

PREM 19/2738

CONFIDENTIAL FILE

Moratorium on Application for  
Support and Innovation

Research and Development

INDUSTRIAL POLICY

[In attached files:  
1989 Review of Gov. Funded Co.]

Pt 1: November 1984

Pt 7: September 1989

Referred to	Date	Referred to	Date	Referred to	Date	Referred to	Date
<del>12/1/89</del>							
<del>28.9.89</del>							
<del>2.10.89</del>							
<del>16.10.89</del>							
<del>20.10.89</del>							
<del>24.10.89</del>							
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PREM. 19/2738

Part 7  
CLOSED

PART 7 ends:-

DTI to Pq 28.12.89

PART 8 begins:-

Pq to Pm 2.1.90

**dti**

the department for Enterprise

The Rt. Hon. Nicholas Ridley MP  
Secretary of State for Trade and Industry

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Private Secretary to the  
Prime Minister  
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Your ref  
Date 28 December 1989

*Dear Paul,*

**ACOST REPORT: OVERCOMING BARRIERS TO GROWTH IN SMALLER FIRMS**

You asked DTI to take the lead in coordinating the Government response to the recommendations of the ACOST Report on Overcoming Barriers to Growth in Smaller Firms, with a view to publishing the Report and the Government Response together.

The Government Response, cleared with other Department, is attached, together with a draft letter for the Prime Minister to send to Sir Francis Tombs.

This long report from ACOST is disappointing, based on anecdote rather than analysis and its recommendations are not, in general, backed by convincing arguments. Hence it has taken rather longer than we expected to coordinate a reply. However, the report addresses a very important area and the Government Response is couched in generally positive terms.

Our view remains that it would have been better to publish this ACOST report separately, to allow some public debate before preparing the Government's formal reply. Until recently this was the normal procedure with ACOST reports, and we would prefer a return to such a procedure for future ACOST reports.

I am copying this letter and attachments to those who received a copy of your letter to me of 16 October.

*Yours ever at hand  
Neil Thornton*

NEIL THORNTON  
Principal Private Secretary



Recycled Paper

DRAFT LETTER FOR THE PRIME MINISTER TO SEND TO  
SIR FRANCIS TOMBS

ACOST Report: Overcoming Barriers to Growth in Smaller Firms

You wrote to me on 17 July enclosing a copy of the report to ACOST on the Barriers to Growth in Smaller Firms.

I now attach the Government's formal response, for publication with the ACOST report as I suggested in my letter to you of 2 October.

Improving the performance of smaller companies is a matter which is being addressed by a wide range of Government policies. I am grateful to ACOST for the work they have carried out on barriers to growth and, as the attached response indicates, we will be taking account of ACOST's recommendations in reviewing and developing our policies in this field.

PRIME MINISTER

MEETING OF E(ST): 14 DECEMBER

You saw over the weekend some of the papers for tomorrow's E(ST) meeting. You will need to reach decisions on how the UK representatives should handle the discussions of the EC R&D framework programme at Friday's Research Council meeting.

The full list of papers is:

- Flag A - Nick Ridley's paper, which you looked at last weekend. The recommendations are summarised in paragraph 13, and you may like to use this paragraph as the agenda for the meeting.
- Flag B - Paper by the Chief Secretary on the public expenditure implications, which again you glanced at last weekend.
- Flag C - A letter from John MacGregor (which you have not seen before) asking for the EuropES base-line to be re-distributed between Departments.
- Flag D - Cabinet Office brief, which you may like to use to steer the discussion.
- Flag E - A new note from George Guise. You saw an earlier note of his last weekend before George had received the latest detail of the Commission's proposals. His revised note now takes these into account.

*PLG.*

PAUL GRAY

13 December 1989

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PRIME MINISTER

P 03593

## EC R&amp;D FRAMEWORK PROGRAMME

Memorandum by the Secretary of State for Trade and Industry

E(ST) (89)3

Memorandum by the Chief Secretary, Treasury

E(ST) (89)4

## DECISIONS

1. The Committee need to decide the negotiating line on the discussion of the EC R&D Framework Programme for 1990-4 due to take place at the Research Council on 15 December.

2. The Commission earlier proposed a total cost of 7.7 becu. E(ST) decided on 2 October that this was unacceptable. The French Presidency are likely to propose a compromise figure. You may wish to begin the discussion by asking Mr Ridley whether there is any more news of the Presidency's proposal. They may wait until the meeting of the Research Council before they put it forward. Mr Ridley thinks they will propose 6.5 becu and recommends agreeing to 5.6 becu or a little more subject to reference back.

3. You may wish to handle the meeting by going through the recommendations in paragraph 13 of Mr Ridley's paper.

a. the technical content of the programme. The main question here is whether the Committee is satisfied that near-market research and unnecessary duplication have been cut out, and that the projects are good value for money.

b. rolling programme. Mr Ridley proposes a commitment to a further rolling programme starting in 1993.

c. phasing of expenditure for 1990-94. This is an important point. A low figure for the second part of the

period should minimise commitments for the future. You may want to discuss what control we will have over the mid-term review of the new programme in 1992.

d. the size of the programme. The main issue is whether you are content with the negotiating brief which Mr Ridley is proposing: a total cost of 5.6 becu, or a little more subject to reference back.

e. the implications for public expenditure. The Chief Secretary wants to leave these for future Surveys.

Frage B

#### BACKGROUND

4. The French Presidency will seek agreement to the third EC R&D Framework programme, covering the period 1990-1994 at the Research Council on Friday 15 December, at the end of this week. This programme would overlap with the second programme, of which 3.1 becu would remain to be committed between 1990 and 1992.

5. The Commission earlier proposed a programme of 7.7 becu. E(ST) decided on 2 October that this was unacceptable. The French Presidency are expected to propose a compromise figure, although perhaps not until the Research Council itself. Mr Ridley's paper says that informal indications from the French are that it will be 6.5 becu.

6. The phasing of the expenditure within 1990-94 is important. We want a declining level in the years 1992-94 to minimise commitments beyond 1994. That is the purpose of the "bell-shaped" profile Mr Ridley proposes.

#### ISSUES

##### Technical content

7. You will want to check that the Committee are satisfied with the technical content of the programme as set out in the Annex.



Some questions are:

- i. Is it clear that near market R&D and unnecessary duplication have been excluded? (first paragraph of annex)
- ii. What would be covered by the reference to aeronautics and the clean car which Mr Ridley hopes to exclude and how likely is exclusion? (Line 2).
- iii. Could there be any duplication with our work on the environment, especially global climate change? (Line 3).
- iv. What agricultural R&D would be included (Line 4)? Mr Gummer was concerned about this last time, given our own cuts in this area.
- v. What is the work on fusion (line 5)?

#### Rolling programme

8. The paper recommends (para 9) that we should accept a further 5-year rolling programme beginning in 1993. It says this will make it easier to argue for lower figures for 1993-4 under the programme now under discussion. It would however commit us to an EC R&D programme up to 1998. You will wish to consider whether to accept this recommendation.

#### The size of the third programme

9. You may wish to split this discussion between 1990-92 and 1993-94:

- a. 1990-92. The Inter-Institutional Agreement (IIA) provided for maximum spending under the new programme in this period of 2.7 becu (in addition to 3.1 becu under the existing programme). Mr Ridley expects the Presidency to propose 2.7. He suggests that the UK should make an opening bid of 2.2, but be prepared to go to 2.5.

- b. 1993-94. Mr Ridley expects the Presidency to propose 3.8 becu. He suggests an opening bid of 2.5-2.7, the exact figure to be decided after talking to the Spanish and Dutch, with willingness to go to 2.9-3.1.

The figures Mr Ridley is prepared to offer for the two periods - namely, 2.5 becu and up to 3.1 becu - total 5.6 becu for the whole programme. He also recommends that if agreement could be clinched at a total figure slightly higher than this Mr Hogg should report back.

#### The mid-term review of the next programme

10. There will be a mid-term review in 1992. Mr Ridley says that the Commission will then argue for higher spending in 1993-94. You may wish to discuss whether we could prevent such an increase and whether we would have an effective power of veto.

#### Timing

11. Mr Ridley does not discuss the timetable for the Community's decision, but assumes that it must be taken at the Research Council on 15 December. You may wish to check that we have to accept this. You may also wish to ask about the consequence of failure to agree, if for example the other member states will not accept a figure of 5.6.

#### Public expenditure

12. The Chief Secretary says that a programme of 5.6 becu would mean a gross contribution from us of £715m. The EUROPE mechanism would lead to offsetting savings in domestic provision of £465m, giving an increase in public expenditure of £250m. Many Ministers will be concerned about having to make such big offsetting savings, but the Chief Secretary proposes that the impact on domestic programmes can be discussed in future Surveys. You will not want to reopen the Survey just concluded and may be prepared to agree with the Chief Secretary's proposal.

13. Mr MacGregor has written to the Chief Secretary asking for a redistribution of the EUROPE baseline before Easter 1990. You may wish to ask the Chief Secretary to comment on this. Redistribution of the baseline would not of course affect the public expenditure total, and the Treasury have briefed the Chief Secretary to agree if necessary to a study by officials led by the Treasury, of the scope for it. But they would prefer to avoid any presumption that there should be such a redistribution.

## HANDLING

14. The Secretary of State for Trade and Industry will wish to introduce his paper. The Chief Secretary, Treasury will wish to comment on the implications for public expenditure, and the Minister of State, Foreign and Commonwealth Office, Mr Waldegrave on those for European policy. Other Ministers with R and D programmes will have an interest and the Chief Scientific Adviser may also wish to comment.

