II

(Acts whose publication is not obligatory)

COUNCIL

COUNCIL DECISION

of 8 July 1991

adopting a specific research and technological development programme in the field of information technologies (1990 to 1994)

(91/394/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 130q (2) thereof,

Having regard to the proposal from the Commission (1),

In cooperation with the European Parliament (2),

Having regard to the opinion of the Economic and Social Committee (3),

Whereas, by Decision 90/221/Euratom, EEC (4) the Council adopted a third framework programme of Community activities in the field of research and technological development (1990 to 1994), specifying, *inter alia,* the activities to be pursued in the field of information technologies; whereas this Decision should be adopted in the light of the grounds set out in the preamble to that Decision;

Whereas Article 130k of the Treaty stipulates that the framework programme shall be implemented through specific programmes developed within each activity;

Whereas, in addition to the specific programme concerning human resources and mobility, it is necessary to encourage the training of research workers and engineers in the context of this programme;

Whereas, pursuant to Article 4 of and Annex I to Decision 90/221/Euratom, EEC, the amount deemed necessary for the whole framework programme includes an amount of ECU 57 million for the centralized dissemination and exploitation of results, to be divided up in proportion to the amount envisaged for each specific programme;

Whereas Decision 90/221/Euratom, EEC provides that a particular aim of Community research must be to strengthen the scientific and technological basis of European industry, particularly in strategic sectors of advanced technology, and to encourage it to become more competitive at the international level; whereas it also provides that Community action is justified where research contributes, *inter alia,* to the strengthening of the economic and social cohesion of the Community and to the promotion of its overall harmonious development, while being consistent with the pursuit of scientific and technical excellence; whereas the programme of research in the field of information technologies should contribute to the achievement of these objectives;

Whereas small and medium-sized undertakings (SMUs) should be involved to the maximum extent possible in this programme; whereas account should be taken of their special requirements without prejudice to the scientific and technical quality of the programme;

Whereas the constitution or consolidation of a specifically European industrial potential in the technologies concerned is an urgent necessity; whereas its beneficiaries must be research establishments, undertakings, including SMUs and other bodies established in the Community which are best suited to attain these objectives;

(1) OJ No L 174, 16. 7. 1990, p. 1.
(2) OJ No C 30, 6. 2. 1991, p. 16 and Decision of 13 June 1991 (not yet published in the Official Journal).
(3) OJ No C 41, 18. 2. 1991, p. 10.
(4) OJ No L 117, 8. 5. 1990, p. 28.

Whereas information technologies are becoming increasingly ubiquitous throughout both the economy and society; whereas they give a decisive boost to the competitiveness both of industry and of the services sector and improve working conditions as well as many aspects of personal life; whereas information technologies require a major research and development input, which is contingent on transnational cooperation; whereas micro-electronics, information processing systems, business and home software, computer-integrated manufacturing and the corresponding basic research were deemed priorities in Decision 90/221/Euratom, EEC;

Whereas basic research must be encouraged as far as is necessary throughout the Community;

Whereas, in the context of this programme, an assessment should be made of economic and social impact as well as of any technological risks;

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

HAS ADOPTED THIS DECISION:

Article 1

A specific research and technological development programme for the Community in the field of information technology, hereinafter referred to as the 'programme', as defined in Annex I, is hereby adopted for a period from 8 July 1991 to 31 December 1994.

Article 2

1. The funds estimated as necessary for the execution of the programme amount to ECU 1 338,48 million, including expenditure on staff and administration amounting to ECU 94 million.

2. An indicative allocation of funds is set out in Annex II.

3. Should the Council take a decision in implementation of Article 1 (4) of Decision 90/221/Euratom, EEC, this Decision shall be adapted accordingly.

Article 3

Detailed rules for the implementation of the programme and the amount of the Community's financial contribution are set out in Annex III.

Article 4

1. In the second year of implementation of the programme, the Commission shall review it and send a report on the results of its review to the European Parliament and the Council; the report shall be accompanied, where necessary, by proposals for amendment of the programme.

