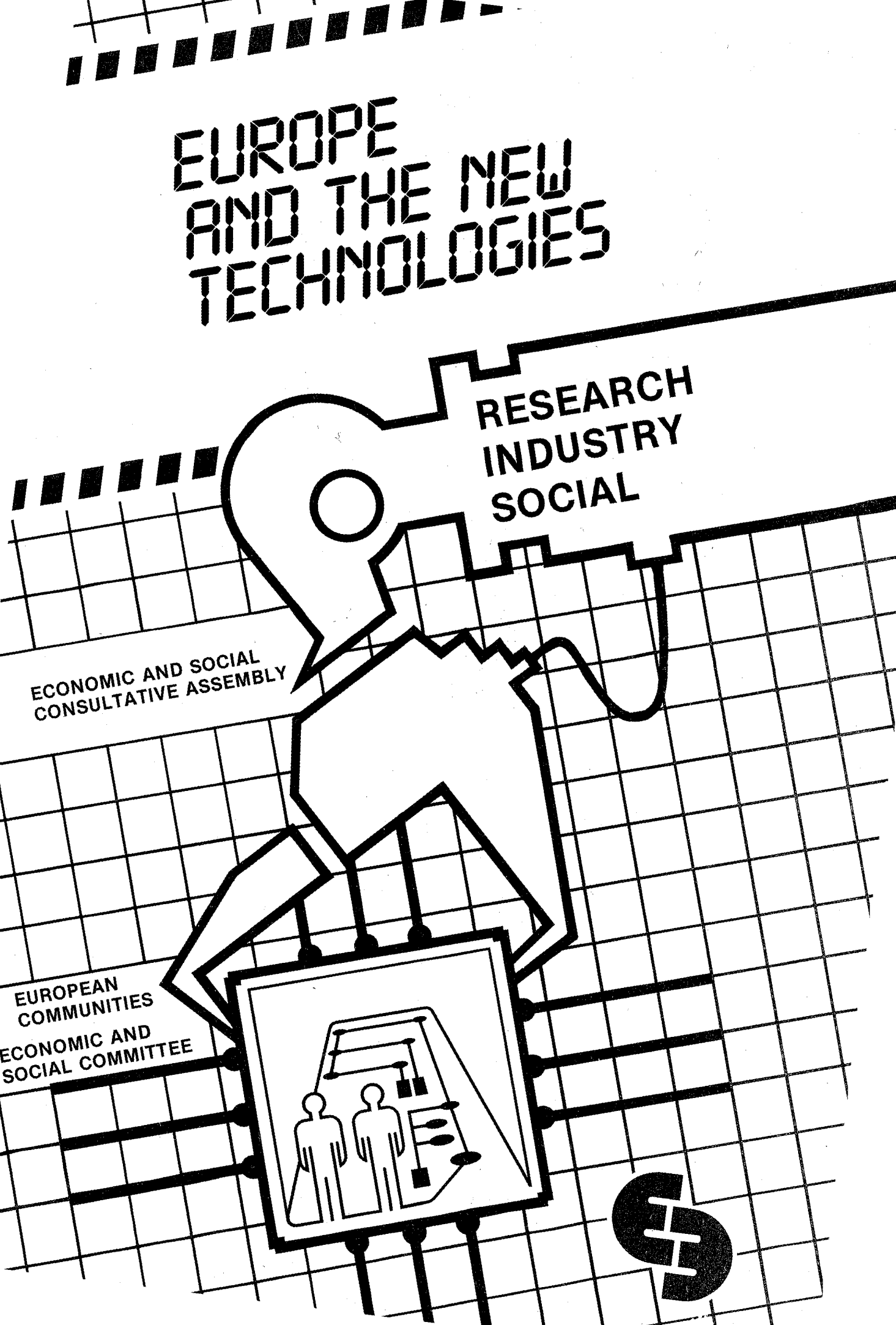
EUROPE AND THE NEW TECHNOLOGIES

RESEARCH
INDUSTRY
SOCIAL



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EUROPE AND THE NEW TECHNOLOGIES

R & D
INDUSTRY
SOCIAL ASPECTS

Brussels 1986

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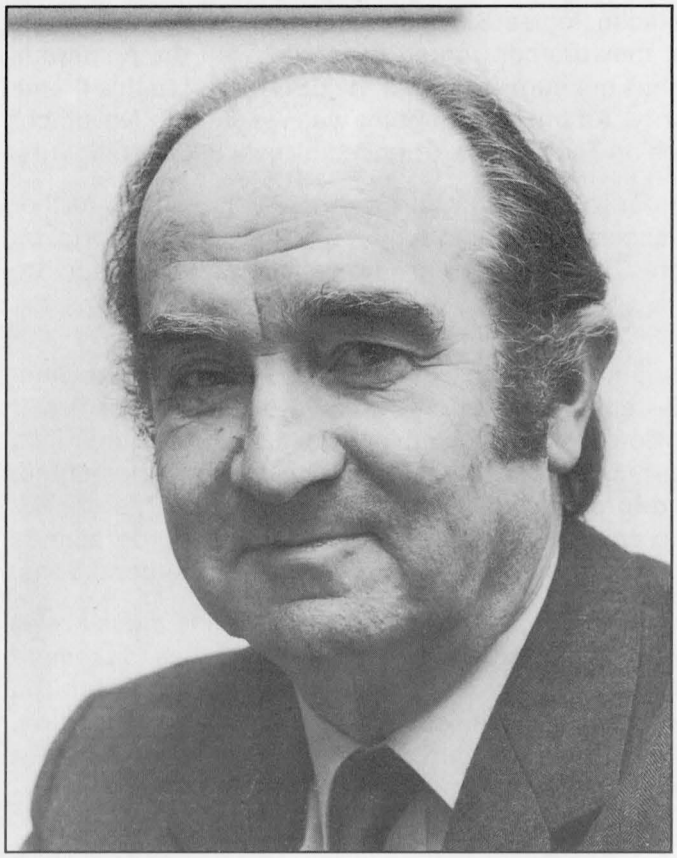

Mr Gerd MUHR,
Chairman of the Economic and Social Committee

INTRODUCTION

The new technologies are one of the greatest challenges of our time. They are the cause of radical economic and social changes. If there is talk about a third industrial revolution, that is precisely because the magnitude of their impact is so great. There is, however, great and widespread concern that Europe is lagging behind and must struggle even to hold its ground in the face of its major competitors, the United States and Japan.

There is broad agreement on the reasons for Europe's difficulties with the new technologies. The main causes are identified as the lack of a large unified market, which is necessary if production costs are to be brought down; the compartmentalization of the public purchasing market; the duplication of research work; the failure to exploit research findings in processes and products; and the insufficient contribution of small firms as a result of numerous bureaucratic and economic obstacles such as the lack of risk capital and many other factors. In short, the European dimension is lacking.

Alongside these problems, which ultimately affect the ability of European industry to compete internationally, there is the equally important question of the social consequences of the new technologies. The main problems concern the revamping of our education systems, the re-organization of work, and worker participation.

How can our society keep technological change under control? How can we ensure that change is accepted? What positions are the social partners to adopt?

Technology is not an end in itself but a means of making our life and our work easier. It should lighten the individual's workload and enhance the prosperity of society. And if it were to give rise to unforeseen and harmful changes, such as to threaten the very foundations of consensus on economic and social issues, then a reaction would be called for from the community as a whole to set things straight.

As a forum for the Community's economic and social interest groups, the ESC cannot remain indifferent to developments in the field of new technologies. Since the ESC's members are primarily concerned with the practical aspects of life, they are confronted every day with the numerous consequences of the new technologies. It is thus not surprising that the ESC turned to this theme at an early stage and awarded it a high priority. An initial high-point was reached in November 1984 when it organized a European Conference on Technology, attended by over 500 participants.

At this conference it became clear that in order to keep up to date with developments, further work should be carried out. This publication accordingly contains three Information Reports, on **R & D, Industrial Aspects** and **Social Aspects**. The Reports show how closely these fields are inter-related.

I. The first Report covers research and development (R & D). It compares expenditure on technological R & D in the Member States, the USA and Japan, showing how the trend is for R & D spending to increase more rapidly than gross domestic product. It looks at how the Community's own 1984-87 Framework Programme for scientific and technical strategy is being implemented, in terms of actual versus estimated expenditure for the major research areas. This shows, alongside the long-standing EC emphasis on energy, a growing concentration of programmes linked to industrial competitiveness and to the improvement of living and working conditions.

The Report looks again at the so-called technological gap. It emphasizes the need to press ahead with university-industry cooperation (the EC's COMETT programme) and with measures to promote the more efficient and quicker utilization of the results of EC R & D (a subject with which the Economic and Social Committee is actively concerned). The keynote, it says, must be cooperation, cooperation between the Member States and the EC, between firms in different countries, between research institutes and universities, and between the firms and the institutes.

The Report gives its full support to the Commission proposals and calls for a larger share of the Community budget to be devoted to technological R & D activities. The Report likewise welcomes the EUREKA project's main philosophy which is to encourage cooperation between European firms. Nevertheless, it is essential for the EUREKA project to be brought in line with the Commission proposals. The Commission should be given full responsibility for coordinating all technological R & D activities throughout Europe, in order to ensure that these activities are complementary and that technological developments within the European Community are better balanced.

Finally, the Report stresses the importance of socio-cultural factors in gaining acceptance for innovation, encouraging the marketing of technological R & D findings and pressing ahead with the process which should lead to a European technological Community.

II. The second Report, on Industrial Aspects, sets out the following main conclusions:

— From a company's point of view, the new technologies are an important element in innovation strategy.

— Only innovative companies will survive the major changes which are underway.

— Only with a thorough knowledge of the possibilities and effects of the new technologies needed can a company develop new products through effective product innovation.

— Successful innovation is the result of a number of factors both within and more especially outside the company.

— If Europe as a whole and the majority of European countries and companies wish to remain competitive, they must increase their innovative capacity.

Europe has all the prerequisites to be as innovative and efficient as the USA and Japan, and in some cases has proved to be so.

Awareness of the gap between practice and potential has increased, and in recent years there have been many moves to minimize this gap.

The examples of successful cooperation on large-scale projects provide an indication of the path to take in the future.

The European Community can play a crucial role by taking action in three main areas:

— The first type of action involves directly increasing familiarity with new technologies. The aim must be to avoid dangerous gaps in the fabric of knowledge which would gradually weaken its whole structure. The targets of these measures would be public and private sector research centres, and companies. The instruments are the Community programmes, laying great stress on international cooperation.

— The second kind of action involves the creation of a genuine large internal market. The Commission White Paper is fundamental to this. The proposed schedule will require a full commitment and a will to succeed on the part of all the Member States and social groupings involved. We must realize that a further failure or excessive delay could mean the definitive failure of the plan to build a true Community. The creation of a European market could give rise to beneficial cooperation and rationalization. In the public supply sectors (energy, transport, telecommunications, etc.) in particular, this could lead to the creation of real pluri-national companies.

— The third area in which the Community can deploy resources to maximum effect is that of large-scale projects. The basic feature of this new initiative should be the commissioning from international consortia of prototype products or systems (as a rule, the minimum unit value of projects should be not less than 100m to 150m ECU). The items to be commissioned should be close to the marketing stage and have a high new technology content.

European industry can meet the challenge posed by the new technologies. However, promotional action at international and Community level must be strengthened and made more effective. The path to take must be to:

— ensure that scientific and technological knowledge keeps fully abreast of development;

— encourage the creation of continent-wide demand with a high innovative content, particularly large-scale projects;

— encourage the creation of true European supply capability.

III. The Report on the Social Impact of the New Technologies takes as its starting point the basic assumption that in themselves the new technologies are neither positive nor negative and that it is the way in which they are applied and used that gives them positive or negative aspects. The Report examines how new technologies can be introduced in a socially acceptable way.

It can be assumed that over the next ten years 40%-50% of all jobs will be affected by the introduction of new technologies. Positive effects on employment cannot be expected yet as the technologies currently being introduced are increasingly affecting low-skill groups - i.e. jobs lending themselves to automation. In the Community metal manufacturing and mechanical engineering industries alone, 160,000 to 400,000 jobs will be shed due to the introduction of robots and automated machinery. Offsetting this, an estimated 4 to 5 million jobs could be created in the Member States by 1995 as a result of new technologies.

In the light of this situation, the ESC urges that greater emphasis be placed on qualifications. As the Report points out: "People working in the areas affected must acquire new skills in order to keep pace with the introduction of new technologies and to remain eligible for satisfying work". It is also important to make training staff aware of the inter-relationship between new technologies, organization of work, and skills.

Another key issue which the Report tackles is "participation". Trust must be established between employers and workforce and a common social approach agreed for the efficient introduction of new technologies. The involvement of everyone working with the new equipment must be ensured. Given the problems of getting new technologies accepted, participation and cooperation by workers is increasingly important.

The impact of technological change is not confined to the workplace. Information and communications technologies will affect virtually all areas of the economy and society. The boundaries between the place of work and the private sphere are becoming blurred as a result of this transformation, for example in the shape of home terminal work.

In its conclusions, this Report focusses on the following points:

— the new perspectives opened up by the introduction of new technologies;

— the changes in economic, investment and social policy needed for the efficient use of the new technologies;

— the socially acceptable growth areas in which new technologies can be used to good effect, and the qualitative aspects of their introduction;

— the requirements to be taken into account for the introduction of new technologies and the role to be played by the Community;

— the studies and research to be conducted on the social consequences of the new technologies;

— the role of the European Foundation for the Improvement of Living and Working Conditions;

— the need to develop the IRIS programme (Initiative for Research in Informatics applied to Society).

The Report concludes by stating that in our application of technological knowledge (and hence in our technology policy) we must be guided by that which we consider to be good, right and responsible. It is not enough to calculate the financial or economic cost or benefit of specific technologies; we must also make a moral judgement of actions relating to technology and technology policy.

IV. The Reports are accompanied by a particularly interesting appendix which lists the relevant Community or European-wide programmes and organizations. To our knowledge, such an exhaustive list is not to be found elsewhere.

V. In conclusion, a comment must be made on the procedure followed here. The Reports were prepared by the Energy, Industry and Social Sections for the benefit of the ESC Plenary Session, which examined them at its meeting of 30 January 1986.

Unlike Opinions, amendments to such Reports may not be tabled at the Plenary Session. As a result, divergent points of view may not emerge as clearly as in the case of Opinions. The fact that the ESC decided unanimously to send these documents to the other Community bodies does, however, clearly prove that they broadly reflect the ideas of the economic and social interest groups represented on the Committee. The Reports also set out all the latest information at the Committee's disposal and should thus serve as a basis for future work on the subject.

Gerd MUHR

Brussels
February 1986

INFORMATION REPORT
on
NEW TECHNOLOGIES
EUROPEAN COMMUNITY R & D

Rapporteur: Mr Tomás ROSEINGRAVE

The Section for Energy and Nuclear Questions(*)
adopted this Information Report on 10 January 1986.

(*) This Section is also responsible for research and technology in general.

Mr Roseingrave, Rapporteur

The preparatory work was done by the Section's Study Group on New Technologies, made up as follows:

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	Mr	MARGOT	B
	Mr	NIELSEN P.	DK
	Mr	SATU	F
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Section Chairman:	Mr	ROMOLI	I
Experts:	Mr	WARD	
	Mr	APARO	
	Mr	COCCO	
	Mr	DE BANDT	

CONTENTS

INTRODUCTION

In dealing with the research aspects of the current new technologies debate, this Information Report will avoid producing a static presentation of the situation as it is, and instead endeavour to take a dynamic approach by indicating the opportunities open to the EC in TRD. The Report will in some respects continue where the Opinion on Research Priorities[1] ended.

It will not usurp the role of scientists and specialists by making a detailed analysis of research programmes. The Section will examine the present position, beginning with information on Community research, development and demonstration activities and an overview of the available information on expenditure on technological research and development in the Member States. In the present situation the principal goal cannot merely be to approach American and Japanese levels. Instead it should be radically to rationalize our work in this field and to step it up to unprecedented levels. It should be to ensure that maximum effort is being exerted, to make the most efficient use of time and expenditure devoted to technological research, as well as ensuring its swift implementation. Whilst not as an end in itself, the Community must try to reduce and, if possible, eliminate as a sine qua non for economic and social progress, the adverse developments occurring in European society.

A strategy for research and development involves:

— Definition of objectives;

— Examination of means and resources;

— Diagnosis of deficiencies;

— Planning for organization efficiency.

Following the presentation of information on current EC technology research and development programmes, the efficacy of the current Community strategy will be discussed. Particular attention will be paid to the potential of the coordinating role of the Commission and to the organizational problems which rapid, multiple and fragmentary programme development could produce. The Commission document "Towards a European Technological Community" (COM(85) 350 final) and its sequel (COM(85) 530 final) will be dealt with in the final section.

(1) OJ No. C 160 of 1 July 1985

1. AN INVENTORY OF CURRENT COMMUNITY TECHNOLOGICAL RESEARCH AND DEVELOPMENT PROGRAMMES, AND A BRIEF DESCRIPTION OF THE MOST IMPORTANT RECENTLY-INITIATED PROGRAMMES

Inventory

A comprehensive inventory in highly synthesized form is provided by the CREST review of Community Research Development and Demonstration Activities. The most recent such review available (CREST/1203/85) is reproduced overleaf.

Description of some recent initiatives

European File 15/85 (October 1985) on European Research Policy provides a brief outline of the rationale and scope of EC R & D and gives a clear account of the major Community research programmes. In this section of the Report the intention is to provide information on relevant **recent** initiatives.

The Memorandum "TOWARDS A EUROPEAN TECHNOLOGY COMMUNITY" (COM(85) 350 final of 25 June 1985), complemented by the Communication of the Commission to the Council on the Implementation of the Commission's Memorandum "Towards a European Technological Community" (COM(85) 530 final of 30 September 1985).

As stated in point 2, (page 4) of the first of the two Commission documents:

> *The fundamental objective is to strengthen the technological bases of European industry and to develop its international competitiveness.*
>
> *To serve this objective, the Technology Community must have the remit and the resources to carry out certain actions in the interests of the Community; to conduct technology research and development programmes with the participation, which may vary from one programme to another, of the Member States, firms and research centres, and to carry out horizontal or back-up measures in support of the TRD programmes.*
>
> *It is not proposed at this stage to put forward a definitive plan, but the main types of measure.*

Commission Vice-President NARJES, in his introductory statement to the Section's September 1985 debate on "Research and Technology in Europe" (CES 736/85), explained that in this document:

> *... the Commission listed projects which they had selected because of their potential industrial and socio-economic impact. At this stage, they should be regarded as examples rather than as final proposals. They include information technologies, biotechnologies, new materials, lasers and optics, large scientific instruments, broad-band telecommunications, new generation means of transport, use of space, mastering the marine environment and education and training technologies.*

CIT

The Plan for the Transnational Development of the Supporting Infrastructure for Innovation and Technology Transfer (CIT) can be described briefly by quoting from the First Annual Progress Report on the Council Decision (83/624/EEC) given in the Commission's DG XIII Newsletter of July 1985 (No. 43) "New Technologies and Innovation Policy":

The philosophy behind the plan

The Council Decision is based on the following three aims. As a general principle, action should be taken to ensure that more inventions and ideas do indeed mature into new projects and methods, while there should also be a reduction in the time now elapsing between the invention and the marketing of a given product or process. At the same time, the necessary action should be taken by the Community - since it alone can do this effectively - to derive real benefit from the advantages offered by the large economic unit of the EEC with its gradual resemblance to a single domestic market. In order to do this, the plan relies predominantly on two direct methods and one indirect method:

- *the stimulation of personal contacts across frontiers in fields that are important for innovation and technology transfer, as a means of accelerating information flows and developing mutual trust;*
- *stimulation of cross-border exchanges of information in the fields of innovation and technology transfer by collating appropriate technical information and supporting specialized information media;*
- *improving the effectiveness of national and regional innovation policy through exchanges of experience and, where necessary, coordination.*

COMETT

This proposal was submitted to the Council by the Commission with the title: "Adopting an Action Programme of the Community in Education and Training for Technology - COMETT (1986-1989)". This proposal was agreed to by the Council for Social Affairs on 5 December 1985. The four main objectives are summarized as follows:

- *to promote the European dimension of cooperation between university and industry in advanced level training relating to innovation and the development and application of new technologies;*
- *to promote the exchange of experience, the pooling of resources and the realization of economies of scale, through the joint development of advanced training programmes;*
- *to strengthen and diversify provisions for advanced training at local and regional level and contribute to the balanced economic development of the Community;*
- *to identify progressively gaps and new priorities in existing training policies and provisions which could be filled by supplementary action both within Member States and at Community level.*

IRIS

The "Initiative for Research in Informatics Applied to Society" (IRIS) is an Italian Government initiative launched in June 1985. It has a three-fold aim: to stimulate research on information technology-based products and processes which could improve the quality of life of the European citizens; could contribute to developing and maintaining employment; and could favour the mastering of the European market of the New Information Technology (NIT)-based "social products" for the European enterprises - a market which is likely to grow progressively.

There are mainly seven areas to which applications are foreseen:

— medicine and health
— security and privacy
— education and training
— culture and communication
— social services
— environment, ecology and agriculture
— traffic management.

EUREKA

The proposal for a European Research Coordination Agency (EUREKA), launched by the French Government in April 1985, and was approved by a Conference of Ministers of 17 countries and representatives of the European Commission in Paris in July 1985.

The expressed purpose of EUREKA is to enable Europe to master and exploit the use of the new technologies for civilian purposes and to develop Europe's potential and capability in the major sectors. At present its scope covers 18 countries (the EC Member States, Sweden, Norway, Finland, Austria, Switzerland and Turkey).

At the intergovernmental conference of the Foreign and Research Ministers of the 18 countries held in Hanover on 6 November 1985, a "EUREKA Charter" was adopted and this sets out the objectives, priorities, criteria, project implementation and coordination, funding and the organization of a secretariat. Ten specific projects are now considered ready to be launched under the EUREKA initiatives.

The objective is described in the EUREKA "Charter" agreed at Hanover:

> *The objective of EUREKA is to raise, through closer cooperation among enterprises and research institutes in the field of advanced technologies, the productivity and competitiveness of Europe's industries and national economies on the world market, and hence strengthen the basis for lasting prosperity and employment: EUREKA will enable Europe to master and exploit the technologies that are important for its future, and to build up its capability in crucial areas.*
>
> *This will be achieved by encouraging and facilitating increased industrial, technological and scientific cooperation on projects directed at developing products, processes and services having a world-wide market potential and based on advanced technologies.*
>
> *EUREKA projects will serve civilian purposes, and be directed both at private and public sector markets.*

2. MEMBER STATES' EXPENDITURE ON TECHNOLOGICAL RESEARCH AND DEVELOPMENT (TRD)

Information on the resources committed by Member States to research and development is contained in a series of statistical reports obtained by CREST (Scientific and Technical Research Committee) as part of the "Confrontation of National and Community R & D" (COPOL 85). Differences in format, approach and content unfortunately make these reports less useful than they might have been for the provision of an overall picture and for a comparison of trends, both within the Community and with the USA and Japan.

The Commission has provided assistance with the standardization of data in the COPOL Reports by commissioning an analytical report "R & D in the Member States of the European Communities: Current Situation and Prospects" (by Mr G. KINT, January 1985, XII/42/85, under revision). The Commission services also addressed a Note for the attention of the Scientific and Technical Research Committee (CREST) (XII/43/85 - rev. 1, 23 April 1985).

The established methodology of measuring resources committed nationally to research and development by Member States of the OECD has been NABS, i.e. Nomenclature for the Analysis and Comparison of Science Programmes and Budget. NABS research and development classifications differ from the goals and scientific objectives of the Framework Programme. The research and development which is included in NABS information covers a wider field than the Framework Programme. Moreover, it is very important to note that the reports from Member States (COPOL 85) and the KINT analysis based on them, give financial commitment in a current year and actual out-turn figures for previous years. What are represented, therefore, are budgeted amounts and budgetary extrapolation which will be affected as possible indicators of the future by factors such as completion of a programme in progress and new programmes not yet budgeted. Such data are a basis for conclusions on the general lines adopted in the recent past for national medium-term research and development financing. Budgetary extrapolation is, however, a very different orientation from a science policy orientation.

In this section of the Information Report the commitment of financial resources by Member States will first be handled using the NABS protocols to permit comparison with the USA and Japan (page 9). The basis for this information is OECD figures taken from Note XII/43/85. Then the most recent revised figures compiled by Mr KINT for his analysis are given (page 10).

Finally, table 2.4 (page 12) gives the budgetary information provided by Member States and reclassified by Mr KINT, according to the goals of the Framework Programme for which it was possible.

Data given in the following pages are taken from an up-dated version of the KINT Report currently being printed.

Gross expenditure on R & D (EUR 10, USA and Japan) 1975-1983 at current values and at values and exchange rates 1975

Country / Year	1975	1979	1980	1981	1982	1983
TOTAL **EUR-10** (MioECU, current value)	20 349.54	33 664.85	38 351.46	44 302.94	49 165.85	53 074.69
TOTAL EUR-10 (MioECU, 1975 value)	20 349.54	22 968.13	23 172.64	24 070.92	24 669.85	25 309.42
Increase rate index (1975 prices and exchange rate)	100.00	112.87	113.87	118.29	121.23	124.37
USA (USD) (*)	36 680.00	56 496.70	64 189.40	73 768.00	81 002.00	88 329.00
MioECU, current value	29 562.29	41 218.91	46 102.15	65 993.10	82 679.57	99 221.54
MioECU, 1975 value	29 562.29	34 785.01	36 126.76	37 991.60	39 209.40	41 031.04
Increase rate index (1975 prices and exchange rate)	100.00	117.67	122.21	128.51	132.63	138.80
JAPAN (YEN) (*)	2 974 573.00	4 583 630.00	5 246 247.00	5 982 356.00	6 528 701.00	7 180 782.00
MioECU, current value	8 090.20	15 254.87	16 652.43	24 380.07	26 806.96	33 975.14
MioECU, 1975 value	8 090.20	10 319.94	11 479.22	12 761.35	13 669.49	14 897.17
Increase rate index (1975 prices and exchange rate)	100.00	127.56	141.89	157.74	168.96	184.14

N.B.: Some figures used in calculating the EUR-10 total are estimates.

(*) Figures for USA and JAPAN expressed in MECUs are affected by the strong fluctuations of the US$ and the YEN during the period 1975-1983.

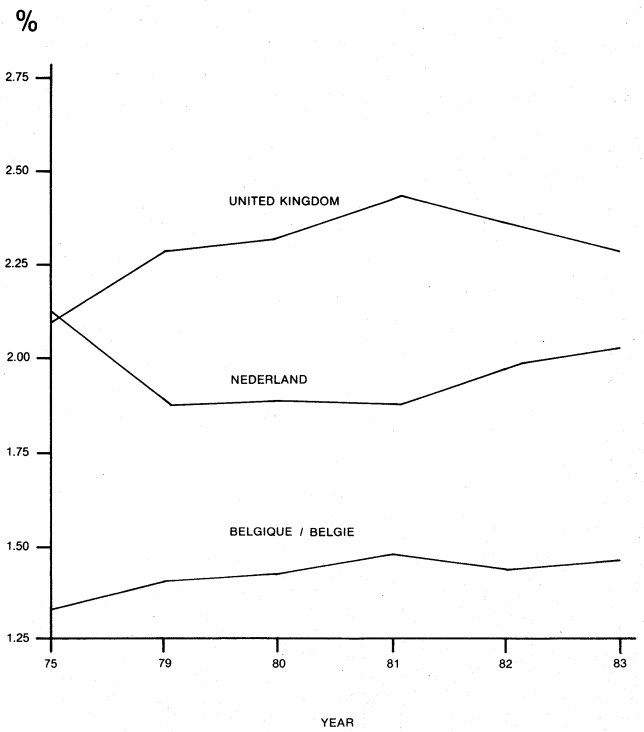
GROSS DOMESTIC EXPENDITURE ON R & D AS A PERCENTAGE OF THE GDP

Country / Year	1975	1979	1980	1981	1982	1983
DEUTSCHLAND						
R & D (mio ECU)	7 532.00	13 324.74	14 223.84	15 255.66	17 382.23	18 938.39
GDP (Bil ECU)	336.60	554.60	586.90	613.60	673.00	731.00
R & D / GDP %	2.24	2.40	2.42	2.49	2.58	2.59
FRANCE						
R & D (mio ECU)	4 926.11	7 568.98	8 692.19	10 343.02	11 636.45	12 505.35
GDP (Bil ECU)	273.00	419.00	471.90	515.10	555.00	584.40
R & D / GDP %	1.80	1.81	1.84	2.01	2.10	2.14
ITALIA						
R & D (mio ECU)	1 442.91	2 009.60	2 436.32	3 210.42	3 713.36	4 750.73
GDP (Bil ECU)	154.90	237.30	284.80	317.90	356.10	397.00
R & D / GDP %	0.93	0.85	0.86	1.01	1.04	1.20
NEDERLAND						
R & D (mio ECU)	1 416.31	2 159.61	2 299.78	2 393.79	2 785.11	3 019.08
GDP (Bil ECU)	66.80	115.00	122.00	127.10	140.70	148.50
R & D / GDP %	2.12	1.88	1.89	1.88	1.98	2.03
BELGIQUE / BELGIE						
R & D (mio ECU)	661.85	1 106.76	1 196.24	1 267.26	1 229.75	1 315.73
GDP (Bil ECU)	49.80	79.20	84.20	86.10	86.10	90.10
R & D / GDP %	1.33	1.40	1.42	1.47	1.43	1.46
UNITED KINGDOM						
R & D (mio ECU)	3 966.78	6 899.11	8 850.25	11 090.02	11556.68	11 618.12
GDP (Bil ECU)	189.20	303.10	383.60	458.20	493.20	511.40
R & D / GDP %	2.10	2.28	2.31	2.42	2.34	2.27
IRELAND						
R & D (mio ECU)	56.20	82.54	102.48	120.55	142.09	156.93
GDP (Bil ECU)	6.80	11.60	13.60	16.00	18.80	20.20
R & D / GDP %	0.83	0.71	0.75	0.75	0.76	0.78
DANMARK						
R & D (mio ECU)	308.87	461.51	492.01	552.73	647.92	700.30
GDP (Bil ECU)	30.40	48.10	47.80	51.50	57.30	63.40
R & D / GDP %	1.02	0.96	1.03	1.07	1.13	1.10
HELLAS						
R & D (mio ECU)	38.51	52.00	58.35	69.50	72.25	70.06
GDP (Bil ECU)	16.80	28.10	28.80	33.00	38.70	38.90
R & D / GDP %	0.23	0.19	0.20	0.21	0.19	0.18
EUR 10						
R & D (mio ECU)	20 349.54	33 664.85	38 351.46	44 302.95	49 165.84	53 074.69
GDP (Bil ECU)	1 126.20	1 799.00	2 026.90	2 222.70	2 422.90	2 592.00
R & D / GDP %	1.81	1.87	1.89	1.99	2.03	2.05
U.S.A.						
R & D (mio ECU)	29 562.29	41 218.91	46 102.15	65 993.10	82 679.57	99 221.54
GDP (Bil ECU)	1 242.90	1 742.50	1 872.10	2 628.80	3 108.30	3 679.70
R & D / GDP %	2.38	2.37	2.46	2.51	2.66	2.70
JAPAN						
R & D (mio ECU)	8 090.20	15 254.87	16 652.43	24 380.70	26 806.96	33 975.14
GDP (Bil ECU)	402.60	727.60	748.80	1 029.20	1 086.90	1 299.10
R & D / GDP %	2.01	2.10	2.22	2.37	2.47	2.62

According to these tables the trend in most countries is for R & D spending to increase more rapidly than the GDP.

In three Community countries (Germany, France and the United Kingdom) the share of GERD in the GDP exceeds 2%. An analysis of this indicator throws light on the differences and discrepancies in national science policies within the Community.

GERD AS % G.D.P.


%
2.75
2.50
2.25
2.00
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1.50
1.25
UNITED KINGDOM
NEDERLAND
BELGIQUE / BELGIE
75
79
80
81
82
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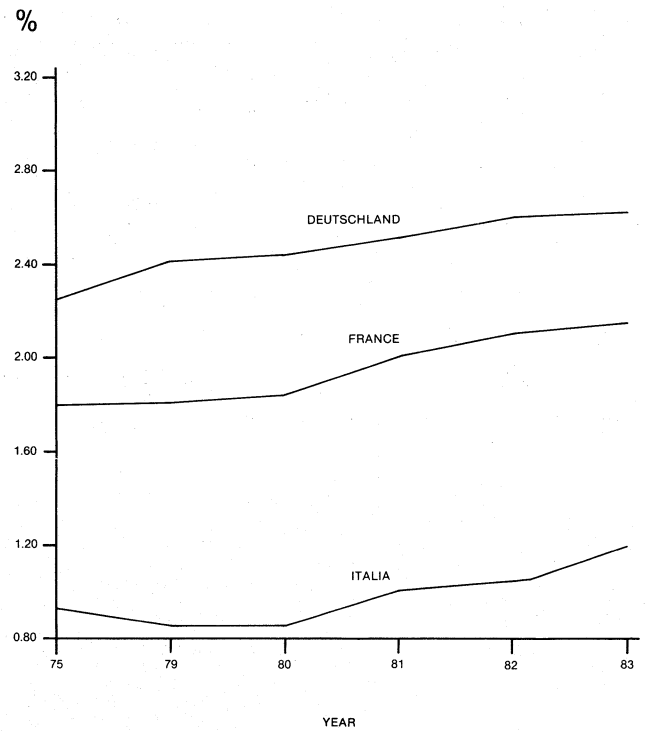
YEAR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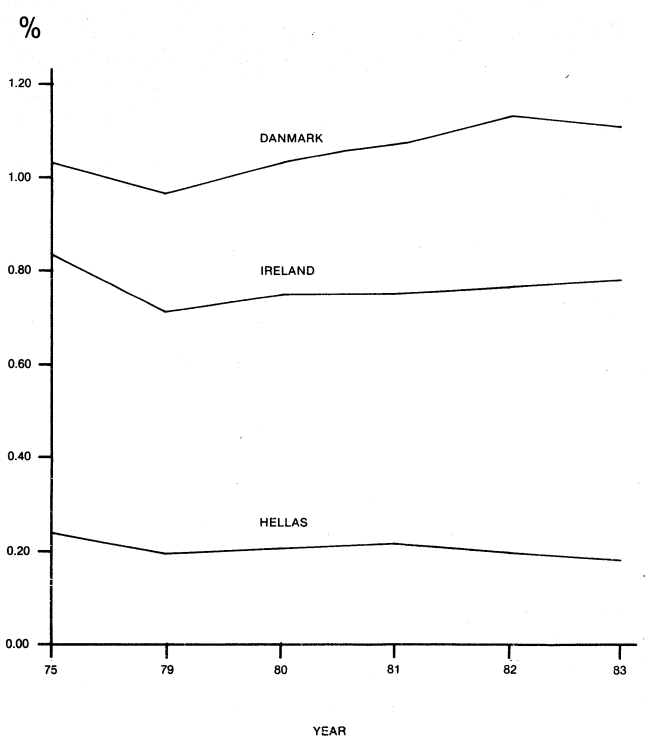
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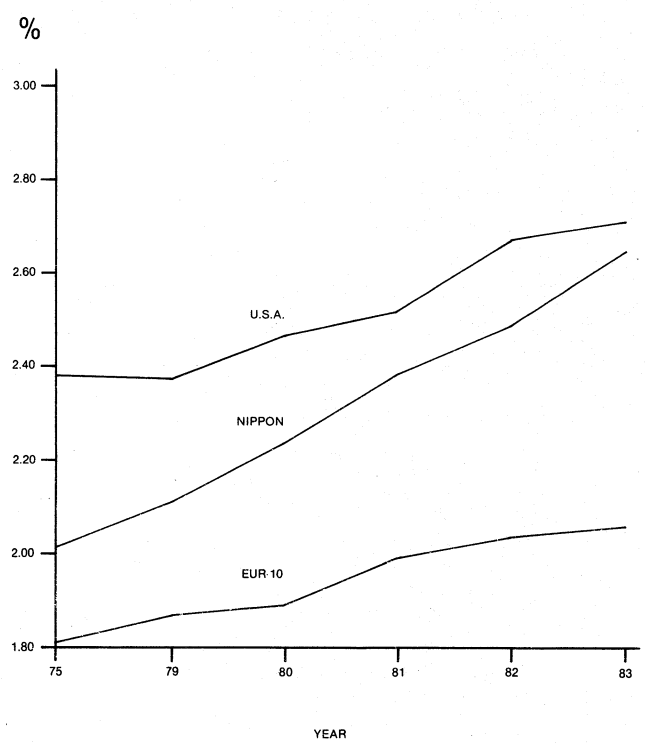
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Budgetary extrapolation 1984-1987 reclassified by the goals of the "Framework Programme": Total per goal at 1982 values

Goals	1984	1985	1986	1987	Tot.	%	Framework programme %
1. **Promoting agricultural competitiveness (including fish)**							
Mio ECUs 1982	920.7	888.3	891.6	888.4	3,589	11.4	3.5
Indices	100	96.5	96.8	96.5			
2. **Promoting industrial competitiveness**							
Mio ECUs 1982	2,604.3	2,637.6	2,609.6	2,602.9	10,454.4	33.3	28.2
Indices	100	101.3	100.2	100.0			
4. **Improving the management of energy resources & reducing energy dependance**							
Mio ECUs 1982	2,607.2	2,580.0	2,453.2	2,387.4	10,027.8	31.9	47.2
Indices	100	99.0	94.1	91.6			
5. **Implementation of S/T. activities which benefit developing countries**							
Mio ECUs 1982	354.7	358.3	365.8	373.5	1,452.3	4.6	4
Indices	100	101.0	103.1	105.3			
6. **Improvement of safety & protection of health**							
Mio ECUs 1982	1,042.8	1,039.9	1,025.3	1,029.9	4,137.9	13.2	10.3
Indices	100	99.7	98.3	98.8			
6. **Protection of the environment**							
Mio ECUs 1982	419.3	434.0	440.5	447.5	1,741.3	5.6	
Indices	100	103.5	105.1	106.7			
Total	7,949.0	7,938.1	7,786.0	7,729.6	31,402.7	100	93.2*

(*) If certain "horizontal" programmes not mentioned in this table are included, one arrives at a total of 100.