R.T.J.

R T J WILSON  
Cabinet Office  
13 December, 1989

PAUL GRAY

13 December 1989

*cc Bading*

FRAMEWORK

I have now received a later text from the Commission further describing the detailed work. This is attached with some pencil comments.

It is clear that our team have worked hard to cut down Eurowaffle and vague statements. The new text seems designed to pacify UK objections to ill-defined sub-programmes of near market exploitative development. These sub-programmes are now more clearly specified with more detail. Much is made of the setting of standards to operate in the single market. Indeed, words like 'standards', 'pre-competitive' and 'pre-normative' are scattered with abandon on every page. There are even sound sentences such as; 'There will be no financing of product development'.

An about turn in so short a time may reflect well on our negotiators but inevitably leads to the suspicion that a lot of it may be lip service. The underlying attitude in Brussels is that this programme is intended to improve European industry and they recognise little distinction between basic, strategic and development work.

Nevertheless, there is no longer a strong case for delaying agreement at the 5.6 Becu level. The Prime Minister should, however, place a strong onus upon our representatives at the sub-programme level to keep a sharp eye on any use of community funds for feather bedding industry. There will be a natural tendency towards this from the Commission as the previous texts well demonstrate.

*Guise*

GEORGE GUISE

Annex 1 - Commission's latest text.

Annex 2 - Internal Treasury note on Fusion.

FROM: M L WILLIAMS (PE1)  
(4769)

DATE: 11 December 1989

MR MERCER (EC2)

cc. Ms Goodman (PE1)  
**Mr Guise** (No.10)

EC R&D FRAMEWORK PROGRAMME: FUSION

1. I mentioned on Friday that Mr Guise had telephoned me to express his concern about the reference to future work on fusion in the Commission's draft framework programme. It seems to commit us to an extension of JET and further work on its follow-on NET (and possibly on ITER which also involves non-community countries). He suggested that the UK might object, or at least withhold agreement until we have willingness from our partners to contribute to our host country premium or the decommissioning costs of JET which in due course will fall to the UK.

2. I of course share Mr Guise's underlying objectives. And I have discussed these issues at some length with DEn. They point out:

- (i) Within the Commission's 1990-94 programme of 7.7 becu, the energy line is 1.1 becu. Fusion comprises 55-60% of this, which represents a cut compared with its current programme.
- (ii) This provision is likely to be squeezed further, both because a smaller programme will be agreed and because of pressure from our partners for greater expenditure on non-nuclear energy (in particular renewables).

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- (iii) The Commission's latest draft (which I have not seen, and apparently has yet to be translated) has much more helpful language. It apparently speaks of the framework allowing an extension of JET, and it could involve further work on NET, taking account of ITER.
- (iv) The Commission is to evaluate the fusion programme during 1990, and decisions, in which of course we will be involved, on the extension of JET will be taken in the light of that.
- (v) For the time being, we are unable to discuss effectively with our partners the possibility of their making further contributions. Their attitude will of course also depend on our attitude to further work. (DEn believe that it might be worth agreeing to an extension of JET, in order to push NET closer to infinity, but I remain noncommittal.)

3. In the circumstances, this is not an issue on which I would advise the Chief Secretary to intervene. If the Prime Minister does, DEn will have to meet her arguments. You may want to include the following in the Chief Secretary's brief:

"It is possible that the PM might express concern that the proposed programme on fusion expenditure within the framework will commit us to an extension of the JET project, and to working on its successor, NET. We might withhold agreement until our partners have shown willingness to meet a greater proportion of the UK's contribution to the fusion programme. This proposition will be for Mr Wakeham to answer; but, while sharing the underlying objectives / ~~being~~ the question, we doubt the effectiveness of such an attitude: fusion is already under pressure in the Community, the framework programme is being redrafted to avoid new commitments, and no decisions can be made until a review of the fusion programme is completed next year."



M L WILLIAMS

Mr. FAIRLOROUGH

ANNEX 1

EUROPEAN COMMUNITIES

Brussels, 28 November 1989 (DR 12)  
(DR 11)

SCIENTIFIC AND  
TECHNICAL RESEARCH  
COMMITTEE

CREST/1219/89

CREST

*Yves  
Yves  
me talk*

*H. Fay*     *inclusion*

OUTCOME OF CREST'S DISCUSSION OF ANNEX II

*P. Steyer*  
*nb J*

THE ACTIVITIES

The third framework programme of research and technological development (1990-1994) defines objectives for giving an innovatory thrust to Community action during those five years. The specific programmes of the second framework programme (1987-1991) are retained. The third framework programme will be able to bring to them the necessary elements of continuity.

The selection of the broad outlines of the third framework programme meets six major concerns:

- improving industrial competitiveness whilst maintaining the pre-competitive nature of Community activities;
- meeting the challenges linked to the attainment of the large market as regards norms and standards by strengthening prenormative research;
- modifying industrial operators' attitudes in the direction of further transnational initiatives;
- introducing a European dimension into the training of scientific research and technological development staff;
- increasing economic and social cohesion whilst ensuring the scientific and technical excellence of research projects;
- taking into account environmental protection and the quality of life.

The choice of scientific and technical objectives rests inter alia on the principle of Community added value and subsidiarity. In this sense, the criteria laid down for the previous framework programme, set out in Annex III, take on an added significance; they will be taken into account in the evaluation of the different activities.

There will be greater consultation of representative scientific, technical and industrial bodies in the Community.

In industrial programmes, the emphasis will be on pre-competitive research and technological development. The main objective will be to contribute to the technological bases for the development of standards in order to encourage the attainment of the single large market, thus making it possible for industry to invest in the design of products on the basis of common standards. Transfer of technology in order to encourage the use of new technologies will assume particular importance and will include certain demonstration projects with particular reference to use of such standards. There will be no financing of product development.

The principal instrument of the specific programmes remains the shared-cost action, without ruling out the possibility of adjusted rates of support. In those cases where co-ordination of existing research activities at the national level is the predominant aspect, concerted action will be used. The other methods of implementation provided for in the Treaty may be used, in particular to establish or strengthen links with long-term Eureka projects meeting the criteria for Community action.

The Joint Research Centre is to participate in the implementation of the framework programme in those fields where it has the necessary competence. These



are inter alia industrial and materials technologies, research with a preformative character, nuclear safety (fission and fusion), technological forecasting, the environment and industrial risks.

The research, development and innovative capacities of small and medium-sized undertakings, higher education establishments and research centres will be given sustained attention and their partnership activities will be encouraged. Particular attention will be given to promoting the access of small and medium-sized undertakings to Community programmes.

Emphasis will also be placed in the various courses of action on fundamental research geared to any area where it might become necessary.

The Council will define the detailed arrangements for the dissemination of knowledge resulting from the specific programmes and other arrangements for implementing the framework programme. Within this legal framework, dissemination activities will be coherent and co-ordinated, which presupposes on the one hand a central level of management and on the other freedom of action in specific programmes to organize a level of specialized dissemination. In both cases such activities may be carried out through publications or by computerized means according to common standards and protocols.

The activity of dissemination will also cover information on Community programmes and actions to provide easier access to information for small and medium-sized undertakings and private and public research laboratories. To this end, encouragement will be given to the creation or extension of the activities of national and regional "relay" centres for the dissemination and exploitation of results.

As far as the exploitation of results is concerned, although it is clear that in the first place it is the responsibility of undertakings and laboratories, in certain cases it requires Community action, co-ordinated with the operators concerned and the competent public or private organizations in particular at national or regional level (including inter alia the above relay centres), in order to protect certain results and facilitate and guarantee the best possible innovation transfer.

Both for the dissemination of knowledge and for the exploitation of results, it is necessary to specify or define the rules concerning intellectual and industrial property and the exploitation of the results within the Community and to observe them.

In addition to the evaluation activities involved in the various programmes, work on the methodology of evaluation, forecasting and strategic analysis will also continue unabated in co-operation with the Member States with a view to improving the effectiveness of Community research.

In strict accordance with the guiding character given to the framework programme by the Treaty, the following paragraphs make reference to the strategic elements of the 1990-1994 framework programme.

## I. ENABLING TECHNOLOGIES

### 1. Information and Communications Technologies

The development of the relationship between information and communications technologies, the increased requirements of users regarding standardized systems and trans-European services networks to assist in unifying the

European area and the strengthening of scientific and technological bases lead work on information and communications technologies to be directed in three main ways. An essential aim is to achieve open standards making it possible to improve the integration of advanced systems into the networks. In all the areas concerned, the active participation of users and small and medium-sized undertakings and the transfer of technology to their advantage will be encouraged.

#### A. Information Technology

Whilst ensuring that all the work relating to information technology remains focussed in the pre-competitive area, the emphasis will be placed, on the one hand, on demonstration activities for the preparation and validation of standards and for the integration of technologies and, on the other, on basic research, in particular in sectors which have the potential to make a substantial impact on industrial innovation, such as the cognitive sciences. In addition, activities on topics dealt with in the ESPRIT programme will be oriented towards the new generations of technologies. In a general sense, the balances between the various basic areas of technology defined in ESPRIT II (including those for microelectronics) will be respected.

