality of produce and the easing of the problems of less-favoured regions. Other projects are being prepared. These efforts are, nevertheless, considerably inferior to the ambitions of the framework programme and the needs of European agriculture and fisheries. Agriculture needs to find new ways of preventing surpluses and answering demands for quality produce and environmental protection, while dealing with the social consequences of changes now in progress. The fishing industry has to find ways of dealing with the decline of stocks.

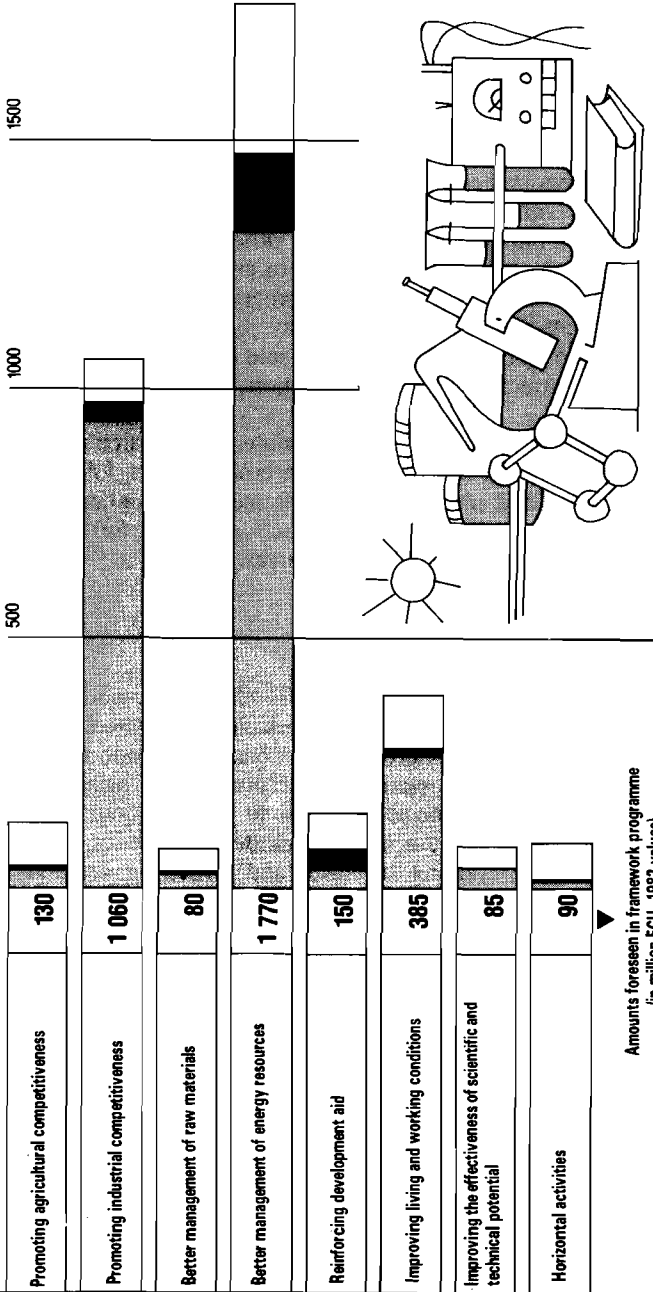
Industry

- Research into information technologies (Esprit): this programme, worth 750 million ECU between 1984 and 1988, aims to close the gap between the Community and its competitors in the computer field by stimulating research at the pre-competitive stage mid-way between basic research and commercial

¹ Equivalent to 3.75 billion ECU at 1982 values. The current value of the ECU (European currency unit) is about £0.57, Ir. £0.72 or US \$0.79 (at exchange rates current on 2 September 1985).

First framework programme for science and technology in the European Community (1984-87): progress at mid-1985

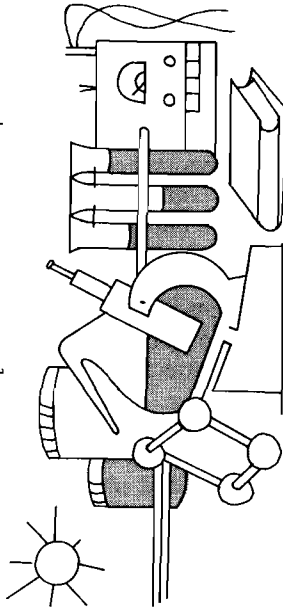
OPTIONS



Amounts foreseen in framework programme
(in million ECU, 1982 values)

Annual projects and multiannual programmes already adopted

Proposals presented to the Council of Ministers



applications.¹ Research contracts are offered on tender to collaborators, mainly from industry, who pledge to work closely together and match the sums invested by the Community. In the first year alone, 104 projects involving 540 participants were launched. They covered areas such as advanced micro-electronics, software techniques, advanced information processing, office computerization and computer-assisted design and production. In 1986 the Esprit programme will include nearly 2 000 scientists and technicians in all the Member States.