In the conclusions of Note XII/43/85 the Commission services indicate the considerable extent to which Member States' research and development priorities are in harmony with the scientific objectives of the Framework Programme. The conclusions are as follows:

Generally speaking national R & D priorities coincide with the scientific and technical objectives of the Framework Programme although the emphasis differs from one country to another. In particular the differences noted in the share of programmed appropriations - classified according to the objectives of the Framework Programme - in total appropriations are significant of the varying scale of the efforts made by the Member States to give the scientific and technical objectives of the Framework Programme a degree of national priority (whether national or international activities for these Member States).

The KINT study shows that the various national departments are tending to make greater and more widespread use of the Framework Programme both as a scientific and technological policy tool (setting of scientific and technical targets) and as a multiannual financial planning tool. This comment is particularly relevant for R & D activities in high technology sectors where, under the pressure of foreign competition, a deliberate support policy has been adopted (for example for information technology and biotechnology).

The growing use of the Framework Programme as a planning guide has demonstrated both its creative value and its limitations, but possibilities of improvement have been identified and put forward by the experts consulted. The proposals made include the following:

a) possibility of cooperation between a limited number of countries under Community auspices (variable-geometry programmes),

b) inclusion of new scientific objectives such as:

   — science of society (management)
   — R & D on services (e.g. transport)
   — space research
   — basic research (promotion of university research),

c) financial forecasts on high technology sectors to be treated differently from those on conventional areas (agriculture, raw materials, developing countries, health); a more detailed classification is regarded as necessary for the former (operating expenditure, bi- and multilateral national expenditure, Community expenditure),

d) the Framework Programme should cover a five-year period with a roll-over each year.

3. STATUS OF IMPLEMENTATION OF THE COMMUNITY'S FRAMEWORK PROGRAMME 1984-1987 (A SCIENTIFIC AND TECHNICAL STRATEGY FOR EUROPE)

This Information Report includes suggestions on how EC technology research and development programmes can help to improve the Community's efforts to increase its competitiveness in world trading markets. The Framework Programme (1984-1987) is pivotal to EC research and development. Consideration and evaluation of the present status of implementation and the degree of achievement of its goals are therefore essential.

In its Working Document **The Scientific and Technical Strategy of the Community** (COM(85) 140, of 9 April 1985) the Commission outlines the progress made in implementing the Framework Programme.

The total estimated funding, proposed for the 4-year period, at 1982 value, was 3,750m ECUs. At 31 March 1985, counting all the R, D & D programmes in progress or recently decided, it appears that all activities under the Programme had attained a total of 2,685m ECUs (1982 value). The total is raised to 2,952 m ECUs if programmes formally proposed by the Commission, but not yet decided, are included. The need for an increasing part of own resources to be devoted to these activities is a central concern of the Commission.

As a preparation for a review of the Programme, the Commission identified 5 major issues that need to be discussed with Member States concerning the Community's Scientific and Technical Strategy. These are:

a) The extent to which the Community gives a marked priority to the goal of promoting industrial competitiveness at the expense of other goals, such as promoting agricultural competitiveness.

b) The persistence and worsening of the "heavy imbalances" between objectives within the goal of improving the management of energy resources.

c) Whether new goals or areas of interests should now be taken into consideration. (For example, the FAST II Programme is now "showing up major questions in particular on service activities, regional development infrastructure, the future of financial services".)

d) The need to develop and stimulate further cooperation and scientific and technical exchanges, to establish inter-centre networks and encourage the transfer of technology.

e) The prospect of Spain and Portugal joining the Community in 1986 must be examined in the light of its implications for the common R, D & D technology strategy.

The data given by the Commission on the financial estimates for each goal of the Programme and their present utilization rates show that at 31 March 1985, the projects already decided at that date account for 72% of the total for the period 1984-1987.

No goal of the Programme has as yet reached the financial aim set in the Framework Programme. The position in relative terms shows inter alia:

a) Three goals have exceeded a utilization rate of two-thirds of the amount assigned to them, i.e. industrial competitiveness 88%; management of energy resources 74%; living and working conditions 69%.

b) Two goals have reached a utilization rate between one-third and two-thirds, i.e. improving the effectiveness of the Community's scientific and technical potential (51%) and management of raw materials (38%).

c) The three other goals - agricultural competitiveness (30%), reinforcing development aid (27%) and horizontal activities (19%) - have not even reached one-third of the amounts assigned to them.

d) The three most generously funded goals together account for 94% of the appropriations granted (see table page 15).

The Commission document referred to at the foot of the previous page examines the situation vis-à-vis the objectives of the Framework Programme. This review of the present status in terms of utilization rates in the implementation of the Framework Programme provides data on how the Programme is proceeding towards the goals and objectives of the Community's pivotal programmes of technological research. This Report limits itself to this analysis on the basis that it is too early yet to have evidence to indicate to what degree the goals of the Framework Programme are being achieved in general. In particular, therefore, there remains a need to assess to what degree the goals of industrial and agricultural competitiveness in world markets are being attained as a result of the research projects carried out.

COMMUNITY RESEARCH, DEVELOPMENT AND DEMONSTRATION ACTIVITIES

			1984	1985	1986	1987	1988	1989	1990	Ref.doc.
1. AGRICULTURE AND FISHERIES										
1.1. *AGRICULTURE*										
Agricultural Research	CSA-CONC				30					L 358-83
Ligno-cellulosic By-Products for Animal Feeding	CONC				0.65					L 103-84
1.2. *FISHERIES*										
Fisheries	CSA				5					COM(80)420
2. INDUSTRY										
2.1. *INDUSTRIAL TECHNOLOGIES*										
Community Bureau of Reference	CSA			25/16						L 26-83
Nuclear Measurements and Reference Materials	JRC				64/(1)					L 3-84
High Temperature Materials	JRC				28/(1)					L 3-84
Basic Technological Research (BRITE)	CSA					125/25				L 83-85
Steel Research	ECSC		17	17	*	*				L 335-84
Pilot/Demonstration Projects in Steel Industry	ECSC	<		50						C 81-83
Textile	CSA	<	3.9							L 367-81
Foodstuffs - COST 90bis	CONC	<		0.67						L 353-82
Foodstuffs - COST 91bis	CONC				0.78					L 151-84
2.2. *INFORMATION TECHNOLOGIES*										
Data Processing - 1st part	CSA	<		21						L 308-84
Data Processing - 2nd part	CSA	<	30							L 126-84
Microelectronics	CSA	<	40							L 376-81
ESPRIT	CSA				750					L 67-84
EUROTRA	CSA	<		16/8						L 317-82
Telecommunications Technologies (RACE), Definition Phase	CSA				22.1/12					COM(85)113
2.3. *Biotechnologies*										
Biomolecular Engineering	CSA	<	15/5							L 305-83
Biotechnology	CSA					55/15				L 83-85
3. TRANSPORT										
Aids to Coastal Navigation	CONC	<	2.1/1							L 378-82
4. RAW MATERIALS										
Raw Materials	CSA	<	54/19							L 174-82
5. ENERGY										
5.1. *NUCLEAR FISSION*										
Reactor Safety	JRC	<			192/(1)	(5)				L 3-84
Reactor Development and Advanced Technologies	*		0.93	1.1/(6)	*	*				C 185/1
Management and Storage of Radioactive Waste	CSA	<	43/10			62/12				L 83-85
Radioactive Waste Management	JRC				49/(1)					L 3-84
Fissile Materials Control and Management	JRC				45/(1)					L 3-84
Nuclear Fuel and Actinide Research	JRC				66/(1)					L 3-84
Decommissioning of Nuclear Plants	CSA				12.1/3					L 36-84
Utilisation of HFR Reactor	JRC				59/(1)					L 3-84
5.2. *FUSION*										
Thermonuclear Fusion - Jet & General Programme	CSA	<				690/270				L 83-85
Fusion Technology	JRC				46.5/(1)					L 3-84
Specific Credits foreseen for Projects of European Significance	JRC			12.5(2)/(1) (3)						L 3-84 COM(84)271
5.3. *NON-NUCLEAR ENERGIES*										
Energy (Non-nuclear)	CSA				175/40					L 83-85
Solar Systems Testing Methods	JRC			22/(1)						L 3-84
Habitat Energy Management	JRC			17/(1)						L 3-84
Altern. Energy Sources, Energy Saving, Substitution	PD	<	215				545			COM(85)29
Liquefaction and Gasification of Solid Fuels	PD	<	50				155			COM(85)29
Coal Research	ECSC		19	19	*	*				L 335-84
6. DEVELOPMENT AID										
S/T for Development	CSA	<		40/9						L 352-82
Development of Indigenous S/T Research in Devel.Countries	CSA					60/9				C 180-83
7. HEALTH AND SAFETY										
Radiation Protection	CSA	<				58/57				L 83-85
Medical and Public Health Research	CONC	<		13.3/9						L 248-82
Effects on the Health of Workers in Occupational Hazards	ECSC	<		9						C 307-81
Ergonomics and Rehabilitation in Coal & Steel Industries	ECSC	<	13			15				COM(84)677
Industrial Hygiene in Mines	ECSC	<		11						COM(83)343
Safety in Mining	ECSC	<		12.5						C 195-82
Control of Pollution in the Iron and Steel Industry	ECSC	<	15							C 147-79
Safety in Steel Industry	ECSC	<	1							E/423/83
8. ENVIRONMENT										
Protection of the Environment	JRC				49/(1)					L 3-84
Environment and Climatology	CSA-CONC	<	49.3/16							L 71-84
Application of Remote Sensing Techniques	JRC				29/(1)					L 3-84
Industrial Risk	JRC				21/(1)					L 3-84
Clean Technologies and Measurement Methods	PD			6.5						L 176-84
Sea Protection			0.9	1.0/(6)	*	*				C 75-84
9. IMPROVING EFFICACY OF S/T POTENTIAL										
Stimulation		<	7/3		60/12					L 83-85
10. HORIZONTAL ACTIVITIES										
FAST	CSA				8.5/12					L 293-83
Scientific and Technical Education and Training	CSA	<	8.8/6							L 101-81
Utilisation of R&D Results					(4)					COM(83)18
Programme Preparation and Evaluation			2.1	2.3/(6)	*	*				C 213-83

(1) JRC's Staff for the whole Programme : 2260 Agents
(2) Decided but not allocated Credits
(3) Tritium Laboratory (Commission's Proposal as Project of European Significance)
(4) 1.5 % of the Overall R&D Budget
(5) Including Shared Cost research (1985-1987)
(6) Annual Sum as it appears in the preliminary draft budget for 1985, which is not yet approved

The figures given in the columns show, respectively, the sum allocated to the activity in Mio Ecus, and staff, wherever these are mentioned in the decision (Mio Ecus/Staff).

14a

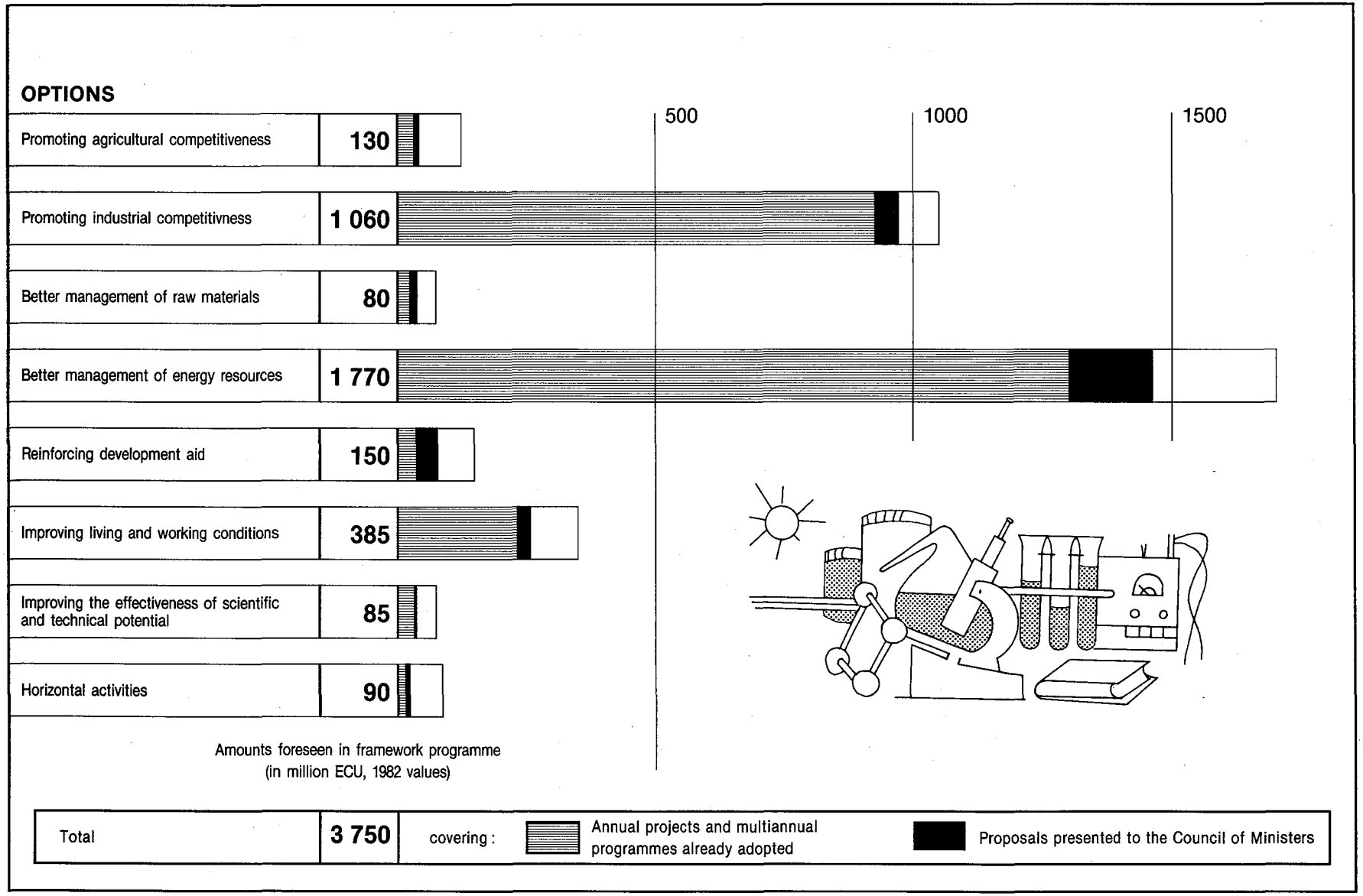
CONC : Concerted Action (including COST)
CSA : Cost Shared Action
PD : Pilot/Domonstration
ECSC : European Coal and Steel Community
JRC : Joint Research Action

* Annual Budget Appropriations

Programme Decided by the Council

Programme Proposed by the Commission

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



Source: European File 15/85 (October 1985) page 6

The unequal levels of utilization of assigned resources may in fact be distorting the implementation of the Framework Programme as a whole. The Committee has already strongly recommended the early approval of the overall financial indications for the Framework Programme, forecasting that short of this the Commission's praiseworthy efforts to develop R, D & D could lead to "a more or less fragmentary allocation of resources to a series of 'ad hoc' programmes and thus put in jeopardy the development of a coherent scientific and technical strategy for R, D & D" (CES 318/85, paragraphs 1.4. and 1.5.).

Do the large variations in the utilization rates reflect undesirable imbalances in the commitment of resources? Within the goal of promoting industrial competitiveness, for example, projects aimed at "removing and reducing impediments" to trade, and "Information Technology" reach 149% and 101% of the utilization aim respectively, while "new techniques and products for the conventional industries" and "Biotechnology" attain much lower utilization rates of 70% and 46% respectively. The Commission remarks in regard to "removing and reducing impediments" that the overspending on this project is "high in percentage terms but limited in absolute value".

The Section welcomes the fact that in a final section of its document the Commission notes that since the 1984-1987 Framework Programme was adopted, a number of new facts have emerged which will have to be taken into account - including among them the fact that "The Economic and Social Committee has prepared an Own-initiative Opinion on Research Priorities, the conclusions of which provide valuable data for the review of the Framework Programme".

4. THE EFFICACY OF COMMUNITY TRD

As far as overall evaluation of effectiveness is concerned, there is a dual task to be faced. Firstly, there is the task of finding operational criteria or indicators of performance if we are to endeavour to measure and/or verify the application of TRD in achieving the goal of EC competitivity in world markets. Secondly, what model of management and organization of TRD - if any - can we propose that would be best calculated to achieve the goal of competitivity?

From the evidence received the conclusion is that it is very difficult to measure cost-effectiveness in technological research and development. This suggests that maximum attention must be given to:

— the efficient and rapid valorization and commercialization of the results of Community technological research and development;

— the setting up of a suitable model of management and organization for Community technology resources and development.

There follows below a brief consideration of four central fields of European Community R & D leading on, in section 5 below, to the question of bridging the technological gap, so frequently referred to as the source of Europe's competitive disadvantage in relation to its major trading partners can be bridged.

Energy

Nuclear energy was the first field on which Community R & D was focussed to any appreciable extent, following the establishment of the European Atomic Energy Community EURATOM. The initial aim in the fifties and sixties was to assist industry in the Community in the construction of nuclear power stations which were based on uranium fission technology.

The Joint Research Centre (JRC) was established during this period and work in support of nuclear energy was carried out at the Community installations in Ispra, Karlsruhe and Petten. "Indirect actions" (now known as shared-cost projects) were also launched in a deliberate attempt to stimulate R & D in the countries of the Community.

The reshaping of Community energy research started in the Seventies and has continued into the Eighties. The main aspects of this reshaping process are:

— increased concentration of Community R & D on safety as related to nuclear fission;

— massive expansion of Community R & D in the field of fusion technology;

— extension of R & D assistance to various areas of non-nuclear research, including renewable energy resources and the rational use of energy and the demonstration projects of the Commission's DG XVII;

— increased involvement of R & D in areas such as agriculture, industrial competitiveness, raw materials, development aid and living conditions.

Energy research constitutes a very large portion of the total Community R & D budget. However, under the Commission's proposals for revising the outline programme it will fall from above 60% to below the 50% mark. The Committee in its Opinion "Priorities for Community Research" (CES 318/85) suggested that the appropriate percentage be 40%.

R & D work in the field of fusion technology is one excellent example of fruitful Community research. All of the Member States' activities in this field are coordinated by the Commission. As a result, a well-coordinated Community-wide programme has been developed in one of the most complicated and ambitious areas of technology.

Industry

The scope of the financial participation by central Community funds is indicated by the current Framework Programme. Normally a fundamental requirement for participation by the Commission is that the projected research would not otherwise be carried out, or would extend over a longer period, or would benefit from participation by more than one State or industry or academic establishment. The Commission only initiates research and participates financially where clear additional benefits are perceived for the Community as a whole.

All industrial research assistance is confined to the precompetitive stage of early project development. Elsewhere in this Report we comment on the transition from research through development to implementation. It can be questioned whether the efficacy of research, particularly in a multinational part- Community-funded project, is not impaired by the Community rules of competition. It is likely that the prospect of immediate exploitation of successful research would act as a powerful stimulus to speedy progress. It is suggested that the desirable object of monitoring competition can, when applied to the implementation of good ideas, be a harmful retardant.

Materials

Materials (basic materials, raw materials) are always needed for the manufacture of industrial products. The Community and, in a broader context, the whole of Western Europe are largely dependent on external suppliers for many raw materials. Increasingly the raw materials exporting countries aim to process their indigenous resources into semi-finished and finished products. For this reason careful raw materials management should be a primary concern of the Community. This comprises:

— the exploration and extraction of non-renewable raw materials (minerals) on its own territory;

— the production of renewable raw materials on its own territory;

— the efficient and economical use of raw and other materials;

— the recycling of waste, and

— the search for new substitutes and advanced materials.

Accordingly the first Framework Programme for R & D (1984-87) rightly made raw materials and materials management one of its seven key areas.

In its Own-initiative Opinion on the "Community's research priorities" (CES 318/85 of 27 March 1985) the ESC called for special attention to be given to this aspect of research policy, placing particular stress on "recycling" and "substitutes technology".

As a follow-up to the first research programme in this field 1978-1985 (primary mineral raw materials and waste recycling, supplemented in 1982 by wood as a renewable raw material, substitution of materials and technical ceramics), in July 1985 the Commission submitted proposals (COM(85) 399) from 1986 to 1989. The ESC has given an Opinion on these new proposals (CES 1087/85, Rapporteur: Mr de NORMANN).

It is gratifying to see that the Commission proposes to continue and expand the research in this field. The fact is also to be welcomed that the Commission will be assisted in the implementation of the proposed programme by the Advisory Committee (CGC) Raw Materials and Other Materials. This will encourage consultation with scientists, experts and above all with industry, ensuring that work at Community level is properly coordinated with Member States' work in this field and meets the practical needs of industry.

Agriculture

The agricultural dimension of the European Technology Community is an integral part of the discussion of technological development, and references in this Report to increasing competitiveness in industry include the aim of doing so in agricultural products and land-use, improved and perhaps reconstructed through the effective use of the new technologies.

In recent years the Community has taken a number of important initiatives with regard to research and training in the field of biomolecular engineering. Although a good deal of basic research still has to be done, it is possible to say already that the actual applications to which this research will be put in the fields of commerce, industry and agriculture may be very far-reaching and even revolutionary. In the fields of genetic and biomolecular technologies the Commission thinks that the following will be key targets for basic research:

— the description of the genomes of a number of higher organisms and the genetic and molecular exploration of some of their functional properties with important implications for the medical sector or agro-industry;

— directed evolution making it possible to plan development at the level of molecules and organisms.

As far as agro-industrial technologies - including agricultural technology in the stricter sense - are concerned, there are a number of areas of great potential for technological research and development:

a) Apart from the specific R & D requirements of the Community of Twelve, attention should be paid to certain aspects of the situation in present and future Lomé Convention countries, in particular these developing countries' potential and requirements as regards timber production and consumption, seed and stock breeds and a more systematic approach to the problem of desertification. If the countries of the Community could play even more of a pioneering role with regard to R & D and demonstration projects for the benefit of these developing countries, extra jobs might be created in the Member States.

b) In connection with the discussions currently in progress with regard to certain fundamental problems facing the Common Agricultural Policy, it can be mentioned here that some European R & D programmes may create new openings for achieving a better balance between supply and demand and for adopting a more positive approach to a number of environmental demands, e.g. R & D aimed at finding alternative products and consumption outlets (food, energy, pharmaceuticals ...).

The search for greater harmony between the achievements of modern biotechnology and the ecological system makes us realize that various points have been dealt with in greater detail in the recent Commission proposal, approved by the Council, for Multiannual R & D Programmes in the Field of the Environment (COM(85) 391 final of 24 July 1985) than in the Commission Memorandum (COM(85) 350 final of 30 June 1985).

Information technology and the information market

Following the 1979 European Council in Dublin a series of concerted actions on Information Technology have been developed, notably ESPRIT and the Community action programme in telecommunications. Attention has been given to education and training relating to new information technologies and the FAST programme has been concerned to identify trends and possibilities in this crucial field. At the European Council meeting in Brussels in March 1985 the Heads of State and Government agreed that the achievement of a common information market should be a specific goal of the Community. In its Communication to the Council "Work Programme for Creating a Common Information Market" (COM(85) 658 final of 29 November 1985) the Commission has underlined the key role of information for trade and industry and the potential of the growing world information market.

Attention must urgently be given to the economic implications of the changing information market and to the social consequences, particularly in labour intensive industries. Human resources are crucial in the information market and Community success in this will stand or fall on the qualification level of young Europeans.

Information technology and changes in the information market have important implications for regional development in the Community. There is a risk of accentuating regional imbalances. The currently available information technology, however, can eliminate the disadvantages hitherto inherent in distance, provided policy decisions to apply it are made at Community and Member State levels. The Commission's intentions regarding Less Favoured Regions contained in the above-mentioned Work Programme deserve accelerated acceptance.

5. BRIDGING THE TECHNOLOGICAL GAP

Europe, according to the Commission's Memorandum "Towards a European Technology Community" (COM(85) 350 final), in its opening section, has a potentially powerful armoury to meet the challenges of competing in trade in high-technology products, maintaining its standard of living, reversing the unemployment trend and ensuring that it can stand on its own feet:

— a continent-wide market, for Europe's industry, rid of the barriers now dividing it into unviable segments;

— national R & D efforts which have maintained the high level of European science but whose dispersal deprives the Community of the synergetic effects and the economies of scale that would stem from a collective effort targeted on certain jointly defined strategic priorities;

— the cooperation that exists among European firms which has positive results when it can flourish under the stimulus given by such research programmes as ESPRIT, industrial programmes like Airbus and strategic programmes like the Space Agency.

The Community must therefore as a matter of urgency summon up its considerable resources to reverse a trend whose present consequences are lost market shares, less job creation, increased technological dependence and the emigration of its finest research workers.

The internal market

The internal market of the European Community compares very favourably in numbers with those of the major competitor blocs, but it is more fragmented and less aware of being a common market.

Urgent attention should be given to the harmonization of standards and the development of a real operational internal market.

The European patent should be advanced as rapidly as possible.

Diffusion of information

Diffusion of information about Community research and development programmes and proposals still presents problems. In particular, information dissemination needs improvement at the level of prospective participants in the Member States, especially SMEs and smaller research institutes and universities.

The Committee has already expressed its view on promoting greater access to the results of research and other information in its Opinion on **Priorities for Community Research** (CES 318/85, para. 2.2.7.).

> *The Committee, while recognizing the positive contribution which setting up a data bank could make, is also conscious of high cost, technical difficulties and the long set-up time required. For these reasons the Committee supports:*
>
> — *the development of the Information Exchange System which comes under the ESPRIT Programme. The Committee would recommend that its use be extended in the future to areas other than information technology.*
>
> — *the proposed information and documentation system that the Commission intends to set up as part of the Stimulation Plan in the form of interconnected local data bases giving information on research work and cooperation opportunities. This project is related to the Resolution made at the Conference of European Research Ministers held under the auspices of the Council of Europe (Paris, 17 September 1984).*

Utilization

The Committee has expressed an Opinion (OJ No. C 23 of 30 January 1984) on the urgency of the implementation of measures contained in the Communication on the "Utilization of the Results of R, D & D".

In this connection the Section would draw attention here to the plans of the Department for Scientific and Technical Communication of the Commission's DG XIII, for a European Symposium on the Utilization of the Results of public or publicly-funded Research and Development, Luxembourg, 23-25 September 1986. The "Proposed Topics" for this symposium encapsulate the crucial issues facing the EC on this aspect of bridging the technological gap.

Socio-cultural factors and the adoption of innovation

Socio-cultural factors are important in the adoption of innovation, in promoting the commercialization of the results of research and development, and in furthering the realization of a European Technology Community. European traditions, relationships, expectations and social structures are different from those to be found in Japan or the USA. Whilst it is possible to learn from the successes and failures of Japan and the USA what has succeeded in those societies may not succeed in Europe; Europeans might in turn succeed in some spheres where the US and Japan have failed.

There is an urgent need for research and analysis of the relevance of socio-cultural factors to the efforts of the Community to improve its competitiveness in Community and world markets.

The vision of a technologically-minded society is likely to be socially acceptable in Europe only if there is general reassurance that attention will be paid to the impact of the technological developments, on workers and citizens; that there is a commitment to using technology for social and environmental goals and that the potential of the new information technologies will be used to increase participation in decision- making as against the danger of its being used to increase control over the lives of citizens. These matters were discussed at the ESC Conference on "Europe and the New Technologies" (6-7 November 1984) and the Section draws attention to the conclusions of that Conference.

In the European socio-cultural context, and with the structure of statutory provision for social services of the Member States, there is a potentially very large market for the application of the results of technological research and development to products with a potential to improve living conditions for citizens in general and for the aged and handicapped in particular.

Attention is drawn to a major inhibiting factor, namely the absence of common European social and environmental policies, backed by the necessary financial instruments. Such policies could generate the consequential needs to be satisfied by the production of new products and the provision of new services which would be satisfied by the application of research. New products and services (leisure and entertainment, domestic services, special structure access to information, etc.) could be the result of new social and environmental objectives to be satisfied by new technologies in the interests of the individual. The IRIS proposal appears to be a useful initiative in this regard.

Innovation and associated tensions

In Europe's attempts to bridge the technological gap there is tension between the introduction of new methods of production, aimed inter alia at not losing markets, and the social consequences of process innovation, which frequently causes a loss of jobs.

The Committee stated in its Opinion on "Priorities for Community Research" (CES 318/85, page 10):

> *In Europe the need to be more competitive has led to a search for excellence in production methods in order to promote growth and productivity. The Committee supports the conclusions of FAST I that a better balance between products and processes should be emphasized. Moreover, given the present preference for new accelerated processes of production rather than new products and services, Europe must avoid going up a blind alley whereby we would be applying scarce research resources to production processes in fields in which our competitors already have an almost unassailable lead. Europe should look for a balance in the application of new technologies to achieve both improved productivity through better processes and the preservation of existing jobs and job creation through new products and services to satisfy new needs.*

There are two approaches to developing products and increasing markets for products and, consequently, to identifying where technological R & D should be concentrated in the Community:

a) analysis of where the European Community lags behind the USA and Japan in technological R & D;

b) analysis of the needs of citizens of the European Community which are currently unmet, including emerging needs some of which may be specifically related to social and demographic characteristics of the European Community.

These two approaches should be regarded as complementary rather than as competing and both should be used in defining the objectives of Community R & D. This is done in the IRIS programme (see page 6 above); it is equally appropriate in relation to other new technologies. In particular, both approaches should be kept in mind when finalizing the mobilizing research projects of the European Technology Community and the research activities of the second Framework Programme.

Basic research and the commercialization of the results of research

It is recognized that Europe has major strengths and indeed is frequently ahead in basic research. It is important that basic research continue to be valued. The success of the JRC, ESPRIT and BRITE should be built upon. Cooperation and networking become more easily possible every year and can increase the effectiveness of Community research and development efforts.

It is unfortunate that the Framework Programme Horizontal Activity, to promote more efficient and quicker utilization of the results of Community research and development, appears to be developing very slowly.

Measures to stimulate and promote ever-increasing mobility of researchers are very important. The mobility in question is from Member State to Member State, from university and research centre to industry and vice versa and from research centres including Community centres to universities and vice versa. The Community Stimulation Plan for Cooperation and Scientific Interchange (OJ No. L 83 of 25 March 1985) is an important contribution to the efforts to bridge the technology gap and help to establish a "Researchers' Europe".

University-Industry cooperation

The COMETT Programme (1986-1989) for University- Industry Cooperation will make an important contribution to the maximization of the strengths of the universities of Europe and their orientation towards industrial use of the results of research.

The terms of reference of COMETT (see page 6 above) should not be interpreted narrowly. Indeed, the broad interpretation inherent in the previous paragraphs of this Information Report should be incorporated explicitly into the final proposals. For example, the need in the sphere of agriculture and land-use for biotechnological experts from the universities should be emphasized. Equally, the envisaged joint training projects should include training for entrepreneurship and for the new modes of management required in the new technological era. The proposed fellowships should include academic and industrial staff, and students in education and the social sciences, to advance the reconstruction of education and the understanding of socio-cultural factors in the adoption of innovation.

The reconstruction of education

The reconstruction of education is referred to in various Commission documents as well as by CEDEFOP with the idea of promoting a more technologically-minded system of education.

It is necessary to go further and plan for Education for a Technological Society. The approach to technological innovation, as well as the entrepreneurial spirit, require more than a technologically-minded education. They require more than the education of individuals. We need to think about education for a collective awareness of the usefulness and potential of technology. Education plays a major role in this - not conventional schooling and training alone but informal and continuing education, including the mass media of communication. It is the development of an "ethos" of technologically-based thinking with a view both to innovation and to the mastery of innovation for societal goals.

A good deal of concern in planning for education focusses on the need for persons with suitable qualifications for work in a technologically-advanced Europe. The danger of differing understanding of the term "qualifications" is clear in the Report of the CEDEFOP Conference on "Technological Change, Employment Qualifications and Training" (Berlin, 24-26 November 1982, p. 7). English speakers tend to use "qualifications" for paper accreditations, diplomas, etc., whereas speakers in other languages mean by "qualifications" real skills, competences or knowledge. CEDEFOP uses the term in the latter sense, notably in its November 1984 Work Programme. It is important to think of qualifications in the CEDEFOP and other - rather than English - usage. We here are thinking of qualifications necessary to face up to technological development. We should look ahead. We can foresee that rapid technological development will make machines redundant quite rapidly; the danger is that the workers on those machines will become redundant with their machines. That danger is greatest for workers whose training and qualifications are specific and specialized. We should emphasize education as a basis for flexibility and as a base for retraining.

Satellite use should increasingly permit the sharing of the education strengths of universities and centres. Distance has become irrelevant. Within the Community this approach could complement the mobility of researchers currently being promoted in the EC Stimulation Programme. This European dimension in education for enhanced R & D through reciprocal sharing among the Centres of Excellence, universities and research centres, is increasingly facilitated by the available technology which already makes for relatively easy access to data and the development of networks. It also has potential for assistance to Lesser Developed Countries. The Eurokom project, Research, Networks, Equipment for wide-band Networks, warrants urgent promotion.

As the seminar "The Inter-relations between Technology, Employment and Work" organized by the Commission's DG V and DG XII, FAST, in collaboration with CEDEFOP and the European Foundation for the Improvement of Living and Working Conditions, Dublin (10-12 January 1984) agreed, the Conference held by FAST at Pont-à-Mousson indicated very clearly that the non-deterministic nature of technology affords firms a margin of freedom in their choice of strategies for remaining competitive. The submission from CEDEFOP noted how often, notwithstanding this, training departments are confronted with "faits accomplis" and are obliged to act from a short-term perspective.

Cooperation

Cooperation is vital to the achievement of the goals and objectives of the programmes of European technological research. It should be characterized by an integrated and coordinated approach operating at different national and sectoral interest levels:

— **between** the EC and Member States;

— **between** the Member States (as exemplified in ESPRIT, the various cross-frontier agreements now existing and the 2-year monitoring carried out by CREST);

— **between** different firms (there is evidence that this is now happening and has to have regard to the relevance of the competition rules set by DG IV);

— **between** universities and universities;

— **between** universities and industries and agricultural agencies and research institutes.

The aims of such a process of technological cooperation should be directed towards:

a) facilitating the transfer of technology between research agencies, firms and Member States while remaining within the confines of the rules of competition policy;

b) bringing together the sources of technology in one part of the Community so that they can be applied somewhere else in the Community.

There should be continued support for the Consultative Committee on Innovation and Technology Transfer (CIT) (COM(85) 274) in its efforts for the development of the transnational supporting infrastructure.

Language differences

In the implementation of research policies and the transfer of technology, language differences can be a major source of difficulty. Language problems appear to inhibit the exchange and mobility of researchers which the programme to stimulate the efficacy of the Community's scientific and technical potential is supposed to further. Language factors are a concern of the Committee on Innovation and Technology Transfer (First Annual Report COM(85) 274). Barriers to the University-Industry Cooperation Programme COMETT include an insufficient sense of European identity and practical problems of language. On 4 November 1982 the Council of the European Communities adopted an EEC Research and Development Programme for a Machine Translation System of advanced design (OJ L 317 of 13 November 1982), the Eurotra Project, which is intended to help overcome language barriers within the Community. This appears to be making slow progress.

6. TOWARDS A EUROPEAN TECHNOLOGICAL COMMUNITY

The Commission's proposals for establishing a European Technological Community

The Commission presented its proposal for a European Technology Community (COM(85) 350 final) on 25 June 1985. Since that date, however, the Commission has sent a further Memorandum (COM(85) 530 final) of 30 September 1985 to the Council which is intended to be a blueprint for implementing the proposals set out in the first Memorandum.

In the first Memorandum (COM(85) 350 final), the Commission proposed the launching by the European Community of a European Technology Community (ETC) which would allow all Member States to participate or restrict their participation to certain programmes only. Such an ETC would have a legal and political base and be directed towards the achievement of clearly defined objectives, all aimed at the essential goal of strengthening the technological bases of the European economy and of developing its international competitiveness.

In the Memorandum, the Commission pointed out that Europe will be able to harness the new technologies for a common purpose only if a genuine European Technology Community is established which will aim to:

— exploit the Community dimension to the utmost extent possible in the achievement of a continent-wide market and the utilization of Community programmes in TRD;

— promote, through cooperation and exchanges, the potential of purely national programmes and seek to attain the greatest possible synergetic effects from the interactions of national and Community efforts in TRD.

By achieving these aims Europe could succeed in activating its potentially powerful armoury of high level science and research capabilities to meet the challenges of competing in world markets in high-technology products, protect its economic living standards, and place itself in a position to proceed to reverse its present rising unemployment trends.

The Commission's Communication to the Council on the Implementation of the Commission's Memorandum towards a European Technology Community (COM(85) 530 final) maintains that

> *the establishment of the European science and technology community should, in the Commission's opinion, be marked by an aggressive strategy, a qualitative leap and an acceleration and intensification of efforts.*

and goes on to set out what should be done now:

— to work, in conjunction with all the partners concerned (Member States, European non-member countries, industry and other European S/T organizations) towards the identification of common objectives to be pursued by confirming, adjusting or broadening the objectives already set for the period 1984-1987 and to establish priorities for the new Framework Programme (1987-1991);

— to modulate and specify the actions and activities to be developed or undertaken (generic sciences and technologies, strategic programmes, large facilities and schemes for creating a Researchers' Europe);

— to ensure consistency between national activities and different types of action conducted at different levels and in different contexts;

— to complete the internal market and improve the innovation process;

— to modify the institutional structure in order to speed up the Community's excessively slow decision-making procedures;

— to decide on the financial commitment needed in the medium term for the planning of activities on a scale commensurate with the objectives to be attained.

Research and Technological Development were discussed at the European Council (2/3 December 1985 in Luxembourg) and at the Conference of the Representatives of the Governments of the Member States (16/17 December 1985 in Brussels). It was proposed that 12 articles on Research and Technological Development go forward for legal and linguistic editing of the texts prior to their being enshrined in a revised version of the Treaty.

Section III of COM(85) 530 final broaches the problem of deficiencies in Europe's record in innovation and the exploitation of research results:

> *Today more than ever a dynamic innovation capacity is essential. At a time when a considerable effort is to be put into consolidating the Technology Community, it is essential to strengthen the Innovation Community so as to ensure the survival and development of companies on changing markets and to improve the living conditions of men and women dependent on products and services that may or may not match their requirements.*

The Section agrees with the Commission's analysis. Effective innovation and the rapid exploitation of R & D results are essential prerequisites to industrial and agricultural competitiveness.

The challenge to the Community is to coordinate the respective but conflicting demands of technology, social and human factors and industrial potential in order to identify a limited number of mobilizing projects in which the Community can make a significant progress in world markets.