The various activities envisaged may be grouped round four large fundamental topics which contain elements of continuity but also exhibit new facets in comparison with earlier research.

a) Microelectronics

The objective is to contribute, by means of pre-competitive research and technological development work, to the strengthening of the European technological foundation of semiconductors in which to attain a European manufacturing capability for advanced products and the technologies for component processing. This work will also concern application-specific integrated circuits (ASIC), multi-function circuits, very fast circuits, opto-electronics, advanced power circuits (smart power), new equipment and materials for integrated circuits and, in conjunction with other initiatives in the Community such as JESSI, the technologies linked to submicron silicon.

Research into and development of advanced and standardized computer-aided design tools for integrated circuits will also be pursued, particular attention being given to users' needs.

These actions will be organized in such a way as to link users and producers and encourage and ensure broad participation by operators in the Community as a whole, for the benefit of all.

(b) Information processing systems and software

The rapid development of this sector leads research to be directed towards parallel architectures, knowledge-based systems, work stations, hosts and distributed and real time systems. The tools and methods necessary to increase the productivity of the software and the integration of the systems will continue to be developed.

much more  
specific

Emphasis will be placed on the portability of the software, re-usability and design of standardized modules and on prenormative research. Attention will be given to seeing that European industry, in particular SMUs, can adopt standardized software on a large scale and use the best practices in the area of programming tools, methods and environments, taking account of national activities in this area.

(2) Advanced office technology systems and peripherals

The main objective will be to use European technological competence to construct improved forms of architecture, software packages and other system components capable of adding to the value of devices and systems, in particular those based on standards.

The two main themes are research and development concerning the use of software engineering for the development of selective applications based on open standards and the integration of sophisticated information systems and interfaces. Among the fields concerned may be cited information systems adapted to mobile terminals, co-operation work (groupware), house automation and intelligent buildings and integrated data processing systems for business.

In this context, peripherals take on an added importance. The objective of research and development work is to reinforce the scientific and technological bases for new generations of

Does sound  
near market!

peripherals which are reliable, cheap and capable of being produced in large quantities, without going as far as product development. This requires the use not only of basic technologies at the best state-of-the-art level, but also of new generic methods of manufacture. The action will have to lead, for instance, to new in-out arrangements and storage systems.

(d) Computer-integrated manufacturing and application of information technology to industrial engineering

The objective is to provide, by means of pre-competitive research and technological development work, the bases for open, multi-site and multi-vendor systems. The work will cover planning and scheduling systems, production control, computer-assisted engineering systems, robotics and quality-guarantee technologies. The areas concerned are those of discontinuous, continuous and batch manufacture, flexible assembly and mass production. Technology transfer activities will comprise some demonstration projects in which information technologies occupy an important position and which may be launched in real industrial environments enabling standards to be validated and their use to be promoted. These activities will be carried out in close co-ordination with those under heading 2. This action will contribute to better integration in advanced systems of design and computer-assisted production of the needs voiced by industrialists including problems of work integration and organization and job evaluation.

## B. Communications Technologies

The principal objective is to enable the integrated broadband network to take on the emerging new services, constructed on "open" standards, and to make the use of integrated services both flexible and cheaper.

Parallel to the continued development of the integrated broadband network and the strengthening of the research effort on optical communications and techniques of synchronic/asynchronic switching, the new activities will be directed towards the development of intelligent, reliable and secure networks and new value-added services that are both profitable and adapted to the developing needs of users. These actions include a Community R&D effort of the prenormative type in order to guarantee the interoperability of the systems on the basis of common standards and protocols.

Particular attention will be given to the growing demand for mobile telephony services and the integration of these services into networks.

The following actions are planned:

- **Development of intelligent networks**, using new techniques of information transfer, optical communications and possibly artificial intelligence. The objective is to enable second-generation systems to exploit foreseeable progress in data processing. This requires research and technological development work in the fields of standardization and interconnection protocols. This work should take into account the development of a new European regulatory

environment on open architecture (ONP - Open Network Provision)

- **Mobile communications.** The objective is to contribute to definition of the standards necessary for the third-generation system which should appear on a time scale of 1995 and beyond and permit the exploitation of new hyperfrequencies in mobile telecommunications services.

- **Image communication:** building on numerical image transfer (including high-definition television - HDTV), research efforts are needed into processing, storage and display to integrate image into multimedia communications and to ensure the development of allied protocols and coders-decoders.

- **Service engineering:** work of a prenormative type on architectures and software, realized on basic teleservices and on improved value-added services, with particular attention to their ease of use by small and medium-sized undertakings and preparing the scientific and technological bases for development of standards both for systems and for telecommunications services.

- **Experiments in advanced communications.** It will be necessary to identify the characteristics and functions of certain advanced model services. These experiments of a generic kind, in real conditions, will contribute to developing interconnection standards and to verifying the feasibility of integrated communication systems so as to limit the dangers when they are introduced later.



**Security of information.** The objective is to contribute to the development of technologies which can guarantee effective and practical security meeting the requirements of interconnected or integrated communication services used by economic operators and by the general public. Priority research and technological development work is required to contribute to the definition of international standards and verification technologies.

C. Development of telematic systems in areas of general interest

The general objective consists, by means of prenormative research and a limited number of experimental development activities concerning the validation of common functional specifications, in ensuring the interoperability of systems, peripherals and telematic networks at trans-European level. Special attention will be given to consideration of quality, reliability, security and ease of use of services, and to economies of scale and the abolition of barriers to information exchange.

The work will be carried out in areas corresponding both to requirements resulting from the implementation of the large European market and the new increased requirements of a social and economic nature which can both benefit from the use of new telematic resources.

The realization of the large internal market is setting new requirements in the field of information exchange services. In relations between

public administrations, new requirements are being expressed, for instance, in the areas of emergency services, justice, the social services, statistics, customs and the environment. Sectors of general concern are predominated by questions of transport, health, problems relating to the handicapped and aged, problems of training, problems of links between libraries and access to rural areas.

To meet these requirements, beyond the efforts being undertaken within regional or national contexts, an additional Community effort is also needed in research and technological development.

More specifically, some of these sectors have already been explored in the course of exploratory activities (AIM, DELTA, DRIVE) or preliminary activities (investigation of needs in rural areas and libraries). The planned research and technological development actions will be based on the experience and results obtained from these exploratory actions. Endeavours will be made to ensure their continuity so as not to lose the advantage of the community of interest created.

It will only be possible to develop such projects fully outside the framework programme: the setting-up and exploitation of networks and services are not covered by this work.

In each of the above two areas, making services easier to use will require a sustained effort in language research and engineering. Following work already done as part of the EUROTRA programme, it is now necessary to encourage the development of operational systems linked to information and communications systems.

All these actions will involve information and communications industries, telecommunications operators, providers of telecommunications services and pioneer users of advanced communications. In the case of telematic services, the trans-European dimension will be even more necessary for success than elsewhere.

## 2. Industrial and materials technologies

The objective is to contribute to the rejuvenation of European manufacturing industry by strengthening its scientific base through research and development work. With that in mind it is important to encourage:

- basic technical research;
- integration of new technologies by user industries;
- acquisition of the scientific and technical knowledge needed in order to establish standards and codes of good practice facilitating the transfer of such technologies;
- harmonization of methods of measurement and testing.

The advanced technologies required cover the whole life cycle of materials and aim at reducing the "design to product" lead time and improving manufacturing processes. In selecting actions to be implemented, account will be taken of the experience acquired through current programmes and pilot projects (BRITE-EURAM, Raw Materials, Recycling and BCR).

These technological developments will integrate considerations of future market requirements and more severe constraints as regards the environment and working conditions, while at the same time enabling improvements to be made in the competitiveness of European producers and users.

The more it can be guaranteed that technologies will have a human dimension, the more the quality of work and consequently the quality of production will increase. Work will therefore cover research and development concerning the working environment and continuous adaptation of the skills of workers to technological change. New methods of management and organization will be sought in order to ensure a smooth relationship between technology and the working world.

*Sounds like a re-training programme*

Work carried out in any of the three areas described below will be linked to the others and consequently not performed in isolation, but under a systematic approach. Research on new materials will be closely linked to research on the design and manufacturing processes needed to make economic use of the materials and to research prior to defining the standards, allowing the incorporation of such materials into products and ensuring environmental acceptability.

*Sounds like near market work hiding behind the magic phrase "defining the standards".*

The research work proposed will help to consolidate and further technological developments within the Community and make more effective use of resources. A particular effort will be made to help small and medium-sized undertakings become more involved in transnational research, develop links with other undertakings and universities and manage their technical resources better.

Research on measurements and testing is necessary to the application of harmonization of quality standards and testing methods and the acceptance of results throughout the Community. Greater collaboration between laboratories will improve the quality of results and their acceptability as called for by the completion of the Single Market.

This approach concerns both the following areas of activity and their interfaces:

A. Materials - Raw Materials

The objective is to contribute to improving the performances of materials at a cost which permits competitive industrial exploitation over a broad range of applications not restricted to a few high-performance items. The aim will be to promote an integrated approach to the whole life cycle of materials, including recycling.

The activities in question will concern both research on advanced materials for key applications, such as ceramic composites and metallic matrices, which may have important spin-off effects in other areas, and research on traditional materials of broader application, such as are used in the construction industry where improvements to the materials life cycle are needed.

Emphasis will be placed on research enabling innovative uses of materials, metals and industrial minerals, and on their production and processing, including exploration, recovery and recycling.

*longer lasting  
reinforced  
concrete?*

There will also be strong encouragement to undertake basic research and exploit emerging and rapidly-developing technologies.

Particular attention will be paid to research into new materials to improve understanding of their structures and properties, including the production cycle.