2. At the end of the programme, an evaluation of the results achieved shall be conducted for the Commission by a group of independent experts. This group's report, together with its comments, shall be submitted to the European Parliament and the Council.

3. The reports referred to in paragraphs 1 and 2 shall be established having regard to the objectives set out in Annex I to this Decision and in accordance with Article 2 (4) of Decision 90/221/Euratom, EEC.

Article 5

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

2. Contracts concluded by the Commission shall govern the rights and obligations of each party, in particular the arrangements for the dissemination, protection and exploitation of research results, in accordance with the provisions adopted pursuant to the second paragraph of Article 130k of the Treaty.

3. A work programme shall be drawn up in accordance with the aims set out in Annex I and updated where necessary. It shall set out the detailed objectives and types of projects to be undertaken, and the financial arrangements to be made for them. The Commission shall draw up calls for proposals for projects on the basis of the work programme.

Article 6

The Commission shall be assisted by a Committee composed of representatives of the Member States and chaired by the representative of the Commission.

The representative of the Commission shall submit to the Committee a draft of the measures to be taken. The committee shall deliver its opinion on the draft within a time limit which the chairman may lay down according to the urgency of the matter. The opinion shall be delivered by the majority laid down in Article 148 (2) of the Treaty in the case of decisions which the Council is required to adopt on a proposal from the Commission. The votes of the representatives of the Member States within the committee shall be weighted in the manner set out in that Article. The chairman shall not vote.

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

If the measures envisaged are not in accordance with the opinion of the committee, or if no opinion is delivered, the Commission shall without delay, submit to the Council a proposal relating to the measures to be taken. The Council shall act by a qualified majority.

If, on the expiry of a period of three months from referral of the matter to the Council, the latter has not acted, the proposed measures shall be:

— adopted by the Commission, in the case of matters covered by the second, third, fourth, fifth, sixth, seventh and eighth indents of Article 7,

— adopted by the Commission, save where the Council has decided against the said measures by a simple majority, in the case of matters covered by the first indent of Article 7.

Article 7

1. The procedure laid down in Article 6 shall apply to:

— the preparation and updating of the work programmes referred to in Article 5 (3),

— departures from the general rules set out in Annex III,

— the assessment of the research projects and accompanying measures provided for in Annex III and of the estimated amount of the Community's contribution to these projects and measures where that amount exceeds ECU 1 million a year,

— the participation in any project by non-Community bodies and undertakings as referred to in Article 8,

— the contents of the calls for proposals,

— any adaptation of the indicative breakdown of the amount set out in Annex II,

— the measures to be undertaken to evaluate the programme,

— arrangements for the dissemination, protection and exploitation of the results of research carried out under the programme.

2. Where, pursuant to the third indent of paragraph 1, the amount of the Community contribution is less than or equal to ECU 1 million a year, the Commission shall inform the committee of the research projects and accompanying measures and of the outcome of their assessment.

The Commission shall also inform the committee of the implementation of the concerted action projects referred to in Annex III.

Article 8

1. The Commission is hereby authorized to negotiate, in accordance with Article 130n of the Treaty, international agreements with third countries which are members of COST, particularly the member countries of EFTA and the countries of Central and Eastern Europe, with a view to associating them with the whole programme or a part of it.

2. Where framework agreements for scientific and technical cooperation have been concluded between the Community and European non-member States, bodies and undertakings established in those countries may, in accordance with the procedures laid down in Article 6 and on the basis of the criterion of mutual benefit, be allowed to become partners in an action undertaken within the programme.

No contracting body based outside the Community and participating as a partner in a project undertaken under the programme may benefit from Community financing for this programme. Such body shall contribute to the general administrative costs.

Article 9

This Decision is addressed to the Member States.

Done at Brussels, 8 July 1991.

For the Council

The President

W. KOK

ANNEX II

OBJECTIVES AND SCIENTIFIC AND TECHNICAL CONTENT

The approach embodied in the third framework programme (1990 to 1994), the scientific and technical objectives and the underlying aims which it pursues form an integral part of the programme.