The Commission is correct when it points to the success of the management tool used for the JET Programme and the European Space Agency. It appears, however, over-optimistic when (in section V of COM(85) 530 final) it expresses its satisfaction with the existing "variety of methods by which Community R & D actions are implemented nowadays," supplemented by further methods such as "joint undertakings, minority holdings, the creation of specialized agencies, the creation of multilateral associations".

The Section regards the study of innovation, management and the exploitation of R & D results within the EC and the transfer of technology as in need of serious and urgent attention.

The current limitation of R & D to pre-competitive research appears to be questioned in the Memorandum COM(85) 350 final and the Communication COM(85) 530 final:

> *Community action must not be limited to developing research; it must also help to exploit results which lend themselves to commercial applications. In some cases it may be useful for the Community to have the means to bear certain pre-development costs, at least in part, in particular in the case of innovative SMEs.*
>
> *(COM(85) 350 final, pp. 6 and 7)*
>
> *Where it is a matter of providing assistance for the exploitation of results with the aim of extending the support already given to pre-competitive research (pre-development, prototype) and promoting the application, especially by innovative SMEs, of the results, the Community must be allowed to deploy non-budget resources, such as innovation loans and risk capital holdings.*
>
> *(COM(85) 350 final, p. 9)*
>
> *The internal market also means observing certain rules of the game. Competition policy and a policy to promote high technology can pursue the same objectives insofar as new technologies bring about more competition (innovative competition through new products and processes) and increased productivity. The Commission competition policy, therefore, is in favour of cooperation in R & D, specialization, joint ventures and other means of promoting high technology.*
>
> *(COM(85) 530 final, p. 13)*

The Section, while supporting the general purpose of the Treaty provisions concerning competition, questions whether they are appropriate to support a unified focus in certain areas of research and development in industry. It believes that limited and controlled support for non-competitive research is desirable to enable new products and processes to become established within the total internal market of the Community.

The Section draws attention to an important aspect of planning for a European Technology Community, viz. the contribution it can make to the integration of the European Community. Conversely, the Section believed that the implementation of plans for a European Technology Community will depend to a great extent on the speedy development of a large homogeneous and dynamic European market, the formulation of joint industrial standards, the elimination of current technical obstacles, the opening up of a system of public procurement, and a European patent agreement. In this regard the Section welcomes and supports the Commission's efforts to advance the completion of the internal market.

IRIS

A European Technological Community among its objectives aims at achieving competitivity for the EC in the trading markets of the world. That is clearly the focus of the Commission Memorandum COM(85) 350 final and COM(85) 530 final. It also aims at achieving an acceptable quality of life for the citizens of Europe. This is specifically the focus identified in the Italian initiative for the IRIS Programme.

At the Conference on IRIS in Venice (2-4 December 1985) the Vice-President of the Commission of the European Communities, Dr K. H. NARJES, pointed out that the real significance of "the ambitious but necessary and unavoidable goal" of the European Technological Community is "the construction of Europe for the future well-being of the Europeans" and this depends to a large extent on "the mastery of the new uses and diffusion of new information technology applied to society", - i.e. to education and health, transport and culture, security and leisure, home maintenance and city management.

The mastery and diffusion of the NIT to achieve the goal of a European Technological Community will mean, said Mr NARJES, "a technological change predominantly affecting the how and where goods and services are produced as well as a technological change affecting the types and range of which products and services are produced and how they are used". The potential of NIT is a new phenomenon and is a major challenge and opportunity in the construction of a European Technological Community.

The Section welcomes and supports the initiative for the IRIS Programme and strongly recommends that budgetary provision be made for it in the second Framework Programme.

Whilst IRIS is designed to stimulate research on NIT products and processes, it should also focus on research projects and the development of systems and strategies that would facilitate the enhanced usage of existing information technologies, to meet users' needs, both for individuals and enterprises and this would enable people to improve their quality of daily life and to meet new progressive and acceptable values and social and individual needs.

The IRIS Programme could help to overcome marketing problems posed by short time-lead obsolescence in new information products, which can occur due to the rapidity of social and economic change.

EUREKA

An assessment of the proposals for an ETC requires a prior consideration of the other important proposal made about the same time for a European Research Coordination Agency (EUREKA) (see page 7 above).[2]

The proposal stated that the technological renaissance of Europe must begin with the mastery of technologies for information processing, production and the life sciences. To achieve such mastery it selected five specific fields to form the leading edge of research and scientific investigation: computers, telecommunications, robotics, materials and biotechnologies. These five specific fields of the EUREKA project may be set down by way of comparison with the 10 possible mobilizing projects selected in the proposal for a European Technology Community and the research areas envisaged in the second Framework Programme 1987-1991.

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(2) EUREKA: The Technical Renaissance of Europe (June 1985), document signed by Mr Roland DUMAS, Minister for External Relations, and Mr Hubert CURIEN, Minister for Research and Technology. The initiative for this programme came from the French government in April 1985.

EUREKA and the ETC

The Section welcomes the philosophy inspiring EUREKA, but strongly suggests that a social dimension be incorporated into it.

It is possible to draw a number of limited and tentative distinctions between the proposal for a European Technology Community and that for a European Research Coordination Agency, known as EUREKA.

The ETC is essentially concerned with pre-competitive research; EUREKA is concerned with exploiting research and development, including pre-competitive research on subjects which are judged to be close to commercial exploitation and proceeding rapidly to capture markets for them.

The ETC's main objective is to induce European industrial firms to join forces and cooperate with universities and other centres of research for TRD up to the development stage: EUREKA would act as an agency in bringing European industrialists together so as to identify specific potential TRD projects which could be brought quickly beyond the development and innovation stages to the market place.

Whilst both ETC and EUREKA aim to achieve improved competitiveness in world markets, the latter, unlike ETC, would have no mandate as an agency to promote the coordination of national and community TRD policies. EUREKA aims at linking a number of firms and research institutions in a series of cooperative enterprises in civilian projects in the field of advanced technologies and thereby to raise the productivity and competitiveness of European industries and national economies on the world market.

Whilst fundamental distinctions must be drawn between ETC and EUREKA where objectives, structures and funding are concerned, efforts must, however, be made to accommodate and reconcile both proposals in the interests of Europe's economic development in general, and its ability to bring the results of its TRD programmes in particular, to commercialization in the shortest possible time-span.

As was made clear at the Hanover Conference (see page 7 above), significant interaction and cooperation can exist between the programmes of the ETC and those of EUREKA. Lack of adequate coordinated arrangements for the organization of European R & D could result in an undesirable development of EUREKA leading to serious imbalances. For example, the small countries could become mere spectators by their inability to participate in many of the projects, and regional differences and imbalances in the levels of technological development could become even more pronounced. Care must be taken also in accordance with the EUREKA Charter to ensure that SMEs are not excluded from the benefits arising from the dissemination of the resulting technological knowledge, and that Eureka will remain open to all efficient enterprises including SMEs, and smaller research institutes in which many of the innovative technological products and processes are initiated.[3]

It is difficult to see how the objectives and functions of EUREKA can exclude it from the scope of a European Technological Community, or indeed bring it into conflict with the research Framework Programme and its research action programmes. A reconciliation of specific objectives and a coordination of efforts in implementation ought to characterize the relationships between them.

There is an urgent need for cooperation in resources and effort as regards the research fields of EUREKA and the Framework Programme. This is particularly so, given the stage reached in Europe's pre-competitive and applied R & D programmes to master and exploit the new technologies so as to develop products, processes and services which can be sold competitively on world trading markets.

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(3) EUREKA Charter

EUREKA 5 SPECIFIC RESEARCH FIELDS	10 MOBILIZING RESEARCH PROJECTS OF THE ETC	8 RESEARCH AREAS ENVISAGED IN THE SECOND FRAMEWORK PROGRAMME
1. **Computers** (First computers, artificial intelligence, etc.)	1. **Information Technologies** (super computers, artificial intelligence, etc.)	1. **Information Technologies** (high capacity computers, artificial intelligence, preparation for the second phase of ESPRIT, etc.)
2. **Telecommunications** (Open universities and remote work stations)	6. **Broadband Telecommunications**	3. **Communication Technologies** (new)
	7. **New generation means of transport**	4. **Advanced Transport Techniques** (new) (a definition phase for the RACE programme) An R & D programme on transport aimed at improving competitivity increased safety, and limiting adverse effects of environment
	4. **Lasers and optics**	7. **Industrial technologies** (BRITE, ESPRIT)
3. **Robotics** (mobile robots, fully automated flexible factories etc.)	5. **Large scientific instruments** (advanced wind tunnels)	
	8. **Use of space** (hostile environments)	5. **Use of space** (new) (remote sensing and industrial applications, land-use)
		5. **Use of space** (new) (results of microgravity experiments to materials)
	9. **Mastering the marine environment** and exploiting the earth's crust	6. **Marine sciences and technologies** (new)
4. **Materials** (whole range of state-of-the-art technologies)	3. **New Materials** (super conductors, ceramics)	
5. **Biotechnologies** (food health and re-vitalization of non-arable land resources)	2. **Biotechnologies** (genetic and biomolecular engineering)	2. **Biotechnologies** (renewal of medical research programme, new prospects for research and AIDS and Cancer)
	10. **Education and training technologies**	8. **Education and training technologies**

The Section welcomes the initiative EUREKA represents in bringing together industrial enterprises which may be competitors today but tomorrow must take advantage of an expanding European market so that they compete successfully on the world markets.

EUREKA, as such, should form an important extension of a European Technological Community.

This development has accelerated the need for legal provisions governing the operations of EC companies.

Coordinating European R & D

In the areas of organization, management and access to resources many procedures need to be determined and the necessary agreements reached on them. Ways and means must be found to avoid overlapping of programmes so as to ensure a smooth and effective working relationship between the body responsible for coordinating R & D at the EC level, namely the Commission of the European Communities, and the coordinating body for EUREKA, namely the Conference of Ministers of the 18 European countries plus the Commission of the EEC. The Section proposes therefore that the Commission be closely involved in the functioning of the EUREKA secretariat.

The Section believes also that it is necessary to ensure that resources are not unduly diffused and that no available resources will be drawn off from the Framework Programme. If that occurs the resources applied to the different areas of research could prove inadequate to achieve the results.

With the initiation of the ETC and the development of EUREKA there is a need for a re-evaluation of the scope and role of COST (European Cooperation on Scientific and Technical Research).

The Effectiveness of European R & D

The strengths and weaknesses which characterize the present condition of Community R & D in the new technologies are difficult to summarize, but there appears to be agreement on two central points - Europe is strong in basic research, but weak in the process of transferring the results of basic research to the market.

In the words of the Summary of the Proceedings of the ESC Conference Europe and the New Technologies (ESC 84/016, page 5).

> *Europe has the potential, both human and material, to meet the threat posed by the United States and Japan who are increasingly outpacing it in certain key sectors. The European Community may, however, be too weak, too fragmented and too incomplete to realize this potential. Fears and hesitations about the social impact of the new technologies also need to be overcome.*

It would be a serious mistake to be discouraged by the difficulties to be surmounted. European innovations and achievements in science and technology should be recalled, notably biotechnology, medical science, nuclear research, aircraft and the early discoveries in communication technologies. The current need is to overcome the tendency to fall behind in innovation and enterprise. The Section calls for urgent study of all the factors involved in bridging the technological gap and urges immediate attention to the considerations contained in Section 5 of this Report.

Regarding the matter of measuring research results, the Section appreciates the problem posed in any endeavour to accurately or even adequately cost the outturn of R & D results. It examined this matter and whilst acknowledging that the comparative figures for Expenditure on Research as a percentage of GDP in the EC, Japan and the US, for example, do not provide adequate data to measure research results, nevertheless with the resources available to draw up this Report, it was unable to provide more accurate comparative figures.

The progress of research should not totally be uncontrolled. The early investment in any research is an expression of faith. There is a need to exercize sympathetic monitoring of each project, to exercize firm authority to bring to a close those projects which are failing to reach usable conclusions and to ensure that success in research is rapidly exploited in demonstration, development and production by the introduction of adequate funds and managerial dedication. Attention should be given to qualitative monitoring as well as to financial auditing.

The Community's Framework Programme (Research, Science and Technology)

In putting forward the case for an ETC, the Commission in its latest document (COM(85) 530 final) clearly proposes that following the introduction of a number of adjustments so as to strike new balances, and with the broadening of objectives by way of including new topics, the proposed new Framework Programme for the next five years (1987-1991) will be the pivotal TRD programme to implement its proposals for a European Technology Community. The Framework Programme is intended by the Commission to represent "the qualitative leap" heralded in the Communication entitled: "Towards a European Technology Community".

It must be accepted that a greater share of the Community budget be devoted to TRD.

The Council should give early proof of its agreement with the general thrust of the Commission's proposals in this area.

This Information Report endorses the Commission's approach. The Framework Programme is indeed pivotal to EC research, and the Commission must have full responsibility for coordinating all TRD actions at the European Community level. The Commission must be the driving force behind all such EC research action programmes.

The provisions of the Luxembourg Agreement (as amended on 16/17 December 1985) concerning the consultation of the Economic and Social Committee on TRD questions are welcomed.

7 . MAIN CONCLUSIONS

European Technological Community (ETC)

Full support should be given to the Commission's proposal for establishing an ETC described in Commission documents COM(85) 350 final and COM(85) 530 final.

The Council should give early proof of its agreement with the general thrust of the Commission's proposals in this area.

The budgetary implication of the ETC proposals

It must be accepted that a greater share of the Community budget be devoted to Technological Research and Development (TRD).

The Framework Programme for Scientific and Technological Strategy

The Framework Programme must be seen as being pivotal to Community TRD action. Scientific and technical objectives should be as suggested in the ESC Opinion "Priorities for Community Research" (OJ No. C 160 of 1 July 1985).

The provisions of the Luxembourg Agreement requiring that the Economic and Social Committee be formally consulted on TRD matters are welcomed.

EUREKA

The Section welcomes the philosophy inspiring EUREKA insofar as it brings together industrial enterprises from different countries.

The Section strongly suggests that a social dimension be incorporated into EUREKA.

ETC and EUREKA

The ETC and EUREKA proposals must be reconciled. One must be complementary to the other. The first indications are that there is too much overlap between the two. Lack of adequate coordinated arrangements for the organization of European R & D could result in an undesirable development of EUREKA leading to serious imbalances.

The Section emphasizes the potential of SMEs and small research institutes to innovate and create new technological products and processes.

Coordination between ETC and EUREKA

Whilst recognizing that the Community is already represented by the Commission on the Coordinating Body of EUREKA, a more complete coordination between ETC and EUREKA would be ensured by Commission participation in the functioning of the EUREKA Secretariat.

The Commission should have full responsibility for coordinating all TRD actions at the European level.

The development of basic research

Europe has major strengths and is frequently ahead in basic research. Therefore, the Section considers that it is important that basic research continues to be valued. The success of the JRC, ESPRIT and BRITE should be built upon.

Efficacy of Community TRD

Effective innovation and the rapid exploitation of R & D results are essential prerequisites to competitiveness. The Section regards the study of the management of innovation, the exploitation of R & D results within the EEC and the transfer of technology as in need of serious and urgent attention.

Improved means of measuring the efficacy of Community TRD are needed. Attention should be given to qualitative monitoring as well as to financial auditing.

The time-span between embarking on TRD activities and making the best use of the results of the research in the market place must be shortened. There is an urgent need for research and analysis of the relevance of socio-cultural factors in this respect.

Better management of the Community's technological and human resources must be promoted.

The internal market

The full benefit of an effective Community ETC will depend in large measure on the completion of the internal market. This involves common standards, the elimination of technical barriers, European patents agreement, and the opening up of public procurement.

R & D activities and competition rules

The Treaty provisions regarding competition need to be examined with a view to their less rigid application to support for TRD.

Social aspects of technological innovation

Attention must at all times be paid to the impact of technological developments on employment and on working and living conditions. There must also be a commitment to using technology for social and environmental goals.

TRD should be oriented towards improving living conditions for citizens. In this regard, the IRIS initiative is welcomed and supported.

Education aspects

Technological innovation and the entrepreneurial spirit not only require a more technologically-minded system of education, but also a plan for educating citizens for a technological society, and the development of an ethos of technologically-based thinking, with a view both to innovation and to the mastery of technology for social goals.

Cooperation in the field of TRD

In order to facilitate the transfer of technology inside the Community and to enhance the achievements of Community TRD programmes, cooperation is vital. This cooperation should be promoted at trans-European level between all agencies (e.g. companies, universities and research institutes).

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INFORMATION REPORT ON NEW TECHNOLOGIES AND INDUSTRY

Rapporteur: Mr ARENA

The Section for Industry, Commerce, Crafts and Services
adopted this Information Report on 8 January 1986 by 38 votes to 0, with 4 abstentions.

Mr Arena, Rapporteur

The preparatory work was carried out by the Section's Study Group on New Technologies, made up as follows:

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	Mr	BRINDEAU	
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SUMMARY

SUMMARY AND CONCLUSIONS

The analysis made in the present Information Report on new technologies leads to the following main conclusions:

— from the company's point of view, the new technologies are an important element in innovation strategy;

— only innovative companies will survive the major changes which are underway;

— only with a thorough knowledge of the possibilities and effects of the new technologies needed can a company develop new products through rational product innovation;

— successful innovation is the result of a number of factors both within, and more especially outside, the company;

— if Europe as a whole and the majority of European countries and companies wish to remain competitive, they must increase their innovative capacity;

— Europe has all the prerequisites (and in some cases has proved it) to be as innovative and efficient as the USA and Japan;

— awareness of the gap between practice and potential has increased, and in recent years there have been many moves to minimize it;

— the successful examples of cooperation in large-scale projects provide an indication of the path to take in the future.

The European Community can play a crucial role in taking up these challenges, by taking action in three main areas. The first type of action involves directly and specifically increasing familiarity with new technologies, the consequences of their application, and the skills needed to use them. The aim must be to avoid dangerous gaps in the fabric of knowledge which would gradually weaken its whole structure. The targets of these measures would be the same as usual: public- and private-sector research centres, companies. The instruments, too, are the usual ones: Community programmes, laying great stress on international cooperation. The most recent Community programmes indicate the direction to follow. As the aim of these programmes is to avoid and where necessary fill gaps in knowledge, priority must be given to the weakest sectors - first and foremost, the new materials sector.

The second kind of action involves the creation of a genuine large internal market. The Commission White Paper(*) is fundamental to this: the framework is complete, and the measures proposed form a coherent, balanced whole. The proposed time- schedule is certainly extremely demanding, and will require a full commitment and a will to succeed on the part of all the Member States and social groupings involved. We must realize that a further failure or excessive delay could mean the definitive failure of the plan to build a true Community. The creation of a continent-wide market could give rise to beneficial cooperation and rationalization. In the public supply sectors (energy, transport, telecommunications, etc.) in particular, this could lead to the creation of real plurinational companies. These could at last operate on a completely new footing, no longer based on a protected domestic market and an export system which defies all economic logic and which is only made possible by massive and increasing State aid.

The third area in which the Community can deploy resources to maximum effect is that of large-scale projects. To date, however, agreements between countries or companies have been the norm. Given the decisions taken by the intergovernmental conference on EUREKA, and the Commission

(*) Ref. COM (85) 310 final

proposal for a technology Community, it is possible to distinguish the beginning of a major European-scale initiative to help European industry achieve growth and success in high-tech sectors.

The basic features of this new initiative should be:

— commissioning from international consortia of prototype products or systems (as a rule, the minimum unit value of projects should be not less than 100 to 150m ECU);

— selection criteria for the items to be commissioned:

  a) close to the marketing stage;

  b) high new-technology content;

  c) lack (even in the medium term) of a sufficiently large national market to justify a local production initiative;

  d) presence of technological and financial risk which is too high for one country to bear alone;

— commissioning formulae based on "variable configurations" with mechanisms to ensure a fair return;

— sufficiently broad overall economic scale to make the initiative effective and ensure continuity[4].

The list of subjects given in the communication on the technology Community generally fulfils these criteria.

Measures to develop European public high-tech demand (which could usefully involve non-EEC States such as Sweden, Norway, Finland, Switzerland, Austria and Yugoslavia) could subsequently be expanded into coordinated programmes to strengthen and integrate the main continent-wide infrastructures (railways, roads, telecommunications, energy, airlines, environmental protection, etc.). As well as promoting the new technologies and encouraging the creation of more "European" companies, this would help improve communications (and therefore living standards) between the nations of Europe and stimulate their economies by boosting public investment. Some of the programmes backed by EUREKA could usefully be included here.

European industry can meet the challenge posed by the new technologies. However, promotional action at international and Community level must be strengthened and made more effective. The path to take must be to:

— ensure that scientific and technological knowledge keeps fully abreast of developments;

— encourage the creation of continent-wide demand with a high innovative content, particularly with large-scale projects;

— encourage the creation of true European supply capability.

The work to be undertaken is wide-ranging and exacting and success will depend on a common commitment.

On many and more difficult occasions, the nations of Europe have demonstrated the will, ability and culture needed to achieve great things; the Section hopes that they can now harness their common political will to make another major step towards the building of Europe.

(4) For example, with an annual operating budget of 1,500 to 2,000m ECU, 10 new projects of 150m ECU could be launched yearly over a three-year period, or 10 projects of 200m ECU over four years. 30 or 40 consortia could thus be operative at the same time.

Part one
GENERAL CONSIDERATIONS, THE COMMUNITY DIMENSION, AND APPRAISAL OF COMPANY ACTION

1. THE NEW TECHNOLOGIES

This expression covers technologies which have recently seen major advances (e.g. microelectronics, molecular biology) and new production and processing techniques, particularly for new materials (composites, ceramics, amorphous metals). The mechanisms of innovation mean that these technologies are giving rise to new products, systems and services (telematics, flexible automation of processes, biotechnology pharmaceuticals, etc.), and to considerable improvements in the performance of existing products, systems and services.

The new technologies are ushering in a period of accelerated development for a large number of major industrial sectors. This, however, is not necessarily accompanied by an expanding market. This accelerated development is likely to extend over at least twenty years, but the effects on the individual sectors most directly involved should be seen much sooner (in around five years).

There is thus likely to be a dramatic increase in competition (to some extent this is happening already); the main firms to survive and prosper will be those which have been able to make the most innovative use of all the available technologies (and more especially master and absorb the new technologies).

Many different technologies - some established, others newer - contribute to the development of a product or system. A company which seeks to be technologically innovative must therefore possess (or at least have access to) all the technologies involved. Taking for granted the mastery of established technologies (although this must be safeguarded and improved), attention inevitably focuses on the new technologies.

The new technologies are becoming more widespread in all sectors, penetrating them with varying degrees of speed and intensity, often under the pressure of increasingly stringent requirements (operating features, reliability, safety, performance, etc.). Although the impact of the new technologies is initially greater in certain areas (information technology, aerospace, defence, industrial automation, biotechnology, etc.), it will also be considerable in more "mature" industrial sectors such as electrical engineering, machine tools, the motor industry, textiles and the metal industry. Sooner or later, the changes in competition engendered by the new technologies will permeate all sectors.

The introduction of new technologies (particularly in the process sphere) may have implications for the geographical location of even the most firmly established activities. The developing countries (except those producing necessary raw materials or providing a market for finished products) will lose some of their attraction, which is based mainly on their low labour costs. Similarly, even industrialized countries could lose their ability to attract investors if their political, economic and social structures are weak or too strife-prone. In some cases the complexity of the processes involved will mean that location in industrialized areas offering specialized services is essential. Radical changes may thus occur in the international division of labour and in the North-South dialogue as regards industrialization. This type of problem is already apparent in sectors where the impact of the new technologies is strongest and most immediate. Elsewhere (e.g. the clothing industry), the phenomenon may be less dramatic or may materialize more slowly.

In assessing the new technologies, we must consider not only the scale of the prospects opened up, but also the speed and pattern of introduction of the new technologies. Companies must carefully weigh up the reliability of the technologies themselves, the financial constraints connected with modernizing or replacing plant and the improvements expected in productivity and quality. Companies which act in the most rapid and coordinated fashion are likely to be at an advantage here. Attention necessarily focuses here on the technological problems which innovation brings. However, innovation is a complex process which affects the whole business system, including organization, the financial side and the market. These aspects may even sometimes be more important than the technological side.

Firms undoubtedly have a central role and responsibility in innovation. However, their prospects of success also depend on the extent to which the environment (economic, social, cultural, institutional) in which they are operating is truly conducive to this process. Of particular importance here are the attitude of the two sides of industry to company mobility (see above) and especially the changes in working conditions, such as the need for geographical and occupational mobility of workers, which are vital for the new technologies.

2. THE SITUATION IN EUROPE

It is difficult to assess the relative development stage of each new technology in the various companies, sectors and countries. However, if we view the new technologies as elements in the innovation process, the many studies on this subject will help give an indirect picture. Taking three main categories of indicator:

— innovativeness,

— competitiveness,

— trade in high-tech products,

the conclusion is unmistakable: despite some major successes and a leading position in many sectors, the EEC is losing ground to the other two main economic areas (USA and Japan).

These studies also highlight an important point. Europe's scientific and research capabilities are of a uniformly high level and at all events match those of the most advanced nations. Europe's weakness seems to be in the transition from research (particularly when carried out by public bodies) to its application to products and processes. Precompetitive research would be all the more interesting to companies since if successful they could expect to win orders. One of the main advantages of private competitive research is its secret and exclusive nature, and the fact that its results can be patented. Every effort must be made to encourage it. Programmes should be allocated as quickly as possible after their conception and publication. The possibility of reducing the time-lag here should be examined at all levels of the consultative and decision-making process.

Several European countries have taken steps to try and help their companies become more innovative. The effectiveness of these measures cannot be gauged from available statistics, as in many cases government action is fairly recent. However, it is reasonable to assume that measures at national level are potentially less effective than Community-level measures would be.

However, experience so far shows that innovativeness depends on a number of different factors, and that government action to increase it must take balanced account of all of them. A brief analysis of policies to date would suggest that they have either been too limited or sporadic, or have involved a collection of specific and not necessarily consistent measures.

Various surveys by research institutes in several European countries suggest that the main obstacles to innovation (and hence the lack of stimulus to use and invest in new technologies) are:

— demand (especially State demand - energy, telecommunications, the environment, transport, etc.) which does not always have a high innovative content;

— the limited nature of the markets to be won, which may not justify the work needed on R & D, experiments, demonstration and production;

— widespread difficulties in linkage with outside centres of knowledge (universities, public research institutes);

— the partial shortage of specialist staff and, in some cases, insufficient mobility;

— barriers to wider cooperation between companies, particularly at international level;

— the lack of technical information and the reluctance to use knowledge developed by others.

The importance of each of these factors clearly varies according to the individual sector, market and country. In general terms, however, the above list gives a fair idea of the position emerging from the various surveys. Many people feel, however, that the two key points are (a) the link between R & D and innovation in companies (cultural, legislative and administrative factors are important here) and (b) the lack of financial instruments to provide medium and long-term support for the innovative capacity of companies (especially as regards risk capital).

One other factor has a restraining effect. This is company mobility, an area in which the European system is probably too inflexible. Existing industrial policy instruments should be geared more to change than simply to protecting what already exists. The same is true of other mechanisms which could stimulate innovation, such as acquisitions and mergers. Here the barriers are mainly at national level. Lastly, the costs borne by a company when winding up an activity which has proved unsuccessful are sometimes even higher (and the difficulties greater) than those of setting it up. The "birth-rate" of new companies is consequently well below that in the USA or Japan.

The number of people employed in industry is falling steadily in all the industrialized nations. This can be seen as a consequence of the introduction of new technologies (especially in the process sphere) and of the slowdown in economic growth. In Europe, however, this phenomenon is particularly worrying both because of its scale and because it is not always offset by a substantial improvement in the competitiveness of the various sectors affected. In too many cases, the adjustment processes are based only on national parameters (demand, supply, export capacity). As new technologies lend themselves more than others to internationalization of the markets, the path taken by adjustment processes in Europe is not proving conducive to their widespread use. Europe also seems less able to create new jobs in the services sector. On the other hand, a cautious if not hostile attitude to the introduction of new technologies would:

— weaken the competitive capacity of European industry and thus aggravate employment problems in the medium term;

— run the risk of neglecting some of the potentially positive aspects of new technologies, particularly with regard to the development of new products, systems and services, and the associated new skills requirements.

3. ACTION TAKEN IN EUROPE

The Community has in recent years sought to set in motion a series of measures which, if implemented swiftly, could play a positive part in improving company innovativeness. While bearing in mind the individual obstacles mentioned above, we may single out the following broad areas (for a more detailed analysis of these subjects, see Part 2 of this Report):

— **high innovation demand**: mention should first be made of the proposal on the creation of a European Technology Community (COM(85) 350 final and COM(85) 530 final). Other impulses have come from multilateral initiatives such as the ESA programmes, and collaboration in the defence (Tornado, etc.) and energy (Superphenix) sectors;

— **expanding the markets**: the position on this emerges mainly from the White Paper on the internal market (COM(85) 310 final) and the various documents (the latest being COM(84) 717 final of December 1984) on public supply contracts. The new strategy on technical harmonization and standards (COM(85) 19 final) and the proposals on standardization in the field of information technology and telecommunications (COM(85) 230 final) also provide concrete contributions to the completion of the internal market;

— **cooperation between companies**: as this is a very broad area, we will mention only the measures on the creation of a European company law framework (European Economic Interest Grouping and Statutes of the European Company) and on the harmonization of rules on intellectual property and fiscal policy. Equally important are the measures taken in such programmes as BRITE, ESPRIT, RACE, and other smaller projects in which cooperation between companies from various Member States is a prerequisite for participation;

— **risk capital**: with the exception of the United Kingdom, where venture capital has had considerable success, European countries have been worryingly slow to adopt this formula. This has helped keep down the number of new business start-ups - this is a particularly crucial point, as we have noted above.

Other measures (some of major importance) concern R & D, energy, the link between universities and companies, the setting-up of centres of excellence and the creation of large- scale research infrastructure, the mobility and training of specialist staff, employment in high-tech sectors and advanced services, and information dissemination systems. These subjects are considered in more detail in the Reports of the ESC's Energy and Social Sections.

Community action has thus covered a wide range of areas. The White Paper on the internal market provides a useful summary of past achievements and future projects, and the measures it proposes are broadly consistent with the guidelines given above.

Alongside the many horizontal measures mentioned above, a number of more specific measures are being prepared and implemented. These aim to promote knowledge of new technologies and their experimental use and, indirectly, to create wider markets and foster cooperation between companies.

a) **Community programmes**

These have the dual aim of knowledge acquisition and cooperation. Apart from the numerous COST actions, whose impact and significance should perhaps be reassessed, there are the more recent ESPRIT, BRITE and RACE programmes, and the European nuclear fusion programme. The sectors receiving support (microelectronics and information technology, telecommunications, new production technologies) are undoubtedly key elements in the modernization of industry and society.

b) **Supranational programmes**

These are set up and administered by ad hoc international bodies (agencies). The most successful is ESA, thanks to which Europe is taking on a leading role in the highly advanced space sector. All ESA programmes are developed by international consortia. Another example of this type is CERN, in the field of physics research.

c) **Multilateral projects**

These are mainly the result of agreements between governments or public bodies from various countries (or companies with explicit government backing). Their object is a product or a joint initiative with a high technology content, a large financial commitment, and a high degree of risk. The best-known examples are the Airbus consortium for the design and manufacture of the commercial aircraft of this name; the Panavia consortium for the production of the Tornado multi-role fighter-bomber; the Nersa consortium for the production of the Superphenix sodium- cooled reactor; the KALKAR SNR 300 project; the Italo-French consortium for the production of the ATR 42 commuter aircraft; the various ad hoc bodies formed to set up and manage physics research installations, and so on.

d) **National programmes**

Although outside the scope of this Report, these should be cited as bearing witness to the resolve to take steps to promote knowledge and use of the new technologies. Virtually all Member States have instruments - some of them extremely sophisticated - to promote research and improve the innovative capacity of domestic firms.

Each of these programmes has a considerable budget. A comparative analysis of them (and of their various aims) will help to explain the varying effectiveness of the instruments used so far. Appendix I to these Reports details the Community programmes and the main multinational bodies and programmes.

4. ASSESSMENT OF THE ACTION TAKEN AND OF THE METHODS USED

It has already been noted that Europe has all the prerequisites (culture, economy and market size, tradition, scientific structures, spending levels, etc.) to achieve much better results than is the case at present.

A first indirect explanation of why this potential is not always reflected in concrete results is that innovation is not the result just of individual initiatives or resolve, but rather the fruit of a favourable general environment. The many and varied measures taken in Europe in recent years to encourage innovation have not always lived up to expectations.

The Community has focussed its efforts on two areas:

— establishing a system of common rules;

— promoting knowledge and experience.

With the exception of agriculture (and possibly the steel industry), progress in the first area has been relatively slow. The White Paper on the internal market makes this quite clear. This lack of effectiveness is not only politically and economically based, aggravated by the recession of the '70s and '80s. It is also due to complex compromise mechanisms linked to the need for unanimous decisions on regulations, and to the time (largely outside the Commission's control) which directives take to be incorporated into national legislation.

For example, although the situation varies considerably between Member States, it is known that quite a high percentage of directives are incorporated into national legislation over two years behind schedule, or even fail to be incorporated at all.

The Community's efforts to promote knowledge and experience have also so far produced results that are in general not very exciting. There seem to be three main reasons for this:

— the low level of funding, particularly in comparison with analogous national programmes;

— the complex decision-making procedures, which make progress slow;

— the limiting of Community involvement to "pre-competitive" research, which sometimes gives companies little incentive to participate, and means that the effectiveness of Community action is not readily apparent.

The ESPRIT project promises well, and the Section has noted with interest the favourable assessment made by a group of independent experts on the programme's first two years of operation. The positive aspects of ESPRIT are the relatively high (compared with other Community programmes) financing level and its international nature. The programme at present covers a very broad spectrum of research but in the next few years it should focus increasingly on a few strategic projects; the operating agreements which are emerging between various information technology and electronics companies in Europe can be cited as another positive element of ESPRIT.

The most important supranational programme is the European Space Agency (ESA), which is generally deemed to be extremely effective. Thanks to such projects as Ariane in its various versions, Spacelab and Columbus, and the various telecommunications and scientific satellites, Europe now occupies third place in the world in the non-military space sector. And this is not all: ESA was delegated to negotiate with the USA on participation in the American space station programme, and on the major ten-year programme adopted at the beginning of 1985, which involves a virtual doubling of annual allocations. These examples provide clear confirmation of the common desire of the governments to work together on the most demanding space programmes.

The ESA formula has proved its worth, but mechanical reproduction of this formula in other sectors seems more problematic. In particular, we must not, in the name of supposed efficiency in the short term, encourage the setting-up of more and more bodies independent of the Community, with the attendant risk of reducing the Community to an "agricultural Europe" and a centre for rules and recommendations, relinquishing any active part in industrial and research policy and promotion.

The above analysis illustrates the contradictory situation of Europe at the moment: Europe has the culture, the tradition and the market to equal the USA and Japan. Yet despite this potential, Europe is losing ground.

The Community can play a crucial role in eliminating the shortcomings outlined above, by taking action in three main areas. The first type of action involves directly and specifically increasing familiarity with new technologies. The aim here must be to avoid dangerous gaps in the fabric of knowledge which would gradually weaken its whole structure. The targets of these measures would be the same as usual: public- and private-sector research centres, companies. The instruments, too, are the usual ones: Community programmes, laying great stress on international cooperation. The most recent Community programmes indicate the direction to follow. As the aim of these programmes is to avoid and where necessary fill gaps in knowledge, priority must be given to the weakest sectors - first and foremost, the new materials sector.

The second kind of action involves the creation of a genuine large internal market. The Commission White Paper is fundamental to this: the framework is complete, and the measures proposed form a coherent, balanced whole. The proposed time- schedule is certainly extremely demanding, and will require a full commitment and a will to succeed on the part of all the Member States and social groupings involved. We must realize that a further failure or excessive delay could mean the definitive failure of the plan to build a true Community. The creation of a continent-wide market could give rise to beneficial cooperation and rationalization. In the public supply sectors (energy, transport, telecommunications, etc.) in particular, this could lead to the creation of real plurinational companies. These could at last operate on a completely new footing, no longer based on a protected domestic market and an export system which defies all economic logic and which is only made possible by massive and increasing State aid.

The third area in which the Community can deploy resources to maximum effect is that of large-scale projects. To date, however, agreements between countries or companies have been the norm. It is not possible at this stage to predict the outcome of the various discussions on this subject currently underway at Community and European level. However, on the basis of the above analysis, it seems possible to distinguish the beginning of a major European-scale initiative to help European industry achieve growth and success in high-tech sectors.

The basic features of this new initiative should be:

- commissioning from international consortia of prototype products or systems (as a rule, the minimum unit value of projects should be not less than 100 to 150m ECU);
- selection criteria for the items to be commissioned:
  - close to the marketing stage;
  - high new-technology content;
  - national market too small (even in the medium-term) to warrant a local production initiative;
  - presence of technological and financial risk which is too high for one country to bear alone;
- commissioning formulae based on "variable configurations" with mechanisms to ensure a fair return;
- sufficiently broad overall economic scale to make the initiative effective and ensure continuity[5].

The list of subjects given in the communication on the technology Community generally fulfils these criteria.

Such a large-scale new type of public commissioning might be expected to alter the competition situation, and perhaps even lead to the formation of supply cartels and monopolies. It should be noted, however, that this has not been the case with space activities and that on the contrary

(5) For example, with an annual operating budget of 1,500 to 2,000m ECU, 10 new projects of 150m ECU could be launched yearly over a three-year period or 10 projects of 200m ECU over four years. 30 or 40 consortia could thus be operative at the same time.

a series of relatively stable international consortia have emerged (MESH, COSMOS, STAR, etc.) which compete amongst themselves and represent real, lasting associations.

Measures to develop European public high-tech demand (which could usefully involve non-EEC States such as Sweden, Norway, Finland, Switzerland, Austria and Yugoslavia) could subsequently be expanded into coordinated programmes to strengthen and integrate the main continent-wide infrastructures (railways, roads, telecommunications, energy, airlines, environment, etc.). As well as promoting the new technologies and encouraging the creation of more "European" companies, this would help improve communications (and therefore living standards) between the nations of Europe and stimulate their economies by boosting public investment.

The EUREKA initiative is also a part of the picture sketched out here; indeed, it can contribute to the launching of a series of large-scale international projects intended to develop new technologies and respond actively to the future needs of European countries. It is therefore necessary for the Council to give the Commission funds and powers to take an active part in the EUREKA projects by supporting - financially and otherwise - those which accord best with the plan to achieve a genuine technology Community. The Section stresses that the EUREKA programmes must complement Community programmes and not compete with them. To this end, the Commission should be closely involved in the management of this initiative.