#### B. Design and manufacturing

The objective is to reduce the "design to product" lead time and to improve the means, processes and management of design and manufacturing operations, on the basis of the state of the enabling technologies concerned.

Emphasis will be placed, inter alia, on quality, reliability, the control of products and processes, and on the research and technological development work needed for the adaptation of computer-aided design and manufacturing techniques, especially for small and medium-sized undertakings. Care will be taken to ensure close co-ordination of this activity with the enabling aspects of such design and manufacturing techniques covered by heading 1.

The development of the technologies necessary for the modernization of European industry requires a basic research effort, in particular in the areas of physics and chemistry. Similarly, recourse will be had at the same time to enabling disciplines (such as mathematical modelling,

*Sounds good  
but our representatives  
will be hard  
put to have  
the programme  
stop at basic  
research!*

acoustics, fluid dynamics, process engineering ...] and new technological developments (concerning, for example, surface treatment, miniaturization, optomatronics...).

C. Measurement and testing

? The objective is to lead, by means of improved harmonization of methods of testing, measuring and analysis, to the elimination of certain obstacles to trade in the large internal market.

To that end, transnational actions will be undertaken in four main fields: establishing the scientific and technical bases for Community regulations and directives concerning measurements (including exploitation of research results concerning instrumentation), testing and analysis; the resolution of such sectoral testing problems as might arise when an international approach to certification and testing is adopted and implemented; work arising out of a co-ordinated approach to the provision of measuring standards adopted henceforward in the Community; and support for the development of new methods of measurement and new instruments.

The drawing up and implementation of standards and codes of good practice, which are necessary to meet the requirements of the market and which require prenormative research and development work, will be guaranteed by means of the research programmes concerned and are covered by other lines of activity.

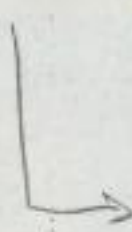
In carrying out the research outlined above, flexibility of means of action will be particularly important. Two notable means of implementing these proposals will be:

1. Technological stimulus and co-operative research action to extend current initiatives, an open arrangement, without any constraints of theme or timetable, will be set up to support particularly innovative technological projects which, at any given time, could not be included in the other actions. This will help in particular to solve technical problems common to groups of SMEs without research facilities of their own.

2. While maintaining the enabling approach followed under this heading, selected integrated projects will be considered in appropriate fields where a range of enabling technologies need to be brought together with a view to providing users with a definition of operational specifications. These projects will have specific targeted objectives, bringing suppliers and users together in a systematic approach and at the same time facilitating the participation of small and medium-sized undertakings. **Product development and commercialization will be a matter for the appropriate industries.**

In view of the needs created by the setting up of the large internal market, the fields to be considered here would include, for instance, transport (which will be the subject of integrated activities concerning, for example, the aeronautical industry, the motor industry and the "clean car"). The logistical aspects of harmonization and

Let us hope  
this is not  
lip service.





standardization of means of transport will also be given special attention in conjunction with the activities under heading 1. Other fields will be likely to benefit from an integrated approach.

In general, all these actions will have to contribute to the emergence of European small and medium-sized undertakings, in particular by encouraging their integration in the technological networks developed at that time.

The Joint Research Centre will contribute to these activities via work on advanced materials which gives priority to the prenormative aspect, the preparation of nuclear and non-nuclear reference materials, the acquisition of reference data and the validation of certain reference techniques.

## II. MANAGEMENT OF NATURAL RESOURCES

### 3. Environment

Here the purpose is to develop the scientific knowledge and technical know-how the Community needs in particular to carry out its role concerning the environment, as spelt out in Title VII of the EEC Treaty.

In this sector, the research activities are directed towards an understanding of the fundamental mechanisms of the environment, identification of pollution sources and assessment of their combined effects on the environment. They will contribute to the preparation of quality standards, safety and technical standards and the working out of

methodologies for environmental, health and economic impact assessment and will also be geared towards the prevention of natural and technological hazards and towards rehabilitation of the environment. In addition to these activities, "horizontal" aspects of the environment will be taken into account in the various courses of action.

**A. Participation in global change programmes**

The objective is to contribute to understanding the processes governing environmental change and to assess the impact of human activities. Community participation will be concentrated on problems which will have an impact on environment policy and in areas where the Community is best placed to ensure European co-ordination in the framework of large international programmes while taking account of national programmes. This participation will contribute to the development of research on natural and human-induced climatic change, the interaction between biogeochemical cycles, atmospheric physics and chemistry, effects on ecosystems, physical, chemical and biological oceanography and climatic processes in general, as well as the depletion of the stratospheric ozone layer.

**B. Technologies and engineering for the environment**

The objective is to promote better environmental quality standards by encouraging technological innovation at the pre-competitive level. The two main lines of research in this field will be environmental monitoring, including remote sensing applications and the development

of techniques and systems to protect and rehabilitate the environment (for example recycling, treatment of toxic wastes, of contaminated soil and of waste water, and clean technology).

#### **C. Marine sciences and technologies**

In the area of marine sciences and technologies, in addition to the MAST pilot programme a special effort will be made on basic know-how (including oceanography), coastal engineering and technologies for the exploration and exploitation of resources whilst respecting the environment.

#### **D. Research on economic and social aspects**

The objective is to improve understanding of the legal, economic, ethical and health aspects of environmental policy and management, and concerns: natural and technological risk assessment, perception and management, the economic evaluation of environmental impacts, the socio-economic impact of the implementation of environmental policies, and the effectiveness and consistency of laws and regulations related to environmental matters.

#### **E. Integrated research projects**

The objective is to co-operate on interdisciplinary research into a limited number of areas of transnational interest. These transnational projects may involve co-ordinated campaigns, extending from observation and experimentation to integrated operations attaching to all aspects of a regional issue and encompassing general

research work on natural and technological risks. Integrated research into modelling will also have to make possible assessment of technological strategies for the environment. There will also be concerted action on the databank.

The JRC will contribute to activities in the environmental field, in particular by prenormative work on atmospheric chemistry and on modelling, by study of the assessment and management of technological risks and by use of experimental ways of assessing such risks. The JRC will make a specific contribution to the application of remote sensing techniques in co-operation with the European Space Agency; in co-operation with the future Environment Agency of the European Community, it will contribute to the development of new instruments and trial techniques, to the harmonization of methods of measurement and to intercalibration.

#### 4. Life sciences and technologies

The long-term strategic objective is to contribute in a selective and integrated way to the development of Europe's potential for understanding and using the properties and structures of living matter.

##### A. Biotechnology

The aim of this research is to reinforce basic biological knowledge as the common and integrated foundation needed for applications in agriculture, industry, health, nutrition and the environment.

*Sounds  
Suspicious!*

All the necessary importance will be attributed to the ethical implications of such work and their relevance to industry. ✓✓

The goals of the BRIDGE programme will be expanded. The priority areas will include protein structure and function, molecular modelling, the structure and function of genes, in particular genome analysis in representative species, the conservation of genetic resources, the expression of genes and controls thereon, cellular regeneration and development, and the reproduction and development of living organisms. Work will also cover animal and plant microbe metabolisms and their essential physiological tracts, the ecological implications of biotechnology, with particular reference to microbe ecology and the environmental behaviour of modified genes and organisms. Communication systems within living matter, in particular immunology, neurobiology and the operation of receptors, will also be studied. ✓

The methods and tests making up the requisite scientific prenormative bases for the preparation of Community rules will be developed.

#### B. Agricultural and agro-industrial research \*

The objective is to contribute to securing a better match between production of land and water-based biological resources and their use by consumers and industry. Within the pre-competitive field, sights should be set on upgrading and diversifying agricultural and silvicultural

\* This whole area really seems to be geared towards commercial exploitation i.e. very much against what UK has done in its own Agricultural R+D. I suspect phrases like "pre-competitive" and "proper protection of the environment" have been put in to pacify the UK.

products, on enhancing the competitiveness of agricultural and agri-food undertakings in line with other Community policies, while contributing to better rural and forestry management and to ensuring proper protection for the environment.

These will involve interdisciplinary projects which make use in particular of the findings of biotechnology and take account of genetic factors, agricultural and sylvicultural engineering, cultivation or breeding techniques, and environment-plant interaction. In particular there will be a project to develop effective remedies for desertification and deforestation. Research in the field of aquaculture and fisheries will be pursued.

Work has already started on some topics in the second framework programme, especially under the ECLAIR programme. Still within the pre-competitive field, they will be supplemented by demonstration projects jointly developed by producers and users to bring the products of research and development closer to their applications.

In the field of industrial uses for agricultural and sylvicultural raw materials, still within the pre-competitive sphere, research must as a matter of priority be directed to innovative processes aimed at industrial exploitability<sup>(1)</sup> of the by-products of food-oriented applications and at developing new, cleaner industrial and energy applications holding out favourable economic prospects.

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(1) In French, "valorisation".

Agri-food research already begun under the second framework programme in particular the FLAIR programme, will be amplified, particularly as regards: definition and satisfaction of nutritional needs, toxicology and food hygiene, new technologies for agri-food processing. Further work in these sectors will take account of ongoing programmes (ECLAIR, FLAIR, agricultural research and fisheries).

When these projects are being implemented, encouragement will be given to the execution of innovative projects by small and medium-sized undertakings.

### C. Biomedical and health research

The chief objective is to contribute to improving the effectiveness of research and development in medicine and health in the Member States, in particular through better re-ordination of their research and development activities, to applying their findings through Community co-operation and to using available resources in common.