Paragraph I.1.A of Annex II to the framework programme forms an integral part of the programme.

The following presents an analytical description of the content of the programme based, on and taking account of, the above elements.

The programme constitutes a new phase of the European strategic programme for research and development in information technology (Esprit), oriented towards the new generations of technologies.

The broad areas of work which will be supported are set out below. This work will build on the results of Esprit I and Esprit II; it will support work in areas in which the European information technology industry has established technological strengths as well as in areas where such industry is in a weak position.

The programme will be carried out in five areas:

Area 1: Micro-electronics;

Area 2: Information processing systems and software;

Area 3: Advanced business and home systems; peripherals;

Area 4: Computer-integrated manufacturing and engineering;

Area 5: Basic research.

Some major projects may cover several areas, for instance in the field of open microprocessor systems.

Accompanying measures comprise technology transfer and training activities carried out in each of the areas. They include special actions, which aim at increasing the potential for participation in Community R&D in information technology of organizations in peripheral regions and likewise their ability to make use of the results. They include acquisition of information, both within the programme and from the information technology (IT) community at large, training measures to increase advanced skill levels of research workers and engineers which are related to the programme's R&D work, as well as measures to create awareness of opportunities and availability of results including standardization-oriented results, and to develop synergies between participants and with the IT community at large. They also include the Information exchange systems for programme participants (IES) and participation in the Eureka project Cooperation for OSI networking in Europe (Cosine). Specific information on projects will be provided in close cooperation with the Community R&D information service (Cordis). These measures will be complementary to other existing activities at Community, national and international level, and take into account the requirements of subsidiarity and economic and social cohesion.

The impact of the programme on both society and the individual user will be duly taken into account where necessary.

AREA 1: MICRO-ELECTRONICS

In micro-electronics, which provides the technology foundation to information technology and telecommunications, the three main strategic actions will be to:

— contribute to the strengthening of a European technology base on which future manufacturing capability of a broad range of leading edge ICs can be based. This will be done by stimulating the exploitation, and building on and extending the work which has been performed in the previous phases of Esprit and in the national programmes. Strategic work on very advanced submicron CMOS technologies will be carried out in synergy with the Joint European submicron silicon project (Jessi), taking into consideration the different research emphasis performed by Community programmes and Eureka, the need to avoid overlaps, and the need to safeguard the cohesion requirements and subsidiarity principle.

— strengthen the capabilities in the Community with respect to the chain of designing manufacturing, testing and applying advanced and reliable integrated circuits,

— draw on all the resources available, ensuring wide participation of the largest number of potential actors (large and small industries, both producers and users, universities and research centres) in the Community. Particular emphasis will be placed on novel applications by end-users.

Emphasis will be on application-specific integrated circuits (ASICs). These include multifunction circuits, high density circuits, high speed circuits, optoelectronic circuits, advanced power circuits ('smart power'), new equipment manufacturing technology and materials for advanced integrated circuits.

Work on high density integrated circuits will centre on 0,5 to 0,3 micron silicon (Si) complementary metal oxide semiconductor (CMOS) technology. In addition to the actual lithography and other semiconductor process and material technologies, computer-aided design (CAD) tools and systems capable of designing and testing at higher complexity levels (between four and eight million transistors of mixed memory and logic) will be developed.

Work on high speed integrated circuits will address both silicon bipolar and III—V technologies for digital and analog circuits. The work includes semiconductor technology and materials and specific aspects of design and testing of high speed ICs (for instance for high frequency digital integrated circuits).