Part two
INNOVATION IN THE COMMUNITY : THE CORPORATE ENVIRONMENT

1. The internal market

None of the ten national markets in the Community is more than 5-10% of the size required to justify the investment which large-scale technological innovation necessitates. A precondition for Community firms profiting fully from their R & D investments in new technologies is therefore the existence of a true Community market of continental proportions.

The barriers to trade between the countries of the Community (technical, administrative, fiscal, etc.) are great in number and certainly "cost" more than one thousand million ECUs each year. This expenditure is due in the main to border formalities and taxes.

In addition, trade within the Community has been declining since the beginning of the '80s in relation to total Community trade[6] after having grown between 1959 and 1970 at an average annual rate of 16%, which at the time was well above the 9% growth rate for trade with non-Community countries.

The creation of a real Community market by 1992, as envisaged in the White Paper, is therefore crucial for the establishment of a climate which is favourable to innovation and the strengthening of Community industry in the face of international competition.

New technologies make various cross-border services possible and therefore demand technical and administrative support measures from the Community to open up the market. Two target areas are the freedom to transmit and receive information anywhere in the Community and the freedom to use new marketing and distribution systems such as home videotex and new payment cards.

This will add a new dimension to the information, research, production and distribution procedures available to economic operators and to customer purchasing methods and will require:

a) a general opening-up of closed markets (especially in the field of public procurement) (point 3) and common technical standards within the internal market for new production processes and information, distribution and purchasing methods and services (point 2);

b) a competition policy which encourages the introduction of new technologies (point 5);

(6) "Assessment of the function of the internal market" (COM(83) 80 final, pp. 7 and 8.

c) an external trade policy for the Community which takes new technologies into consideration (point 6);

d) the creation of a single capital market in the Community and of a tax system which encourages the launching of new technologies (point 7);

e) legislation in the field of the right of establishment and freedom to provide services which enables new technologies to be brought on stream within the internal market (point 8); - and as an essential back-up:

f) a Community information network (point 9) and

g) Community-wide company legislation (point 10) for making it easier to use and develop new technologies.

In this way a true common market in advanced technologies could be created.

2. Community standards

The establishment of recognized Community-wide technical standards is crucial for the completion of the internal market and is the key to the development of new technologies at Community level.

The Community is active at two levels with a view to ensuring that this vital standardization process is effective, viz.:

a) during the preparatory stages, i.e. when information is exchanged beforehand about technical standards and regulations which Member States are contemplating;

b) when standards are adopted.

A Directive designed to regulate the prior exchange of information about technical standards and rules was adopted by the Council in March 1983 and entered into force on 1 January 1985[7]. Under this Directive, Member States are obliged to give each other and the Commission advance notice of their intention to adopt new national regulations in the near future. The Community is then normally allowed six months to bring in similar regulations, if need be, in place of those planned by the Member State.

This Directive has already been put into practice, e.g. when the Federal Republic of Germany announced its plan to introduce regulations about clean motor vehicles. This plan resulted in the laying down in July 1985 of Community rules on this matter.

A new Community approach to standardization, known as the "general reference to standards" approach, has been launched this year. This approach is based on the four following principles:

— legislative harmonization is limited to the adoption, by means of Directives under Article 100 of the EEC Treaty, of the essential safety requirements (or other requirements in the general interest) with which products put on the market must conform, and which should therefore enjoy free circulation throughout the Community;

— the task of drawing up the technical specifications needed for the production and placing on the market of products conforming to the essential requirements established by the Directives, while taking into account the current state of technology, is entrusted to organizations competent in the standardization area;

— these technical specifications are not mandatory and maintain their status of voluntary standards;

— at the same time, however, national authorities are obliged to recognize that products manufactured in conformity with harmonized standards (or, provisionally, with national standards) are presumed to conform to the "essential requirements" established by the Directive[8].

(7) Directive 83/189/EEC.
(8) See COM(85) 19 final.

In other words, this work will in future mainly involve the enactment of Community provisions and outline contracts in conjunction with standards drawn up by the European Committee for Standardization (CEN) or the European Committee for Electrotechnical Standardization (CENELEC).

The outline contracts for 1985-1988 drawn up between the Commission and CEN/CENELEC on 20 September 1985 cover standardization work in the fields of mechanical engineering, electronics, chemical engineering, building, steel and information technology.

New proposals with regard to standardization in the fields of information technologies, telecommunications and the mutual recognition of type approval for telecommunications terminal equipment[9] have been submitted in the meantime by the Commission and were approved by the Economic and Social Committee on 25 September 1985 (CES 771/85). The main aims of these proposals, which are vital for this sector's future, are:

a) to ensure that **European standards** in information technology and common specifications in telecommunications are drawn up and serve as references in public purchasing by the Community institutions and the Member States, this constituting a sine qua non for a truly open market in this field;

b) to establish in this field **a procedure for the mutual recognition of tests carried out by laboratories approved** in the Member States, on the basis of common specifications adopted at Community level.

As the Economic and Social Committee has pointed out in the NIERHAUS Report, these objectives will not be able to be attained unless Member State governments are seriously intent on creating **a Community telecommunications network as quickly as possible.**

In one particular area of telecommunications - direct TV transmission by satellite - the European Broadcasting Union (EBU) has developed new technical standards for a new advanced transmission system. The new system, which is called C- MAC/packet, provides a very high transmission quality for pictures, sound and data.

Another version of the C-MAC/packet system, called D2- MAC, should permit both direct reception (dish aerials) and reception via cable.

The Commission, basing itself on the preliminary work of the European Broadcasting Union (EBU) and interested European industries, is planning to submit proposals by the end of 1985[10] for standardizing the use of TV satellite technology throughout the Community.

In order to make new payment cards more widespread in the Community in place of cheques and credit cards, the Commission is planning to propose appropriate measures.

The conclusion of European-wide agreements between banks, traders, manufacturers and consumers with regard to system compatibility, network links, user rules and rates of commission is also favoured by the Commission, given the growing trend towards cross-border marketing, distribution and purchasing networks. However, the Community's rules on competition must be respected by these agreements.

3. The opening-up of public procurement

Firms developing and using new technologies are very keen on the opening-up of national public procurement markets in the Community considering that the public sector accounts for some 20% of the Community's gross domestic product.

The extra costs having to be borne at the moment by public purchasers owing to the fragmentation of the Community market amount to some 40,000 million ECUs per year[11].

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(9) COM(85) 230 final.

(10) Commission Communication COM(85) 264 final, which explains the need for the rapid adoption of uniform technology throughout the Community and urges Member States not to adopt, even temporarily, standards other than those laid down by the EBU (i.e. D2-MAC).

(11) Albert/Ball Report, EP document of 31 August 1983, p. 79.

Despite the provisions in force aimed at eliminating discriminatory practices in the supply of goods and services (Directives 70/32/EEC and 71/304/EEC) and opening up tendering procedures to Community-wide competition (77/62/EEC), it has not been possible so far to make any decisive headway in breaking down the barriers between national markets and creating one Community-wide market in public contracts for goods, works and services[12].

In practice less than one quarter of public expenditure in the areas covered by the above Directives is the subject of publication in the Official Journal and is thrown open to Community-wide competition. And less than 5% of contracts, in terms of value, go outside the country placing the order.

The opening-up of public procurement markets would determine to a very large extent the competitiveness of European firms in advanced technologies such as telecommunications, modern high-speed transport, and the energy and environment sectors.

The orders placed by public authorities and enterprises which take account of the Community dimension in advanced technology sectors are likely to have a spin-off effect, leading to the research and prototype work necessary for the development of new technologies on a Community scale.

Since 1984 there has been a **voluntary scheme** - in the form of a Council Recommendation - to throw open at least 10% of telecommunications terminal purchases to bids from suppliers throughout the Community[13].

Thus, this and other public procurement markets are still national markets and Community firms which do not have an office in the same country as the public authority or enterprise issuing the invitation to tender are generally unable to bid.

Since this will have a damaging effect on the development of innovation in the Community, the Community's efforts under the plan to establish a proper Community market in public supplies have been concentrated on practical measures for:

— ensuring the rapid publication of notices and especially the development of the electronic publishing system TED;

— improving as a matter of urgency the Directives designed to increase transparency (system of **prior information**, **publication** of the intention to use **single tender procedures**, **publication of the award of contracts**, improvement in the quality and frequency of statistics);

— including four key sectors in Directives (prior to 1992), namely energy, transport, water and telecommunications (supply contracts). The Commission proposals to this effect are due to be published before the end of 1987;

— with regard to certain NT services which require a continental-size market and on which public procurement policies have major impact (e.g. audio-visual services, information market, data processing market), the Commission wants to encourage the establishment of these new technologies throughout the Common Market, though the Community's competition rules should not be violated in the process.

The use of performance criteria rather than product specifications as the basis for Community-wide harmonization would also make it easier for Community firms to gain access to national public procurement markets.

4. Competition policy

The launching of new products and processes on the market stimulates competition within the Common Market and strengthens the ability of European industry to compete on international markets.

(12) COM(84) 717 final, p. 3.
(13) "Recommendation with regard to telecommunications", (COM(80) 422 final).

Innovation is a normal part of the entrepreneurial spirit. Because innovatory firms can achieve more by working together, certain categories of R & D agreements have in recent years been included in the group exemptions from the rules on competition in accordance with Article 85(3) of the EEC Treaty.

The relevant Regulation[14] for the period from 1 March 1985 to 31 December 1977 covers three types of agreements:

— joint research and development of products and processes with joint exploitation of the results of that research and development;

— joint research and development of products and processes without joint exploitation of the results;

— joint exploitation of the results of prior R & D agreements between the same undertakings.

In general, the Commission is in favour of cooperation in R & D, specialization, joint ventures and other means of promoting high technology.

The Commission nevertheless makes sure that competition is maintained by having several independent centres of research. Hence, the conditions governing the exemptions differ according to the competitive position of the parties[15].

5. Role of patents in technological innovation

Community technological innovation is closely linked with standardization of patent systems. Such standardization could help boost the innovation drive - especially in small and medium-sized businesses - on a truly European market.

The main problem, to which no solution has yet been found, is protection of the "original invention", viz. to extend legal protection to cover subsequent essential additions to a new technical product that has been patented.

Patent experts and lawyers in the Member States are virtually united in favour of guaranteeing the inventor - from the angle both of industrial property (invention) and intellectual property (copyright) - the right to improve an invention by subsequently incorporating a further innovation.

The Munich Convention on the European Patent is in force, but the Luxembourg Convention on the Community Patent, which automatically provides this protection throughout the Common Market, has been ratified by only seven Member States so far. Consequently reliable and rapid protection is still not provided in full.

Essential improvements to an invention may therefore often by exploited by large businesses without adequate protection being given to the inventor (in many cases a SME) who is handicapped by the Munich system's protracted procedures and inordinately high costs. This state of affairs is currently a major obstacle to SME innovation potential on the Community market.

In the light of this situation, the Commission is proposing - in anticipation of the day when the Munich and Luxembourg Conventions on European and Community Patents will make their full impact - to extend such protection immediately, in the shape of a suitable Regulation, to subsequent essential improvements to a patented innovation in two areas of new technology: biotechnological inventions[16] and micro-circuits[17].

The Commission also suggests a number of additional practical measures in respect of the administrative assistance and infrastructure back-up that it is in a position to offer European industrial firms in the field of patents and industrial property:

— research into patent trends;

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(14) EEC Regulation No. 418/84 of 19.12.84, OJ No. L 53 of 22.2.85.
(15) 14th Report on Competition Policy 1985, pages 42 and 43.
(16) COM(82) 865 final.
(17) COM(85) 310 final and COM(85) 530 final of 30 September 1985, where the Commission also mentions software.

— compilation and updating of a complete comprehensive survey of national measures taken by the Member States to assess and protect inventions;

— Community funding to help finance patent registration costs in the event of insufficient support from national public authorities[18] [19].

6. Trade policy and cooperation with non-member countries

The Community's slackening momentum in some areas of new technology (e.g. information, telematics) means that its trade with countries in the forefront of technological development (Japan and the United States) shows a substantial deficit as regards imports of certain types of advanced technology products. Further, the problem of technology transfer, which already operated to the advantage of the United States, has been exacerbated by the announcement of the SDI.

As mentioned in points 1 - 5, the Community is trying to recover its competitive edge in these fields by losing no time in completing a single market unhampered by administrative and technical barriers and developing a common industrial and innovation policy. By extending this action to embrace non-member countries in Europe (especially the EFTA countries) the Community seeks to step up cooperation in the field of standardization and is eager to make a start in the field of public purchasing. S/T cooperation agreements are shortly to be concluded with Sweden and Switzerland; others, with Finland and Norway, are in progress. Exploratory contacts have been made with Austria.

In the medium-term the efforts made in these sectors could have a positive impact on the Community's external trade.

International trade is becoming increasingly reliant on exchanges of computerized data, resulting from the application of new technologies, but these information flows can be disrupted by regulations or costs that in some cases may have been imposed to safeguard confidentiality. In the case of financial services, the authorization of national authorities often has to be sought before "exporting" data, possibly subject to restrictions or the payment of charges for use of telecommunications lines rented for private purposes.

Whether or not this matter can be taken up in the forthcoming GATT Round will depend on whether the parties involved wish the Round to include a "services basket", which is still highly controversial.

7. Capital markets - taxation

Capital markets

The Community's substantial savings capacity (approx. 400,000 million ECUs per annum) - higher than in the United States - is not sufficiently utilized within the Community for purposes of productive investment, including the new technologies. A major share of these savings goes into Euro- currency markets and is invested outside Europe.

By the early 1980s only 15% of total investment in the Community was in manufacturing industry, compared with around 23% a decade before.

According to the Commission, the slump in industrial investment in the Community has reached the point where it will be far from easy to correct the trend[20].

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(18) "Overall approach to the promotion and utilization of the results of Community sponsored research and development" (COM(83) 18 final).

(19) "Plan for the transnational development of the supporting infrastructure for innovation and technological transfer" (COM(82) 251 final).

(20) (COM(82) 641 final). The Commission clearly states that even in the case of a sustained drop in interest rates, the present level of self-financing would still be insufficient to enable firms to achieve a satisfactory balance between own funds and borrowed capital.

The Commission, the Economic and Social Committee[21] and the European Parliament[22] are all agreed that this drop in investment is resulting in ageing plant and delays in the introduction of modern technologies. It is also steadily blunting the competitive edge of Community firms. Confronted with this alarming state of affairs, the Commission - alongside an extensive investment strategy programme for the Community (calling on the Member States to adopt a common approach on matters ranging from taxation to public spending reforms) - has concentrated on framing a Community financing instrument tailored to the specific terms of development of new technologies: the risk capital instrument[23].

This new type of financing, consisting of a "European innovation loan", was primarily intended to fund investment in high technology firms in the Member States. During a trial phase (during 1983) the Commission was to have at its disposal an appropriation of 100 million ECUs, obtained under the New Community Instrument (NCI or "ORTOLI facility").

Attempts to set up this European innovation fund to grant loans both for small-scale business ventures and for large innovation schemes failed to secure a Council decision.

On 22 May 1985 the Commission, while adhering to its original standpoint, adopted a proposal for a Council Decision on the setting up of NCI IV, mainly intended to fund **SME investment** in new technologies and innovation. This NCI IV project, with an appropriation of 1,500 million ECUs, could help to fund certain "intangible" assets directly linked with investment (patents, licences, R & D and general know-how).

Besides these measures to assist the funding of innovation, the Community must work for the creation of a climate encouraging the development of financial markets conducive to Community innovation - a policy which presupposes a set of measures to dismantle barriers between financial markets and ensure effective liberalization of capital and trade movements, including an end to exchange controls. This is a sine qua non for creating a European financial system proving attractive and competitive for both Community and non-Community businesses, thereby guaranteeing that European savings are deployed as fruitfully as possible.

The EEC Treaty and secondary Community legislation are inadequate for this purpose and must be supplemented by other proposals based on Article 235 of the Treaty or by a revised Treaty (European Union).

Directives on a number of technical aspects of liberalization of capital markets, namely the need for publication of balance sheets and consolidated accounts, came into force in 1983 and firms and financial institutions will have to bring themselves into line by 1990[24].

Taxation

At the symposia organized by the Commission in Luxembourg in 1982, 1983 and 1984[25], the working parties reached the conclusion that fiscal policy was the key factor in encouraging new technology-based enterprises as well as risk capital firms.

The members of two of these working parties even went so far as to suggest that one of the main reasons why European "venture capital" firms had invested some 300 million US$ in 1980 in the United States (i.e. ten times the total investment in European risk capital) was that some European taxation systems were hostile to innovation[26].

In 1983 the Commission embarked on discussions with the Member States with the intention of rendering national taxation policies more welcoming to new technologies and boosting their

(21) In several of its Opinions (e.g. CES 663/85) the ESC has advocated a boost in selective private and public sector investment so as to provide the funds required to develop the sunrise industries.

(22) The European Parliament, in an Opinion on the revival of the Community economy suggested (Herman Report) that economic agencies should concentrate more on productive investment, especially in the shape of risk capital (EP Resolution of 26.10.84, OJ No. C 315 of 26.11.84).

(23) "Proposal for a Council Decision empowering the Commission to help finance innovation within the Community" (COM(83) 241 final).

(24) (COM(83) 241 final).

(25) See the documentation for the Luxembourg symposia held in 1982, 1983 and 1984 (DG XIII A/2).

(26) See the recommendations of the 3rd and 4th working parties at the symposium on "The Needs of New Technology-Based Enterprises", 17-19 November 1982, Luxembourg.

effectiveness, besides enhancing the incentive effect of taxation measures designed to stimulate innovation. In particular, it submitted proposals on the carry-back and carry-forward of firms' losses and on the reduction of indirect taxes on the raising of capital[27].

8. Right of establishment and freedom to provide services

The dismantlement of barriers impeding the right of establishment and free provision of services is likely to open up fresh horizons to SMEs in the new technologies and to help build an extensive market and a genuine European technological community.

The development of new technologies has led to the creation of new cross-border services which are playing an increasingly important role in the economy.

This applies mainly to audio-visual services, information and data processing services and to computerized marketing and distribution services (see also point 2 above).

In addition, the Commission would stress that a market free of obstacles at Community level necessitates the installation of appropriate telecommunications networks with common standards.

In the field of audio-visual services, the Commission recommends the establishment of a single Community-wide broadcasting area, which will become a key sector of the Member States' economies and have a decisive impact on the future competitiveness of Community industries in the internal market.

In line with the aims and freedoms enshrined in the Treaties (especially Articles 52 and 58-60 of the EEC Treaty), the Economic and Social Committee[28] sees the creation of a common market for broadcasting services as a key factor in ensuring freedom of information for Europeans and freedom of action for entrepreneurs within the Community market.

The problems inherent in extending such freedom to provide services and the appropriate framework of economic, social and legal conditions for development of this single broadcasting market have been especially highlighted by the Economic and Social Committee.

The main legal obstacles that still impede the creation of the desired European market of services and information in a field which hitherto has been governed by basically national legislation are:

— different limitations on the extent to which programmes may contain advertising;

— the scope and limitations of the rights of owners of copyright and related rights to authorize retransmission by cable of broadcasts for each Member State separately.

9. Community information network

A. Achievements

Community information programmes and services are a major component of its innovation strategy. The term "information" refers to the Community services which give access to research findings, commercial data, legal and administrative provisions, calls for tender etc. In 1983 some 650 reports and 300 academic articles were published, together with some 2,500 papers read to conferences and the proceedings of some 60 conferences and lectures arranged by the Commission.

The information networks and services[29] are: EURONET-DIANE, EURO-ABSTRACTS, INNOVATION-NEWSLETTER, SIGLE (grey documentation), TED (daily tender bulletin) and the Community Business Cooperation Centre.

The **EURONET-DIANE** network, set up by the Commission and the post office services of the Member States, gives access to some five hundred data bases. Since it was set up, the Community

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(27) The ESC approved these two proposals in its Opinions of 27.3.85 (CES 319/85) and of 30.1.85 (CES 95/85).

(28) ESC Opinion No. 776/85 of 27.9.85 - Green Paper on the Establishment of the Common Market for Broadcasting, especially by Satellite and Cable.

(29) See Information/Technology Report drawn up by the Commission's DG XIII, Information and Innovation Market (1984).

has done much to narrow the gap between the relatively few data bases of the EEC and those of the USA, by promoting the development of access systems (used mostly by private industry).

The **EURO-ABSTRACTS** bulletin disseminates the findings of R & D work which has received financial support from the Community.

NEW TECHNOLOGIES AND INNOVATION POLICY is a newsletter setting out brief announcements of new R & D programmes, forthcoming scientific and technology conferences, details on major new publications and abstracts of the proceedings of the Consultative Committee for Innovation, which helps the Commission implement the Transnational Development Plan for backup infrastructure for innovation and technology transfer.

SIGLE (SYSTEM FOR INFORMATION ON GREY LITERATURE IN EUROPE) is a bibliographic data base covering all grey-literature papers drawn up in the Member States but not published by professional publishers. It comprises reports, theses, conference proceedings, official limited-circulation papers and non-marketed translations on innovation, research and development.

The **SIGLE** system was launched in early 1981. In its first two years it only covered **science and technology**. The initial stage was spent developing a data base which can now be accessed on-line via the EURONET-DIANE network using the **INKA and BLAISE** host computers. In the current phase (1984-1985), SIGLE has been extended to economics and social sciences.

TED (TENDERS ELECTRONIC DAILY) is a computerized bulletin published in seven languages. It provides details on public contracts awarded by national, regional and local authorities for which suppliers from any Member State can tender. TED is the computerized version of Supplement S of the Official Journal of the European Communities, which contains all public calls for tenders.

The **COMMUNITY BUSINESS COOPERATION CENTRE** was set up by the Commission in 1973 to help cooperation between small firms based in different Member States. The Bureau receives (and passes on) requests from firms looking for partners for transnational cooperation schemes which are not entirely commercial. These schemes may involve cooperation in the fields of R & D, joint purchasing, supplementary production, marketing, sales or management. At the moment the Centre is concentrating on Spain and Portugal.

B. Initiatives

The Commission is preparing a pilot scheme for the creation of international information/cooperation networks concerned with the distribution and export activities of small firms which produce and use new technologies. The aim is to help them with various problems - administrative, legal, linguistic - which they generally have to face.

10. Company law in Europe

At a time when new technologies are a major focus of Community attention, there is no Community-wide company law for the creation of transnational public and private limited companies in the industrial and commercial sectors.

This is particularly serious in view of the size of the major US and Japanese companies, which reflect the size of their domestic markets and can therefore compete at world level. They can concentrate their new-technology R & D in a major internal market free of technical barriers and tax and administrative constraints.

In one specific area - encouragement of cooperation between independent firms - the EEIG (European economic interest grouping)[30] decision has set up a legal instrument for cross-frontier cooperation.

The activity of the EEIG has to be related to the economic activities of its members and must not be more than ancillary to those activities.

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(30) Council Regulation EC No. 2137/85 of 25.7.1985. OJ No. L 190 of 31.7.1985.

Consequently, a grouping may not:

a) exercise, directly or indirectly, a power of management or supervision over its members' own activities or over the activities of another undertaking, in particular in the fields of personnel, finance and investment;

b) directly or indirectly, on any basis whatsoever, hold shares of any kind in a member undertaking; the holding of shares in another undertaking shall be possible only in so far as it is necessary for the achievement of the grouping's objects and if it is done on its members' behalf;

c) employ more than 500 persons.

Individuals and companies can thus set up consortia in any field where joint action is desirable or necessary, for instance in new-technology R & D.

The creation of this legal vehicle is thus part of a wider Community drive to improve the competitiveness of Community growth industries such as those covered by the ESPRIT programme, innovation grants for small firms and block exemption arrangements for R & D agreements.

APPENDIX

to the Information Report

The following proposals for amendments were rejected by the Section.

Page 39 - Summary and conclusions

Add the following to the sixth indent:

> *"however, a major handicap is that the Community does not have a common defence system like that of the USA, which makes unified, centralized use of the whole range of advanced technologies, not just in the USA but also in Europe."*

Voting

For: 5
Against: 21
Abstentions: 10

Page 41

Delete the last two paragraphs of the summary and conclusions.

Reasons

These paragraphs do not say anything specific and are self-evident.

Voting

For: 13
Against: 14
Abstentions: 7

Page 42, at the end

Add the following:

> *"The Community has no common defence system or common defence budget and lacks a continental dimension. Certain countries already have joint combat aircraft projects, but this does not have the same integrating effect. Consequently, unlike the USA, the Community is unable to commission joint secret defence research which, if successful, brings the virtual certainty of large orders for the companies involved.".*

Voting

For: 13
Against: 25
Abstentions: 5

INFORMATION REPORT
ON
NEW TECHNOLOGIES - SOCIAL ASPECTS

Rapporteur: Mr NIERHAUS

The Section for Social Questions
adopted this Information Report on 16 January 1986.
There was a majority in favour, and one abstention.

Mr Nierhaus, Rapporteur

The preparatory work was carried out by the Section's Study Group on New Technologies, made up as follows:

Chairman:	Mr	NOORDWAL	NL
Rapporteur:	Mr	NIERHAUS	D
Members:	Mr	BERETTA	I
	Mr	BURNEL	F
	Mr	ETTY	NL
	Mr	FULLER	UK
	Mr	GORIS	NL
	Mr	LÖW	D
	Mr	MOURGUES	F
	Mr	RAINERO	I
	Mr	SCHWARZ	UK
	Mr	VAN MELCKENBEKE	B
Section Chairman:	Mr	Mr KIRSCHEN	I
Experts:	Mr	HOLM	
	Mr	COLDRICK	
	Mr	MILES	

SUMMARY

1. General comments

Basically, it may be assumed that in themselves new technologies are neither positive nor negative. It is the way in which they are applied and used by people that gives them positive or negative aspects.

Hence complete negation of the new technologies is not the answer; on the contrary, this would lead to incalculable economic and social problems. But such problems would also arise from unbridled introduction of new technologies.

It should also be noted that while the "new technologies" encompass the whole spectrum of technological development and change, the information and communications technologies are particularly important since, among other things, they impinge on nearly all areas of the economy and society.

The Section warmly welcomes the Commission Memorandum of 25 June 1985, Towards a European Technological Community[31], as an important step towards strengthening the Community economy and improving its competitive position vis-à-vis non-European economic blocs (e.g. USA and Japan).

This Memorandum does not, however, consider any measures to assess the repercussions of technology. Nor does it address itself to the problems of the "social acceptability" of new technologies. Finally, the Memorandum has little to say on ways of bridging the gap between R & D results in the new technologies and their successful application.

Hence the Section sees a need to raise with the Commission the following questions, considered from the angle of the "social acceptability" of the new technologies:

— Which technologies does the Community need urgently?

— What resources are needed in this connection?

— What are the manpower, institutional and organizational requirements?

A technological development is "socially acceptable" if, in the opinion of the majority of those concerned, it improves or at least does not worsen the balance of social interests and satisfaction of needs, and if it can be directed to this end.

The Section is aware that any policy which attempts to bring about technological change in a socially acceptable manner is fraught with problems:

— In the case of those technologies whose development is still in full spate and for which new applications are constantly being found - and whose introduction is susceptible to resistance and non-acceptance - it is extremely difficult to ascertain to what extent and in what way people's needs are actually affected by the changes. Hence continual monitoring and assessment of these developments is needed.

— People's needs, values and interests are often impossible to define precisely, but are formed and changed by contact with certain consequences of technological change.

— The objective significance of technological change for a person's needs, values and interests is not the same as a person's subjective perception of how he is affected. Even when certain effects of technological change are established fact, it may be that the individual does not notice them, will not admit them to himself, or suppresses them for various psychological or social reasons.

— The multiplicity of individual needs, values and interests means that one and the same objective effect of technological change can affect people quite differently.

— The subjective perception of change should not be equated with its social and political importance. Only interests which can be shared by others, organized politically and defended have a chance of countering the negative effects of technological change.

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(31) COM(85) 350 final

In the Section's view the new technologies must help to:

— promote quantitative and qualitative economic growth,

— facilitate the satisfaction of the material necessities of life,

— promote progress while remaining socially acceptable,

— meet justified ecological demands,

— satisfy non-material needs (e.g. creativity, solidarity, social participation).

Looking at the new technologies from the social angle, the following tasks are important:

— safeguarding and creating jobs and incomes,

— improving working conditions,

— providing goods and services in an ecologically and socially acceptable manner,

— and, in addition, financing such social tasks from the gains.

The Commission and Council have expressed the following views on the volume of employment:

— In its Communication entitled Technological Change and Social Adjustment (V/1821/83) the Commission notes that forecasts of the impact of the new technologies on the volume of employment "differ from and contradict each other". However, a "decline in demand and production" rather than a "rise in productivity through the application of the new technologies" is seen as the decisive factor for the employment level. Nevertheless, "in a phase of low or zero growth, technological change and the volume of employment are so closely linked that any rise in productivity will probably have a negative effect on the employment situation".

In the official version of the Commission's Communication to the Council, with the same title (COM(84) 6 final), the Commission expresses no views on this point, but makes the following comparison in an Annex - "Points of reflection":

— the loss of 160,000 to 400,000 jobs in the metalworking and mechanical engineering industry in the EEC due to the introduction of robots and automated machinery;

— the creation of 4 to 5 million new jobs in the EEC by 1995 which, according to the FAST research programme team, could come from the development of new products and services linked to the new technologies.

Attention came to be focussed on not only the quantitative but also the "qualitative" repercussions of the new technologies, and on the problems of a "mismatch" between the skills available and those required:

— The Conclusions of the Council of 7 June 1984 on Technological Change and Social Adjustment (OJ No. C 184 of 11 July 1984, pp. 1-2) particularly stressed this aspect in connection with the retraining of workers. And on technological change: "The Council recognizes the unavoidable nature of the introduction of new technologies for the strengthening of competitiveness of European undertakings and restoring economic growth." (Point 1)

— Accordingly the Conclusions of the Council of 22 June 1984 concerning a Community Medium-Term Social Action Programme (OJ No. C 175 of 4 July 1984, pp. 1-3) emphasize the problem of training and retraining: "Measures will have to be implemented in the constant knowledge that production machinery will have to be adapted to technological development in order to foster a high level of competitiveness in the face of international competition." (Point 1)

— The effects of the demographic trend and the importance of the need for education and retraining that will arise if the average life expectancy continues to increase so markedly, as experts predict.

The primary concerns voiced by the Commission and Council in connection with technological change are the lack of flexibility of the labour market as regards structure and supply, the failure of the skills on offer to match those required, etc., all of which impair competitiveness.

In the Section's view a reasonable degree of trust must be created between employers and workers and an agreed social plan be drawn up for the efficient introduction of new technologies. In addition, the participation of the users must be assured.

The Communication of the Commission to the Council (COM(84) 6 final) has the following to say on this point:

As regards participation in technological changes, experience has shown that the competitiveness of European industry often depends on the adaptation of industrial relations. Where the staff concerned have been consulted and their know-how and commitment used, technological innovation and the protection of employment has taken place efficiently, without jeopardizing the decision-making powers of the entrepreneurs regarding the introduction of new technologies. (Point 10)

Similarly the Council, in its Conclusions of 7 June 1984, recognized that

... technological transformations are greatly assisted if workers are fully involved; they and/or their representatives ought therefore to be informed and consulted beforehand with a view to arriving at agreements.

Such information and consultation should be as exact and as full as possible and regularly accompany the implementation of technological options. To this end, the parties concerned should be able to benefit from expert advice. (OJ No. C 184 of 11 July 1984, Point 5)

In its Conclusions of 22 June 1984 on the Social Action Programme the Council urged the two sides of industry to develop "information, consultation and negotiation at the appropriate level" in connection with technological change.

A working party report at the Conference on Europe and the New Technologies organized by the Economic and Social Committee on 6/7 November 1984 noted the following:

In the context of consultation and participation, much importance was attached to Europe's most valuable asset - political stability in Europe - and to the need to assure the continuing social cohesion in the Member States. Hence the need not to consider the economic challenge of new technologies in isolation from social objectives and progress which their introduction ought to bring about.[32]

In the past the Commission and the Council have also commented on working time and living and working conditions. The Commission Communication COM(84) 6 final stresses the following as regards the management of working time:

....The reorganization and reduction of working time, i.e. its management in the broadest sense, can assist the introduction of new technology and, provided it does not detract from the competitiveness of firms, can help to maintain employment levels. (Point 9 (i))

and again:

....New technologies can fulfil personal aspirations for more flexibility in working time. (Point 9 (ii))

On working and living conditions the Commission document states that:

....The successful introduction of new technology and the general economic and social success of technological change depend on substantial improvements in working conditions brought about by new technology and the reduction in risks and constraints due to certain uses of these technologies. (Point 9 (iii))

and further:

....New technologies can have a positive impact on living conditions, for example by increasing leisure time, improving the utilization of public services and facilities and helping the social integration of handicapped people. (Point 9 (iv))

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(32) ESC Conference on Europe and the New Technologies, Closing Report of Workshop A (New Technologies in the Traditional Mass Production Industries) NT 13/84 of 7 November 1984, page 4.

The Council echoes this in its Conclusions of 7 June 1984 (OJ No. C 184 of 11 July 1984, point 6):

> *Since technological change has consequences for employment, the organization of work and production, these ought to form the subject of dialogue between labour and management. While the competitive position of undertakings should be preserved, particular attention should be paid to improved utilization of plant and equipment, to employment problems, to working conditions and safety at work, as well as to the length of working hours.*

Likewise in its Conclusions of 22 June 1984 on a Social Action Programme (OJ No. C 175 of 4 July 1984, point 1.3.) the Council states that:

> *As technological change has consequences for employment, work organization and production, the economic aspects connected with the raising of competitiveness should not be examined in isolation from the social aspects concerning the conditions of use of the labour force. Both sides of industry should be encouraged to enter into a dialogue on the conditions of use of equipment, adjustment of the organization of work and working hours, employment problems and the length of working time.*

Comprehensive knowledge of the relations and interactions between technology and society is needed to ensure that new technologies are introduced in a socially acceptable way. Therefore the Section proposes, as it has done on several occasions in the past, that the problems consequent upon the introduction of new technologies be defined and analyzed. The aim is to draw up a programme which will ensure that technology is managed in a manner acceptable to society.

This is necessary because the technological changes of today and tomorrow are completely different from previous upheavals: the paths taken in the past to adjust employment (shift from agriculture to industry, from industry to the services sector) are no longer practicable. Consequently the policies pursued hitherto do not fit the present situation.

The main points of emphasis in this Report are the impact of new technologies on:

— the labour market;

— education and vocational training;

— worker participation;

— employment;

— social relations in leisure time and the environment.

2. New technologies and the labour market

The introduction of new technologies is not expected to have a sufficient favourable impact on the labour market until well into the 1990s.

Previously the tertiary sector tended to compensate for job losses in the industrial sector, but for the most part this is no longer so. The substitution effects of the new technologies - especially the information and communication technologies, which play a dominant role - are currently being felt increasingly in the low-skill groups, i.e. those carrying out repetitive/automatic tasks. It is estimated that approximately 40%-50% of all jobs will be affected by the introduction of new technologies. The positive effects on employment in the new technology producer industries - such effects are quite possible, as the example of consumer electronics shows - cannot therefore be expected to offset in full the effects of rationalization in the user sector.

On the other hand, the wrong or delayed use of technical potential may not only jeopardize existing jobs through the loss of market opportunities, but also impede or at least substantially delay the creation of new jobs.

The growth in the economy as a whole would have to be above average for any substantial fall to take place in unemployment. Even a very optimistic estimate of the impact of the new technologies does not give such a figure in the near future. As the rise in productivity is expected to continue outstripping the growth in GNP, there is a danger that the trend in employment - even in the growth sectors of the economy - will generally stagnate or fall.

The structural growth in national product is becoming increasingly divorced from the structure trend on the labour market. Overall productivity is expected to continue rising at a faster rate than output; this trend could even accelerate. Basically there is greater readiness than ever before internationally to introduce new technologies, though average rises in productivity vary considerably.

The reason for this is the demand for information in terms of volume and quality, which is dependent on various regional and sectoral parameters. It remains to be seen whether the introduction of new technologies has a substitution effect on products and services or whether it actually results in new products and services which stimulate growth.

The position of small and medium-sized enterprises is special in that they need particular attention in connection with the introduction of new technologies:

— not only workers but also firm owners sometimes have difficulty in accepting new technologies;

— their financial resources are often insufficient to cover the investment required.

There are two aspects to the improvement of quality through new technologies: firstly, product improvement (memory size, access times, user friendliness) and secondly, new methods of linking up different technical systems (improved information management, reliability of planning, expert research and advisory work). The improvements in quality have different effects on the structure of employment: there is a trend towards increased employment in specialized technical and managerial fields, while the prospects for administrative and ancillary activities are likely to be considerably reduced in some cases (Office Management, April 1985, p. 356).

In future the increasing effects of rationalization on employment in the secondary sector will be outstripped by trends in the tertiary sector, notwithstanding the possibilities for improving customer service created by new technologies.

Examples:

— In the commercial sector the use of electronic cash systems is likely to produce substantial productivity savings of up to 40%.

— Lufthansa has achieved the following increases in productivity: transmission and distribution of texts 90%; document handling and filing 50%; (cf. Kubicek, A. Rolf: Mikropolis 1985, p. 69).

— Ordering with mobile data acquisition achieves time savings of 50% and a reduction of up to 50% in work checking incoming goods; (cf. B. Conz: Datenerfassung, 1979).

Such developments generally have a negative effect on employment for those with few qualifications, older workers and women.

As the introduction of new technologies must often follow a particular regional pattern, additional demands are made on worker mobility. At present there is no appreciable shift to home-based working, e.g. "telecommuting", such as would affect the labour market. Hence the current imbalance in economic growth and employment prospects at sectoral and regional level will probably continue and lead to greater segmentation of the labour market. This results in highly differentiated groups of, on the one hand, well-trained, skilled workers, specialists, multi-skill workers, and, on the other, the de-skilled unemployed.

Intensive work is being carried out on the fifth generation of computers, e.g. on about 50 research projects in the USA. The first solutions are expected in 1986/87 (12,000 million operations per second, compared with 1,000 million on today's most efficient computer, the Cray-2). The aim of these developments is to overcome the rigidity in the man-machine dialogue through a new computer quality.

Such a system has access to bodies of knowledge (expert systems, deduction systems, natural languages) and processes the tasks, methods and parameters of the given situation. Hence it is capable of simulating the work of experts in such fields as medicine and geology, of analyzing documents for factual and grammatical errors, and even of translating them. The use of natural language will facilitate access to technology enormously. The result will be a huge increase in possible applications. Technical potential will be available in precisely those areas where previously there were limits to rationalization.