The main focus is on new approaches to tackling economically and socially significant diseases (in particular cancer, AIDS, cardio-vascular disease and mental illness), ageing, the problems of the handicapped and the problems of health at the workplace, through harmonized methodological and protocol studies in epidemiological, biological and clinical research. Activities will also cover the analysis of the human genome and will be closely co-ordinated with work done elsewhere on the other

genomes. Ethical, social and legal aspects of implementing the findings of research into the human genome will be carefully assessed

This will be supplemented by pre-competitive research into ways and forms of administering medicines.

Particular attention will be paid to methods of early screening for risk factors, to the development and assessment of prophylactic and therapeutic methods and to the management of health services.

7

D. Life sciences and technologies for developing countries

The objective of this programme is to increase co-operation in the field of tropical agriculture (including fisheries), medicine, health and nutrition between European scientists and scientists from developing countries so as to enable the developing countries to benefit from the scientific knowledge and technological developments available in the Community and to encourage the development of their own research potential and the Member States of the Community to increase their own potential.

All the problems associated with tropical areas (soil, water, forests, energy, environment, agriculture, population, health, nutrition, etc.) will be taken into account.

In tropical agriculture, emphasis will be placed on integrated management of agricultural resources, including aquaculture and forestry, for

Is this not a back door extension of the aid programme?  
What does tropical agriculture have to do with Brussels?



reducing food shortages in regions at risk while conserving the environment with due regard for the human factor. Special attention will be paid to crops which are potential substitutes for those used for producing narcotic drugs.

Tropical medicine research will undertake new initiatives on major health problems, particularly as regards transmissible diseases and health care systems.

## 5. Energy

The main aim of Community action in this area is the development of sound, environmentally-safe energy technologies designed to improve the Community's energy balance at reasonable expense within the large market. This will be pursued in the following three areas.

### A. Fossil and renewable energy sources, energy utilization and conservation

The objective is to contribute to the development of new energy options that are both economically viable and more environmentally safe, including energy-saving technologies, by means of joint activities to assist Member States in this direction. In this connection, increased attention must be paid to work on those energy technologies which, despite their high potential and the fact that they have no adverse effects on the

environment, particularly the climate, cannot be used under satisfactory economic conditions at present as this work cannot yet be fully funded by industry.

Activities will be concentrated in three interconnected areas: energy conservation, renewable sources and reduction of the adverse effect on the environment. As regards energy conservation, account will be taken of the leading role of fossil fuels in the Community's energy supplies. This will include work on improving technologies for economizing energy in all its uses, energy production from fossile sources using advanced technologies, in particular combined cycles, and suitable substitutes for conventional fuels in the transport sector. As regards the environmental impact of producing and using energy, in particular electricity, emphasis will be placed on reducing emissions of gases responsible for the greenhouse effect, including CO<sub>2</sub>. R&D work in the field of renewable energy sources will be stepped up to bring it rapidly up to the level where it can make an optimal contribution to the Community's energy policy.

Research into modelling should also enable technological strategies relating to energy conservation and energy-environment interaction to be assessed.

#### B. Nuclear fission safety

The aim of this action is to continue the common endeavour to support Member States in the fulfilment of their responsibilities for regulating and protecting the environment.

*Better to  
concentrate  
on these  
costs of fossil  
fuels!*

Community action will foster a harmonized approach to safety by bringing together all the parties involved, thus reinforcing the prenormative dimension of research. A new impulse will be given by concentrating research on reactor safety with greater attention to passive technologies, radioactive waste management, decommissioning operations, intervention in a hostile environment, fuel elements, actinides, and control of fissile materials. Radiation protection research will cover radiation from natural and medical sources, a better definition of the risks of low radiation doses and new technologies to assess quickly the radiological consequences of nuclear accidents.

*This is quite consistent with UK decision to retain state ownership of nuclear plant.*

The Joint Research Centre will participate in this action through work in the field of reactor safety, radioactive waste safety and management, the management and safety of fissile materials, nuclear fuel and actinides.

### C. Controlled nuclear fusion

The long-term objective of the Community fusion programme is the joint creation of safe, environmentally sound prototype reactors. The immediate objective is the establishment of the scientific and technological base for the construction of an installation designed to achieve and study the ignition and prolonged combustion of plasma and related technological problems (Next Step). Accordingly, in order to achieve control of plasma in conditions close to those of the Next Step, the Council could decide, in the light of the

original Nov 22 test said prolong JET to 1996!

↳ evaluation, to prolong the JET Joint Undertaking beyond the date currently planned. Work relating to the Next Step and the new systems will be continued taking into account developments in ITER co-operation. Following assessment of ongoing actions, work may include the building of specialized equipment necessary for attaining the objectives of the programme. Some existing fusion devices will be phased out, having completed their experimental programmes. The present keep-in-touch activity with other approaches to controlled thermonuclear fusion, and particularly with inertial confinement, will be continued.

The Joint Research Centre will make its contribution by means of work on installation safety, support for NET and some basic work on materials. This work will be closely co-ordinated with that undertaken in the same fields in associations.

### III. UPGRADING OF INTELLECTUAL RESOURCES

#### 6. Human capital and mobility

The objective is to help increase the human capital in terms of research and technological development which the Member States will be needing in the next ten years and to make optimum use of their scientific and technical infrastructure, paving the way for a genuinely European scientific and technical community. The project should provide Community added value of benefit to all the Member States.

Unlike the preceding headings, which are to be organized in a thematic or sectoral manner, this action will be organized across the board following a bottom-up approach, around two main strands: training and mobility of research staff, and the building-up of networks.

Increased mobility of research staff will enable more of them to spend a significant amount of time during their careers working in high-level scientific and technical establishments in other Community countries.

Projects will be aimed chiefly at training young people embarking on careers in research and technological development (especially at doctoral and post-doctoral level) and may also cover other staff, at times when they need to acquire new specializations, particularly during retraining required to adapt to rapid scientific and technological change, and in exchanges and co-operation schemes which are to be maintained on a permanent basis.

The building-up of an infrastructure of networks under this action is of crucial importance for the achievement of the objectives of the Community's research and technological development policy in consolidating and complementing the structuring effects of thematic programmes.

The networks will bring together both public and private sector laboratories and research teams from the Member States, so that they

can all benefit from the experience acquired by the best amongst them. They will particularly encourage interchange between different disciplines, the grouping together of several techniques and the extension of applications from one area to another.

The networks should extend to all the regions of the countries of the Community, particularly bearing in mind the special needs of peripheral regions and regions that are currently lagging behind. Highly qualified scientific and technical potential will thus be built up in these regions.

The activities being carried out under the SCIENCE plan will be taken further. In addition to twinning between laboratories, encouragement will also be given to projects of the same type involving both industrial and applied fundamental research, grouping together institutions from several countries or bring together national and Community initiatives.

The effects of such action will be increased by developing co-operation between laboratories and teams of research establishments (including the JRC), undertakings and higher-education establishments.

Account must be taken of demographic factors and of the research and training structures peculiar to the various States, to help each of them to acquire the best possible capabilities.

*We must not  
train other  
countries' scientists  
at a discount,  
even if they  
are from the  
Southern EC.*

This will also involve encouraging special access to existing major scientific facilities and fostering consultations when future facilities are being planned.

All these schemes will cover the various branches of technology, the exact and natural sciences, including mathematics and the human and social sciences, which help to strengthen the scientific and technical foundation of European industry and make it internationally competitive. Interfaces between basic science and technological applications will be taken into account.

Care will be taken to see that these activities have due regard to the existing bilateral and multinational co-operation to which the Member States are party, including co-operation in the COST framework.

Care will also be taken to see that they are in keeping with other Community training and research activities.

The scientific, technical and industrial community will be involved in implementing this project, particularly in identifying networks and choosing beneficiaries, with due regard for the guiding principles of the projects and for Community added value.

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*CC PM*

12-35L



1

ELIZABETH HOUSE  
YORK ROAD  
LONDON SE1 7PH  
01-934 9000

Rt Hon Norman Lamont MP  
Chief Secretary to the Treasury  
HM Treasury  
Parliament Street  
LONDON  
SW1P 3AG

12 DEC 1989

*Dear Chief Secretary,*

EC R & D FRAMEWORK PROGRAMME 1990-94

*attached*

In my absence in Brussels, Angela Rumbold will be attending E(ST) on 14 December when this issue will be discussed. But I would like to put on record one point in relation to the financing of EC research and development work.

As the Treasury paper E(ST)(89)4 makes clear, any increase in UK public expenditure will be offset by each Department having to reduce its domestic PES provision to the extent that EC expenditure exceeds its EuroPES baseline. In the case of the DES, that baseline, which was set in 1986 when DES-attributed science was a small component of the Framework programme, is extremely small. Since then the balance of the existing programme has changed, with a shift away from near-market research towards pure science and learning and the DES proportion has increased substantially. The baseline is therefore already inequitable. Any expansion of the Framework programme would thus be particularly adversely at direct expense of DES domestic R & D programmes which I would not wish to sacrifice. The build-up proposed is rapid, and it would not be possible for the Research Councils to achieve so major a shift in their activities; inevitably, research as a whole would suffer if we required them to do so.

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The solution to this is to redistribute the EuroPES baseline between the Departments involved. Ideally we should do so before we agree on the size of the new Framework programme; otherwise we are all in doubt as to the implications for our own programmes. But I recognise that we need to settle a negotiating brief for the European Research Council discussions on 15 December. I would therefore suggest that we should agree at this stage only on the principle that the baseline should be redistributed before Easter 1990, in good time for the next PES round; and that officials should be asked to prepare proposals accordingly.