Activities that have now become crucial and deserve special attention include equipment, materials (III—V based, Si-related and innovative), manufacturing science and technology, as well as packaging and connectivity (comprising electrical and optical solutions). Work in this area will aim to improve the manufacturing capability of the European integrated circuit industry by addressing all the aspects that are necessary to achieve higher quality low cost integrated circuits. This includes R&D in equipment engineering, automation, clean room technology and quality control. One of the main objectives will be to reinforce the cooperation of equipment and IC manufacturers, since this is recognized as a central element for the timely development of the type of equipment required for the very fine geometries and large wafer size of state of the art integrated circuits. Concerning design aspects, work in the area of tools development, improvement and integration of CAD systems and the strengthening of standards activities, notably by the development of a common CAD framework, need to reflect the requirements of users. For microwave and opto-electronic circuits, work will be undertaken to improve manufacturability and cost effectiveness for widespread use of these circuits in satellites, telecommunications, instrumentation and dataprocessing.

Enabling work on integrated systems of increased performance and reduced size and cost will progress towards the 'system on a chip' through the development of flexible processes that allow the combination of various features on one chip such as digital and analog functions, non-volatile memory, low voltages, power switching and sensors. Such features will be integrated into a standard submicron digital CMOS process. The increased process complexity requires special measures to achieve sufficiently high yields. Special CAD tools which are, for example, capable of simulating the different functions on the chips, are also required.

The longer-term, most innovative aspects of the work in micro-electronics will be carried out taking into account the achievements and the objectives of the area 'Basic research', thus securing overall coherence in this sector, within the programme.

Technology transfer, training and other accompanying measures will be undertaken where there is a specific need for action to establish closer links and access to sources of IC supply in Europe. In particular a set of measures will be established, building around the achievements of projects addressing ASICs, and bringing coherence to initiatives undertaken to provide support and stimulation for small and medium enterprises in the use of micro-electronics; measures to tackle specific skill deficits that can only be addressed in cooperation with industry (for instance, those that require access to industrial facilities) will be undertaken.

AREA 2: INFORMATION PROCESSING SYSTEMS AND SOFTWARE

The main lines of action in information processing systems and software aim at exploiting potential technological breakthroughs in concurrent architectures, at providing better interfaces to satisfy the needs of end-users, and at promoting the take up of new software production technologies.

Concurrent architectures are seen as the key to future breakthroughs in the cost/performance ratio of computers. Work in this area will lead to a minimal set of machine architectures needed to satisfy selected target applications with around 10^5 computing elements. Concurrent systems will ease improvements to be made in systems reliability and security. The work will be driven by user needs and be based on standards which support new systems and services.

Advanced experiments to validate and benchmark selected parallel architectures may be included. It will take the requirements of distributed computing and of real-time applications into account. It will, in particular, concentrate on tightly coupled and homogeneous systems. Operating systems allowing information sharing between existing systems and newly emerging parallel operating systems and languages will be addressed. Enabling research for high performance technical and scientific workstations based on parallel architectures will be performed. This will build upon existing work and be linked to plans for subsequent exploitation which will take place by industry itself or through other mechanisms such as Eureka. Accompanying the substantial increases in computing power is the need to manage and process great increases in the volume of information currently available. Current data management technologies are estimated to be able to cope with only 5 % of the information available to the average organization, yet information is increasingly an organization's most critical asset. New technologies based on a convergence of knowledge-based techniques and highly parallel architectures are needed. These must deal with volumes and data rates of several orders of magnitude above those currently managed. The ranges of data types and media should be substantially increased.

Future generations of computers will not only need better and more reliable performance, they will also need better interfaces to satisfy the needs of end users, especially man-machine interfaces. Efforts will be undertaken aimed at establishing provision of user interface management tools. The work will build on existing results and will place emphasis on systems for the perception and synthesis of information from highly complex signals. These concern, in particular, human speech recognition and image understanding. Such interfaces will employ not only conventional techniques with improved integration but increasingly the understanding of direct speech, the use of animated graphics and the introduction of new techniques of interaction using movement and gesture. Furthermore, systems are increasingly required to interact with their external environment in a fully automatic manner via vision, acoustic and other sensory elements. The need for automatic inspection and scene interpretation is growing rapidly and covers applications ranging from improved industrial robotics, through environmental monitoring to medical imaging. Of particular relevance are architectures that will include a range of sensory devices, cope with an increasing range of signal types and rates and deal with real-time interpretation.