The directness of the access to business decision systems, data banks and robots can have an unexpected impact on the structure of employment and may also threaten time-honoured systems of organizing and allocating work. As regards the structure of employment, however, there is a marked demand for higher skills.

The following basic points may be made:

a) — Structural changes in employment can be expected throughout the coming decades as a result of new technologies, especially information/communication technologies. Whether or not this leads to a considerable decline in employment depends on which of the opposing trends - innovation and rationalization - predominates.

b) — The rationalization potential of information and communication technology is approximately twice as high in the office as in manufacturing.

c) — Information and communications technologies make it possible to (re-)integrate information-related activities into jobs with a lower information-processing content. Thus, as information and communications technologies advance, not only is there a differentiation in job content, but new combinations of previously separate activities also arise.

d) — Information and communications technologies have a burden-easing function: quantitatively - provided the volume of information remains constant - this means a potential freeing of capacity, but qualitatively it means a change in the content of data and information work in the relevant occupations and sectors.

— As a rule short-term imbalances on the labour market cannot be offset by the use of information and communications technologies. The quantitative impact of NT on employment is significant in the medium to long term.

— Improvements in the Community labour market depend on the extent to which existing innovatory potential is harnessed to Community know-how and leads to new products and production processes which reach not only the European but also the world market. It is probably inevitable that rationalization and specialization will lead to adverse structural changes in employment - of varying degrees of seriousness - in certain sectors of the labour market. Only if the growth of the economy as a whole is sufficient can these effects be contained through back-up measures on training and further training.

e) — Technological change offers a real opportunity for a net increase in new jobs if the entire economy is geared to increased demand, stimulation of production (and not just productivity), changes in working time and the integration of technological rationalization in all sectors. How the technological changes are to be organized and combined with growth in employment must be determined by the majority of those affected. Technological determinism without social priorities will not work.

3. New technologies and skills

The effects of technological change are being felt in an increasing number of jobs and the skills required for those jobs are changing to an ever greater extent.

New technologies are permeating not only more and more areas of work and individual jobs, but also general aspects of everyday life.

It is, therefore, becoming increasingly important to ask questions about the demands which the new technologies are placing on training and skills.

In this context there is evidence of disparities in the educational infrastructure. General school education, vocational training and further training must be better integrated than hitherto. The process of preparing for the new demands created by technological change must begin at school.

At present, however, schools suffer from a number of shortcomings:

— excessive specialization of curricula;

— too much emphasis on the reproduction of learnt information;

— inadequate integration of general schooling and vocational training;

— inadequate "grounding in technology" in important areas of the school curriculum.

For example, in the Federal Republic of Germany:

60% of all schools are equipped with computers; this includes 90% of all "Gymnasien" (= approx. grammar school) but only 24% of "Hauptschulen" (= approx. secondary modern school). This means that only approximately 60% of young people have any chance of a systematic introduction to technological development.

Adequate facilities for information on new technologies should be available in all schools for all groups of pupils.

In many cases the likely effect of technological changes on training requirements is only just beginning to emerge.

And yet even now it is becoming clear that the present structure of training has to be changed; courses will have to be reappraised, supplemented or reorganized. In certain cases it is possible that hitherto separate jobs will merge or that new jobs will come into existence.

Although the dissemination of new technologies and training conditions vary at present between individual EC Member States, it is to be expected that with the passage of time a process of convergence will take place specifically as regards the spread of technological innovations.

One example is the job of technical draughtsman, which is affected by the new process of computer-aided design (CAD).

The widespread introduction of CNC machine tools has in some cases completely transformed jobs in the metalworking industries, or at least considerably changed working methods.

New jobs are being created, particularly in data processing, some of them requiring highly specialized skills.

Since extensive preparatory work still needs to be done in the fields of general schooling and basic vocational training before they can meet the new demands, further vocational training is becoming increasingly important in connection with technological changes.

The emphasis here is on acceptance, skills, compensation, adaptation and mobilization.

People working in the areas affected must acquire new skills in order to keep pace with the introduction of new technologies and to remain eligible for satisfying work.

The most visible and, because of the quantitative increase, most urgent requirements for new skills are in the fields of trade and industry and administration, i.e. in production and commercial/management functions.

The changes in skills arising from technological innovations vary from one area of employment to another, however.

A distinction can be made between three types of skills, e.g. as regards information and communications technologies, as follows:

— basic skills (basic grounding in the technologies);

— user skills;

— producer skills.

Basic skills are the minimum requirement for dealing with new technologies. These include basic specialized knowledge. Technological change also entails certain more general abilities, e.g. for problem solving, independent further study and creativity, but also for information processing and transmission, marketing and interpersonal communication.

User skills can be described as typical further qualifications. They build on basic skills and comprise additional product and process-related skills and knowledge. The desired user skills vary enormously between individual areas of work, as may the extent to which they are needed and employed within a given field or job.

Producer skills are the skills needed to produce technologies. The technology is the job itself.

The present situation of technological flux means that there is a high degree of uncertainty as to what new jobs and areas of employment will emerge and what traditional ones will survive.

This problem has already been touched on in an Opinion of the Economic and Social Committee (OJ No. C 307 of 19 November 1984, p. 4).

A rough assessment of the varying degrees to which jobs are affected can be made by classifying them according to the impact of technology on the content of the work. Accordingly, three groups can be distinguished:

a) jobs in which new technologies are the subject of the work;

b) jobs in which the tools (machines, etc.) are functionally affected and determined by technological innovations;

c) jobs made essentially redundant by the introduction of new technologies.

A rough distinction can be made between the basic vocational training requirements for the three groups. These range from additional specialist qualifications in microprocessors and microcomputers (Group 1), through additional qualifications to complement "basic specialist training" or knowledge of the application and use of data processing systems and microcomputers (Group 2), to radical retraining e.g. from mechanic to electronics engineer (Group 3).

Examples from Group 1 are jobs in the field of electrotechnology involving the installation, repair, testing and maintenance of machines and systems using microelectronics, e.g. measurement and control engineers, electronics engineers for power plants.

A Group 2 example in the industrial field would be metalworking jobs such as lathe operator, milling machine operator or toolmaker. Here the introduction of CNC machines has led to radical changes in machine operating procedures and the organization of work.

The job of technical draughtsman could be quoted as an example of Group 3. Here traditional skills and knowledge are being replaced as a result of computer-aided design and drawing.

The content of further vocational training and retraining will also have to change on account of the addition of new technologies to the various spheres of activity.

Here, too, a great deal of research still needs to be done before the key specialist and social requirements for the mastery of technological change can be determined.

Only on the basis of such research, as the Economic and Social Committee pointed out in the abovementioned Opinion, can skills appropriate to the problem be determined, applied on an experimental basis and then actually introduced into further training and retraining.

In general it is also clear that the work content and skill requirements arising from technical change are not identical in all areas of activity. This is true of the production/technical side, but also of the commercial/management side.

The job of a commercial manager might be quoted as an example of the latter case; here the use of interactive data processing is already widespread. This acts as an aid to decision-making and at the same time lightens the burden of routine work.

But the impact on skills of the introduction of interactive data processing is dependent on the actual organization of work.

Technological and organizational changes are bringing about a gradual move away from over-specialized education/training. Broad vocational training is required first, followed by supplementary specialized training. In future knowledge of new technologies will be required as a fundamental element of broad basic training. Training, further training and retraining must foster and preserve the flexibility of working people.

The quality of vocational training will, to a large extent, be determined by the available training staff.

Training and further training measures are, therefore, needed to ensure that training staff and teachers have a thorough specialist, pedagogical and methodological preparation enabling them to communicate the relevant technological knowledge.

It is essential that further training be continuous, varied (internal and external) and compulsory for the training staff. In this context the **introduction of time off for educational purposes** should be considered.

The practice current up until now of using knowledge acquired through home study, e.g. via a home computer, for training purposes is not adequate to meet the demand for vocational skills.

Instead it would be preferable for training staff and teachers involved in basic and further training to visit companies with up-to-date equipment so as to gain an impression of the practical use of technology in industry. Here they could discuss previous technological knowledge and experience directly with the people concerned. Through visits to industry they could obtain direct experience of technical innovations and use this in schools and for vocational training.

It is important that training staff should be made aware of the interrelationship between **new technologies, organization of work, and skills.**

Structural change in the market, in technologies, in organization of work and in skills are closely connected with the labour market situation.

And so training - and in this context further training in particular - has an essential role to play in the realization of social and employment objectives.

Further vocational training must provide a starting point for the adaptation and reintegration of, in particular, such groups as the young unemployed, women, the handicapped and older workers.

The vocational interests and career needs of these groups need to be taken into account with a view to their future prospects and equipping them with adequate technological skills. It is important to forestall the development of a "new social problem" through publicity for training opportunities, specially designed training courses and new ideas.

In the case of older workers the danger is that they may miss the boat of technological change - partly because their own learning habits prevent them from undertaking further training on their own initiative, and partly because they are under the impression that the learning process ended with their own training.

In the case of women new fields of activity need to be opened up, giving them greater access to the demanding jobs created by the new technologies.

Working at a home terminal perhaps offers a chance of avoiding an interruption of working life. This presupposes that skilled work can be organized as home terminal work in such a way that existing and future labour protection rights are respected.

In addition to the necessary technical and functional skills, the social skills which have become increasingly necessary as a result of the processes of technological change must also be developed and promoted.

It should not be the exclusive aim of the educational system to qualify workers for specialist vocational needs. It must also develop capabilities which will in the long term improve the individual's chances of coping with the problems of complexity, change and interconnections which they will encounter in their working life (cf. F. Malik, **Strategien des Managements komplexer Systeme**, Bern 1984), and encourage personal development in general.

In addition to the skills required for the execution of vocational tasks, the persons concerned must receive training designed to develop and promote social capabilities. They must be enabled to play an active role in moulding technological, social and organizational innovation and thus to make an individual contribution to the maintenance and development of their own employment chances and capacity for work.

In its Opinion on the Communication to the Council concerning Technological Change and Social Adjustment (OJ No. C 307 of 19 November 1984, p. 4) the Economic and Social Committee made a particular recommendation: that as a complementary measure research work be initiated to identify the key specialized and social skills needed to cope with technological change. This recommendation is emphatically reiterated.

Numerous empirical studies on the applications of microelectronics are now available, and so it is in this area that statements can most easily be made on the effects of change on skills. Other technologies, biotechnology and genetic engineering for instance, are still to a large extent at the research and development stage.

One important task for the immediate future is to define the scope of the changes which are taking place in skill requirements and affecting most working people, and how these are likely to evolve in the wake of technological change. Only on the basis of such specialized skill requirements based on the expected changes can a skills strategy be developed and assimilated into education and vocational training policy.

The following general points may be made:

a) — The departure from repetitive mass production and the integration of types of work formerly organized separately makes multi-functional and more demanding jobs possible. In the office and management sphere one consequence of relevance for vocational training and skills is that of different jobs being merged at a high level. Account also has to be taken of the fact that measures adopted in the field of work organization will bring about renewed rationalization of these jobs and thus pave the way for thoroughgoing automation.

b) — In the last ten years the introduction cycles for new products and production processes have been reduced from approximately 4.5 years to 1.5 years. Apart from the general need to get to grips with the new technologies, the consequence of this for basic and further training is an increased need to match technological developments with measures aimed at providing the affected industrial workers with appropriate skills.

c) — It should not be the exclusive aim of such measures to enable workers to adapt to the use of machines and systems in relation to a single product; rather, workers must be enabled to understand the technology independently of the specific product or process. Only broad basic skills complemented by specific knowledge of vocational applications will in the long term enable the worker to keep pace with technology and guarantee the transfer of vocational skills to other jobs.

d) — All teachers and training staff must receive comprehensive further training in the new technologies. The method often used up until now of acquiring the knowledge through self-teaching is no longer adequate for the vocational skills demanded. On-the-job training is a better way of acquiring the necessary command of new techniques.

e) — There is already a divergence in the level of skills between persons trained in large companies and those trained in small and medium-sized businesses. But in order to help all people, whether working, threatened by unemployment or unemployed, the following are needed in the short term:

— Further training measures in the field of new technologies which are not limited to specific machines and systems, but which lead to more wide-ranging skills and help safeguard jobs.

— Refresher courses for older workers and the long-term unemployed, in order to increase their employment prospects.

f) — The changed vocational aspirations of women and the increasing numbers working in jobs outside the traditional female preserves also increase the need for further training leading to technical skills.

g) — In a complex and increasingly unpredictable world people need support and guidance. It is essential that through further vocational training answers be found to the challenges of our time and people's needs and expectations (through the elimination of IT illiteracy, the avoidance of bottlenecks in the skills available, improved selectivity). In future, therefore, further vocational training will have to go beyond training in vocational specialisms and become a comprehensive and multidimensional concept. Current problems are associated, inter alia, with complexity, change and interconnections:

— In many areas it is clear that people are not capable of mastering complex systems without help. As far as further vocational training is concerned, therefore, assistance in adapting to modern realities must be recognized as a fundamental pedagogical and organizational principle.

— A second structural principle of further vocational training in the future, which can be derived from the realities of the world of work, is interconnection, i.e. the network. Coordination and cooperation, thinking in terms of systems, the integration of theory and practice in specialized and broader training alike, must be made the central objectives of further vocational training.

— A third structural principle of modern further vocational training is the kind of progressive thinking which is appropriate to change in technology, economy and society.

4. New technologies and working conditions

The horizontal and vertical division of labour is generally changing through the use of new technologies. The creation of comprehensive information systems is giving rise to new interfaces between different activities and functions. The following are examples of this trend: the integration of administrative activities with ancillary activities, the link-up between financial accounting and computer-assisted systems in the sphere of materials and logistics management and between computer-assisted design systems and production planning and process control.

The new technologies open up possibilities for job enrichment through the integration of tasks combined with appropriate margins of freedom regarding the execution of the work. Work structures that make use of these possibilities to increase employees' scope for action make new demands on versatility, adaptability and willingness to change, so that new requirements are set for staff.

The following could be mentioned as examples of such a trend: the creation of multifunctional work stations and the setting-up of flexible manufacturing facilities and systems. The possibilities of the new technologies can, however, also contribute to a radical loss of job content, for example through the progressive decentralization and increasing standardization of work processes.

The humanization potential of the new technologies in terms of the elimination of physical stress and an increase in safety at work can be considered high. Positive effects will probably include the elimination of unnatural postures and stresses in the form of noise, heat and dust, as well as the replacement of dangerous substances.

New stresses can arise through the mental demands on staff. Recording and evaluation of the mental stress inherent in new forms of work are problematical; there are at present no reliable work study standards for establishing the causes and effects of stress. In particular it is not clear which mental, emotional, sensory or social factors give rise to mental stress. (Paetau, M.: Arbeitswissenschaftliche Bewertung der Mensch- Maschine-Kommunikation auf dem Prüfstand, in: Office Management 12/1984, p. 1198 et seq.)

There are, however, reliable indications that the displacement of occupational skills by adaptive technical systems, the reduction of individual autonomy, the monotonization of work and the dissolution of collective work structures, combined with the break-up of cooperative relationships and the reduction of social communication, will have negative mental effects at the workplace. (Lange, K.: Zwischen Bangen und Hoffen, in: Office Management 11/1984, p. 1068 et seq.).

17% of the full-time workers and 31% of the part-time workers questioned in a scientific survey were afraid that technical changes would have negative consequences for their work (Public Attitude to New Technology, Research Study conducted for the Technical Change Centre, London 1985).

The long-term effects of stress through the intensification of work as a result of the use of new technologies cannot be properly estimated at the present time. It is certainly significant that the new technologies provide considerably greater scope for regulating the work flow. The reduction of built-in time lags in the work process can lead to work intensification. These new stresses can have long-term effects, so that new "diseases of attrition" may be expected in the future. Current statistics on diseases and pensions do not as yet, however, provide sufficient pointers here.

On the other hand, further technical development can also lead to machinery and equipment that is easier to operate, thus lightening the burden on the worker.

New, differentiated manpower planning practices geared to the timing and volume of work are to be expected where new technologies are applied. This will lead to greater manpower utilizability, which will be promoted by the individual variability of working arrrangements, particularly in the area of part-time work, capacity-oriented work and work at a home terminal. Continuing developments in telecommunications could make such forms of work economically attractive alternatives. Full-time jobs are already increasingly being converted into part-time jobs in some sectors in connection with changes in work planning. This form of flexibilization of working time creates specific problems, above all for women who generally perform highly-standardized automated operations in relatively unskilled jobs. This applies in particular to the commercial sector, where strong tendencies towards optimization of staff utilization by various methods are to be observed. The question of working time arrangements thus takes on additional importance.

Flexible working time arrangements that enhance the utilizability of staff can lead to work structures that are quite acceptable from the social point of view. Depending on the specific organizational details, new margins of freedom can be created for staff.

Mention should be made of work at a home terminal as one form of flexibilization of work that could expand considerably through the application of new technologies - although forecasts as to the speed at which this form of work will spread, differ. Home terminal work is no dream of the future - it already exists in Europe, although generally still in the experimental stage. In the USA banks, insurance companies, hardware manufacturers and software firms have been experimenting for years with such terminals. Experts forecast that by 1990 about 20% of all office jobs in the USA will have been shifted to private households (Kieser, A.: Teleheimarbeit - organisatorische und soziale Aspekte, in: Jahrbuch der Bürokommunikation 1985, p. 106 et seq.).

In Europe the digitization of existing telephone networks - which is already in progress in some areas - will create new technical conditions for further uncoupling of work processes in time and space. In the meantime the only activities suitable for execution at home are those which do not require frequent direct contact with other centres (e.g. word processing and standardized operations at a relatively low skill level).

In general, increasing social isolation is to be feared in addition to the already-mentioned deskilling of work. Surveys of home workers in the USA have indicated that 56% would prefer to continue to go every day to a place of work outside the home (Industriemagazin, July 1985, p. 119 et seq.).

Furthermore home work can involve a considerable increase in social risks for those concerned. If home workers have the status of self-employed persons they are not covered by labour and social insurance legislation. They have to reckon with both liability and entrepreneurial risks, although they may be in a situation of complete economic dependence. If home workers are employed on a freelance basis they have minimal protection under labour and social insurance legislation which, however, can vary depending on the arrangements in each individual case. If they have the status of employed persons, adherence to working hours, breaks, labour and health regulations and the monitoring thereof is still problematical.

It should not be forgotten here that the positive aspects of such home work, e.g. the greater individual freedom as regards the timing of the work and the possibility of making adjustments to suit the workers' own requirements, can provide compensation.

In this connection it should be noted that the application of new technologies can in many ways ease the burdens borne by certain groups of handicapped people, although on the other hand use of new technologies may be limited by the specific nature of the handicap.

New requirements concerning in particular the scope of statutory provisions arise in connection with the promotion of employees' interests within the framework of co-determination rights.

Effective participation and cooperation by employees is becoming increasingly important (from the point of view also of existing acceptance problems) particularly since new technologies are largely applied as process innovation. Employees are evidently attaching more and more importance to controlling technology and assessing its consequences.

The following basic points can be made:

a) The application of new technologies will give rise to new forms of division of labour which cannot be precisely foreseen at the present time. Margins of freedom for employees will certainly be created. The utilizability of manpower should increase through the application of new technologies.

b) The nature of the stresses in the work process will change. An increase in mental stress in particular is to be expected as a result of work intensification strategies, cycle times and deskilling. It cannot be said at present what the long-term effects of this increase in mental stress will be.

c) As far as the necessary possibilities of regulation are concerned, health and industrial safety aspects can in future be removed from collective review. New forms of work organization in time and space will make regular presence at the workplace unnecessary and will create completely new workplaces in private households. The work process will be increasingly monitored, regulated and documented as a result of the new technologies.

d) Employees' representatives, safety officers and industrial physicians are not adequately prepared for their new tasks in connection with the changes in the pattern of stress that will be brought about by the new technologies. Special efforts will be called for here.

5. New technologies and participation

The introduction of new technologies in industry and office work is generally conceived as an investment in productivity-boosting rationalization leading to reduced staff costs and/or greater work intensity. The intended technical and organizational changes harbour considerable risks for employees. A higher capital input with a view to overall cost savings ultimately means a reduction in staff costs, e.g. through:

— redundancies
— retirement on reaching the age limit
— regradings.

A higher capital input also results in increasing automation of work and a reduction in margins of freedom of the individual worker. A "social dialogue" between the parties concerned should be instituted as soon as possible for both those reasons, and also so that the social needs of the worker can be taken into account.

This "social dialogue" should cover:

— the carrying out of analyses and feasibility studies;

— organizational measures for the introduction of technology;

— preparatory technical and spatial measures.

These subjects should also be covered in collective wage negotiations.

In this way the main effects of the introduction of technology at the workplace can be established.

The introduction of new technologies brings about a qualitative change in the relations between employer and employee, since the employer's scope for management and monitoring will be increased. Personal communication is likely to give way to increasing reliance on technology. One reason for this trend is doubtless the possibility of centralizing information for decision-making.

Physical remoteness will arise from the expected increase in decentralized work, e.g. work at a home terminal.

The fact that under certain circumstances there may be increasing quantitative and qualitative changes in the content of work means that there is in general a greater possibility of conflict between the various industrial interest groups.

The advantages that the new information and communication technologies offer in terms of cost reduction, particularly as regards the use of modern telecommunications systems to open up remote regions of the Community, should be utilized to a greater extent through appropriate Community measures.

Moreover, the impact of the product innovations and technologies introduced in certain regions of the Community is of great importance for the population in these areas.

The introduction of new technologies can give rise to major economic and social problems particularly for working systems in small and medium-sized enterprises. One reason for this is that SME employers sometimes plan and choose new technical systems on the basis of inadequate information. Consequently the technologies introduced are in some cases economically and socially inappropriate. Staff with technical knowledge and work experience are sometimes not properly involved in the planning and selection process. When qualified staff finally are consulted - too late - it emerges that the new system is only partially suitable, and thus uneconomical.

These problems can also arise in large organizations, if local establishments are not prepared for the introduction of new technologies throughout the organization.

This shows the primordial importance of involving the people affected by the introduction of new technologies at an early stage in the planning process. Only in this way is it possible to make a timely, and therefore effective, assessment of the consequences, thus largely obviating the need for steps later to compensate for technical shortcomings. At the same time a greater degree of acceptance can be secured from those concerned.

The process of rationalization through new technologies is proceeding apace and is assuming more complex and diverse forms. Collective wage agreements, etc., are the main tools available to the two sides of industry for the solution of their problems. But only in a very few cases has it proved possible to lay down statutory participation rights or agree on employee co-determination rights.

Where plant agreements contain provisions for extensive forms of participation for employee representatives, the course usually followed is the setting-up of joint committees. Experience has shown, however, that such committees tend to concentrate on social security arrangements linked to results and job engineering; more comprehensive framework agreements are only rarely concluded.

There is broad agreement between employers, trade unions and politicians on the need in principle for greater worker participation. The question at issue is the form that this participation should take. The employers favour a form of individual participation by workers affected by specific technical changes. This form of participation, which can be described as "user participation", is based on a general or specific internal arrangement which is introduced by the employer by virtue of his right to issue instructions to employees and which can be revoked. The reasoning behind this form of participation is that it offers the opportunity of benefiting from the experience of workers and securing their acceptance of the technology.

The second participation strategy, favoured in particular by the trade unions, is based on legal provisions governing the participation of employees' representatives within companies. This can be described as "representative participation". This form of participation has its basis in statutory provisions and/or collective agreements the aim of which is to extend the general principle of worker protection. In practice the above forms of participation may be in competition but they can also complement each other.

The formation of data networks (e.g. electronic data processing, ISDN, viewdata) gives the problem of the "social acceptability" of the new technologies a new dimension: the legal framework which is the basis of data protection is only effective as long as data and movements of data are easy to perceive and demarcate. But the "fundamental openness" of the systems undermines the whole foundation of data protection. If it is no longer possible to be sure where any given data are being stored for organizational and technical reasons, as the place of storage can be changed, the right to information on data and data erasure becomes illusory.

The efforts to commercialize information and communication represent a considerable threat to consumer protection. When the borderline between economic interest and state regulatory action begins to become blurred, the effectiveness of the arrangements for the protection of the individual is called in question.

The danger that the legal instruments governing the protection of data and the individual may no longer be sufficiently effective has heightened people's sensitiveness, their need for security and their scepticism towards the new technologies. This is a trend which will probably gather strength.

The following measures appear necessary to counter this trend:

— extension of national data protection laws and inclusion of forms of data processing not yet covered, as well as their harmonization at European level in connection with transfrontier networks;

— extension of the right of individuals to obtain information from institutions;

— ensuring the security and supervision of private information gathering (banks, insurance companies, credit reference agencies);

— shorter deadlines for the erasure of data;

— gathering and processing of information to be legally authorized for specific purposes only.

The progressive refinement of network technology (digitization, ISDN, MFA) offers increasing opportunities for gathering, combining and storing for unlimited periods medical, psychological and social data. The overall result is an integrated system for personnel accounting, planning and supervision.

This process is only just beginning in industry. And yet it is already clear that, apart from rationalization, the main effects of the introduction of computerized personnel files are in the area of the working climate. Conflicts arising directly at the workplace may lead to a deterioration in the relations between the two sides of industry.

The following are typical sources of conflict:

— extensive monitoring of employees with regard to working hours, output, conduct, error records, as well as trade union activities;

— utilization of the workforce by matching job specifications and skill profiles;

— use of health data;

— work pressure through reduction of unproductive time.

The combination of universally applicable new technologies and international competition means that computerized personnel files may be used internationally without those concerned having organized for the protection of their interests. In the next few years agreement will have to be reached on the right relationship between business efficiency and appropriate working conditions. This should be investigated for each sector and here the European Foundation for the Improvement of Living and Working Conditions in Dublin could make valuable contributions, which should be passed on to the Economic and Social Committee for examination.

In general it appears that operating data gathering systems have a tendency to identify the functional data of machines with human activities at the workplace, or else to apply "corresponding" performance standards. The employee's scope for decision-making and individual development may thus be circumscribed in direct proportion to the progress of technology: hence greater anonymity and work pressure.

Monitoring facilities are used in factory and office in the form of both isolated units and electronic monitoring systems linked up with operating data gathering systems and computerized personnel files, as well as operational planning and control systems. The following are regarded as monitoring systems:

— electronic (flexitime) time-clocks
— telephone data gathering systems
— access control
— electronic petrol and/or cantine billing systems.

The basic structure of hierarchical work organization and the fundamental problem of transparency in monitoring and decision-making processes remain in principle unchanged. But at the same time the easy accessibility of the decentralized stations exacerbates the problem of manipulation and considerably reduces data security.

This does not apply to monitoring facilities that are needed for safety reasons or for the protection of health (e.g. tachographs in lorries).

The following basic points can be made:

a) It is particularly important that there should be appreciably closer contact between employer and employee in connection with the introduction of new technologies. The specific structure of the new technologies may, however, in some cases impede or prevent the fulfilment of this requirement.

b) In cases where existing arrangements under collective agreements do not offer sufficient scope for effectively promoting the dialogue between the two sides of industry they should be expanded. Existing and future contributions of the Economic and Social Committee in this area should be taken into account.

c) In many areas data protection is not taken sufficiently seriously. In addition, the technical methods are at present either unsuitable or not yet sufficiently well developed (e.g. viewdata) to meet the requirements of data protection legislation. The increasing complexity of technical systems also leads to the setting up of other barriers which make data protection more difficult.

d) The use of comprehensive computerized personnel files and operating data gathering systems paves the way for more intensive monitoring of work and behaviour. Employees' fears can only be allayed by full and unreserved explanations of the use of these systems. Any danger of the employee's individual rights being threatened by the new monitoring systems must be ruled out.

6. New technologies and their impact on society and the environment

The impact of the new technologies on society and the environment is a complicated subject that can be dealt with here in summary fashion only. The following observations can, however, be made: the growth of an information society will lead to quite new forms of production, distribution and use. The trend in the relationship between work and leisure time to date indicates that work will become progressively more "private" (private households as places of work) thus rendering the traditional distinction between the spheres of work, leisure and consumption obsolete. Further development of digital transmission techniques will, for example, make it possible to transmit information (speech, data, texts and graphics) at a speed of 144,000 bits per second.

The effect on spatial structures (e.g. as a result of work at home, tele-shopping and home-banking) is not clear at present, some indications being contradictory. Primarily economic reasons have been given for predicting an easing of urban congestion, for example:

— the savings in time and money through not commuting and the resulting increase in leisure time;

— the reduction in environmental pollution and the saving of energy.

According to calculations for the USA for 1975, for example, a 12% to 14% reduction in commuter traffic as a result of telecommunications systems would have meant a total saving of 75 million barrels of petrol, making the USA completely independent of crude oil imports. It must, however, be borne in mind that the new technologies are mainly used in heavily populated areas and that the process of change which is expected to affect social models, attitudes and life goals will entail a revaluation of the social quality of nucleated towns, with the main focus being on leisure-time and cultural needs. For the present, no decisive effects on spatial structures are expected. (Hoburg, R.: Räumliche Wirkung neuer Medien, in: Office Management 5/1984, p. 430 et seq.)

The new technologies will probably have a particularly positive effect in the area of environmental protection. In particular, energy and materials technology as well as biotechnology and genetic engineering can contribute to the development of processes which use resources economically and are ecologically sound (e.g. for waste disposal and the prevention of water and air pollution in the industrial sector and for fodder production and pest control in the agricultural and forestry sectors). There are also positive developments in medicine (computer tomography, ultrasound scanning, prosthetics, vision and hearing aids) and in national and international transport systems (e.g. emergency radio, engine and transmission control, control systems, air traffic control facilities).

The new time and space configurations that are possible between place of work and place of residence give rise to further processes of change in the social sphere. Particular mention should be made of the following:

— a probable decrease in direct personal contacts and meetings as these are replaced by communication via technological media;

— the appearance of industrial and bureaucratic practices in the private sphere;

— an increase in individualist tendencies and group privatism leading to the emergence of social sub-cultures;

— changes in leisure-time behaviour.

Here there is a particular danger that differences which already exist in the ways certain groups or social classes organize their daily lives may become more pronounced. We can now assume that only a small proportion of the population (those with a high social status, the financially and educationally privileged, young people) will acquire the competence necessary for productive use of the new technologies and hence, that only they will benefit. The majority of the population will have little to do with the new media (as is evident in the case of "traditional" media - e.g. books). It is to be feared that these developments will increase the gap between those who have knowledge or information and those who do not. This gap will have an impact on financial position and the distribution of income since those who have knowledge will have a competitive advantage.

This division into two "classes" could be made more extreme by the use of the new media in the leisure sphere, which could offer possibilities of improved educational activities but which could equally well lead to a loss of creativity as the result of purely passive media consumption. Increasing social isolation might reinforce tendencies to escape from involvement with the real world. The main problem groups here would be older people, the disabled and people who are socially isolated in other ways. Steps must be taken to prevent a new kind of social impoverishment from arising here.

Finally, steps must be taken to preclude the risk of older age groups being pushed to the fringes of society through the effects of information and communication technology and their limited ability to make use of this technology.

Somewhat stronger group differentiation could mean that ethnic groups retain their identity to a greater degree. It is not necessarily disadvantageous for these groups if they represent a very wide range of tastes and life styles, since this can be an important source of innovation.

The future will see a quantitative and qualitative expansion in the range of media and the range of programmes and services offered. The spread of the new media and their use will probably have the following main effects:

— more and in some cases new kinds of radio and television programmes and services (e.g. local radio, open channel/people's television, special interest programmes);

— a wide variety of new possibilities in the field of interactive services (e.g. information and advisory services, travel, health and consumer advice, school and educational programmes, teleshopping);

— new forms of individual communication in both the public and the private sphere (e.g. data, text and picture transmission in the business and administrative sectors, individualized programme selection and use by means of video-cassettes, video-discs and compact discs);

— new applications in the field of household and leisure-time technology (e.g. technological equipment for work, games and sports).

In general changes are anticipated in daily life or everyday life styles as a result of the further spread and greater potentialities of the new media. In connection with the expected change in social values there will be a reassessment of individuals' and groups' needs for

— social contact;

— spontaneous communication;

— stimulation and relaxation.

It is, however, possible that the particular habits of young people in their use of the media and in leisure-time pursuits will crystallize into a new youth media and leisure-time culture.

Fortunately, the Commission is now looking into the far-reaching effects which the new technologies are expected to have on society. Its "Initiative for Research in Informatics Applied to Society (IRIS)" goes straight to the core of the problem, since IRIS adopts as its main aim

> *the improvement of the quality of life of European citizens through the development of NIT ...*

IRIS makes provision for, inter alia, the following concrete areas of activity:

— reinforcing citizens' security at work and in society;

— improving activities in the cultural and educational spheres;

— facilitating the use of the social services.

The Section therefore supports the measures provided for in IRIS and stresses that the necessary financial provision for their implementation should be included in the budget planning for the Second Framework Programme. The Section expects that the Economic and Social Committee will be included in the discussions on these measures under the IRIS programme without delay.

The question as to the possibilities of participation in the shaping of social processes must be reformulated. In social fields of action marked by power structures, information policy (the gathering, processing, evaluation and transmission of information) has a key role as regards the promotion of interests. New possibilities of communication arise for the political-administrative system. It is conceivable that the end result might be the replacement of forms of representative democracy by more plebiscitary decision-making structures in the form of a direct democracy.

The use of the new technologies in this context might have a positive effect in terms of:

— greater local participation;

— greater autonomy of the citizen through own access to information;

— the de-hierarchization of information;

— the breaking-down of barriers blocking access to information.

This could lead to greater transparency and feedback in the area of social policy.

A free community based on its citizens' capacity for action and cooperation must guarantee self-determination in the area of information. In view of the expansion of modern information and communication technology, the question of the scope of national and European data protection comes to the fore again. The dissemination and rapid development of the modern technologies means that new measures are required to incorporate new forms and areas of data processing in data protection law.

There is a considerable need for research on the changes which are expected to ensue from the new technologies. So far, the effects on the structure of society and the other social consequences have only been cursorily dealt with. A stepping-up of research, with appropriate financial support, could lead to important new findings, particularly in relation to the following:

— individuals' political attitudes and behaviour;

— power relationships and power distribution systems in society;

— the structure of political planning and action processes;

— the effects of the permeation of daily life by technology;

— changes in the social environment;

— changes in local/communal sectors;

— the monitoring of individual attitudes to life and reference models;

— the effects on family life.

A further point to be investigated is to what extent the new technologies are used for regulation and planning for the future. It will have to be asked how far employees, consumers and other social interest groups are involved in the process of planning and shaping their social and natural environment. This will be important since greater democratization could open up new possibilities for alternative technology concepts. This principle of participation should also apply as regards analyses of the effectiveness of the use of technology.

The following fundamental points can be made:

a) All spheres of life are affected by the application of new technologies. No sphere will remain untouched.

b) The boundaries which have hitherto existed between the place of work and the private sphere are becoming blurred (particularly in the case of home work); work will assume a new position in everyday life, particularly since the hitherto rigid distinction between work, leisure-time and recreation will no longer be applicable.

c) As regards data protection, there is a danger that extensive and uncontrollable collection of data might lead to a situation where everything is known about the individual. A further fear is that the State's monitoring function could take on a life of its own unless this danger is averted through appropriate legislation. Conversely, it must be pointed out that the data protection argument can also be used to cover up unwillingness to provide information. Artificial barriers can thus be constructed which may be particularly detrimental if the information is of general public concern.

d) Since the 50s, a considerable number of studies on the social effects of the use of computers and of information and communication technology have been commissioned. In the majority of cases empirical methods have been used to try to assess the effects to date of specific applications of technology. On the whole, the findings differ considerably and are frequently contradictory. Most of the commissioned research had to be carried out within a very short time span so that a theoretical frame of reference was generally dispensed with. So today, a confusingly large volume of research findings is available on particular applications of technology or on specific effects. Although these studies may be relevant for particular organizational decisions, they do not appear to be of much help for the infrastructural and social decisions which have to be made at present. In fact, they seem to provide justification for the absence of regulatory action so far.

e) The prudent use of the new technologies could contribute significantly to reconciling ecological and economic requirements if supported by social regulatory and monitoring systems.

7. Conclusions

The increasing use of new technologies, and in particular the convergence of data processing and telecommunications technologies, is providing a wide variety of new opportunities which can be used to achieve numerous aims:

a) rationalization, i.e. the replacement of human labour by machines;

b) the creation of decentralized jobs (home work);

c) the manufacture of new products;

d) the creation of more humane and more stimulating jobs;

e) the faster and more reliable manufacture of products;

f) the saving of energy, raw materials and capital;

g) the protection of the environment;

h) the storage and linking of data.

A characteristic feature of the new technologies is flexibility, i.e. a given end can generally be achieved using a variety of technical methods.

Economic, investment policy and social changes are needed for the efficient use of the new technologies.

New technologies run the risk of themselves becoming part of a rigid structure unless they are adapted to the individual and his manifold capabilities.

In this context the Section considers that qualitative improvement is required as well as quantitative growth. Socially acceptable growth areas in which new technologies can be used to good effect can be enumerated as follows:

— improved use of energy;

— rehabilitating and enhancing the environment;

— improved housing;

— promotion and expansion of practical and forward-looking basic and advanced training;

— extension of social and medical care;

— promotion of intra-Community development (equal working and living conditions throughout the Community);

— promotion and implementation of biotechnology projects (sea farming, biological pest control, use of agriculture for the production of raw materials, e.g. protein and energy sources, etc.).

These growth areas can be encouraged by government initiatives. They must ultimately, however, be complemented by acceptance of the end product by the consumer.

In future it will no longer be so easy to regard technology merely as a powerful tool capable of re-shaping the world. Here, too, the trend is away from ever-increasing quantity and towards improved quality.

— Large-scale technologies of great complexity,

— unmanageably long time-scales,

— a plethora of possible side-effects,

together with the uncertainty as to the extent to which our personal details are already stored in data banks, are leading to a different attitude towards the new technologies. The new approaches range from greater encouragement for the use of new technologies, whilst taking account of the alternative small-scale and decentralized technologies, to fierce extra-parliamentary protests against the prevailing large-scale technologies. The division of society into supporters and critics of the new technologies cuts across the boundaries of party and political organization. This trend is influenced to a considerable extent by the current employment situation. It can be assumed that in a situation of full employment the debate on the introduction of new technologies would take a different course from that we often see today.

As in all his other actions, man must in his application of technological knowledge (and hence in his technology policy) be guided by that which he considers to be good, right and responsible. It is not enough to calculate the financial or macro-economic cost or benefit of specific technologies; higher considerations, i.e. a moral judgement of actions relating to technology and technology policy, must also be taken into account. In other words we need a technology ethic. But it must not be a specialist ethic. In so far as it sets out to constitute an ethic at all, it must be able to explain and perhaps show understanding for the possibility of the rejection of technology.