I am sending copies of this letter to other members of E(ST) and to Sir Robin Butler.

*Yours sincerely*

*John Macgregor*

pp. JOHN MACGREGOR  
(Approved by the Secretary of State  
and signed in his absence)

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RA

PRIME MINISTER

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MEETING OF E(ST): 14 DECEMBER

There is a meeting of E(ST) next Thursday to review the position on the EC R&D framework programme. You may like over the weekend to take a first glance at the papers that have come in late this evening. These are:

Flag A - note by Nick Ridley setting out the proposed negotiating approach for the Research Council meeting on 15 December;

Flag B - paper by the Chief Secretary setting out the potential implications for Departments' domestic expenditure programmes;

Flag C - note from George Guise with his comments on the latest shape of the Commission programme.

Rec.

PAUL GRAY

8 December 1989

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PAUL GRAY

8 December 1989

FRAMEWORK PROGRAMME

I have not yet received the DTI paper (which will be from Ridley, not Hogg) nor the Chief Secretary's comments. However, I have been through the latest detail of the Commission's proposals (attached and marked up).

I understand that the DTI will propose accepting a 5.6 becu programme against the EC's proposed 7.7 becu. The Chief Secretary will not oppose this, providing that the funding is within the existing Europes baseline projections. This will mean a mandatory saving on Departments' domestic R & D programmes of £465 million over the 92/93 to 96/97 period. The Treasury are a lot happier with the way the Framework proposals are now set out, although the roles of Government and shareholder in making industry more competitive are still frequently confused. You will see my detailed comments marked in pencil in the text.

If E(ST) does agree such a programme, and Departments accept this mandatory saving, it is essential that the basic science budget be protected. Savings must come from the remaining near market R & D sponsored by Departments - of which there is still a good deal!

It will be difficult to hold out against this programme, with all eleven States in favour supported by our own DTI and Treasury. The Prime Minister should therefore emphasise that unanimous support is required when setting the level of the overall programme, whereas the constituent sub-programmes are settled by majority agreement. There is, therefore, still some tactical case for holding out against the funding level of the overall programme until the components are more clearly specified to our satisfaction.

*gyc*

GEORGE GUISE

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~~ANNEX~~B

Working Paper concerning  
the proposal for the

**FRAMEWORK PROGRAMME  
OF COMMUNITY ACTIVITIES  
IN THE FIELD OF RESEARCH AND  
TECHNOLOGICAL DEVELOPMENT**

(1990-1994)

Working Paper concerning the Proposal for the  
FRAMEWORK PROGRAMME OF COMMUNITY ACTIVITIES  
IN THE FIELD OF RESEARCH AND TECHNOLOGICAL DEVELOPMENT  
(1990-1994)

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CORRIGENDA - English text

- |       |               |  |
|-------|---------------|--|
| p. 5  | line 17       | "the trade deficit ..." should read "the annual trade deficit ..."   |
| p. 17 | line 1        | Replace "800 million ECU (100 man years) per year on..." by "800 million ECU over 10 years on ..."   |
| p. 17 | lines 2 and 3 | Replace "... of research. These efforts build on recent progress in information and communication technologies. Based on ..." by "... of research. Based on ..." |
| p. 19 | line 3        | Replace "\$" by "ECU"  |
| p. 22 | line 11       | Replace "standardisation" by "harmonisation"   |
|       | 18            | Insert "For these reasons, the total amount for environmental research is to increase significantly in both absolute and relative terms"                         |
|       | 25            | Add "or continental" after "global"  |
| p. 23 | line 22       | Replace "testing" by "measurement"   |
| p. 25 | line 13       | Replace "These sciences are" by "The development of these sciences is"   |
|       | 22            | Insert "Community" between "future" and "performance"  |
| p. 30 | line 21       | "10 to 15 %" should read "15 to 20 %"  |
| p. 34 | line 10       | Insert "is" between "workers" and "under"  |
| p. 36 | line 9        | Insert "Telematic" between "Interest" and "Systems"  |
|       | 15            | "17 %" should read "18 %"  |

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I ENABLING TECHNOLOGIES

1. INFORMATION AND COMMUNICATIONS TECHNOLOGIES

The relatively great importance given to the development of these technologies within the Framework Programme results from the fact that, by considerably increasing human intellectual capabilities, they pervade the whole economy and all aspects of society.

When integrated in complex systems, themselves the subject of new areas of research, these technologies make possible the creation of what can be called an economic and social "nerve system". Their evolution is very fast. Their mastery is essential for the competitiveness and productivity of the economy, for improvement of the quality of life. It requires a "critical mass" of highly skilled manpower drawn from all the economic actors concerned, including SMEs and universities, and substantial levels of finance. These technologies are, in fact a vertical sector which is rapidly becoming of pervasive and horizontal importance in a variety of ways. The Community dimension, with its various aspects of added value, is essential to the mastery of these technologies.

The activities within this domain fall under three sub-lines of action and twelve areas of high priority R&D areas.

At the present stage in the elaboration of the framework programme, and taking into account the margin of flexibility necessary at this stage, the approximate financial breakdown can only be indicated for the three sub-lines. This tentative breakdown leads to the following ranges for each sub-line within the line:

Information technologies	59% to 64%
Communications technologies	21% to 23%
Development of telematic systems in areas of general interest (including linguistic engineering)	16% to 20%



## A. Information Technologies

In this domain, 55% of worldwide R&D expenditures are American, 27% Japanese and only 18% European. The world market in IT products and services is 600 BECU. Information Technologies is already a large sector of European industry, representing 4.4% of European GDP. It is growing fast and will represent 6.7% of GDP by 1993, which is more than any other industrial sector. Moreover two-thirds of Community manufacturing industry and services are dependent on IT for their continued competitiveness. The pace of innovation in the IT sector is continuing at high speed. Three-year product cycles are common. Europe's technology position has improved over the last five years. The rate of the investment expressed in percentage of turnover has doubled and has thus reached the US level (14%) during the same period. European IT industry is also better positioned now in its home market, with its share in computer systems having risen from 35% to 43% in the same period.

In spite of this progress, Europe's IT industry is still relatively weak in particular in certain areas. It constitutes only 16% of world market share in computer systems. The trade deficit for IT exceeded 20 BECU in the recent past.

The only way to combat remaining weaknesses and secure newly acquired competitive positions is to pursue massive collaborative efforts on a European scale into the 1990s.

### 1. Re-orientation of the ESPRIT programme

The ESPRIT Programme will be re-oriented. The re-orientation addresses firstly the new generation of IT technologies. Secondly, it emphasizes the implementation of the concept of open systems leading to systems which permit inter-operability

between multi-vendor systems developed by different manufacturers. And thirdly, it stresses systems engineering in order to match the requirement of producing integrated systems for broad user populations.

Continued emphasis will be put on IT-oriented basic research.

## 2. Microelectronics

Microelectronics is of strategic importance to a growing number of manufacturing industries and services. Integrated circuits are not only used in computers and telecommunications, but now increasingly in the automotive and machine tools industry and in household electronics. The electronics content of a car, for instance, is expected to triple from 5% to 15% by 1995. A HDTV set will contain more integrated circuits than today's personal computer. Europe is lagging behind as a user and even more so as a manufacturer and supplier. Europe's consumption was only 17% of the \$ 51 billion world market for microelectronics in 1988, while the share met by European supply was even lower at 10%. These low levels, and in particular the disparity between supply and demand, are a great concern for the future of European industry as a whole.

*The implication is that Governments should subsidise industry.*

Investment needs are particularly onerous: a 1 ECU investment is required for a turnover of 1 ECU. In this context, close working relationships between semiconductor users and suppliers across the Member States will ensure cross-fertilization. Concerted action will notably be of benefit to the numerous innovative small and medium-sized enterprises who will forge closer links and access to sources of supply in Europe.

The microelectronics activities follow the principle of subsidiarity; they build on the work which has been carried out in ESPRIT, national programmes, and which is planned in the JESSI project in sub-micron silicon technology. They will be organised in such a way as to ensure large participation of the involved actors in

the Community as a whole and to benefit to all of them.

A common effort engaging all actors, users and suppliers, is required to break the critical technological dependence of European industry at large on overseas supply.

### 3. Peripherals

The Community's trade deficit in peripherals amounts to 5 BECU. Simultaneously the contribution of peripherals to hardware costs has grown from 40% in 1980 to 60% now. Japanese and South-East Asian manufacturers produce over 90% of worldwide output of advanced display units. US and Japanese manufacturers also represent 90% of the world production of printers. European dependence is even higher for key components, e.g. the lasers in non-impact printers which are a Japanese monopoly. Disconnected from the sources of supply, European users are constrained to design their systems around components specified elsewhere and without their involvement.

The Community market dimension is required in order to establish sufficient cross-fertilization between producer and user industries.

This area has been inadequately addressed so far in ESPRIT and is now a priority for the future.

The activity will stimulate the technology base towards international competitiveness.