In the majority of IT systems the software component is now seen as the dominant element of cost. Constraints in European software production capabilities are now seen as the most critical problem for the IT industry. Tools and methods to support systems integration and to increase software productivity will be enhanced where significant progress can be expected, for instance, in real-time applications. The work will build on existing or emerging standards and aim at harmonizing European activities. Particular attention will be paid to portability of software, re-usability and design of standardized modules. Renewed emphasis, concentrating particularly on the transfer of modern design methods into common use, will be given to improving productivity, quality and security. Industrialization of software engineering tools and environments will be encouraged by the demonstration of applications. This work includes the industrialization of knowledge engineering techniques, in particular as complements to existing conventional systems engineering techniques.

Measures will be undertaken to promote the take up of new software production technologies and to increase skill levels on a broad scale. This will include training oriented to industrial needs. These measures will build on the results of projects under Esprit, Eureka and Member States' programmes concerned with the provision of industrial methods and tools. The activities will be closely coordinated with, and complementary to, existing dissemination mechanisms, including use of existing mechanisms, wherever possible.

AREA 3: ADVANCED BUSINESS AND HOME SYSTEMS; PERIPHERALS

Advanced business and home systems will aim for function integration in the business environment as well as in and with the home environment. It will also aim at easing the use of systems. An especially high priority will be given to prenormative work. Distributed computing, including data base management, and also the corresponding workstations and microprocessor systems and technologies will be of major concern throughout the activities. The work in distributed computing will, in particular, concentrate on loosely coupled and heterogeneous systems. Systems assurance experiments will be carried out, as appropriate. In this context, the integration of tools and facilities in specific applications of real user interest will be demonstrated, as well as the integration of different streams of activity leading to more efficient data flow across organizations.

Two complementary, but inter-related areas are addressed.

Research and development (R&D) work on integrated business systems addresses the information flow across departments and sites within an undertaking and enables the close integration of various activities between functional units. It includes the integration of mobile terminals into business information systems, where close links need to be established with the work undertaken in the specific programmes on communication technologies

and telematic systems. In this context, systems for cooperative work play an important role. They allow cooperation through the provision of, for example, the following facilities: cooperative writing, file processing, project management, decision making, informal interaction, problem definition and conferencing. Another strategically important research direction is open systems for the integration of heterogeneous software components supporting different applications, including multimedia systems. The improvement of working conditions and job-level qualifications are of major concern.

The R&D activities concerning intelligent homes and intelligent buildings are partially similar to those concerning integrated business, but obey different boundary conditions concerning functionality and cost. In particular, aspects of consumer electronics need to be taken into account. The work will include requirements analysis, functional specifications and prenormative work, and will aim at integrating IT with other building functions such as security, privacy, voice and document communication, heating, lighting and energy management. Various aspects of quality of life, such as ergonomics and improvement of working conditions, are of particular relevance.

In the context of business and home systems, peripherals are taking on increasing importance. The objectives of R&D work in peripherals are efficient system integration based on open standards and reinforcement of the scientific and technological bases for new generations of peripherals, which are reliable, cheap and capable of being produced in large quantities. In order to contribute to the renewal of a European industry in the field of components and sub-assemblies for peripherals through R&D, synergies between producer and user industries need to be established, and a critical mass must be reached.

The peripherals technology activities will focus on selected areas where there is a potential European manufacturing capability and good prospects for exploitation. The work will include R&D aspects of specific peripheral technologies for future generations of peripherals. Special emphasis will be put on flat panel display technologies, magneto-optical storage systems, non-impact printing technologies, and scanning technologies. Product development will not be supported, but it is expected that the work will be linked to plans for subsequent exploitation which will take place by industry itself or through, for instance, Eureka.

Specialized technology transfer and training measures in the field of advanced business and home systems and peripherals will be undertaken. These include demonstrations of advanced IT solutions suited, in particular, for small undertakings.