The following requirements can thus be drawn up as regards the use of technology:

a) The scope for formative action in the technical and organizational sphere should be exploited to the full.

b) Limits should be set to the use of technology where the functional conditions no longer seem appropriate or acceptable.

c) A detailed investigation should be made of the effects of socially problematic uses of technology (e.g. work at a home terminal, VDU work for pregnant women).

Taking all these factors into account the Section considers that the promotion of research and development on alternatives to microelectronics and computer technology could be valuable. In no other area is such a "monoculture" to be found as in information technology. The goal should not continue to be ever-increasing precision of control at high speed. Instead alternatives should be developed which are not dependent on strict formalization requirements and which above all do not inevitably link the data processing function with the control and monitoring function.

The Section notes that the following action is required in order to put the above ideas into effect:

Forms of organization and communication must be identified or created which will permit better understanding and cooperation between the individual specialist disciplines. Engineers in the fields of communications and computer technology, for example, should cooperate with economists, lawyers and practitioners of the social sciences and the humanities. The new technologies are bringing about social upheavals which affect practically everybody. The opportunities offered by the new technologies make information the most important commodity in existence and the key factor of production in the information society.

Research is also required in the field of work and technology, e.g.:

— alternative forms of work organization;

— possiblities of decentralized organization and control of production through the new technologies;

— measures to cope with the consequences of new product technologies for certain regions of the Community;

— opportunities to participate in and influence the shaping of work and technology;

— possibilities for making new technologies socially acceptable;

— reorganization of working time as a way of compensating for redundancies caused by technology in certain sectors;

— the establishment of fields of application for new technologies that are socially useful and acceptable;

— models for the work and social relationships of various groups in society with reference to technology policy aspects;

— ways of compensating for redundancies caused by the new technologies through the use of microelectronics

— the new technologies vis-à-vis the ethical foundations of a post-industrial society.

The Section considers the following strategies necessary for the achievement of these aims:

a) creation of a special department within the European Foundation for the Improvement of Living and Working Conditions in Dublin to deal with the application of new technologies and their social consequences;

b) launch of a research programme on new technologies and social acceptability,

c) reappraisal and expansion of programmes, whether already running or newly created (e.g. ESPRIT and EUREKA), to take account of social factors.

Representatives of the two sides of industry and of science should be involved, in an appropriate manner, in the setting-up of a special department within the European Foundation for the Improvement of Living and Working Conditions in Dublin to deal with the application of new technologies and their social consequences. Thought should likewise be given to deciding what kinds of organizational and institutional arrangements are needed if the findings and knowledge gathered in this special department are to be made use of in the Member States.

The terms of reference of the new department must be broad and include the following tasks:

a) Information and documentation functions. Work-related findings could be collected, processed and documented and passed on in the light of specific problems and interests.

b) Demonstration function. Alternative solutions to problems could be proved and demonstrated in in-house laboratories or in collaboration with appropriate industrial establishments or through the use of models and media.

c) Practical advisory function. Specialized advice could be offered or arranged (where possible in the planning stage) for industrial reorganization projects, particularly those involving SMEs.

d) Training function. Existing training institutions could be persuaded to make work-oriented additions to their curricula and provided with appropriate plans and media. Training of specialists would be stepped up.

e) Research. Surveys of working and living conditions. Analysis of selected problems in connection with work, technology and social organization, and coordination of these research findings.

f) Coordinating function for work-related research. Clearing house for scientific activities, setting-up and support of research associations, organization of the transfer of knowledge between separate social sectors (protection of labour, health, technology, consultation, promotion of interests).

g) Policy advice function relating to work and technology and geared to the specific area of responsibility of the body in question. Evaluation of State programmes, assessment of the consequences of political decisions, and the social repercussions of particular strategies for the introduction of new technologies.

The Section considers that these functions - and the above list is by no means exhaustive - should be assigned to different institutions, establishments and groups in accordance with their individual areas of responsibility and the problem under consideration; nobody should fulfil all functions simultaneously. A cooperative network should be the goal with a minimum of hierarchical or bureaucratic structures.

The Section thinks that a promotion and research programme on new technologies and social conditions should be launched. This programme for casting technology in a socially acceptable mould should be geared to man's need for a way of life that is humane and in tune with nature - a yardstick for technology. The programme should help to enable citizens of the Member States to:

— reach informed opinions on technology;

— use technology in a way which is detrimental neither to man nor to the environment;

— find ways in which those affected by technology can cooperate and participate in its introduction;

— create a climate of openness for an emancipatory approach to technology.

The specific aim of this research programme should be to identify not only the risks and detrimental consequences of the development and use of technology but also the opportunities and scope for creativity offered by a socially acceptable technology.

The Section accordingly reiterates that it welcomes the IRIS project, which it should examine in depth in due course. The Commission should, however, take account now of the points made in this Information Report in its planning for IRIS.

The action so far taken by the Commission and the programmes submitted have largely failed to take account of the need to deal with the social consequences of the new technologies. The Section, therefore, recommends that the action initiated be reviewed and where necessary modified. In its Opinion of 26 September 1984 (OJ No. C 307 of 19 November 1984) the Committee welcomed the Commission's recognition that the innovatory and growth potential of the new technologies can be liberated and fully exploited if the social consequences of technological change can also be dealt with.

This recognition should be reflected in all the Community's future technology programmes.

APPENDIX

TECHNOLOGICAL RESEARCH, COOPERATION AND INNOVATION IN EUROPE

SUMMARY

Community evaluation, forecasting and strategies with respect to new technologies

Community cooperation with non-Community European countries in the field of scientific and technological research

MULTILATERAL/BILATERAL BODIES AND PROGRAMMES

Nuclear research and cooperation at European (non-Community) level

European aircraft industry

Technological cooperation between European industries in the field of innovation

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OVERVIEW : COMMUNITY PROGRAMMES

Strategy

At a time when the Community Institutions are getting ready to devote much of their time to phasing in a European technology Community (for details see COM(85) 530 final of 30 September 1985), they agree on the need for an overall strategy for scientific and technological R & D. There is also a political readiness to work for the participation of non-Community European countries in new technology schemes (e.g. COST and EUREKA).

Past Community achievements

The Community's substantial scientific and technological assets provide the essential basis for further increased joint efforts.

It has been decided that this Information Report should include a conspectus of the many steps taken in recent years, and the many programmes and schemes set up at Community and European level.

Because this area is in a state of flux, the conspectus is necessarily incomplete. The tables have eight headings.

— Objectives

— Specific character and conditions for acceptance

— Areas covered

— Economic impact

— Structure and form of cooperation

— Funding

— Results and outlook of programmes

— Positions of ESC and EP

Instruments of a European Technology Community [34]

a) — Direct action - Research by Community scientific and technological staff in common research centres and similar agencies (JET).

b) — Indirect action - promotion of research work by joint financing measures and by contracting out work to specialist agencies.

— Indirect action facilitates cooperation between industry, research institutes and governments. At the same time, it opens up a new European dimension. Several programmes are based on indirect action. ESPRIT, RACE, BRITE, BIOTECHNOLOGY and to some extent FAST II.

c) — **Joint action**

— The aim here is to create a European research/technology area, transcending national frontiers, by defining targets jointly (avoiding pointless duplication), arranging meetings between research teams, arranging the exchange of scientists and ensuring wide dissemination of research findings.

(34) For details see "The research policy of the European Community", European Documentation 2/85.

— The following programmes belong to this joint action sector:

— INSIS (coordination of new information technologies at government and Community level);

— CADDIA (use of telematics in Community information systems for imports, exports and administration of farm markets);

— CD (interlinking of computers used for administrative purposes in the Community);

— EUROTRA (advanced computer translation designed to eliminate language barriers to full use of information networks at Community level).

Community action on new technologies

The purpose of this action is to keep Europe among the technology leaders, to secure its international competitiveness and to equip it with a scientific and technological system enabling it to progress in all areas of vital interest to it.

There are four areas of action:

a) — **Creation of a European technology space** (for details see Information Report on the New Technologies Part II, - the corporate environment - and c below)

b) — **Information - training and evaluation of short, medium and long-term evolution of new technologies**

— FAST II programme was set up to evaluate scientific and technology changes in order to identify their long-term implications for the R & D and other policies of the Community;

— The COMETT programme was set up to give a European dimension to university/industry cooperation on training in new technologies.

c) — **New industries and new production techniques**

— The third - and central - area of action is the development and use of key new technologies:

— ESPRIT - information science;

— RACE - telecommunications;

— BRITE - new technologies and the products of conventional industry;

— BIOTECHNOLOGY - biotechnological research

— JRC - industrial technology, high-temperature materials, remote sensing, etc.;

— A number of Community programmes and schemes concern new ways of generating power: HYDROCARBONS, JET (fusion), JOINT RESEARCH CENTRE, ENERGY EFFICIENCY AND DEVELOPMENT OF ALTERNATIVE ENERGY SOURCES.

d) **Back-up**

— The above programmes are backed up by a plan for stimulating **European cooperation and exchange in the science and technology fields**. The aim is to boost joint research in the Member States.

— **A transnational development plan** (1983-1985) covers the facilities needed to further innovation and technology transfer at European level. Apart from measures relating to the European information market, this comprises specific programmes for consultation and exchange of information and findings.

Skeleton programme for scientific research

The Community's overall strategy, mentioned under A.1., is encapsulated in the 1984-87 framework programme for a European scientific and technology programme. This programme of 25 July 1983 may be changed in the light of the rapid progress of technological development and steps taken by Community and national agencies (e.g. EP, ESC, proposals from Member States).

The Community's action is thus based on a flexible but generally consistent strategy which continually updates targets in the light of the requirements of the technological environment in Europe.

The funding of Community programmes

The programmes dealt with by this paper cover the next three to five years. They will cost some 2,900 million ECU. For a period of three to five years (1985 to 1990), 600-900 million ECU will thus be spent annually on financing the European Technology Community called for by the Commission, the European Parliament and the Economic and Social Committee.

Given that a number of programmes will also receive financial support from other bodies, it is reasonable to say that 4,400 million ECU (800 to 1,200 million ECU per annum) will be devoted to the Community's action on new technologies and innovation.

The COST programme has for some fifteen years been the vehicle for **cooperation between the Community and non-member European countries** in a number of research sectors.

Cooperation between European (Community and non-Community) firms is to be promoted by EUREKA. EUREKA schemes will receive appropriate support - in some cases financial - from the governments of the participating countries and from the European Communities.

MULTILATERAL AND BILATERAL AGENCIES AND PROGRAMMES

In some high technologies, cooperation between European firms is already well advanced in:

a) — **European aerospace programmes** (ESA, ARIANE ESPACE, EUTELSAT, EUMETSAT, APOLLO.

b) — **Nuclear research cooperation**. The European laboratory for particle physics, CERN houses in a vast complex of buildings the research workers from thirteen European countries who make up its staff, and others from numerous other countries who are working temporarily there. CERN is the vehicle for cooperation between European countries on fundamental nuclear research.

c) — **Cooperation in the nuclear sector**, on the construction and operation of an advanced nuclear power plant (SUPERPHENIX. NERSA, between French, German and Italian electricity utilities.

d) — **European aircraft industry** (AIRBUS INDUSTRY, which has developed into a major rival of the major aircraft manufacturers of the USA.

The following (admittedly incomplete) conspectus gives more details on the Community and European cooperation outlined above.[35].

(35) New technologies have been developed jointly by makers of military aircraft and other devices based in a number of Member States. These schemes have absorbed considerable resources and provide tens of thousands of jobs (TORNADO, etc.).

INNOVATION · THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (in the process of being implemented)

ESPRIT

1. BASIC LEGAL INSTRUMENT	ESPRIT EUROPEAN STRATEGIC PROGRAMME FOR RESEARCH AND DEVELOPMENT IN INFORMATION TECHNOLOGY Council Decision 84/130/EEC of 28.2.1984 - OJ No. L 67 of 9.3.84
2. OBJECTIVES	— **To promote** precompetitive R & D in Europe in the fields of information technology and telematics — Cooperation between European firms in research with a view to reducing unnecessary costs and duplication; to give an innovatory impetus to European industry in the field of advanced technologies so that it can catch up on the USA and Japan over the next ten years. ESPRIT contributes to the constitution or consolidation of a specifically European industrial capacity in the technologies concerned.
3. SPECIFIC CHARACTER, CONDITIONS	Cooperation by means of contracts between firms, including small and medium-sized enterprises, universities and other bodies established in the Community; the participation of at least two independent industrial partners (not necessarily based in the same Member State) is required. The R & D projects must be carried out within the Community. Firms from outside the Community cannot take part unless they have a R & D department in a Member State and the work is carried out in the Community.
4. AREAS COVERED	The programme contains areas of research and development activity and infrastructure actions. The envisaged areas of research and development activity include: 1. **Advanced microelectronics capability** The main objective is to provide the technological capability to design, manufacture and test very high-speed and very large-scale integrated circuits (VLSICs), that will be needed in the next two decades. 2. **Software technologies** Software technology aims at providing the basic engineering, the methods and tools that are needed in the software development process, the management principles for information technology as well as the scientific knowledge underlying them, and aims to integrate them into a consistent technology. It is founded on traditional mathematics, economics and engineering practices. 3. **Advanced information processing (AIP)** The objective is to create an industrial exploitation basis for the transition from data processing to knowledge processing systems that are the key to the next computer generation. 4. **Office systems** The objective is to carry out research on the information systems that will support the wide range of non- routine tasks performed by humans in the office environment. 5. **Computer integrated manufacture (CIM)** The objective is to establish the technology base for progressive introduction of IT (information technologies) to all phases of the manufacturing cycle leading ultimately to fully integrated production systems. 6. **Infrastructure actions** The infrastructure actions consist of a number of specific measures aimed at establishing the conditions required for successful execution of cooperative research and development on a Community level and for drawing the maximum benefit from ESPRIT as a whole.
5. ECONOMIC IMPACT	The research covers the fields of information technology, the automation of office work and production processes (robotics) and telecommunications. This sector has more or less the same economic impact as the automobile and steel industries. It employs approx. five million Community workers - i.e. 5% of the working population. Two-thirds of the Community's economic activities are influenced by this sector and its social impact affects one half of the Community workforce (approx. 50 million workers).

ESPRIT (contd.)

6. STRUCTURE AND FORM OF COOPERATION	Cooperation in research projects between partners from private industry, the public sector and research bodies. The programme is administered by the Commission's task force for information technologies and telecommunications. An annual work programme is drawn up by the Commission in various stages: — start of year: call for bids from registered firms — March: deadline for bids — May-June: initial consultations with industry, research centres and, if necessary, national authorities (via a management committee) — between June and September: assessment of projects — end of year: adoption of programme by Commission.
7. FUNDING	Shared-cost programme: Participating industry: 50% Community: 50% In the first five-year period (1984-1989), the budget totals 1,500 million ECU (half-funded by the Community and half by European industry).
8. INITIAL RESULTS	During the programme's first eighteen months, 173 projects were adopted. These involved some 1,700 research workers and 448 organizations (263 industrial organizations, 104 universities and 81 research institutes). ESPRIT has been well received in scientific circles and in the industries concerned.
9. POSITION a) ESC	**The Economic and Social Committee** *"expressly welcomes the Commission's plan and approves the present programme, especially as information technologies are crucial to economic and technological development as a whole."* (ESC Opinion of 29 September 1983, OJ No. C 341 of 19 December 1983).
b) EP	**The European Parliament** *"believes that the ESPRIT Programme is essential to restore the Community's competitiveness in information technology and as an instrument for strengthening the European economy through modernizing existing industries and assisting new industries, thus helping to promote employment ..." but "expresses its anxiety that the discussions within the Council which have held up adoption seem to revolve around the financing of the project and would underline that cuts in the financing of the project would also jeopardize its success".* (EP Resolution of 16.2.1984 - OJ No. C 77 of 19.3.1984)

Sources:
OJ No.L 67 of 9 March 1984
OJ No. C 341 of 19 December 1983
OJ No. C 77 of 19 March 1984

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (draft)

RACE

1. BASIC LEGAL INSTRUMENT	Community R & D programme in telecommunications technologies (RACE) Council decision of 25 July 1985, OJ No. L 210 of 7 August 1985
2. OBJECTIVES	To maintain the Community's position and overcome some weaknesses vis-à-vis competition from the US and Japan in basic new IT used in telecommunications. The measures designed to achieve these objectives comprise: a) Creation of a Community terminals and telecommunications equipment market; b) Implementation of joint infrastructure projects; c) Execution of development programme covering the technologies required for the establishment, in the long term, of broad-band networks (IBC); d) improvement of access for the Community's less-favoured regions to the advantages arising from the development of services and advanced networks; e) co-ordination of negotiating positions within the international organizations concerned with telecommunications.
3. SPECIFIC CHARACTER, CONDITIONS	Community R & D programme in advanced communications technologies, divided into three phases: 1) Definition Phase (1985). To execute initial work as required to focus the R & D work of the main programme accurately towards future functional requirements of the network, the terminal area and future applications. It also includes exploratory R & D on key items of agreed urgency. 2) Phase I (1986-1991) would have the objectives: — to develop the technology base for IBC[36]; — to carry out the precompetitive developments necessary for the provision of trial equipment and services for IBC demonstration; — to support the work of CEPT[37] and CCITT[38] in the formulation of common proposals for specifications and standards. 3) Phase II (1991-1996), depending on the outcome of Phase I, would have the overall objectives of developing the technology base for enhanced IBC equipments and services beyond 1995. The contracts will be concluded with network operators, research establishments, firms, including SMEs, and other organizations established in the Community. The work must be carried out in the Community.
4. AREAS COVERED	To ensure compatibility between the various telecommunications systems and services under development in Europe by establishing the technology base necessary for the gradual introduction of an IBC infrastructure and services in the Community.
5. ECONOMIC IMPACT	Total Community investment in new telecommunications (equipment and terminals) is estimated at more than 150,000 million ECU between now and 1995.
6. STRUCTURE AND FORM OF COOPERATION	Cooperation between telecommunications network operators, research establishments, firms, including SMEs, and other organizations established in the Community.
7. FUNDING	The definition phase (1985) will cover 11 aspects co-financed by the Community, industry, research establishments and network operators established in the Member States. Total funding 42.9 million ECU, of which 22.1 from the Community budget.

(36) Integrated Broadband Communication

(37) CEPT - European Conference of Postal and Telecommunications Administrations.

(38) CCITT - International Telegraph and Telephone Consultative Committee.

8. PROSPECTS	Through cooperation between the Community, telecommunications network operators, research establishments and firms, the RACE programme will help to make telecommunications the leading commercial sector in Europe by 1995. The medium- and long-term consequences are: — establishment of stable interface standards and a clearly defined internal Community market, and development of EC solidarity vis-à-vis third countries; — joint development of the transnational part of the Community's future telecommunications infrastructure; — use of new telecommunications technology to benefit the Community's less-favoured regions and development of their infrastructure; — opening-up of Community market for telecommunications equipment which is dominated by public contracts.
9. POSITION a) ESC	**The Economic and Social Committee** *notes that the development and introduction of integrated broad-band networks (...) will be an important technological task for the next decade. The EC, given its economic structure, must be a world leader in this development* (ESC Opinion of 30 May 1985. OJ No. C 188 of 20 July 1985).
b) EP	**The European Parliament** *notes with satisfaction that the long- term research scheduled in the first phase of RACE ties in, and even partially overlaps, with the EUREKA research programme recently proposed by the French Government which is intended to bolster and intensify European competition so that it does not become completely technologically dependent on the US and Japan; this shows that it is possible to make the EUREKA concept a reality by linking it to existing (ESPRIT) or proposed (RACE) EEC research programmes* (EP Report of 3.6.1985, Doc. A2/58/85).

Sources:

OJ No. L 210 of 7 August 1985.
OJ No. C 188 of 20 July 1985.
Doc. EP A2/58/85 of 3 June 1985.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

EC PROGRAMMES (currently being implemented)

INSIS

1. BASIC LEGAL INSTRUMENT	COMMUNITY INTER-INSTITUTIONAL INFORMATION SYSTEM (INSIS). Council Decision of 28 July 1982, OJ No. L 247 of 23 August 1982.
2. OBJECTIVES	Utilization of the new information technologies for improving the functioning of the EC and the establishment of a pilot market for the new technologies and the attendant services.
3. SPECIFIC CHARACTER, CONDITIONS	Coordination of the activities of the Member States and the EC Institutions in respect of the introduction of the new information technologies in their administrations. Coordination of these activities is to be the responsiblity of the Commission, assisted by a Consultative Committee comprising respresentatives of the Member States and the EC Institutions. A draft decision on the establishment of this Committee was submitted to the Council by the Commission on 3 August 1985 (COM(84) 380 final).
4. AREAS COVERED	— **Electronic text transmission** to reduce distribution times for documents; — **Electronic message systems**, written or vocal, with a facility for temporary storage of messages for correspondents who are temporarily absent; — **Databases** of interest to the Community, including the possiblility of communications between different data bases; — **Teleconference systems** (audio- or videoconferences) to reduce the cost and time wasted in travel by participants coming from a distance; — **Horizontal integration of services** to facilitate access by those who are not computer professionals to the various services listed above. The OVIDE system used by the European Parliament represents one application of the INSIS system.
5. ECONOMIC IMPACT	Establishment of a pilot market in the EC to provide equipment manufacturers with indications of future market requirements and to promote the installation of telecommunications infrastructures which transcend national frontiers.
6. STRUCTURE AND FORM OF COOPERATION	Cooperation between administrations in the Member States and the EC Institutions on the administration and coordination of the pilot projects required for the establishment of the INSIS system.
7. FUNDING GUIDELINES	The financial aid from the Community, which will average about 8 million ECU a year, is intended to finance projects of common interest related to the pilot phase of the project or to launch the operational phase.
8. RESULTS AND PROSPECTS	— Establishment and utilization in the EC Member States and the EC Institutions of common standards approved at international level standardization. — Establishment of pilot markets for manufacturers of telematic equipment and users of telecommunications networks
9. POSITION a) ESC	**The Economic and Social Committee** *approved the draft Decision but wished to make a number of observations* (See ESC Opinion of 28 October 1981 in OJ No. C 343 of 31 December 1981). *It called upon the Commission to take the necessary steps to include the Committee in the proposed information system . All ESC members should, in the Committee's view, be given equal access to INSIS information sources.* (See ESC Opinion of 12 December 1984 in OJ No. C 44 of 15 February 1985).
b) EP	**The European Parliament** *has reaffirmed its support for the INSIS programme* (See EP Resolution of 13 December 1984 in OJ No. C 12 of 14 January 1985).

Sources:

COM(84) 380 final
OJ No. L 247 of 23 August 1982
OJ No. C 343 of 31 December 1981 (p. 4)
OJ No. C 44 of 15 December 1985 (p. 4)
OJ No. C 12 of 14 January 1985 (p. 109)

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

EC PROGRAMMES (currently being implemented)

CADDIA

1. BASIC LEGAL INSTRUMENT	COOPERATION IN THE AUTOMATION OF DATA AND DOCUMENTATION ON IMPORTS/EXPORTS AND AGRICULTURE (CADDIA) Council Decisions No. EEC 82/607 of 28 July 1982 (OJ No. L 247 of 23 August 1982) and EEC 85/214 of 3 April 1985 (OJ No. L 96 of 3 April 1985)
2. OBJECTIVES	The provision of the necessary infrastructure and data processing facilities to enable the Commission and Member States to obtain access to, and to process rapidly the information needed for the operation of the Customs Union and the Community's commercial policies and the management and financial control of the agricultural markets. CADDIA represents an application of the principles of the inter-institutional, integrated services information system (INSIS) in the field of technology and standards.
3. SPECIFIC CHARACTER, CONDITIONS	Long-term programme for the use of telematics in the EC imports/exports information system and the management and financial control of agricultural market organizations.
4. AREAS COVERED	— Agricultural markets information system (AMIS) — Early notification system for agriculture — Customs development projects and studies — Statistical development projects and studies
5. POSSIBLE IMPACT	The CADDIA project may bring about a simplification and an acceleration of the management of the customs union, the CAP and EC trade policy. It will make it possible to improve the management of the agricultural markets, to exercise better control over income and expenditure and to make forecasts on the basis of more efficient procedures.
6. STRUCTURE AND FORM OF COOPERATION	Cooperation between the Member States and the Commission in the implementation of projects in which both parties act as both operators and users; definition of the systems and measures necessary for the attainment of the long-term objectives of CADDIA. The Commission has responsiblity for organizing coordination between itself and the Member States with regard to the specification, implementation and utilization of the CADDIA technical systems. In its work the Commission follows a development programme and is assisted by a committee comprising representatives of the main ministerial departments of the Member States and departments of the Commission itself.
7. FUNDING GUIDELINES	Estimated total expenditure on the CADDIA programme for the period 1985-1990 is 26.8 million ECU. At national level the administrations of the individual Member States will provide the staff and other resources and meet the installation costs and costs of developing the software required by the national telematic systems.
8. RESULTS AND PROSPECTS	The CADDIA system will enable the Commission and the Member States to make use of a telematic programme which is an integral part of the EC information system when dealing with agricultural imports and exports and the management and financial control of the agricultural marketing organizations.
9. POSITION a) ESC	**The Economic and Social Committee** *approved the Commission's proposals and the draft Council Decision* (See ESC Opinion of 4 July 1984, OJ No. C 248 of 17 September 1984). *It stressed the need for customs clearance procedures in the Community to be cut back as far as possible by making use of data bases and linked communication systems in such a way as to make the to the inhabitants of the Community.*
b) EP	**The European Parliament** *welcomed the CADDIA Project* (See EP Resolution of 24 May 1984 in OJ No. C 172 of 2 July 1984).
10. STAGE CURRENTLY REACHED	The draft Decision is currently before the Council (COM(84) 119 final of 13 March 1984).

Sources:

OJ No. L 247 of 23 August 1982 (p.25)
OJ No. L 96 of 3 April 1985 (pp.35-36)
OJ No. C 248 of 17 September 1984 (pp.17-18)
OJ No. C 172 of 2 July 1984 (p.172)
COM(84) 119 final.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (proposal)

C.D.

1. BASIC LEGAL INSTRUMENT	COORDINATED DEVELOPMENT OF COMPUTERIZED ADMINISTRATIVE PROCEDURES, C.D. PROJECT (Council Resolution, OJ No. C 137, of 24 May 1984, COM(84) 556 final and COM(85) 295.
2. OBJECTIVES	Development of computerization of administrative procedures in trade between Member States and with third countries.
3. SPECIFIC CHARACTER, CONDITIONS	The C.D. Project defines the competence of the Commission and the Member States as regards the coordinated development of computerized administrative procedures and forms part of the wider CADDIA programme (see page 97).
4. AREAS COVERED	Gradual linking of computers used in the various administrative procedures. The Community framework covers the following areas: — intra-Community trade — trade with third countries (imports and exports) — interfaces with Commission systems — systems interconnection and data exchange standards
5. ECONOMIC IMPACT	The informatics industry will be able to benefit from common standards for data systems, messages and technical interconnections. This standardization and the demand for new informatics equipment will provide major new opportunities for Community industry.
6. STRUCTURE AND FORM OF COOPERATION	Cooperation between the Commission, the Member States and commercial users in the Community in the planning and implementation of projects for the computerization of administrative procedures.
7. FUNDING GUIDELINES	At the present time it is difficult to estimate the cost of the project as this will depend on the methods adopted by the Member States to incorporate the agreed functions and equipment in their national systems, on the timetable for putting these systems into operation and on the cost of the equipment at the time of purchase.
8. RESULTS AND PROSPECTS	The coordination of administrative procedures could speed up administrative checks at the Community's internal borders.
9. POSITION a) ESC b) EP	 None None The Commission has forwarded to the Council a Draft Council Decision dated 11 June 1985 (COM(85) 295).

Sources:

COM(84) 556 final
COM(85) 295
OJ No. C 137 of 24 May 1984

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (in the process of being implemented)

EUROTRA

1. BASIC LEGAL DOCUMENTS	EUROTRA MACHINE TRANSLATION SYSTEM OF ADVANCED DESIGN. Council Decision of 4 November 1982 - OJ No. L 317 of 13 November 1982, pp. 19 and 20.
2. OBJECTIVES	To overcome language barriers so that the benefits of tele- informatics and of communication and information networks can be fully reaped at Community level.
3. SPECIFIC CHARACTER, CONDITIONS	Community R & D programme adopted for a period of five and a half years commencing on 13 November 1982. Under certain conditions the Community may conclude agreements with third countries on their participation in the programme.
4. AREAS COVERED	Creation of a machine translation system of advanced design capable of dealing with all official languages of the Community.
5. ECONOMIC IMPACT	A machine translation system should have numerous industrial applications and be of direct benefit to European industry and, in particular, to exporting industries.
6. STRUCTURE AND FORM OF COOPERATION	The EC Commission is responsible for execution of the programme, in particular by means of research contracts. It is assisted by an Advisory Committee on Programme Management.
7. FUNDING GUIDELINES	The funds earmarked for execution of the programme are 16 million ECU.
8. INITIAL RESULTS	After a two-year preparatory phase, the programme has moved into a basic and applied linguistic research phase. The phase of stabilization of the linguistic models and evaluation of results should start around the end of 1986.
9. POSITION a) ESC	**The Economic and Social Committee** *sees finalization of a European machine translation system (EUROTRA) as a project which, if successful, will be of key importance in dismantling language barriers.* (ESC Opinion of 25 February 1981, OJ No. C 138 of 9 June 1981, p. 3).
b) EP	**The European Parliament** *considers that every effort should be made to a) reduce delays and misunderstandings arising out of the use of many different languages, b) bring Europeans together and c) facilitate commerce and trade. It views the machine translation system as a potential contribution to the attainment of these aims.* (EP Resolution of 17 June 1981, OJ No. C 172 of 13.7.1981, p.45).
10. REMARKS	A system for pre-translation of texts (SYSTRAN), of less advanced design already exists. It was developed in the United States in the 60s and the EC Commission acquired the rights to it in 1976. The system, which is restricted to a few Community languages, is already in use and continues to be improved, though ultimately it is planned to abandon it.

Sources:
OJ No. L 317 of 13 November 1982
OJ No. C 138 of 9 June 1981
OJ No. C 172 of 13 July 1981

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (in the process of being implemented)

COMETT

1. BASIC LEGAL INSTRUMENT	COMMUNITY ACTION PROGRAMME IN EDUCATION AND TRAINING FOR TECHNOLOGY (COMETT) Council Resolution of 19 September 1983. OJ No. C 256 of 24 September 1983.
2. OBJECTIVES	To promote a European dimension in cooperation between universities and industry in the field of advanced training relating to innovation and the development and application of new technologies. To promote the exhange of experiences, pooling of resources and the realization of economies of scale through the joint development of advanced training programmes.
3. SPECIFIC CHARACTER, CONDITIONS	— To promote cooperation between universities and industry on training in the field of new technologies. The Commission implements the COMETT programme with the assitance of a group of high level experts drawn from universities and industry, as well as by consultants. — Support for University-Industry Training Partnerships, which undertake to liaise with counterpart initiatives in other Member States, receive students, academic and industrial personnel from elsewhere in the Community and to develop cross-national cooperative projects.
4. AREAS COVERED	1) Support for the creation and running of a European network of University-Industry Training Partnerships (UITPs); 2) Specific incentives to encourage the transnational exchange of students and industrial and academic personnel through: a) a grant scheme for student placement in firms in another Member State; b) fellowships for academic staff on detachment to specialized areas of industry; c) fellowships for industrial staff on detachment to universities. 3) Support for the design, development and testing at European level of joint training projects by high technology firms in liaison with relevant university departments in those areas where key skill shortages are identified; 4) Support for multilateral initiatives on distance learning systems using new technologies with particular emphasis on the training of trainers and managers; 5) Complementary measures carried out by the Commission to encourage university-industry cooperation including: a) setting up of a data base; dissemination of information and exchange of experience; b) networking arrangements for University-Industry Training Partnerships.
5. ECONOMIC IMPACT	Could help improve arrangements for initial training and the transmission of new skills to those whose employment is affected by technological innovations.
6. STRUCTURE AND FORM OF COOPERATION	Cooperation between universities and industry on local and regional schemes for advanced training in innovation and the development and application of new technologies. The programme will be implemented in two phases over a seven-year period.
7. FUNDING GUIDELINES	The estimated budget for the period 1986-1989 (first phase) is 80 million ECU, to fund: a) 50% of the cost of supporting University-Industry Training Partnerships; b) fellowships for students, academic and industrial staff; c) 30% of the total cost of joint university-industry high technology projects; d) 50% of the cost of multilateral initiatives on distance learning systems and the training of trainers; e) full funding of complementary measures and exchange of experiences.

COMETT (contd.)

8. INITIAL RESULTS	— Improvement of initial training for students or persons qualified in advanced technology. — In-service training of qualified staff and managers in European firms.
9. POSITION a) ESC b) EP	**The Economic and Social Committee** *supports the aims underlying the Council's draft resolution* (ESC Opinion of 26.1.1983, OJ No. C 77 of 21 March 1983). **The European Parliament** *welcomes the Commission proposal to supplement and consolidate the vocational training policy adopted by the Member States and calls on the Council to give its backing to the significant efforts being made by the Community in the field of training* (EP Resolution of 17 May 1983, OJ No. C 161 of 20 June 1983).

Sources:

OJ No. C 256 of 24 September 1983.
OJ No. C 77 of 21 March 1983
OJ No. C 161 of 20 June 1983
OJ No. C 234 of 13 September 1985

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (in the process of being implemented)

BRITE

1. BASIC LEGAL INSTRUMENT	R & D PROGRAMME 1985-1988 IN THE FIELDS OF BASIC TECHNOLOGICAL RESEARCH AND THE APPLICATIONS OF NEW TECHNOLOGIES (BRITE). Council Decision of 12 March 1985 (EEC/85/196) - OJ No. L 83, of 25.3.85.
2. OBJECTIVES	To encourage the creation of a broad advanced technology base on which traditional Community industrial firms can draw so as to remain competitive on the international market over the next decade.
3. SPECIFIC CHARACTER, CONDITIONS	Multiannual programme for basic industrial technological research in Europe, divided into two sub-programmes. Any proposal normally has to be submitted on behalf of a group of participants intending to cooperate on the implementation of a project. Each group must consist of partners with their headquarters in two or more Member States and at least one should be an industrial firm.
4. AREAS COVERED	Precompetitive basic technological R & D in new materials and new production methods, including pilot schemes and demonstration projects relating to new manufacturing technologies adjusted to products manufactured from pliable materials (textiles).
5. ECONOMIC IMPACT	The BRITE programme can promote modernization of production processes in traditional firms.
6. STRUCTURE AND FORM OF COOPERATION	Participation in BRITE R & D projects is open to all firms, regardless of size, and to research institutes, universities and other bodies established in the EC, provided that the proposed work is carried out in laboratories within the Community. Industrial firms can participate solely on a financial basis.
7. FUNDING GUIDELINES	This 4 year programme has a budget of 125 million ECU. Normally the Community contribution does not exceed 50%, the remainder being funded by the industrial participants. Projects must comply with the following conditions: — be of outstanding technical value; — relate to precompetitive R & D; — include innovatory research that does not overlap with or duplicate work already in progress; — require substantial funding; the average budget for future projects is estimated at around 1 million ECU.
8. INITIAL RESULTS	The BRITE programme could: — increase mobility of research workers within the EC and communication between scientists; — promote cooperation between different R & D teams in the Community; — promote vocational training and placement of young research workers.
9. POSITION a) ESC	**The Economic and Social Committee** *gives a particularly warm welcome to the Commission's proposal on the application of new technologies and research by university institutes and industry* (ESC Opinion of 26.10.1983, OJ No C 358 of 31.12.1983).
b) EP	**The European Parliament** *supports the implementation of a multiannual programme for basic technological research and the applications of new technologies for Community industry* (EP Resolution of 18.11.1983, OJ No. C 342 of 19.12.1983).

Sources:

OJ No. L 83 of 25 March 1985
OJ No. C 358 of 31 December 1983
OJ No. C 342 of 19 December 1983

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

THE COMMUNITY PROJECTS (Proposal)

HYDROCARBONS

1. BASIC LEGAL INSTRUMENT	SUPPORT PROGRAMME FOR TECHNOLOGICAL DEVELOPMENT IN THE HYDROCARBONS SECTOR. Proposal for a Council Regulation (COM(84) 658 final) of 21 November 84 providing for the continuation of the measures laid down in the Council Regulation 3056/73/EEC of 9 November 1973 (OJ No. L 312 of 13 November 1973)).
2. OBJECTIVES	Improving the security of energy supplies in the Community through technological development projects which are directly associated with prospecting for, extracting, storing or transport of hydrocarbons. Development of techniques, procedures or products of an innovatory nature in the field of hydrocarbons which may have viable industrial or commercial potential.
3. SPECIFIC CHARACTER, CONDITIONS	Following the "shared-cost programme" formula, support shall not normally exceed 49% of the eligible cost of the projects except in the case of projects by small companies involving a Community contribution of less than 200,000 ECU.
4. AREAS COVERED	Support for projects intended to promote technological innovation in the fields of the exploitation, drilling, extraction, storage and transport of petrol and natural gas.
5. ECONOMIC IMPACT	Reducing the financial burden which importing petrol entails for the Community.
6. STRUCTURE AND FORM OF COOPERATION	The programme is carried out by the Commission as part of the Programme for Research Action (PAR) on non-nuclear energy. It is implemented by means of shared-cost contracts. The Community and the Member States cooperate in working out R & D projects in the hydrocarbons sector. As a general rule, preference shall be given to projects involving the association of at least two independent companies which are not established in the same Member State (cf. amendment proposed by the European Parliament in its report of 24 May 1985 (A2-36/85).
7. FUNDING GUIDELINES	The total for aid granted by the Community is 342 million ECU for the period 1973-1983 and covering 370 projects (since the adoption of the Council Regulation in November 1973). For the year 1984, 35 million ECU have been spent on 51 projects. The support is to be repaid if the project becomes commercially viable. The budget for the Commission's multiannual programme from 1985- 1990 envisages a total credit of 200 million ECU. For 1985 a commitment has been made for 37 million ECU.
8. INITIAL RESULTS	This programme could help to make the Community less dependent on imports of hydrocarbons.
9. POSITION a) ESC	**The Economic and Social Committee** *believes that the experience gained over the last 10 years that Regulation (EEC) No. 3056/73 has been in operation ... justify its belief that there is a continuing need for the Community to support a selected number of technological development projects ... It believes that these projects should be included in the proposed programme of support for new hydrocarbon technologies, being projects which involve a long time scale for completion, and/or have a high technical risk factor.* (OJ No. C 160 of 1 July 1985, page 13).
b) EP	**The European Parliament** approves the Commission proposal (EP A2- 36/85 of 24.5.85) barring certain reservations, suggesting for example that projects should be included which are promoted by small and medium-sized undertakings, solely, jointly, or in collaboration with large undertakings. This request was accepted by the Commission (COM(85) 453 final of 31.7.85) in line with Article 149(2) of the EEC Treaty.