### 4. Software

So far, the market for software is expanding at the exceptional rate of 20% per annum. Software now accounts for 65% of IT systems costs. However, the software industries are beset by two limiting factors. Firstly, there is a shortage of

skilled personnel. Secondly, the increase in the complexity of systems in recent years has led to only a moderate improvement in productivity. In the short term there is no way to overcome the skills shortage. Therefore it is in the first place necessary to improve the productivity, e.g. via portability and re-usability of software, which is modularly designed. Technologically the European industry is not lagging behind US and Japan. However, the issue of increasing software productivity is now at the top of the agenda of the US and Japanese actors. **Whoever is first to solve the issue of software productivity satisfactorily will have a decisive competitive advantage.**

In order to compensate for the advantages enjoyed by the US because of their large homogeneous markets, **the Community level is indispensable for application and standardisation of the tools and methods developed.**

So far ESPRIT and EUREKA have put emphasis on the development of advanced software tools and methods.

A second stage of the Community strategy in the software area is now needed, building on these tools and methods in order to achieve the necessary increase in software and systems design productivity.

##### 5. Application of IT to industrial engineering

The application of IT to industrial engineering will largely determine the competitiveness of manufacturing industries in the 1990s. **For instance, the average mechanical engineering company can currently expect to save 13% of total cost in the five years following installation of state of the art IT equipment.** The total market of IT equipment for industrial automation is expanding rapidly at 15% per annum. Europe already represents a large market, estimated at 28% of the worldwide total in industrial automation. It can rely on a strong engineering background and a skilled labour force. The ESPRIT Review Board, in its

*Standardisation  
and market size  
Yes. Productivity  
improvement should  
be to industry to  
finance however*

*Good, then let  
them install it  
& pay for it.*

independent assessment, has found that European industry is in a strong competitive position in integrated automated systems and complex machine tools, while the US lead in computer-aided design systems and Japan in simple robots and machine tools.

While European industry is in a strong competitive position, the importance of this domain attracts massive R&D investment from Europe competitors so that the effort in this domain must be maintained and reinforced. The main thrust will be to create multi-vendor environments which require a standardisation approach on a Community scale and a cooperation between users and suppliers across Europe.

The activity builds on the results of computer integrated manufacturing obtained in ESPRIT, national programmes and EUREKA. Emphasis will be put on system integration aspects and the pre-standardisation work required for multi-vendor solutions.

Thus, the Community scale will create the momentum, which is indispensable for staying at the technological forefront in a critical domain.

#### B. Communications Technologies

Telecommunications represented a world market of 105 Billion ECU for equipment and 325 billion ECU for services in 1987. It represents 2.5% of the EC GDP. The growth is expected to average 7% p.a. for equipment and 9.5% p.a. for services in the period to 1993, increasing the relative contribution to GDP to 3.6%. Telecommunications will be vital to economic growth in the Community, the strength of its industry on the world markets, the cohesion of the European Community and to realisation of a Community-wide market for services.

The pace of technological development is fast: the technology generation cycle has shortened from over 10 years to less than 5 years and R&D expenditures in the

sector are typically 10% of turnover. Harmonious telecommunications development in Europe depends on collaboration at the R&D stage. The priorities in the proposed Framework Programme identified in 1989 by telecommunications administrations, industries and leading-edge users of advanced communications (IBC Strategic Audit and report Telecom 2000) are linked to the need for harmonised pan-European telematic services and the critical size of R&D effort required.

#### 6. Integrated Broadband Communications

Integrated communication systems using optical and opto-electronic technologies are growing rapidly: in 1988, there was 70% growth in connections of US-users to continent-wide broadband networks. Japan has completed its optical trunk network and is progressively connecting end-users to integrated broadband facilities. These new infrastructures and services reflect the rapid convergence of information processing with voice, data and image communication. Value-added services require the mastery of the technologies that will bring services together. They are the key to competition in new services on a world scale. Consequently, there is a massive R&D effort by Europe's competitors: The R&D investment is over a billion \$US per year, both in the US and in Japan. The cost of developing the next generation of telecommunication systems requires large technological and financial resources: a new public switch requires of the order of 1 billion ECU in R&D investment.

*Yes - provided the purpose is to ensure maximum competition through allowing new entrants access to the system & NOT to have a common European standard which is intended to exclude Japanese & US entrants!*

The critical size of effort can only be realised at European level. Completion of the internal market depends on a concerted European pre-normative R&D effort to ensure the interconnectability of systems, through common standards and protocols, and the integration of advanced services.

In addition to the continued development and consolidation of the technology base, the second phase of the RACE programme will therefore contain a substantial pre-normative R&D effort. This requires selected advanced communications experiments on a European dimension to investigate key technical and service features, involving

the direct participation of the main sector actors and key users.

#### 7. Intelligent network development

Greater intelligence in communications networks could increase operational efficiency by over 50% and give much greater flexibility to meet user needs. The USA and Japan have a lead in this area: Over 1 billion ECU is being invested in intelligent network development in the USA, and in Japan within the context of the new programme launched by the Ministry of Posts and Telecommunications (MPT) in 1988 on the "frontier of telecommunications". Intelligent networks will be crucial for new telematic services which require the interconnection of private and public networks and Local Area Networks, the provision of multi-terminal configurations and the possibility of flexible integration and combination of services.

Standardisation and interoperation protocols are essential for realisation of the single market in Europe. The critical level of effort can only be achieved if network operators, equipment manufacturers, service providers and leading-edge business users cooperate in Community level pre-competitive and pre-normative R&D.

This development requires the introduction of new priority R&D building on previous work in RACE.

#### 8. Mobile communication technologies

It is essential to intensify European pre-normative and pre-competitive R&D to keep abreast of the rapid development in this field. It needs to address the technologies for system interconnectability, common standards, and Pan-European operation. The current fragmentation of the European mobile communication systems carries with it great risks and only concerted Community action can ensure interoperability. The momentum towards the creation of a European mobile telecommunications system by 1991 and the introduction of advanced mobile services in the late 1990s

must be maintained through European-scale collaborative technology and system development.

The market for cellular mobile radio equipment is currently growing at 25% per year and is predicted be worth ECU 1.6 billion in 1992. Europe has the opportunity to be in the forefront of development. With the transition from the analogue technology to digital technology, mobile telecommunications equipment is changing from professional to consumer electronics and opens up a range of innovative services.

This domain was addressed in RACE to a limited extent. It now receives a high priority.

#### 9. Image communications

Both the USA and Japan have major programmes of co-operative development of high quality image communication for entertainment and business use involving regulatory bodies, standardisation bodies, and industry. This is the next step in the evolution of communications. It calls for the concentration of massive intellectual and financial resources and it is vital that Europe cooperates to meet the R&D challenge in this growth sector crucial to the future economic and cultural activities. The economic stakes are very high. The pace of development is very fast, R&D threshold investment is high and standardisation and interoperability are crucial.

The current turnover for European audio-visual services is already about ECU 12 billion per year. With the introduction of HDTV, an equipment market worth about ECU 10 billion per year will exist in Europe in the late 1990s. It is therefore of major importance that European industries are able to meet the demands of these emerging markets and the intensifying international competition.

While EUREKA-95 will address the technological development of HDTV close to the

*Surely industry can cooperate without taxpayers having to finance the R+D!*



market, future developments in image communication need to be the subject of continued strong efforts of a pre-competitive and pre-normative kind.

#### 10. Service engineering

The use of telematic information services is doubling every year in Europe with 40 million service-user combinations (number of users times the number of different services they use) in 1987 and 180 million in 1989. The growth in value-added services is currently near 40% per year and by 2000 as much as 30% of telecommunications revenues could be associated with value-added services. In the USA, over 45 billion ECU was spent on telemarketing services alone in 1988; the investment in value-added service networks was 6 billion ECU. The development challenge is now the engineering of value-added services. New re-usable service functions need to be developed.

Collaboration in pre-normative R&D at European level, involving all actors, is essential for realisation of a single market in telematic services in Europe and to match the efforts of the major US and Japanese organisations in this domain.

This is a new priority reflecting the rapidly growing importance of services in general, the importance of agreed service engineering standards to make services user-friendly and responsive to evolving user, social and market needs.

#### 11. Information security

In telecommunications, the protection of information is of major importance and must be based on sound technologies. The commercial value of information in today's economies is enormous. 10-15% of the cost of information systems is associated with information security. The technical capability to meet needs in a verifiable manner and to contribute to international standardisation are crucial for the acceptance of new services. The US are responding to this challenge with

*Is this US Govt financed?*

major programmes (e.g. NIST<sup>1</sup> US OSI/ISDN Security Programme) aiming at architectures, protocols and semiconductor components. This may result in de facto standardisation and the creation of a new dependency unless there are corresponding efforts and contributions in Europe.

Collaborative European efforts are essential to ensure effective completion of the internal market, in view of common interests across Europe, because of the crucial strategic interests involved, and because of the large size of the technology development effort necessary.

This is a new priority.

### C. Development of telematic systems in areas of general interest

12. Article 130F of the Single European Act underlines the importance of links between Community research and technology development efforts, the establishment of the internal market and the implementation of common policies. Completion of the single market in 1993 will give new freedoms of movement for people, goods, services and capital. These will generate new requirements for public administrations, commerce and industry to exchange and share information and for the emergence of new services. Trans-European service infrastructures will be created.

The service sector already represents over 57 % of the Community GDP. The new key services which must develop rapidly are those provided by public administrations themselves which will require a European dimension, as well as the services of general interest such as transport, health-care, education and training, services related to protection of the environment and services specific to certain regions, in particular rural areas. These have been identified as the priority types

*This falls into the category of Govt financed R+D because Govt is the USA.*

<sup>1</sup> NIST = North-American Institute of Standards and Technology

of services by all the actors involved.