AREA 4: COMPUTER-INTEGRATED MANUFACTURING AND ENGINEERING

The activities aim at providing the technology base for open systems, multi-vendor systems and distributed operations in engineering and manufacturing environments as well as to contribute to better integration of advanced IT systems components in engineering industries. The work will focus on new generations of basic computer-integrated manufacturing (CIM) technologies and on demonstrating their applicability in selected manufacturing and other engineering domains. Complementarity with the specific programme on industrial and materials technologies will be assured. Computer integrated manufacturing and engineering will cover the development of advanced solutions, systems, tools and methods, which will be carried out in conjunction with leading edge users as appropriate.

R&D work will include technological infrastructure and application experiments. Technological infrastructure work will involve the development of the advanced CIM techniques, methods and tools to facilitate manufacturing and engineering applications within the different domains where IT is of particular strategic importance. Software aspects are of increasing relevance in this context. Aimed at improving cost-efficiency, flexibility and high quality, the approach will be based on open-system concepts supported by appropriate prenormative work, and will recognize the multi-site, multi-supplier nature of most engineering undertakings. Topics include logistics and distribution, communications and architectures for engineering applications, the management of industrial processes, engineering design, robotics and equipment technologies (control and instrumentation), mechatronics and microsystems. On-line quality assurance technologies will be developed to ensure safe and reliable operation of products and processes throughout their total life cycle.

Building on the results already achieved in Esprit, new engineering test-beds will be addressed. Vendor industries involved include system integration and software houses, manufacturers of computers and communications equipment, machine tools, robots, autonomous vehicles, cranes, electronics, control and instrumentation, sensors and actuators. Work will be geared to serve the small and medium-sized users, who form the majority of all engineering undertakings, as well as the large users who lead the field in the application of high technology. Collaboration between users and vendors will continue to be strongly encouraged.

Application experiments which focus on standards and codes of practice and which seek to validate advanced IT solutions will be carried out in discrete parts manufacturing, process industry applications, and other engineering applications. In this context may also be addressed the specific requirements of mass manufacturing. Attention will be paid to cleaner industrial operations.

The existing profile of human resources in this domain does not yet match the demands of the advanced manufacturing and engineering industries and this will limit progress if not swiftly addressed. Technology transfer and training activities will be most effective if there is a multi-disciplinary approach, if users are strongly involved, and if they are closely coupled with the R&D activities, in some cases actually as part of major projects. Thus, a broad range of actors, in particular small and medium-sized undertakings, will be able to benefit from the results of the programme, not only through participating in R&D projects, but through specific technology transfer and training activities. Specifically tailored training actions will include the possibility to involve students and young graduates in demonstrator projects.

AREA 5: BASIC RESEARCH

Basic research actions contribute to maintaining and expanding the knowledge and expertise which underpin the scientific basis of European information technology. Areas that such actions support are selected on the grounds of:

— Their potential to produce future breakthroughs or important advances even if they have no immediately visible application. Particular emphasis will be given to topics which are expected to have long-term industrial potential,

— their ability to benefit from the added value which cooperation on a European scale provides,

— their positioning clearly upstream of R&D efforts, while contributing to the overall aims of the programme.

— the reinforcement of interdisciplinary links.

Research is planned for the achievement of low noise and high speed elements through the use of low temperatures and by incorporation of new high temperature superconductivity materials. The need for ultra-high complexity components, which will build the hardware base for future massively parallel systems, will lead to research in the nanometre scaling of electronic circuits. This includes investigations of physical properties of organic and of optical materials with high potential for application in IT devices and systems. Complementarity with activities in material research carried out in the specific programme on industrial and materials technologies will be established. Research on future hardware possibilities will be complemented by activities on the new generation of hardware design methodologies.