10. APPENDIX R & D PROGRAMME - OPTIMIZATION OF HYDROCARBON PRODUCTION AND UTILIZATION 1984-1987	A draft Council decision also exists which prescribes a R & D programme for the optimization of the production and utilization of hydrocarbons from 1984-1987 (COM(84) 273 final). The areas for research and development are the following: — the improvement of basic knowledge concerning methods of assessing oil fields and the perfection of improved production methods; — an increase in the use of natural gas and its conversion into other fuels; — the finalization of improved methods for the possible conversion of heavy oil fractions. — the improvement of fuels for transport and the adequation of motor fuels. This action by the Commission will be carried out as part of the Programme for Research Action (PAR) on non-nuclear energy. The financial resources which will be necessary to put this sub- programme into practice have been estimated at 35 million ECU (COM(84) 273 final).
11. POSITION a) ESC	**The Economic and Social Committee** *"endorses the proposal for a Council Decision" and believes that the programme "might help to promote the further expansion of a modern, forward-looking hydrocarbons technology upstream of the competitive and energy supply spheres" and that "long-term basic research is desirable in order to further improve the utilization of oil reserves and to maximize the technical and economic yield of petroleum projects as regards both manufacturing and final consumption"* (ESC Opinion of 5 June 1984, OJ No. C 25 of 28 January 1985).
b) EP	**The European Parliament** *considers this programme to be "in line with the aims of Community research and deveopment policy", points out that "the financial resources set aside for this programme in the 1985 budget must not lead to a cut in the funds for the ESPRIT programme", recognizes the importance of developing the sector of mining research and the exploitation of hydrocarbons" and "calls on the Commission, in developing this programme, to make use of financial means provided by the major oil companies and industries concerned, and to consider the participation of national corporations in the sector".* (Resolution of the EP of 11 February 1985. OJ No. C 72 of 18 March 1985)

Sources:
OJ No. L 312 of 13 November 1973
COM(84) 658 final of 21 November 1984
OJ No. C 160 of 1 July 1985
A2-36/85 of 24 May 1985
COM(85) 453 final of 31 July 1985

Appendix sources:
(Programme for R & D in the field of the optimization of the production and the utilization of hydrocarbons 1984-1987)
COM(84) 273 final
OJ No. C 25 of 28 January 1985
OJ No. C 72 of 18 March 1985

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (in progress)

JET

1. BASIC LEGAL INSTRUMENT	JET (Joint European Torus) (Council Decision 78/470/Euratom of 30 May 1978. (OJ No. C 151 of 7 July 1978, page 8)
2. OBJECTIVES	To obtain and study a plasma in conditions and dimension approaching those needed in a thermonuclear reactor.
3. SPECIFIC CHARACTER, CONDITIONS	Joint undertaking, as defined in Chapter V of the EURATOM Treaty, including the following members: — European Atomic Energy Community — Belgian State — Commissariat à l'énergie atomique (France) — Comitato nazionale per l'energia nucleare (Italy) — Consiglio nazionale delle ricerche (Italy) — Forsøgsanlæg Risø (Denmark) — Grand Duchy of Luxembourg — Ireland — Kernforschungsanlage Jülich GmbH (Federal Republic of Germany) — Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V. - Institut für Plasmaphysik (Federal Republic of Germany) — National Swedish Board for Energy Source Development (Sweden) — Stichting voor Fundamenteel Onderzoek der Materie (Netherlands) — United Kingdom Atomic Energy Authorithy Membership is open to anyone who can usefully contribute to the objective of JET.
4. AREAS COVERED	Construction, operation and exploitation of a large torus facility of the Tokamak type and its auxiliary facilities in order to extend the parameter range applicable to controlled thermonuclear fusion experiments.
5. ECONOMIC IMPACT	European industry contributes to the programme mainly by supplying parts and equipment. EURATOM staff working on the project numbered 165 (temporary employees) in 1984. A total of nearly 600 people are currently working on the JET project.
6. STRUCTURE AND FORM OF COOPERATION	The organs of the joint undertaking consist of the JET Council, made up of representatives of Members, and the Project Director, plus a back-up team.
7. FUNDING GUIDELINES	Tranches of expenditure for 1976-1989 total 770 million ECU. 80% of the cost will be financed by the Community budget and the remaining 20% by national governments or other sectors at national level. The total cost of the project between 1986-1989 will amount to 433 million ECU.
8. RESULTS AND PROSPECTS	The basic performance phase of the JET construction was completed in 1983. The extension to the full performance phase and the operational phase should be completed about 1990. Agreement on the definition phase of the Next European Torus (NET) to follow JET, was reached in 1983.
9. POSITION a) ESC	**The Economic and Social Committee** *would emphasize that the success of both the general R & D programme and the JET project - which is a major element of the joint efforts - is contingent on exceptionally close liaison between these two programmes.* (OJ No. C 171 of 9 July 1979, p. 40).
b) EP	**The European Parliament** *welcomes the fact that a decision to go ahead with the JET programme has been reached.* (OJ No. C 93 of 9 April 1979, p. 70).

Sources:

OJ No. C 151 of 7 July 1978, p. 8
OJ No. C 171 of 9 July 1979, p. 40
OJ No. C 93 of 9 April 1979, p. 70.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (in progress)

JOINT RESEARCH CENTRE

1. BASIC LEGAL INSTRUMENT	PROGRAMME TO BE IMPLEMENTED BY THE JOINT RESEARCH CENTRE (JRC) FOR THE EUROPEAN ATOMIC ENERGY COMMUNITY AND THE EUROPEAN ECONOMIC COMMUNITY (1984 to 1987) (Council Decision of 22 December 1983, OJ No. L 3 of 5 January 1984)
2. OBJECTIVES	The multiannual research programme is one of the principal means whereby the European Atomic Energy Community can contribute to the safety and development of nuclear energy and to the acquisition and dissemination of information in the nuclear field. The non-nuclear projects provided for in the multiannual programme are necessary for the attainment of the objective of promoting throughout the Community a harmonious development of economic activities and continued and balanced expansion.
3. SPECIFIC CHARACTER, CONDITIONS	Multiannual framework programme 1984-1987 setting out a range of scientific and technical activities to be carried out by the JRC. The programme is being carried out by the scientific and technical staff attached to the JRC and financed by Community budgetary credits allocated for that purpose.
4. AREAS COVERED	The 1984-1987 research programme being carried out by the JRC concentrates mainly on nuclear research. It does, however, also include research into non-nuclear energy, the environment and some industrial technologies which are of central importance for the development of new industrial production procedures. The 1984-1987 multiannual programmes covers the following areas of research: **A. Nuclear research** 1. nuclear measurements in the field of industrial technology 2. fusion research — fusion technology and safety 3. fission research — reactor safety — management of radioactive waste — safeguarding and management of fissile materials — nuclear fuels and actinides research 4. activities of scientific departments (complementary programme) — expoitation of HFR reactor **B. Non-nuclear research** 1. industrial technologies — reference materials 2. materials for high temperature use (including steels and alloys, ceramics, data bank, materials and information centre, materials for high temperature use 3. non-nuclear energy — testing methods for solar systems (photovoltaic systems, heat conversion — management of energy in dwellings 4. environment — environmental protection — application of aerospace remote-sensing techniques (agriculture and soil management, protection of the marine environment, natural disasters) — industrial hazards, accident prevention, accident management and control
5. ECONOMIC IMPACT	In the context of the multiannual research programme 1984-1987 the Joint Research Centre (JRC) plays a central role in the Community's research strategy. It is carrying out work of common interest and for the period 1984-1987 employs a staff of approximately 2200, most of whom are scientific and technical staff. A total of 700 million ECU has been allocated to the programme from the Community budget. Its impact on nuclear and non-nuclear research in the Community is thus considerable.

JOINT RESEARCH CENTRE (contd.)

6. STRUCTURE AND FORM OF COOPERATION	The JRC's activities are divided between a number of establishments in different places. The main participating establishment is ISPRA (Italy) (nuclear safety, non-nuclear energy, thermo-nuclear fusion and industrial hazards). The other organizations are at GEEL (Belgium) (central office for nuclear measurements serving the nuclear industry), KARLSRUHE (Germany) (actinides and nuclear safety) and PETTEN (Netherlands) (materials for high temperature use). The JRC employs (1985 figures) a scientific and technical staff of 1770, including 519 graduate researchers and 668 qualified technical researchers. The administrative staff numbers 490. Total staff: 2260.
7. FUNDING GUIDELINES	A total of 700 million ECU has been allocated to the 1984-1987 multiannual programme, distributed as follows: — industrial technologies - 92 million ECU — fusion - 46.5 million ECU — fission - 352 million ECU — non-nuclear energy - 39 million ECU — environment - 99 million ECU — exploitation of HFR reactor - 59 million ECU (divided between Germany and the Netherlands) — projects of European interest - 12.5 million ECU
8. INITIAL RESULTS	Looking beyond the 1984-1987 research programme, a number of projects are being studied with a view to their being included in a future programme, e.g.: — ignitor experiments on plasma — tritium handling laboratory — vibration table
9. POSITION a) ESC	**The Economic and Social Committee** *supports the integration of research being carried out by the Community's JRC into an overall Community framework programme for research and development. In future the JRC will be able to play more fully its role as a catalyst, a coordinator and a policy instrument.* (Committee Opinion of 28 September 1983, OJ No. C 341, 19 December 1983).
b) EP:	**The European Parliament** *stresses the importance for the EC of direct and indirect research, acknowledges the vital role of the JRC and expresses the hope that the JRC will continue to meet scientific and technological challenges.* (EP Resolution of 14 October 1983, OJ No. C 307, 14 November 1983)

Sources:
OJ No. L 3 of 5 January 1984
OJ No. C 307 of 14 November 1983
OJ No. C 341 of 19 December 1983.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES

ENERGY EFFICIENCY/ALTERNATIVE ENERGY SOURCES

1. BASIC LEGAL INSTRUMENT	Regulation (EEC) 1972/83 on grants for **alternative-energy energy-efficiency and hydrocarbon-substitution demonstration projects. (OJ No. L 165 of 19 July 1983).** This Regulation cancels and replaces Regulations (EEC) Nos. 1302/78, 1303/78, 725/79, 726/79, 727/79, 728/79 and 729/79. It is to be replaced in 1985 by a draft Regulation, bearing the same title, currently before the Council.
2. OBJECTIVES	Energy efficiency, reduction of Community oil imports.
3. SPECIFIC CHARACTER, CONDITIONS	For the purposes of the Regulation, "projects relating to the exploitation of alternative energy sources" means projects to exploit any potential source of energy, with the exception of nuclear energy; "projects relating to energy saving" means projects which involve a significant improvement in the efficiency with which energy is used. All projects submitted by Community citizens or enterprises are considered by the Commission.
4. AREAS COVERED	**4.1. Alternative energy sources:** — Geothermal — Solar — Biomass — Wind, ocean — Hydro-electric **4.2. Energy efficiency** — Buildings — Supply and use of process heat and of electricity in industry and agriculture — Energy industry — Transport
5. ECONOMIC IMPACT	The Commission is convinced that energy-efficiency measures can cut energy consumption by up to 30% before 2000 AD. Alternative energy sources could meet 10% of the Community's energy demand by that year.
6. STRUCTURE AND FORM OF COOPERATION	The Commission decides whether to provide support after consulting an advisory committee on the management of demonstration projects, made up of representatives from the Member States.
7. FUNDING GUIDELINES	Support to the amount of 435.1 million ECU was provided between 1978 and 1984. Up to half of grants has to be refunded if projects are successful. The new draft Regulation (COM(85) 29 final of 25 February 1985), which is to run till 31 December 1990, earmarks 545 million ECU. The Community may not finance more than 49% of "eligible costs".
8. INITIAL RESULTS	Of the 3,063 projects submitted between 1978 and 1984, 804 were accepted. Some hundred projects were terminated in this period. About half achieved the technological and financial results specified in the contracts with the Commission. For 20 of them, reimbursement has already started.
9. POSITION a) ESC	**The Economic and Social Committee** *argues that it is essential for the Community to develop new techniques for conserving energy and diversifying supply sources.* (Committee Opinion of 3 July 1985, OJ No. C 218 of 29 August 1985, p. 4, para. 1.2.).
b) EP	**The European Parliament** *endorsed the Commission's proposal to part finance energy-efficiency and alternative-energy projects.* (Resolution of the European Parliament of 14 November 1977, OJ No. C No. 299 of 12 December 1977)

Sources:

OJ No. L 165 of 19 July 1983, p. 6
COM(85) 29 final of 25 February 1985
OJ No. C 218 of 29 August 1985, p. 4, para. 1.2.
OJ No. C 299 of 12 December 1977, p. 50, pt. 4.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (in progress)

BIOTECHNOLOGY

1. BASIC LEGAL INSTRUMENT	MULTIANNUAL RESEARCH ACTION PROGRAMME FOR THE EUROPEAN ECONOMIC COMMUNITY IN THE FIELD OF BIOTECHNOLOGY (1985-1989) Council Decision of 12 March 1985, OJ No. L 83 of 25 March 1985.
2. OBJECTIVES	To develop biotechnology in the Community by: — the establishment of new methods for the synthesis of compounds with high added value; — more efficient land use through the introduction of new crops which can provide important feedstocks for European industries; — contributing to the solution of environmental problems; — acceptability of the products of modern biotechnology through the use of new testing methods which render possible a more efficient and less costly evaluation of toxicity and biological activity; — replacement of animal experiments with tests on cell cultures; — new approaches in the detection, prevention and treatment of diseases; — protection of health and environment against risks which may be associated with the application of biotechnology.
3. SPECIFIC CHARACTER, CONDITIONS	Contract **research**, training and concerted action to be carried out by means of shared cost contracts to be placed with appropriate industrial organizations, research laboratories or university institutes or combinations of them. The **concerted actions** consist of the coordination at Community level of research activities which are part of existing research programmes in the Member States and, where applicable, of the Community. Encouragement and priority shall be given to contracts bringing together the technological resources of firms and institutions from different Member States, where possible.
4. AREAS COVERED	— the establishment of a supportive infrastructure for biotechnology in the Community; — the elimination, through research and training, of bottlenecks which prevent the exploitation by industry and agriculture of the materials and methods originating from modern biology; — the experimental assessment of biohazards possibly associated with applications in agriculture and industry of biomolecular engineering. **Research and training** **Contextual measures for R & D in biotechnology:** to upgrade the quality and capabilities of facilities, resources and support services underpinning biotechnology research and to enhance access to these facilities and encourage their use in research, teaching, agriculture, industry and health care. — bio-informatics — collections of biotic materials **Basic biotechnology** **A. Research and training** Precompetitive research and research through training in areas of basic biotechnology where technical and scientific bottlenecks prevent the applications of modern genetic and biochemical methods to agriculture and industry. — enzyme engineering — genetic engineering — physiology and genetics of species important to industry and agriculture — technology of cells and tissues cultured in vitro — screening methods for the evaluation of the toxicological effects and of the biological activity of molecules — assessment of risks **B. COST activities associated to the programme as category II** — aquatic primary biomass (marine macroalgae) — plant in vitro culture **C. Involvement in the activities of the *Technology, growth and employment* working group created at the Versailles summit of 1982** — Coordination and concertation in "basic biology" (area 1: data banks; area 2: collections of biotic materials) — Representation of the Community to the "International network of biotechnology". **Concertation** — to improve standards and capabilities in the life sciences and to enhance the strategic effectiveness with which these are applied to the social and economic objectives of the Community and its Member States.

5. ECONOMIC IMPACT	The development of medicine, agriculture and certain industries depends to a large extent on the development on the science of life and living things (biotechnology). 40% of products manufactured in a developed economy are biological in nature or origin. The rapid development of biotechnology in Europe has a decisive impact on the competitiveness of European agriculture and several major industrial sectors such as chemicals, pharmaceutical products, certain aspects of energy production, human and veterinary medecine. Moreover, the use of procedures and products based on biotechnology will give an important impetus to environmental protection policy.
6. STRUCTURE AND FORM OF COOPERATION	**Research and training** **Contextual measures** Training actions and cost-shared contracts with appropriate institutions, with provision as necessary for workshops and meetings. **Basic biotechnology** Training actions to be implemented through training contracts, short-term training grants and courses for each of the themes defined in 4. above ("basic biotechnology"). **COST activities associated to the programme as category II** Organization of meetings, consultation of experts, publications, exchanges of researcher workers between laboratories and coordination contracts. **Involvement in the activities of the *Technology, Growth and Employment* Working Group** Organization of meetings, consultation of experts and publications in the two areas covered by the activities foreseen in "basic biology". **Concertation** In-house work, the setting-up and exploitation of an organized information base and missions, and as necessary study reports, the organization of workshops and meetings and diffusion of information.
7. FUNDING GUIDELINES	The funds estimated as necessary for the execution of the programme amount to 55 million ECU. The programme will be re- examined in the course of the second year. In the light of this this reassessment the Commission will, if appropriate, submit a proposal for a revision of the programme in accordance with the appropriate procedures.
8. INITIAL RESULTS	The realization of a Community policy for biotechnological research and development could help encourage a profound change in traditional methods of agricultural production; the policy covers stock raising, and cereal, vegetable and horticultural production; this change could also help to reconcile to a greater extent the need to protect nature and the environment on the one hand and on the other the need to maintain the competitiveness of European agriculture. The development of biotechnology will also lead to a large range of new activities in industry and medicine and to action to protect the environment.
9. POSITION a) ESC	**The Economic and Social Committee** endorses the proposal for a Council Decision adopting a multiannual research action programme for the European Community in the field of biotechnology (1985 to 1989). *The Committee considers that training and concertation are of primary importance.* (ESC Opinion of 20 November 1984, OJ No. C 25, 28 January 1985).
b) EP	**The European Parliament,** whilst in general expressing its support for the programme and making a large number of recommendations, — stresses the political importance of and the economic need for a European action programme in the field of biotechnology — calls, however, for the simultaneous implementation of a detailed European programme for the evaluation of biotechnology; — welcomes the preparation of a programme which will not only encourage research but will also bring together European technical skills which are at present fragmented because of the existence of internal Community frontiers. (EP Resolution of 14 December 1984, OJ No. C 12 of 14 January 1985)

Sources:

OJ No. L 83/85, 23 March 1985
OJ No. C 25/85, 28 January 1985
OJ No. C 12/85, 14 January 1985.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (in progress)

FAST II (1983-1987)

1. BASIC LEGAL INSTRUMENT	RESEARCH PROGRAMME OF THE EUROPEAN ECONOMIC COMMUNITY ON FORECASTING AND ASSESSMENT IN SCIENCE AND TECHNOLOGY (FAST) 1983-1987. Council Decision EEC/83/519 of 17 October 1983, OJ No. L 293 of 25 October 1983, page 20.
2. OBJECTIVES	Analysis of scientific and technological changes, in order to highlight their long-term implications and consequences for the Community's R & D and other policies over the next ten years and to propose timely policy options.
3. SPECIFIC CHARACTER, CONDITIONS	— Horizontal (multidimensional) evaluation of long-term technological change. Research contracts awarded after calls for applications; — Highlight prospects, problems and potential conflicts which may affect the long-term development of the Community, particularly in the field of science and technology; — Make use of long-term research studies undertaken within the Member States. There are nine criteria for the selection of contracts: 1) Relevance to programme 2) Innovatory value of the proposal 3) Clear specification of methods to be used and respects expected 4) Interdisciplinary character 5) Evidence of competence in the field concerned 6) Feasibility 7) Approximate costs; cost sharing 8) Type of proposer (one person, centre, group of centres, European team, etc.). 9) Knowledge of Commission work in area concerned
4. AREAS COVERED	Three main fields 1) New forms of growth for Europe: — Technology, employment and work — Integrated development of renewable natural resources 2) New strategic industrial systems: — Communications — Food 3) Transformation of service activities and technological change:
5. ECONOMIC IMPACT	Job-creation potential of new technologies in sectors such as agriculture, chemical industry. Work on information science can also have an impact on employment, through the industrial-scale development of this sector. This sector employs 5 million and its evolution is liable to generate changes in all other sectors, such as services and communications.
6. STRUCTURE AND FORM OF COOPERATION	1) Development of the activity of the programme on the basis of a network of some 10 national research units identified in cooperation with the Member States. The form and functioning of these networks will be defined with these units. 2) Association of Community centres or research teams with capability in the analysis of technological change, 3) Promotion of ad hoc networks for information and collaboration at Community level. 4) Secondment to the programme by Community and national institutions (governmental, academic or professional) of persons who work as a member of the FAST unit for a limited period of time (3-18 months).
7. FUNDING GUIDELINES	8.5 million ECU to be contributed by Community 2.5 million ECU to be contributed by Member States (companies, institutions, etc).

FAST II (contd.)

8. INITIAL RESULTS	Better allowance for possible long-term scientific, technological and socio-economic changes. Equipping Community to objectives and priorities of its long-term action.
9. POSITION a) ESC	**The Economic and Social Committee** *noted that FAST was a first tentative step towards evaluating the long-term R & D outlook, and approved the draft Decision* (ESC Opinion of 1 August 1983, OJ No. C 211 of 8 August 1983).
b) EP	**The European Parliament** *noted that FAST had become a major vehicle of Community research policy; and endorsed the proposal to give FAST a further opportunity to prove its value* (EP Resolution of 10 July 1983, OJ No. C 184 of 11 July 1983).

Sources:

OJ No. L 297/83 of 25 October 1983
OJ No. C 211/83 of 8 August 1983
OJ No. C 184/83 of 11 July 1983

EC Commission, EUR 8274 - Evaluation of Community research programme on forecasting and assessment in science and technology (FAST) (1978-1983).
OJ No. C 89/9 of 31 March 1983.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES (in progress)

STIMULATION PLAN (1985-88)

1. BASIC LEGAL INSTRUMENT	Plan to stimulate European scientific and technical cooperation and interchange (1985-1988). Council Decision of 12 March 1985, OJ No. L 83 of 25 March 1985.
2. OBJECTIVES	Stimulation of the efficacy of the Community's scientific and technical potential.
3. SPECIFIC CHARACTER, CONDITIONS	The stimulation plan consists of a range of activities which have as their aim the establishment of a network of scientific and technical cooperation and interchange at European level, which will gradually be extended. It covers all fields of science and technology - both exact and natural sciences. Range of measures to aid the mobility of researchers, communication among scientists and the development of cooperation in the field of research and development in the Community. These are therefore support measures for research workers, teams or research and development organizations to facilitate: — transfers of researchers (whether novice or experienced) from one Community country to another; — the bringing together of expertize which is geographically separated in the Community so that joint projects may be undertaken; — the strengthening of communication and exchanges of information within the European scientific and technical system.
4. AREAS COVERED	The following fields will be given obvious attention: — chemistry: particularly synthetic chemistry, composite materials and monomer chemistry, — "biocommunication", — earth sciences: all aspects relating to structures and materials, — optics: particularly research involving integrated optics, — mathematics and data processing, — oceanography: marine sciences, — surface chemistry and physics: principally catalysis, intersurface exchanges, polymer-metal adhesion, — scientific instrumentation.
5. ECONOMIC IMPACT	Since many of the projects are multisectoral and multidisciplinary, they will further far-searching cooperation between researchers at Community level and thus contribute to the creation of a European social dimension in research and technology.
6. STRUCTURE AND FORM OF COOPERATION	The Commission shall negotiate and conclude the contracts needed to implement the selected projects. The stimulation plan will be implemented by making use of: — multisectoral incentive measures: laboratory twinnings, operations, research grants. These actions imply a European network of research centres, on which they will rely; — contextual measures to encourage the mobility of scientists: examination of the feasibility of a researchers' travel voucher, the organization of concertation meetings between Member States to organize a career endorsement for researchers who have worked abroad, an attempt to establish an inventory of national possibilities for exchange and cooperation. The choice of stimulation incentive measures and the teams concerned will be made by the Commission which, with the help of the Committee for the European Development of Science and Technology (Codest), will make use of a peer review system. The Commission will see to it that there is consistency between stimulation activities and programmed R & D activities by consulting the committees set up under its aegis to assist it in programme management.
7. FUNDING GUIDELINES	The funds estimated as necessary for the execution of the stimulation plan amount to 60 million ECU. The Commission shall be responsible, following consultation of the sectoral Management and Coordination Advisory Committees (CGCs) and CREST, for defining the range of measures to be implemented in the context of sectoral programmes in order to encourage mobility and training as well as the amount of financial resources to be allocated to these specific measures.

STIMULATION PLAN (contd.)

8. INITIAL RESULTS	The closest possible cooperation within the European Community by way of scientific and technological interchange which can encourage collaboration (on joint projects) between experts who are widely scattered in the Community.
9. POSITION a) ESC	**The Economic and Social Committee** *generally welcomes the draft communication (from the Commission) and the draft Council decision* and *remains convinced that the time is ripe for the creation of a genuine European scientific action space, on a scale comparable to that existing in the United States ...* (ESC Opinion of 25.10.84, OJ No. C 343 of 24 December 1984).
b) EP	**The European Parliament** *believes the proposal presented by the Commission to be a valuable basis and a first step in the right direction.* (Resolution of the EP of 26 October 1984, OJ No. C 315 of 26 November 1984).

Sources:

OJ No. L 88 of 25 March 1985
OJ No. C 315 of 26 November 1984
OJ No. C 343 of 24 December 1984

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES

FRAMEWORK PROGRAMME OF SCIENTIFIC RESEARCH

1. BASIC LEGAL INSTRUMENT	Framework programme 1984-1987 for a European scientific and technical strategy Council Resolution of 25 July 1983, OJ No. C 208 of 4 August 1983
2. OBJECTIVES	The development of a common strategy in the field of science and technology, in accordance with the Community's other policies. The scientific and technical objectives, in accordance with the Community goals, are as follows: 1. Promoting agricultural competitiveness (including fisheries) 1.1. Development of agricultural productivity and improvement of products (biotechnology) 2. Promoting industrial competitiveness 2.1. Elimination and reduction of hindrances (CD Programme) 2.2. Improvement and development of new techniques and products for conventional industry (BRITE Programme) 2.3. Promotion and development of new technologies 2.3.1. Information technology (ESPRIT and INSIS Programmes) 2.3.2. Biotechnology 3. Improving the management of raw materials 3.1. Optimal use of raw materials (including recycling them) (PAR Programme) 4. Improving the management of energy resources and reducing energy dependence 4.1. The development of nuclear fission energy, especially safety aspects (multiannual programme of the Joint Research Centre) 4.2. Controlled thermonuclear fusion (JET) 4.3. The development of renewable sources of energy 4.4. Rational use of energy (analysis of systems, hydrocarbons, coal, energy saving) (demonstration projects on energy and on hydrocarbons) 5. Improving living and working conditions 5.1. Protection of the environment (and prevention of hazards) (multiannual R & D programmes in the environmental field) 6. Improving the efficacy of the EC's S/T potential (Stimulation Plan) 7. Horizontal activities
3. SPECIFIC CHARACTER, CONDITIONS	To encourage the integration of the whole range of European research and development efforts, whether at national or Community level, in such a way as to achieve wide-ranging common objectives to be identified by mutual agreement within a strategic framework. The criteria for selection of activities are as follows: — research on a very large scale for which the individual Member States could not, or could only with difficulty, provide the necessary finance and personnel; — research, the joint execution of which would offer obvious financial benefits, even after taking account of the extra costs inherent in all international cooperation; — research which, because of the complementary nature of work being done nationally in part of a given field, enables significant results to be obtained in the Community as a whole for the case of problems whose solution requires research on a large scale, particularly geographical; — research which helps to strengthen the cohesion of the common market and to unify the European scientific and technical area and research leading, where the need is felt, to the establishment of uniform standards.

FRAMEWORK PROGRAMME (contd.)

4. FUNDING GUIDELINES	The amounts considered necessary to achieve the objectives of the 1984-1987 framework programme are: 1. Promoting agricultural competitiveness — 130 million ECU 2. Promoting industrial competitiveness — 1,060 million ECU 3. Improving the management of raw materials — 80 million ECU 4. Improving the management of energy resources — 1,770 million ECU 5. Improving living and working conditions — 385 million ECU 6. Improving the efficacy of the S/T potential — 85 million ECU 7. Horizontal activities — 90 million ECU As an overall goal it is agreed that 4% of the Communities' budget be set aside for Community research, development and demonstration activities by the end of the period covered by the framework programme.
5. RESULTS AND PROSPECTS	Use of research, development and demonstration to tackle competition from outside the Community, and strengthening solidarity among Member States through the choice of joint objectives.
6. POSITION a) ESC	**The Economic and Social Committee** *observes that the proposed approach and the programme are founded on a critical overall appraisal of past experience and trusts that the new approach will enhance the effectiveness of present and future action.* (ESC Opinion of 1 June 1983, OJ No. C 211 of 8 August 1983)
b) EP	**The European Parliament's Committee on Economic and Monetary Affairs** *fully approves of the Commission's proposal defining a four-year multiannual programme setting out the scientific and technical objectives to be achieved at Community level ...* (EP Report of 8 November 1983, doc. 1-981/83)

Sources:

OJ No. C 208 of 4 August 1983
COM(83) 260 final of 17 May 1983
OJ No. C 211 of 8 August 1983
EP Report - Doc. 1-981/83 of 8 November 1983

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

THE COMMUNITY PROJECTS (Proposal)

CODEST

1. BASIC LEGAL INSTRUMENT	CODEST - Committee for the European Development of Science and Technology. Set up by Commission decision of 6 December 1982 (OJ No. L 350 of 10 December 1982). **Committee of top-level specialists,** used by Commission to evaluate the Community's scientific technological capacity and possibilities.
2. OBJECTIVES	Assist the Commission in the preparation and implementation of its policy in regard to the stimulation of the Community's scientific and technical potential. In particular, assist the Commission in defining the **common R & D strategy**, and provide it information with elements for consideration and appraisal during the preparation of the overall framework programme for Community scientific and technical activities.
3. SPECIAL CHARACTER, CONDITIONS	Evaluate scope for R & D in the Community; short, medium and long-term scientific and technical opportunities.
4. AREAS COVERED	— Qualitative evaluation of Community's scientific and technological potential; — Exchange information with the Commission on action taken or to be taken at Community level; — Comment and report to the Commission on R & D, in particular on scientific and technology needs and opportunities within the Community and on requests for support.
5. ECONOMIC IMPACT	Increased national and Community action to stimulate science and technology.
6. STRUCTURE AND FORM OF COOPERATION	The twenty-one members of the Committee are of recognised standing in Community scientific, technological and industrial circles, active in national R & D systems and conversant with national science and technology policies.
7. FUNDING	CODEST is funded by the Community.
8. INITIAL RESULTS	Stimulation of science and technology
9. POSITION a) ESC b) EP	Neither the Economic and Social Committee nor the European Parliament have taken a stand.

Source: **OJ No. L 350 of 10 December 1982, page 45.**

INNOVATION · THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

COMMUNITY PROGRAMMES

COST

1. BASIC LEGAL INSTRUMENT	COST European cooperation in the field of Scientific and Technical Cooperation. General resolution of the ministerial conference for European cooperation in the field of scientific and technical research, held in Brussels on 22 and 23 November 1971.
2. OBJECTIVES	Promote fundamental applied research targetted to specific objectives. This type of research is half way between fundamental research designed to yield new knowledge and technical development designed to yield new products; it is based on cooperation between the Community and non-member countries.
3. SPECIFIC CHARACTER, CONDITIONS	COST is a vehicle for Community cooperation with a number of European countries. It stems from the early-seventies discussions about the American challenge and the technological lag. Nineteen European countries, including the EC Member States, are involved. COST does not have a legal personality, but it has "sui generis" machinery and jointly managed funds. Ten agreements implementing COST schemes have been signed. These agreements are inter-State in the classic sense; their parties have undertaken to participate in the scheme concerned and to comply with the implementing rules laid down.
4. AREAS COVERED	Cost cooperation covers (1981) 1. Information science 2. Telecommunications 3. Transport 4. Oceanography 5. Metallurgy, science of materials 6. Protection of the environment 7. Meteorology 8. Agriculture 9. Food technology 10. Medical research, health. By the end of 1985, COST had implemented some 300 schemes.
5. ECONOMIC IMPACT	Increase European scientific and technological competitiveness.
6. STRUCTURE AND FORM OF COOPERATION	The standing body of COST is the Committee of Senior Officials for Scientific and Technical Cooperation, comprising representatives of the nineteen participating countries. The Community is represented by the Commission. The Committee is serviced by the General Secretariat of the Council. It has defined four types of scheme, in the document on procedures: **Category I**: Community programmes, in which non-Community COST States may be involved; **Category II**: COST projects which also form the subject of a Community programme; **Category III**: COST projects where Member States participate in parallel to the Community; **Category IV**: COST projects where there is no participation by the Community;

COST (contd.)

7. FUNDING GUIDELINES	The Committee administers COST schemes. Generally, these are financed by a fund financed by the participant countries and (for some types of scheme) by the Community. The Committee is responsible for ensuring that participant countries provide the necessary money. The COST Secretariat keeps the participants informed of the amount they need to contribute. The Community generally finances back-up and coordination. This sum, put at 170,000 ECU for 1985, covers: — symposia and workshops — dissemination of findings — specific, fixed-term studies which further COST schemes — meetings with experts — computerized administration of schemes. Participant countries contribute to the cost of coordinating category I and II schemes - in general one-tenth of the amount estimated by the Community. These participant countries contribute a given proportion, proportionate to their GDPs. At the end of 1984, COST expenditure amounted to some BFR 60 million, (1.3 million ECU).
8. INITIAL RESULTS	European coordination of research programmes in three fields: — fields which are inherently international (e.g. oceanography, environment, meteorology) — fields have many similarities in the participant countries and for which joint action is advantageous (information science, agriculture, food technology); — harmonization at European level of telecommunication and transport standards.
9. POSITION a) ESC b) EP	The Economic Committee and the European Parliament have endorsed a number of COST schemes.

Sources: **Discussion on 4 November 1985 with Mr KLOSE of DG XII (responsible for COST schemes).**
OJ No. C 100 of 21 April 1979, page 1.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

MULTILATERAL AND BILATERAL ORGANIZATIONS AND PROGRAMMES IN EUROPE

EUROPEAN SPACE AGENCY

1. BASIC LEGAL INSTRUMENT	EUROPEAN SPACE AGENCY (ESA). Succeeds the EUROPEAN ORGANIZATION FOR SPACE RESEARCH (ESRO) and the EUROPEAN ORGANIZATION FOR THE DEVELOPMENT AND CONSTRUCTION OF SPACE VEHICLE LAUNCHERS (ELDO). The Convention setting up ESA came into force on 31 May 1975. Headquarters : 8-10 rue Mario Nikis, F-75738 PARIS CEDEX 15.
2. OBJECTIVES	To provide for and promote, for exclusively peaceful purposes, cooperation among European states in space research and technology, and their space applications, by : elaborating and implementing a long-term space policy and activities and programmes in the space field, coordinating the European space programme and national programmes, elaborating and implementing the industrial policy appropriate to its programme and recommending a coherent industrial policy to the Member States.
3. SPECIFIC CHARACTER, CONDITIONS	European organization composed of eleven Member States : Belgium, Denmark, Federal Republic of Germany, Spain, France, Ireland, Italy, Netherlands, United Kingdom, Sweden and Switzerland; Austria and Norway are associate members; Canada has observer status. Membership is open to all countries, subject to a Council decision taken unanimously by all the Member States.
4. AREAS COVERED	**4.1. Mandatory activies** 4.1.1. Administration, organization and financial matters 4.1.2. Scientific programme : satellites and other space systems (e.g. ESRO, HEOS, TD-1, COS-B, ISEE-2, IUE, GEOS and EXOSAT). **4.2. Optional programmes** : satellites and other space systems; launching methods and space transportation systems; all other activities approved by the Council (e.g. Ariane, Spacelab, Communications and Earth observation).
5. ECONOMIC IMPACT	ESA and its establishments employ a total of some 1,360 staff. It is estimated that in Europe as a whole, some 20,000 persons, not counting university researchers and civil servants, are employed in the space industry. ESA's activities have repercussions on a great many sectors (telecommunications, meteorology, agriculture, environment, processing of materials and information technologies). The industrial market in space activities in the 1990's is valued at 7 billion dollars per annum (approximately 8 billion ECU).
6. STRUCTURE AND FORM OF COOPERATION	The bodies of ESA consist of the Council, composed of representatives of the Member States, and the Director-General assisted by his staff. 85% of the Agency's resources are devoted to industrial contracts (between 500 and 600 every year), through which the Agency procures the necessary services and hardware for its programmes. Apart from its Paris headquarters, the Agency's main establishments are ESTEC (European Space Research and Technology Centre) located in Noordwijk, the Netherlands, ESOC (European Space Operations Centre) located in Darmstadt, West Germany and ESRIN (European Space Research Institute) located in Frascati, Italy. In addition, several technical teams are located in national establishments to conduct specific programmes.
7. FUNDING GUIDELINES	Contributions by the Member States calculated on the basis of their average national income. **1985 budget : 1.4 billion ECU.** The ESA Council has decided to gradually increase the budget to 1.65 billion ECU over the next five years. Optional programmes are financed by participating Member States.

ESA (contd.)