- Research in advanced telecommunications (RACE): drawn up using the Esprit model, this project is intended to permit the Community to stay in the forefront of communications technology. A preparatory phase for a common research programme will be spread over 18 months. It is funded to the tune of 14 million ECU.
- Biotechnology: progress made in the life sciences is going to play a decisive role in a range of economic sectors: medicine and pharmaceuticals, agriculture and food, the environment and energy.¹ To face the challenge of Japanese and American competition, Community ministers have pledged 55 million ECU to a programme which is intended by 1989 to establish the technical support for the development of European research, to promote exchanges and collaboration between laboratories and to stimulate basic research with industrial and agricultural applications in enzyme technology, genetic engineering and living cultures.
- Basic research on industrial technology (Brite): a 125 million ECU programme between 1985 and 1988 aims to stimulate activity, on the Esprit model of tenders and shared costs, in the development and dissemination of basic technologies used by a number of traditional industries. Topics to be broached include the strength and resistance of materials, new materials, the working of metals, computerized testing methods and the application of computerized design and production techniques to small and medium-sized businesses.
- Other industrial research: between 1984 and 1987 the Community is expected to spend 100 million ECU on steel research and pilot projects. As part of the work of the JRC and the Community standards office, a similar sum will be spent on researching methods, standard measures and reference materials for the definition of European industrial standards, as well as nuclear measurements and materials capable of withstanding high temperatures.

Raw materials

A 54 million ECU programme between 1982 and 1985 supported research and development in a series of areas: prospecting for and extraction of uranium and other minerals, the better exploitation of timber resources, the recycling of urban and industrial waste and non-ferrous metals, and the development of synthetic

¹ See *European File*, No 8/84: 'The European Community and new technologies'.

materials. The Community's dependence on raw material imports justifies the extension and strengthening of these efforts through a new programme devoted to raw and new materials. The European Commission has proposed spending 110 million ECU on such a programme over four years.

Energy

- Nuclear fission energy: more than 80 nuclear reactors are operating in the Community. For many years the JRC has been investing considerable research effort into reactor safety. Programmes worth 400 million ECU are under way in this area. The largest deals with reactor safety and the evaluation of the risks and consequences of accidents. Other projects deal with reactor technology, the cycle of fissile fuels and the management of radioactive waste (treatment and conditioning techniques, storage deep underground, etc.).
- Controlled thermonuclear fusion: in 50 years time it may be possible to control fusion reactions in such a way that almost unlimited quantities of energy can be generated from the most abundantly common materials. Alongside the United States, the Soviet Union and Japan, the Community is taking part in the race to perfect fusion techniques. This is the one area where all Community research is integrated.¹ The Community cofinances and coordinates research in 15 national centres employing nearly 4 000 researchers and technicians. It has also built at Culham in the United Kingdom a powerful experimental reactor, JET (Joint European Torus), which carries the hopes of important new advances in this field in the next few years. Between 1985 and 1989 690 million ECU will be spent on these programmes. Studies for a new installation to replace JET will extend the programme, as will the creation of a laboratory within the JRC framework for the handling of tritium, the only radioactive material needed for fusion reactions.
- Renewable energy sources and better use of energy: these are equally vital for the reduction of the Community's dependence on external sources of energy. They are being studied by the JRC and in two coordinated research programmes covering laboratories in all Member States and worth 175 million ECU in 1985-88. One programme is devoted to renewable energy sources: solar heating of new buildings, the development of photovoltaic cells and of biomass resources, ways of using waste to generate energy, the study of resources and practicable technology for wind energy and the improvement of techniques for exploiting geothermal energy. A second programme is devoted to the more economic use of energy. It covers savings in the heating of buildings, in industry and transport but also the use of solid fuels (improved combustion, reduced nuisance), the development of new techniques (liquefaction and gasification of coal, synthetic fuels) and also improved planning of the supply and demand for energy. Both programmes are complemented by Community-aided demonstration projects which aim to allow experimentation on the ground, with full-scale

¹ See *European File*, No 12/82: 'The JET project and nuclear fusion'.

tests of new procedures or hardware.¹ The Community must earmark 360 million ECU for these projects between 1986 and 1989.

Reinforcing development aid

A 40 million ECU programme between 1983 and 1986 will help to improve agricultural production and profits in the Third World, to preserve natural resources and solve a range of medical, health and dietary problems. The European Commission has also called for a 60 million ECU support programme for research efforts in developing countries. Nonetheless, the Community remained far short of the targets set by its own framework programme.