Breakthroughs needed for the effective and efficient software engineering of the future, and to some extent of computing systems generally, will be predicted on the strengths of the formal description of systems. Therefore, the logical and algebraic foundations of computer science will be addressed providing the necessary framework for the development of concurrent systems, efficient parallel and sequential algorithms, specification and verification techniques, as well as the next generation of programming languages and algorithms. With the target of enabling reliable distributed systems, basic research will be encouraged on dependable distributed systems and integrated databases.

Constraints still existing in the fundamental principles of artificial intelligence are limiting the necessary improvements in many application areas where a change from currently available dataprocessing and networking to more intelligent systems and procedures is required. To help overcome this, basic research will be addressed to massive parallelism, neurocomputing and other critical issues in this field which include the handling of uncertainty and knowledge representation, theories of automated manufacture and human-computer interaction.

Measures in technology transfer, and training will aim at establishing and maintaining close links with the industrially-oriented activities within the programme.

In the context of basic research, the growing problem of skill shortages will be addressed in universities and research centres. Both technology transfer and training demand the emergence of European networks of excellence in different areas of IT. Basic research is uniquely positioned to play an important role in meeting this demand by acting as a catalyst for the emergence of such networks of excellence. Within this context, close coordination will be established with other Community activities in this area.

ANNEX II

INDICATIVE BREAKDOWN OF THE AMOUNT DEEMED NECESSARY

(in million ecus)

Area	Breakdown
1. Micro-electronics	388
2. Information processing systems and software	335
3. Advanced business and home systems; peripherals	227,48
4. Computer-integrated manufacturing and engineering	254
5. Basic research	134
TOTAL	1 338,48 (1) (2)

(1) Including expenditure on staff which comes to ECU 53 million and administrative expenditure totalling ECU 41 million. Between 2 and 5 % of the total appropriations will be spent on the training of research workers and engineers.

(2) An amount deemed necessary of ECU 13,52 million, not included in the ECU 1 338,48 million, will be earmarked as the contribution from the programme to the centralized scheme for the dissemination and exploitation of results.

The breakdown between different headings does not exclude the possibility that projects could come under several headings.

ANNEX III

RULES FOR IMPLEMENTING THE PROGRAMME

1. The Commission will implement the programme on the basis of the objectives and the scientific and technical content described in Annex I.

2. The rules for implementing the programme, referred to in Article 3 of the Decision, comprise research and technological development projects, accompanying measures and concerted action projects. Selection of projects must take account of the criteria listed in Annex III to Decision 90/221/Euratom, EEC and of the objectives set out in Annex I to this programme.

   — **Research projects**

   The projects will be the subject of shared-cost research and technological development contracts, with Community financial participation not normally exceeding 50 %. Universities and other research centres participating in shared-cost projects will have the option of requesting, for each project, either 50 % funding of total expenditure or 100 % funding of the additional marginal costs.

   Shared-cost research projects must, as a general rule, be carried out by participants established within the Community. Projects in which, for example, universities, research organizations and industrial firms, including small and medium-sized undertakings, may take part must provide, as a general rule, for the participation of at least two partners, independent of each other and established in different Member States. These two partners will normally be industrial undertakings, except in the case of projects relating to basic research. Contracts relating to shared-cost research projects must as a general rule be concluded following a selection procedure based on calls for proposals published in the *Official Journal of the European Communities*.

   — **Accompanying measures**

   The accompanying measures referred to in Article 7 of the Decision and described in Annex I, will be implemented through, *inter alia:*

   — the organization of seminars, workshops and scientific conferences,
   — internal coordination, by the creation of integrating groups,
   — advanced technology training programmes,
   — an information exchange system,
   — promotion of the exploitation of results,
   — independent scientific and strategic evaluation of the operation of the research projects and the programme.

   — **Concerted action projects**

   Concerted action projects consist of action by the Community to coordinate the individual research activities carried out in the Member States. They may benefit from funding of up to 100 % of coordinating expenditure.

3. The knowledge acquired in the course of the projects will be disseminated both within the programme and by means of a centralized activity, pursuant to a decision as referred to in the third subparagraph of Article 4 of Decision 90/221/Euratom, EEC.