8. RESULTS AND PROSPECTS	Development of 3 European organizations (see texts on these three organizations): — ARIANE-SPACE (marketing of the ARIANE launcher); — EUMETSTAT (meteorological satellite system); — EUTELSAT (European system of satellite telecommunications). The main satellites in orbit in 1985 were: **1) Scientific programme** — ISEE-2 (exploration of Sun-Earth relations) — IUE (ultraviolet astronomic observations) — EXOSAT (observations of X-ray sources) **2) Applications programme** — OTS-2 and ECS-1&2 (telecommunications) — MARECS-1&2 (maritime telecommunications) — METEOSAT-1&2 (meteorological earth observation) The main projects under development are: **1) Scientific programme** — SPACE TELESCOPE (ESA contribution to the NASA programme) — ULYSSES (exploration of remote space by probe) — HIPPARCOS (space astrometry) — GIOTTO (space probe in the direction of Halley's comet) — ISO (infra-red space observatory) **2) Applications programme** — ECS-4&5 (telecommunications) — OLYMPUS (development of a space platform for direct television) — ERS-1 (esploration of oceans and monitoring of ice) — METEOSAT-P2/LASSO & OPS. PROG. (meteorology) — SPACELAB and SPACELAB FOP (space laboratory) — MICROGRAVITY (study of microgravity) — EURECA (retrievable space platform for carrying instruments) — COLUMBUS (development of a space station) — ARIANE 4 and 5 (new generations of launchers) At its meeting in Rome on 31 January 1985, the ESA Council also took the following decisions: — to participate with the United States in the construction of a manned, orbiting space station; — to approve the COLUMBUS project (laboratory on board a space station); — to develop the Ariane 5 generation of launchers — to carry out studies on the Hermes and Hotol projects (Horizontal take-off and landing). The aim is to design a vehicle capable of taking off, landing and carrying out space flights.
9. POSITION EP	**The European Parliament** *asks the Commission to consider space research activities within the framework of an overall Community policy for science and technology, by establishing relations with the ESA with a view to the coordination of space research programmes with Community projects.* (EP Resolution of 25 April 1979, OJ No. C 127 of 21 May 1979, pp. 42-43). **The European Parliament** *emphasizes the need to promote the evolution of the role of the European Space Agency as the forum for cooperation on space policy, and as the technical body for the pre-commercial research and development phase of scientific and applications programmes.* (EP Resolution of 18 September 1981, OJ No. C 260 of 12 October 1981, pp. 102-104). **The European Parliament** *welcomes the adoption by the ESA of its next ten-year programme on 31 January 1985 in Rome.* (Draft EP Resolution on European Space policy (draft Toksvig Report), PE 95.639/rev. II of 20 August 1985).

Sources:

OJ No. C 127 of 21 May 1979, pp. 42-43
OJ No. C 260 of 12 October 1981, pp. 102-104
Draft Toksvig Report, PE 95.639/rev. II of 20 August 1985.

NEW ESA PROJECTS DECIDED ON 31 JANUARY 1985

COLUMBUS

This is an extension of the SPACELAB and EURECA programmes.

It is a project for a space station which can be used as a manned laboratory. It will be developed and operated jointly by the ESA and NASA. The respective contributions of the two sides are to be clarified in December 1985.

COLUMBUS is unlikely to become operational before 1992.

ARIANE 5

The first stage is to have two propergol motors with a thrust of 500 tonnes each. The main cryotechnical stage is to have a single motor, the HM 60, with a thrust of some 100 tonnes.

ARIANE 5 is to be operational for robot missions towards 1995. It is designed to carry a load of 15 tonnes to low orbits and 8.5 tonnes to geostationary transfer orbits.

Towards 1997, it is planned to use ARIANE 5 to launch a manned space plane, e.g. HERMES.

HERMES

This space plane is to operate at the low orbits, up to 500 km, of future space stations (e.g. COLUMBUS) manned by two to six astronauts and with a maximum load of 4.5 tonnes. It is to be launched for the first time by ARIANE 5 towards 1997.

HERMES will be developed in France by the Centre national d'études spatiales (CNES), with the collaboration of Aérospatiale and Avions Marcel Dassault-Bruguet Aviation.

Eight European countries have said they want to participate (Austria, Belgium, Denmark, Ireland, Italy, Netherlands, Sweden and Switzerland). German participation is being discussed.

Decisions on participation are to be taken in 1985.

The cost of the programme is put at approximately 2,000 million ECU.

Sources

— COLUMBUS Logbook No. 1 - September 1985
— ARIANE - The European Launcher - ESA brochure, 1985
— Le Monde, "Le project d'avion spatial européen. Article by Jean-François AUGERAU, Sunday 20 - Monday 21 October 1985, p. 7.
— Frankfurter Allgemeine Zeitung, Die Bundesrepublik tut sich ... mit Hermes. Article by Günter PAUL, 16 October 198.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

MULTILATERAL/BILATERAL BODIES AND PROGRAMMES IN EUROPE

ARIANEESPACE

1. BASIC LEGAL INSTRUMENT	ARIANEESPACE (private company under French law) Agreement signed between the EUROPEAN SPACE AGENCY and ARIANEESPACE on 15 May 1981
2. OBJECTIVES	Development and production of the European Araine launcher as part of the European Space Agency's activity
3. SPECIFIC CHARACTER, CONDITIONS	Consortium of companies in 11 European countries: shareholders' nationalities and percentages held: French: 59.25%, German: 19.6%, Belgian: 4.4%; Italian: 3.6%, Swiss: 2.7%; Spanish: 2.5%, British: 2.4%, Swedish: 2.4%; Dutch: 2.2%; Danish: 0.7%; Irish: 0.25%
4. AREAS COVERED	Commercial launching of satellites into orbit.
5. ECONOMIC IMPACT	The customers of ARIANEESPACE are found throughout the world: — European Space Agency — Arabsat (Arab League) — Aussat (Australia) — Federal Ministry for Research and Technology (BMFT) and Federal Ministry for Posts and Telecommunications (BMPF) (Federal Republic of Germany) — National Space Research Centre (CNES) and Directorate-General for Telecommunications (DGT) (France) — Embratel (Brazil) — Eutelsat (European Telecommunications' Organization) — GTE Spacenet Corporation (USA) — Inmarsat (International Maritime Communications' Organization) — Intelsat (European Telecommuncations' Organization) — Satellite Business System (USA) — Swedish Space Corporation (Sweden) The total value of firm contracts (34 satellites, of which 10 already launched) is FF 8,200 million (about 1,200 million ECU), 44% of which are with non-European customers; ARIANEESPACE has also obtained 17 options. In 1985, the price of a launch by Ariane 3 is between 25 and 30 million US dollars per satellite (about 32 million ECU).(*) More than 6,000 people are currently working on the Ariane programme, and there should be 10,000 working on it by the end of the decade.
6. STRUCTURE AND FORM OF COOPERATION	ARIANEESPACE is one of the optional programmes of the European Space Agency, which is responsible for its overall management; it is supervised by the CNES (National Space Research Centre) in France. ARIANEESPACE operates as a private company, set up in March 1980 by the 36 main European companies in the space and electronics' sectors, 13 of the larger European banks and the CNES.
7. FUNDING GUIDELINES	The authorized capital is FF 120 million (about 18 million ECU). It is to be raised to FF 270 million (about 40 million ECU). The annual turnover is between FF 2,500 million and FF 3,000 million (about 380 million ECU)(*).
8. RESULTS AND PROSPECTS	Since the first launch in 1979, the Ariane family has grown: it already comprises three versions of the launcher: ARIANE 1, 2 and 3. ARIANE 4 is being developed. On 31 January 1985 a decision was taken to develop the next generation of Ariane launchers - ARIANE 5 - by 1995.
9. POSITION EP	**The European Parliament** considered that the main aim of a Community space policy *should be to take early decisions with a view to ... beginning the ARIANE 4 programme* and *developing a European heavy launcher, as a sequel to the ARIANE programme ... before 1990 ...* Resolution of 18 September 1981, OJ No. C 260 of 12 October 1981. **The European Parliament** *pays tribute to the efforts of all the governments, organizations, enterprises and individuals whose collaboration has played a vital part in European space successes, such as the development and marketing of the ARIANE launcher.* (Rapporteur: Mr TOKSVIG), PE 95.639/Rev. II of 20 August 1985).

Sources:

(*) Conversion to ECU at the Rate prevailing on 30 September 1985.
OJ No. C 260 of 12 October 1981, pp. 102-104
Committee on Energy, Research and Technology (EP), Draft Report on European Space Policy (Rapporteur: Mr TOKSVIG), PE 95.639/rev. II of 20 August 1985.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

MULTILATERAL/BILATERAL BODIES AND PROGRAMMES

EUTELSAT

1. BASIC LEGAL INSTRUMENT	EUTELSAT: European Telecommunications Satellite Organization created by a Convention signed on 15 July 1982 which came into force on 1 September 1985 and is supplemented by an Operating Agreement laying down the technical rules governing the operation of the European satellite system Head Office: Tour Maine-Montparnasse - 33, av. du Maine - 75755 Paris, Cedex 15 - FRANCE Tel. (1) 538.47.47.
2. OBJECTIVES	The main purpose of EUTELSAT is to design, develop, construct, establish, operate and maintain the space sector of the European telecommunications satellite system(s). In this context, EUTELSAT has as its main objective the provision of the space sector required for international public telecommunications services in Europe.
3. SPECIFIC CHARACTER, CONDITIONS	Intergovernmental agency embracing 26 Member States (all the countries of Western Europe plus Yugoslavia). Any European country which is a member of the International Telecommunications Union can apply to join.
4. AREAS COVERED	Operation of the European telecommunications satellite system
5. ECONOMIC IMPACT	The organization itself has a staff of around 150. It permits several million users to benefit from a reliable and modern system of communications. There are numerous practical applications: telephony, television, high-speed data transmission, teleprocessing of texts, facsimile printing of newspapers, teleconferencing and the remote control of unmanned equipment.
6. STRUCTURE AND FORM OF COOPERATION	EUTELSAT's constituent bodies are the Assembly of Parties (Member States), the Board of Signatories (telecommunications bodies or States which have signed the Operating Agreement) assisted by three advisory committees (technical, operational and financial) and the executive organ headed by a Director-General.
7. FUNDING GUIDELINES	Each signatory has an investment share which corresponds to its percentage of the total use made of the space sector by all signatories. Utilization charges are also payable in accordance with the procedures laid down by the Board of Signatories. Revenue in 1985 is likely to total 29.1 million ECU.
8. RESULTS AND PROSPECTS	The first EUTELSAT satellite, ECS-1, was put into orbit in 1983. The second, ECS-2, followed the following year. The launching of ECS-3 in September 1985 was a failure. This setback could be rapidly overcome by launching ECS-4 in 1986. The launching of ECS-5, initially scheduled for 1989, could be brought forward to 1987. A timetable has been drawn up for a second generation of EUTELSAT satellites - EUTELSAT 2. The first of these should be ready for launching in 1989. Preliminary studies into a series to replace EUTELSAT 2 in the 1990s have also been embarked on.

INNOVATION - THE COMMUNITY / EUROPEAN DIMENSION
SPECIFIC MEASURES

MULTILATERAL/BILATERAL BODIES AND PROGRAMMES (in process of ratification)

EUMETSAT

1. BASIC LEGAL0 INSTRUMENT	EUMETSAT Established by a Convention signed on 24 May 1983. In process of ratification. Headquarters: 8-10, rue Mario Nikis, F - 75738 - PARIS CEDEX 15; Tel. (1) 273.75.64
2. OBJECTIVES	To establish, maintain and run operational European meteorological satellite systems, accommodating as far as possible the recommendations of the World Meteorological Organization.
3. SPECIFIC CHARACTER, CONDITIONS	Intergovernmental organization involving the participation of the following countries: Belgium, Denmark, Federal Republic of Germany, France, Greece, Ireland, Italy, Netherlands, Portugal, United Kingdom, Spain, Finland, Norway, Sweden, Switzerland, Turkey.
4. AREAS COVERED	Operation of a European meteorological satellite system comprising a space sector and a land-based sector for the guidance and monitoring of space vehicles and for the central processing of data.
5. ECONOMIC IMPACT	The METEOSAT programme is of benefit to a number of economic sectors: fisheries, water management, agriculture, transport, public works, forecasting of volcanic eruptions and earthquakes. Meteorological data are transmitted to various African and Middle Eastern countries.
6. STRUCTURE AND FORM OF COOPERATION	The bodies of EUMETSAT are: a Council consisting of two representatives from each Member State, and a Director assisted by an international Secretariat.
7. FUNDING GUIDELINES	Pending ratification of the Convention, the EUMETSAT programmes are developed and run by the European Space Agency, and in particular by a small ad hoc group. The overall budget for the first operational programme has been put at 400 million ECU for the period 1983-1985. The cost of the initial system is covered by the annual financial contributions of the Member States and other possible sources of revenue. In accordance with international traditions in the field of meteorology, the use of data obtained by satellites will be free and unrestricted.
8. INITIAL RESULTS	The initial phases of the operational programme - which is the continuation of the pre-operational METEOSAT programme - have been launched within the framework of the European Space Agency. METEOSAT P 2 will be launched in 1986. Three other operational satellites will be launched in 1987 (MO 1), 1988 (MO 2), and 1990 (MO 3). They will be operational until 1995.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

SPECIFIC MULTILATERAL AND BILATERAL PROJECTS

APOLLO

1. BASIC LEGAL INSTRUMENT	APOLLO (Article procurement with local on line ordering) Agreement between the Commission of the European Communities and the European Space Agency of 31 July 1985 (valid for a period of 4 years).
2. OBJECTIVES	Development of an advanced system for the transmission of data by satellite (EUTELSAT ECS satellites).
3. SPECIFIC CHARACTER, CONDITIONS	Pilot project developed by 10 Member States of the European Space Agency (Belgium, Denmark, Federal Republic of Germany, Ireland, Italy, United Kingdom, Spain, Norway, Sweden, Switzerland) in conjunction with the EC Commission's DG XIII (Information Market and Innovation).
4. AREAS COVERED	Rapid transmission of large quantities of data (e.g. digital registration of documents) from a central source to distant users.
5. ECONOMIC IMPACT	The APOLLO programme is an important stage in the development of electronic document transmission systems in Europe. The principal users of the system will be PTT administrations, centres of documentation and the Commission itself.
6. STRUCTURE AND FORM OF COOPERATION	An APOLLO Working Group operates within the Commission and is composed of representatives from the Commission, the European Space Agency, EUTELSAT, and the European Conference on Post and Telecommunications (CEPT).
7. FUNDING GUIDELINES	The European Space Agency's budget for this optional programme is 3.5 million ECU for the period 1985-1989. Each State pays according to the prorata participation of its national industry. The Commission plans to release 2 million ECU in 1985 and 1986, from a 40 million ECU budget, for a Five-Year Community Programme for the development of the specialized information market in Europe.
8. INITIAL RESULTS	The commercial exploitation of APOLLO is planned to begin in 1987.
9. POSITION ESC AND EP	The ESC and EP have generally approved the Commission's proposals on the development of the specialized information market in Europe, without explicitly mentioning the APOLLO project. (Opinion of the ESC and Report of the EP on the Proposal for a Community Programme adopting a Community Programme for the Development of the Specialized Information Market in Europe (OJ No. C 140 of 28 May 1984, pp. 24 to 26) and OJ No. C 117 of 30 April 1984, pp. 9 to 11).

Source: OJ No. C 140 of 28 May 1984, pp. 24 to 26
OJ No. C 117 of 30 April 1984, pp. 9 to 11

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

MULTILATERAL AND BILATERAL BODIES AND PROGRAMMES IN EUROPE

CERN - EUROPEAN LABORATORY FOR PARTICLE PHYSICS

1. BASIC LEGAL INSTRUMENT	CERN(*) EUROPEAN LABORATORY FOR PARTICLE PHYSICS Convention of establishment signed on 1 July 1953; came into force on 29 September 1954. Site of CERN: 110 hectares in Switzerland and 450 hectares in France. Headquarters: Geneva (Switzerland).
2. OBJECTIVES	*The Organization shall provide for collaboration among European States in nuclear research of a pure scientific and fundamental character, and in research essentially related thereto. The Organization shall have no concern with work for military requirements and the results of its experimental and theoretical work shall be published ...* (Extract from the Convention for the establishment of a European Organization for Nuclear Research, Article II - PURPOSES). CERN provides European physicists with facilities for research into particle physics which could not be provided by any member nation on its own. CERN is also the main European centre for basic research into the composition of matter.
3. SPECIFIC CHARACTER, CONDITIONS	Thirteen European countries belong to CERN: Austria, Belgium, Denmark, France, Greece, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom and West Germany. Three countries are observers: Poland, Turkey and Yugoslavia. Member States each pay a contribution based on their net national income.
4. AREAS COVERED	The Convention lays down the following programme of activities: a) the operation of a proton synchrotron (PS) of 28 GeV (came into service in 1959) and a synchro-cyclotron (SC) of 600 MeV (came into service in August 1957); b) the building and operation of intersecting storage rings (ISR) linked to the PS; c) the building and operation of a proton synchrotron of around 300 GeV (which has since become the SPS of 450 GeV) put into service in 1976. These are all particle accelerators providing the high energy particles necessary for experiments; the main parameter of an accelerator is the maximum energy to which it can accelerate beams of particles. This energy is expressed in electron volts (eV), a unit equal to the kinetic energy acquired by a unitary particle of charge under the effect of a difference of potential of 1 volt. On 3 October 1981, the CERN Council unanimously approved the initial phase of the LEP (large electron-positron) collider. The LEP is intended to be the most advanced probe into the heart of matter yet built, and unique in its field. Scientists hope that the results of its explorations will be of considerable importance (for construction cost, see point 7). The LEP takes the form of a ring lodged in a tunnel 27 km long and 38 m in diameter dug at a depth of 50-170 m on either side of the Franco-Swiss frontier. Civil engineering work started in summer 1983. **Programme of experiments** (in progress and in preparation in January 1985): — SPS: 14 in progress, 10 in preparation; — SPS/pp: 4 in progress, 1 in preparation; — PS: 1 in progress plus LEAR (17 experiments); — SC: 9 in progress plus ISOLDE (13 experiments); — for the LEP: 4 experimental facilities in preparation. No. of universities and institutes taking part in the programme of experiments: 195. No. of physicists taking part in the programme: 2,506.
5. ECONOMIC IMPACT (see also 8)	Staff (as at December 1984) 3,550 Established staff (scientists, engineers, technicians, administrators and workmen); 135 fellows 163 Paid scientific associates; 3,287 Scientific associates paid directly by CERN; 73 Trainees and apprentices. 7,208 (some 2,600 physicists from 190 research centres, mostly in CERN Member States; others come on a temporary basis from the USA, the USSR and the People's Republic of China).

(*) Original name: *European Council for Nuclear Research* (1952).

6. STRUCTURE AND FORM OF COOPERATION

CERN is an ideal example of international collaboration in the field of science. The CERN Convention is an open-minded document designed to promote a high degree of collaboration and ensure flexibility in the organization of research.
The Member States run CERN through a Council, a sovereign body meeting twice a year.
Each State has one vote, and decisions are generally taken by a simple majority (by a 2/3 majority in special cases).
The Council is made up of 2 delegates from each Member State, who may be accompanied by advisers. The Council adopts the budget, monitors expenditure and publishes the annual report and accounts.
There are various committees (the Council, scientific directives, finance). The European Committee for Future Accelerators (ECFA) made up of European physicists, is a consultative body and regularly discusses broad guidelines for research. The Inter- regional Committee for Future Accelerators (ICFA) studies major projects for collaboration between the various regions of the world taking part in research into high-energy physics.

7. FUNDING GUIDELINES

1985 Budget: SFR 724.5 million.

Share of each country	(%)	Share of each country	(%)
Austria	2.37	Norway	1.74
Belgium	3.93	Spain	1.31
Denmark	2.09	Sweden	4.04
France	20.60	Switzerland	3.86
Greece	0.40	United Kingdom	16.07
Italy	13.28	West Germany	24.67
Netherlands	5.64		

The estimated cost of building the **LEP** is slightly over SFR 1bn at 1985 values. This sum is drawn as and when needed from the CERN annual budget which (in 1981 Swiss francs) remains constant from 1981 to 1986. The necessary resources are obtained by closing some installations and by progressively cutting down the time spent on using others.

8. INITIAL RESULTS

— main economic effects: innovation, e.g. production of new energy sources, telecommunications satellites, etc.);
— secondary economic effects: purchasing of equipment from industry;
— multiplier effects: those which accompany all public investments that create an additional demand for goods.

A sample of 160 firms out of a total of 519 suppliers of high technology were asked to quantify the economic effects on high- technology industries resulting from their contracts with CERN (period 1973-1987).
This economic usefulness totals SFR 3,107 m (including estimates up to 1987 for a total of sales to CERN of SFR 748 m (1982 prices). It is estimated that between now and 1987 CERN's purchases of high-technology equipment will have led to an economic usefulness total equivalent to around 60% of the total cost of CERN over the same period.
In 1982, some 75% of the increase in turnover sparked off by CERN in industry came from sales in sectors unrelated to particle physics, e.g. the railways, shipbuilding, refrigeration, electricity generation and distribution, and medicine.
CERN is one of the world leaders in high-energy physics. International collaboration is the key to facilitating the chances of understanding between scientists from different countries and from different economic, social and political régimes. CERN stimulates a number of industrial activities, offers scientists and technicians excellent training opportunities, and some training programmes have been stepped up, sometimes on the basis of bilateral agreements with the Member States.

9. POSITION
a) ESC
b) EP

None.
None.

Sources:

(*) Economic usefulness means the sum of increases in turnover and reductions in production costs achieved by firms.
a) CERN, CERN/Doc. 82-4, January 1982.
b) CERN, Social balance sheet, 1983.
c) CERN, Annual report, 1984.
d) CERN, in pictures, CERN/Doc. November 1984.
e) CERN, General information, January 1985.
f) CERN, The LEP.
g) CERN, Economic usefulness of CERN contracts (second study), 1985.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

MULTILATERAL /BILATERAL BODIES AND PROGRAMMES IN EUROPE

SUPERPHENIX - NERSA

1. BASIC LEGAL INSTRUMENT	SUPERPHENIX Fast breeder nuclear power station at Creys-Malville (France). Private company constituted under French law. Agreement signed on 28 December 1973.
2. OBJECTIVES	Commercial exploitation of a nuclear power station with a fast breeder reactor of 1,200 MW for the production of electric energy.
3. SPECIFIC CHARACTER, CONDITIONS	The owner/operator of SUPERPHENIX is the Société Centrale Nucléaire à Neutrons Rapides SA (NERSA), a consortium of three European electricity-generating firms: Electricité de France. (EDF), Ente Nazionale per l'Energia Elettrica (ENEL), Italy, and Schnell-Brüter-Kernkraftwerksgesellschaft mbH. (SBK) - Germany - Belgium - Netherlands - United Kingdom). A capital breakdown gives the following: 51% for EDF 33% for ENEL 16% for SBK.
4. AREAS COVERED	Production of electric energy.
5. ECONOMIC IMPACT	When compared with reactors current in use, fast breeder reactors are much more efficient in their use of fuel, multiplying by a factor of over 50 the energy that can be produced.
6. STRUCTURE AND FORM OF COOPERATION	At an industrial level SUPERPHENIX represents joint efforts by several of the Community's electricity-producing companies in the construction and operation of a large advanced-technology nuclear power station. A special intra-Community industrial structure has also been created to establish this power station.
7. FUNDING GUIDELINES	The cost of the project was put at FF 6,750 million in 1977 (inclusive of initial fuel charge and interim interest). The Community has not contributed to construction costs either directly or indirectly. Nevertheless, the EIB and EURATOM have granted loans to NERSA amounting to a total of 795.8m ECU (386.2m ECU from the EIB and 409.6m ECU from EURATOM).
8. INITIAL RESULTS	SUPERPHENIX could be one of the ways in which the Community might in the long term reduce its energy dependence.
9. POSITION a) ESC b) EP	The Economic and Social Committee and European Parliament have not taken an official stand on SUPERPHENIX.

Sources:

— Nuclear industries in the Community, Indicative nuclear programme (COM(85) 401 final of 23 July 1985)

— Commissariat à l'énergie atomique, "Dixième anniversaire de PHENIX", November 1984

— La Centrale de Creys-Malville - NERSA Edition 1982

— Idem - Extrait des annales des mines - January 1984.

MULTILATERAL AND BILATERAL BODIES AND PROGRAMMES IN EUROPE

AIRBUS INDUSTRY

1. BASIC LEGAL INSTRUMENT	**AIRBUS INDUSTRY** registered as a "groupement d'intérêt économique" under French law under ordonnance 67-821 of 23 September 1967; formally constituted in December 1970. Address: B.P. No. 33 - F-31700 BLAGNAC - Tel. (61) 93.33.33. (BLAGNAC: assembly factory).
2. OBJECTIVES	To strengthen European cooperation in the civil aviation industry so as to compete with the US "giant". To exploit the opportunities offered in one of the fastest-growing industries in the world.
3. SPECIFIC CHARACTER, CONDITIONS	**The members** of AIRBUS are: SNI AEROSPATIALE S.A. (France); DEUTSCHE AIRBUS GmbH (MBB) (West Germany); BRITISH AEROSPACE PLC (United Kingdom); and CONSTRUCCIONES AERONAUTICAS S.A. (Spain). **Associates**: FOKKER N.V. (Netherlands); BELAIRBUS (Belgium) **Subsidiaries**: AEROFORMATION AIRBUS INDUSTRIES OF NORTH AMERICA Inc. In additon, AIRBUS has collaboration agreements with 25 countries throughout the world.
4. AREAS COVERED	Design, manufacture, promotion and sale of transport aircraft: A 320 (144-170 passengers) A 310-200 (210-265 passengers) A 310-300 (210-265 passengers) A 300B4-200 (220-345 passengers) A 300-600 (230-345 passengers)
5. ECONOMIC IMPACT	AIRBUS INDUSTRY and its subsidiaries employ 1301 staff (end 1983) and create jobs for 50,000 skilled workers in several firms in Europe. AIRBUS INDUSTRY has sold more than 420 aircraft worth around £20bn or more than 42bn ECU since the first sale 11 years ago. With its present product line, AIRBUS INDUSTRY has developed a customer base of 53 airlines and has become the biggest supplier of twin-aisle twin-engined commercial aircraft in all geographical sectors except North America. More than 70% of AIRBUS INDUSTRY's twin-aisle twin sales have been for export to countries not belonging to the group.
6. STRUCTURE AND FORM OF COOPERATION	AIRBUS INDUSTRY is totally responsible for management and co- ordination, industrial production and financing. Work distribution among the partners, as sub-contractors, is more or less comparable to their stake in the AIRBUS INDUSTRY as members. The system is sufficiently flexible to allow a different work mix depending on the individual project involved. There are no organic links between AIRBUS INDUSTRY and the governments to members' home countries. An inter-governmental committee has been set up to enable these governments to co-ordinate national measures to support the industries taking part in the programme, but this has no influence on decision-making at AIRBUS INDUSTRY. Externally, AIRBUS INDUSTRY is the only point of contact with the airlines on matters of finance, marketing and product support, including (through its subsidiary AEROFORMATION) training.

AIRBUS INDUSTRY (contd.)

7. FUNDING GUIDELINES	AIRBUS INDUSTRY as such does not have its own budget; this is provided by its members in proportion to their share in the AIRBUS programme: AEROSPATIALE 37.9% DEUTSCHE AIRBUS GmbH 37.9% BRITISH AEROSPACE PLC 20.0% CONSTRUCCIONES AERONAUTICAS 4.2% See also point 5 "Economic Impact"
8. INITIAL RESULTS	Creation of a competitive European civil aviation industry. Development of this in the years ahead through replacement of obsolete aircraft and extension of international market. Face up to world competition.
9. POSITION OF THE ESC THE EP AND THE COMMISSION	**The Economic and Social Committee**: None. **The European Parliament,** *recognizing the significance to the long-term future of the European civil aircraft manufacturing industry, ... acknowledging the contribution to the economy by the creation and safeguarding of jobs and maintaining the development of civil aviation technology in Europe, calls on the Council urgently to discuss the future of the European aircraft industry and to support specifically the development and production of the AIRBUS A 320, which satisfies a real demand in the market place ...* (Resolution on the European AIRBUS industry of 19 January 1984, OJ No. C 46 of 20 February 1984). **The Commission** ... *feels that the AIRBUS venture, while transcending the boundaries of the present Community, is a telling example of successful co-operation at European level in a growth industry. As it has said on more than one occasion, it gives wholehearted support to industries and governments embarking on schemes involving the pooling of resources and the sharing of risks. The Commission is keeping a weather eye on all projects of this kind.* Answer given by Lord Cockfield on behalf of the Commission (25 June 1985) to written question No. 200/85 from Mr Luc Beyer de Ryke (OJ No. C 228 of 9 September 1985).

Sources:

AIRBUS INDUSTRY, Brochure
AIRBUS INDUSTRY, Annual Report 1983
OJ No. C 46 of 20 February 1984
OJ No. C 228 of 9 September 1985
OJ NO C 249 of 1 October 1985.

INNOVATION - THE COMMUNITY/EUROPEAN DIMENSION
SPECIFIC MEASURES

TECHNOLOGICAL COOPERATION BETWEEN EUROPEAN INDUSTRIES IN THE FIELD OF INNOVATION

EUREKA

1. BASIC LEGAL INSTRUMENT	EUREKA - Cooperation between European firms and research institutes in the field of advanced technologies. EUREKA was set up on 17 July 1985 by a conference of Ministers of 17 countries and Members of the Commission of the European Communities. Meeting in Hanover on 5 and 6 November 1985, Ministers of 18 countries and a Member of the Commission of the European Communities approved a declaration of principles relating to EUREKA. The 12 EC Member States are taking part in EUREKA, along with Austria, Finland, Norway, Sweden, Switzerland and Turkey.
2. OBJECTIVES	The objective of EUREKA is to raise, through closer cooperation among enterprises and research institutes in the field of advanced technologies, the productivity and competitiveness of Europe's industries and national economies on the world market, and hence strengthen the basis for lasting prosperity and employment.
3. SPECIFIC CHARACTER, CONDITIONS	The exchange of technologies between European enterprises and institutes is a prerequisite for a high technological standard of European industry. EUREKA projects will encourage and enlarge this exchange. EUREKA projects will satisfy the following criteria: — Compliance with the objectives set out above. — Cooperation between participants (enterprises, research institutes) in more than one European country. — Some identified expected benefit from pursuing the project on a cooperative basis. — The use of advanced technologies. — The aim of securing a significant technological advance in the product, process or service concerned. — Appropriately qualified participants - technically and managerially. — Adequate financial commitment by participating enterprises. EUREKA projects will be prepared by an intensive exchange of information among enterprises, institutes and - where appropriate - potential users. In this context the establishment of industrial fora in certain sectors could help to identify possible EUREKA projects. Governments and the Commission will support the exchange of information so as to inform all interested parties of envisaged projects. EUREKA projects finally will result from the consultations among relevant parties. The enterprises/institutes concerned will carry out the projects in groups chosen by them. Governments of countries of enterprises/institutes participating in an agreed project, and the Commission of the European Communities when appropriate, will establish its compliance with the objectives and criteria laid down for EUREKA. They will then jointly inform the Conference of Ministers through the High Representatives meeting as a group. Such information will include a project description, an analysis of compliance with the objectives and criteria of EUREKA, and an indication of any additional measures involving third parties. Projects requiring such additional measures may be discussed by the High Representatives on the request of any one of them. The procedures will be reviewed in the light of the experience gained. EUREKA projects are not intended as a substitute for existing European technological cooperation, such as programmes sponsored by the European Communities, COST, CERN, ESA projects, bilateral or multilateral cooperative projects, or its further development. Their purpose is instead to extend or supplement it. The European Communities may participate as a partner in EUREKA, e.g. through their own research capacity, research and development programmes and financial facilities.

4. AREAS COVERED	EUREKA will enable Europe to master and exploit the technologies that are important for its future, and to build up its capability in crucial areas, by encouraging and facilitating increased industrial, technological and scientific cooperation on projects directed at developing products, processes and services having a worldwide market potential and based on advanced technologies. EUREKA projects will initially relate primarily to products, processes and services in the following areas of advanced technology: information and telecommunications, robotics, materials, manufacturing, biotechnology, marine technology, lasers, environmental protection and transport technologies. EUREKA will also embrace important advanced technology research and development projects aimed at the creation of the technical prerequisites for a modern infrastructure and the solution of transboundary problems. EUREKA is open to all efficient capacities including those existing in small and medium-sized enterprises as well as in smaller research institutes, in which many of the innovative technological products and processes are initiated. Governments have agreed to launch the following EUREKA-projects(39): 1) European standard for microcomputers for education and domestic use. Partners: United Kingdom, France, Italy. Interest expressed by: Turkey. 2) "Calculateur vectoriel compact". Partners: France, Norway. Interest expressed by: Italy. 3) "Fabrication de silicium amorphe". Partners: France, Germany. 4) "Robot pour le textile". Partners: France, Portugal. Interest expressed by: Spain, Turkey. 5) "Conception et réalisation de membranes filtrantes". Partners: France, Denmark. Interest expressed by: Netherlands. 6) Eurolaser: Evaluation and development of high power laser systems (CO_2, solid state and excimer lasers) for materials processing and production engineering. Partners: Germany, France, Italy, United Kingdom. Interest expressed by: Austria, Switzerland, Spain, Belgium, Greece, Netherlands. 7) Eurotrac: European experiment on transport and transformation of environmentally relevant trace constituents in the troposphere over Europe. Partners: Germany, Austria, Finland, Netherlands, Norway, Commission of the European Communities. Interest expressed by: Italy, Sweden, Denmark, Switzerland, Turkey. 8) European Research Network. Partners: Germany, Austria, Commission of the European Communities, Finland, France, Netherlands, Sweden, Switzerland. Interest expressed by: Italy, Luxembourg, United Kingdom, Ireland, Norway, Portugal, Belgium, Greece, Spain, Turkey. 9) Diagnosis kit for STD (Sexually transmitted diseases) based on monoclonal antibodies. Partners: Spain, United Kingdom. 10) Flexible manufacturing system "all-optronics". Partners: France, Italy. Interest expressed by: Switzerland.

(39) Project titles are in the language selected by the country submitting them.

EUREKA (contd. 2)

5. ECONOMIC IMPACT	Strengthening industrial, technological and scientific cooperation on projects directed at developing products, processes and services having a worldwide market potential and based on advanced technologies. EUREKA projects will serve civilian purposes, and be directed both at private and public sector markets. Make European industries more competitive on the world market and hence strengthen the basis for lasting prosperity and employment. *A symbol of Europe's determination to bring the full effect of its innovative potential to bear in international economic and technological competition.*
6. STRUCTURE AND FORM OF COOPERATION	The parties to a EUREKA project will determine the form of cooperation according to the specific requirements. The parties will likewise be responsible for determining the nature of the project management and for providing their own administrative support. The coordinating body is the EUREKA Conference of Ministers. Its members will be representatives of governments of the participating countries and of the Commission of the European Communities. At the end of each meeting the Conference of Ministers will choose the Chair of the next meeting. The Chair will ensure continuation of the work. It will be the responsibility of the Conference of Ministers to develop further the substance, structures and goals of EUREKA and to assess the results. High Representatives of each of the participating countries and of the Commission of the European Communities will meet when necessary as a group in order to assist the Conference of Ministers in carrying out its tasks and prepare its meetings, including a briefing on projects to be notified to the Conference of Ministers. The Chair of the group will have the same nationality as the Chair of the next Conference of Ministers. The High Representatives, in accordance with national procedures, will make suitable arrangements to — promote the necessary flow of information in their own country; — arrange contacts between enterprises and institutes in countries participating in EUREKA, provide the requisite information and promote the implementation of projects; — inform the other High Representatives and point out sectors, technologies, products or services for which there is a declared interest in cooperation; — provide the other High Representative with information on the preparation of EUREKA projects; — discuss with other High Representatives solutions to any problems and exchange views on project funding. Meetings of the High Representatives concerned may be held to discuss specific projects. A small and flexible EUREKA secretariat or task force under the responsibility of the EUREKA Conference of Ministers will be established to enhance the transparency and efficiency of EUREKA(40). Among its tasks will be: — to collect and to disseminate information, thus offering the services of a clearing house; — to assist enterprises and institutes in establishing contacts with partners for EUREKA projects; — to give support to meetings of the Conference of Ministers and of the High Representatives; — to provide for continuity in the tasks to be performed. The composition of the Secretariat should reflect the participation of EC and non-EC members in EUREKA. The relationship with the European Communities as well as possible support by industry from participating countries should be taken into account.

(40) The High Representatives acting as a group, are requested to discuss ways of setting up such a secretariat by the end of January 1986.

EUREKA (contd. 3)

7. FUNDING GUIDELINES	The enterprises/institutes participating in a EUREKA project will finance the project from their own funds, the capital market and any public funds made available to them. EUREKA will receive suitable support by the governments of the participating countries and by the European Communities.
8. INITIAL RESULTS	The establishment of a large homogeneous, dynamic and outward- looking European economic area is essential to the success of EUREKA. Completion of the internal market means: — elaborating joint industrial standards at an early stage; — eliminating existing technical obstacles to trade; — opening up the system of public procurement. The implementation of the Luxembourg declaration between the European Communities and EFTA countries will also benefit EUREKA. Actions under EUREKA will be carried out in accordance with the principles of international free competition.

Source: Declaration of Principles relating to EUREKA, Hanover, 5/6 November 1985.

GLOSSARY

BRITE	Basic Research in Industrial Technology for Europe
CAP	Common Agriculture Policy
CEDEFOP	European Centre for the Development of Vocational Training
CIT	Consultative Committee on Innovation and Technology Transfer
COMETT	Action Programe of the Community in Education and Training for Technology
COPOL	Confrontation of National Policies
COST	European Cooperation on Scientific and Technical Research
CREST	Scientific and Technical Research Committee
ESPRIT	European Strategic Programme for Research and Development in Information Technologies
ESC	Economic and Social Committee
ETC	European Technology Community
EUREKA	European Research Coordination Agency
EUROBIO	Synthetic seeds, Control and Regulation Systems
FAST	Forecasting and Assessment in the field of Science and Technology
GDP	Gross Domestic Product
GERD	Gross Expenditure on R & D
IRIS	Initiative for Research in Informations applied to Society
JRC	Joint Research Centre
NABS	Nomenclature for the Analysis and Comparison of Science, Programmes and Budget
NIT	New Information Technology
OECD	Organization for Economic Cooperation and Development
RACE	Research and Development in Advanced Communications- technologies for Europe
R, D & D	Research, Development and Demonstration
SME	Small- and Medium-sized Enterprises
S/T	Science and Technology
TRD	Technological Research and Development
UITP	University Industry Training Partnerships

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Catalogue number : CES 86-004-EN

This document concerns the new technologies in the Community and contains three information reports.

The first

— provides information on current Community programmes in the field of technological R & D, and a brief summary of the more important research programmes recently initiated in Europe;

— reviews the progress made in implementing the EC Framework Programme of the scientific and technical activity for 1984-1987;

— analyses the Commission proposal on a European Technological Community.

The second

— demands that scientific and technological knowledge keep fully abreast of developments;

— forecasts the creation of continent-wide demand with a high innovative content, particularly with the end of large-scale projects;

— urges the creation of truly European supply capability.

The third takes as its starting point the basic assumption that the new technologies have, a priori, a neutral impact and that it is only the way in which they are applied and used that gives them positive or negative aspects.

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