Living and working conditions

- Protection against radioactivity: exposure to ionizing radiation can result not only from nuclear power plants but also the use of radiation in medicine and the natural radioactivity of the earth. Between 1985 and 1989 the Community will spend nearly 60 million ECU on research into methods of measuring radioactivity, protection against it, evaluating its risks and studying its genetic and any cancer-related effects. Money will also be spent on studying the control of radio-nuclear effects on the environment.
- Other health and safety programmes: the Community has for many years financed research into occupational diseases and safety in the coal and steel industries. More recently, it has taken an interest, albeit rather hesitant, in major medical and public health problems whose solution could be hastened by better coordination of national research.
- Environmental protection: a range of projects undertaken and cofinanced by national laboratories, as well as a 100 million ECU JRC programme for 1984 to 1987, will deal with the effects of pollution on health and the environment, techniques for reducing and preventing pollution and the preservation and protection of nature. Special attention will be given to acid rain, the impact of human activity on climate, teledetection of pollution from space and industrial risks. Here, again, increased coordination of national research could be especially beneficial; the European Commission has therefore proposed a new programme for which 105 million ECU would be earmarked over a five-year period.

Effectiveness of research potential and 'horizontal' activities

Community success demands general action, covering all research branches:

¹ See *European File*, No 1/83: 'Community demonstration programmes in energy savings and alternative energy sources'.

- Stimulation of cooperation and scientific and technical exchanges: far too frequently, European researchers communicate more freely with their American counterparts than with other Community countries. At the same time, young scientists often have problems finding jobs for which they were trained in their own countries, despite the under-utilization of equipment in other parts of the Community. In a special 60 million ECU programme for 1985-88, the Community hopes to lay the foundations for a genuine European scientific community by giving research and travel grants, supporting the twinning of laboratories and promoting multi-disciplinary research. Priority areas include mathematics and computer science, advanced optics, certain sectors of chemistry, biocommunication, earth sciences, oceanography and scientific instrumentation.
- 'Horizontal' activities: separate funds are needed to ensure that programmes are properly prepared and evaluated and also to improve scientific and technical training and the diffusion and application of research findings.



The implementation of the Community framework programme for research is well under way. The Commission's new strategic guidelines are being implemented. Previously most Community research efforts were concentrated in the energy field. Now a major change of direction has been accomplished, and well-accomplished for the most part, towards boosting industrial competitiveness. Similar progress has still to be completed in other areas but it is already clear that Community research policy has abandoned its long adolescence and hesitations and will shortly become one of the key policies of the European Community.

This new impetus – further strengthened by the Eureka project – resulted in the presentation of a memorandum by the European Commission to the European Council in Milan in June 1985. This memorandum, entitled 'Towards a technology Community', sketches the broad lines of policy which the Community should follow in the years ahead. This will require:

- The laying down by Member States at Community level of the main avenues of research strategy to be pursued at both national and Community level;
- The confirmation of the political will demonstrated by the European Council towards increasing the share of the Community budget devoted to research and development.

In Milan the Heads of State or Government of the European Community called for a collective effort to master new technologies as an essential prerequisite for continued European competitiveness. The Council decided, effectively, to give the Community a new technological dimension and endorsed the Commission report. The political will expressed by the Council must now be translated into concrete actions ■

The contents of this publication do not necessarily reflect the official views of the institutions of the Community. Reproduction authorized.

Commission of the European Communities

Information offices (countries fully or partially English speaking*)

Ireland 39 Molesworth Street, Dublin 2 — Tel. 71 22 44

United Kingdom 8 Storey's Gate, London SW1P 3AT — Tel. 222 81 22
— 4 Cathedral Road, Cardiff CF1 9SG — Tel. 37 1631
— 7 Alva Street, Edinburgh EH2 4PH — Tel. 225 2058
— Windsor House, 9/15 Bedford Street,
Belfast BT2 7EG — Tel. 40708

Australia Capitol Centre, Franklin Street, PO Box 609,
Manuka 2603, Canberra ACT — Tel. (062) 95 50 00

Canada Office Tower, Suite 1110, 350 Sparks Street,
Ottawa Ont. K1R 7S8 — Tel. (613) 238 64 64

USA 2100 M Street, NW, Suite 707,
Washington DC 20037 - USA — Tel. (202) 862-9500
— 245 East 47th Street, 1 Dag Hammarskjöld Plaza,
New York, NY 10017 - USA — Tel. (212) 371-3804

* Offices also exist in other countries including all Member States.