The free circulation of goods and people in the single European market will depend on the intensive use of information technologies by public administrations. They will have a key role to play, for example in areas such as social services, the collection of statistics and public safety. The US is investing 25 billion Dollars in information and communication infrastructures in a 10 year programme to support US administrations in a Federal network serving more than half a million employees : An estimated 10 % of the cost is estimated to be for R&D. In Japan, there are more than 1400 projects directed towards the application of telematics services to meet socio-economic and administrative needs.

Transport services represent more than 6 % of GNP and more than 10 % of family budgets in Europe. Road congestion is estimated to cost 500 billion ECU every year and there are also social costs of accidents and of pollution from vehicle emissions.

Provision of health-care, which takes about 10 % of GDP, is developing rapidly in Europe with a growth rate of 8 % per year. Between 15 and 20 % of the population receive treatment at any time, with associated problems in management, quality of care and funding.

In the education and training sector, 25 billion ECU is spent each year on training services (some 7 % of GDP), but the economically active population has limited access to education and training material. More than 10 million are in some form of training or re-training every year.

Half of the European population lives in rural areas. The areas cover 80 % of the land area of the Community. Special actions must be undertaken to maintain existing jobs and create new ones ( it is estimated that between 5 and 10 million will be needed in the next decade) unless there is to be a further concentration of economic activity in urban centres.

*I doubt if this is all tax payer financed as the language bands are to suppose. The Americans are much more likely to put out a boat which is done by the successful tenderer.*

Environmental pollution is of increasing concern and is no respecter of national boundaries. Many of the environmental problems associated with population and economic growth must be tackled at Community level for action to be effective. Information and communication technologies can play a major role in ensuring harmonisation of data capture, processing, storage, transmission and use in the increasingly complex models of environmental changes. Collaborative pre-normative R&D is essential.

Quite generally, new information and communication technologies can actively contribute in all these domains to ensure that new services emerge, and that they are of high quality for users and of least cost to society.

Co-operation at the level of Community R&D in service engineering, system engineering, in pre-normative work and in experimental demonstrations is essential in order that user needs are met by new services, while providing European industry with opportunities in new markets.

In some domains, there have already been preliminary and exploratory Community actions :

- INSIS and CADDIA to improve communications between administrations,
- TEDIS to develop commercial electronic data exchange,
- AIM, DELTA and DRIVE to adapt information and communication technologies to users' needs in the areas of health-care, education and transport.

The actions to be undertaken in the Framework Programme 1990 to 1994 will build on the results of these actions.

All these R&TD actions will be confronted with the need to respect the linguistic diversity of the Community, to ensure that this is not an obstacle to the development of value-added services. In Japan, the Japan Key Technology Center,

*Yes but why must that be taxpayer financed just because it is "collaborative".*

*[I think pre-normative means the stage before standards can be established because more research is required.]*

?

MITI and PTT spend almost 800 million ECU (100 man-years) per year on this type of research. These efforts build on recent progress in information and communication technologies. Based on the EUROTRA programme on research in linguistics and on automated dictionaries, work in the field of linguistic engineering will aim at producing the tools for overcoming barriers to communication. In this domain, action on a Community scale is indispensable.

## 2. INDUSTRIAL AND MATERIALS TECHNOLOGIES

Manufacturing industry accounts for nearly one third of Community GNP. With a positive trade balance of more than 37 billion ECU in 1987, it employed three quarters of the industrial workforce.

Notable for the marked presence of SMEs (50 % of employees, 96 % of enterprises), the industrial fabric of the Community has been undergoing profound change over the last ten years. Some sectors, such as chemicals, aeronautics or machine tools are highly competitive; others such as automobiles (on which one job in ten in the Community is directly or indirectly dependent) or textiles have recently become competitive. Other highly important sectors, such as construction could improve their competitiveness considerably through developing and introducing new technologies; this requires increased European co-operation, even beyond research and development, hence the need for links with EUREKA.

Programmes such as BRIT/EURAM, BCR, Raw Materials and Recycling have already shown that Community action provides a sound framework to respond to these challenges. It must now take into account the new requirements emerging for prenormative research, and for the development of "clean" production technologies and products. Finally, it will also be necessary to support solutions to technical problems common to a large number of industries, aimed in particular at SMEs, in a similar way to cooperative research schemes already operating in certain Member States.

*In Britain the competitive areas, like chemicals, are the ones which didn't get Govt R+D money!*

*This suggests that they think of the industry financed Eureka programme as appropriate only after R+D stage is spent.*

The following activities constitute a coherent and integrated whole, for example, the area of design has a direct bearing on both materials and manufacturing and can not be considered in isolation.

Taking the above into account, the total resources allocated to industrial research are appreciably increased in real terms. Community financing of integrated projects should represent between 25 and 30 % of the envelope foreseen. Work on materials, design and manufacturing, for their part, should require between 52 and 60 %. Finally the remaining part, i.e. between 15 and 18 %, should be allocated to work on measurement and test.

### 13. Integrated projects

As Europe's competitors have shown, the competitiveness of manufacturing industry depends above all upon its ability to integrate new technologies into its design and production processes. On a European level, such a systems approach could be promoted by "integrated projects" where users and suppliers agree on a common objective (e.g. the "clean car"), define the necessary enabling technologies and agree on the precise role of industry, governments and the Community.

Such projects could help to reduce the "application gap" between research and products by acting as technology demonstrators. Projects associating users and suppliers of new technologies necessary for pursuing common objectives can be identified in close contact with the Community's industrial sectors, such as the automobile, aeronautics or textile and clothing industries.

This action will add a new dimension to previous work supported under BRITE/EURAM and ESPRIT, for example.

*Govt's role is to regulate and be the catalyst for getting industry together but not to finance commercial research & development!*

#### 14. Materials

The world market for advanced materials in the next century is estimated to be some \$100 billion per year. Present trends suggest a market share for Europe of only about 10 %.

For certain materials (in particular plastics-based) the position is better with 30% of world production. However, there are weak points such as high performance composites (only 25% of the triad's production) and carbon fibres (10% of world production).

As a user of mineral products the Community consumes some 35% of world output compared with 25% for the US and 15% for Japan. Economic exploitation and recycling have to take into account not just needs but also growing environmental concerns.

✓✓  
New materials can only be successfully developed and exploited with the full cooperation of researchers, suppliers and potential users. The preparation of standards for materials characterisation and performance will be of particular importance. Coordination and collaboration at a European level is essential to achieve the required critical mass of activities.

These activities go beyond those carried out in BRITE/EURAM and RAW MATERIALS AND RECYCLING (1990-1992).

These activities and those in the JRC will be guided in a coherent manner. The JRC will concentrate on advanced materials (notably engineering ceramics and functional materials) and particularly explore the prenormative dimension. ??

~~~~~

15. Design

*They clearly mean design of a manufacturing process rather than a finished product.*

The effectiveness of production processes is critically dependent on good design. Better practice in design must include materials selection and design rules for manufacturing assembly, reliability and maintenance. For example, maintenance costs vary considerably from industry to industry, averaging some 3.5 to 5% of turnover. Significant savings could be obtained at the design stage.

Such problems are common to manufacturing industry across the Community and their solution depends on collaboration between experienced researchers from different sectors.

These activities extend work beyond BRITE/EURAM, in particular by a greater emphasis on integrating maintenance and manufacturing efficiency.

16. Manufacturing

The effective management of manufacturing operations, including process control and product quality, has long been a weakness in European industry. In particular,

SMEs in less advanced sectors have problems in adopting new technologies such as CAD/CAM, for which the annual overall growth in Europe is some 35%.

As the Single Market approaches, users of technology will increasingly look to organisations in other Member States to supply their needs. Likewise, technology producers will go ever further afield for their markets. There is, thus, an obvious need for activity at the Community level to help increase both technology supply and demand by bringing together both users and producers.

This activity supplements BRITE/EURAM actions by extending access to a larger population of SMEs in manufacturing industry.



17. Measurement and testing

To complete the European internal market, the formulation and implementation of common norms, standards and codes of practice are essential. These must be based on a sound and objective science and technology base. The cost of measurement and testing activities is, however, far from insignificant - of the order of 10% of the GNP of industrialized countries. As an example, there are around 100 million chemical analyses per day performed in the Community. Community action is concentrated on improving the efficiency of these activities, by putting in place common facilities and eliminating duplication of effort at the Community level.

*If this is a cost of regulation or standard setting OK. But not if it is industry's cost of meeting the standard.*

Community RTD activities in this area serve, amongst others, the EC's industrial, agricultural, environmental and internal market policies. In addition, scientific and technological cohesion will be reinforced by making uniform test and measurement procedures widely accepted and available to SMEs from all Community regions.

These activities will represent an important expansion of work already underway in the BCR programme and will provide a more positive response to the standardisation and regulatory needs of the Community.

Work at the JRC will include the preparation of nuclear and non-nuclear reference materials, the acquisition of reference data as well as the putting into place of reference techniques, notably on the reliability of large structures and the testing of photovoltaic systems.

II **MANAGEMENT OF NATURAL RESOURCES**3 **ENVIRONMENT**

Of growing concern to governments and people in all countries is the environmental dimension. This has to be taken into account in all aspects of human activity and

cannot be kept within borders. In the third framework programme, it is doubly important : as a horizontal aspect of most of the activities foreseen (such as work on clean production processes and products) and as specific activities covering at one and the same time the basic knowledge necessary to understand the problems and the development of the technologies required to act in an appropriate fashion (prevention, monitoring and rehabilitation). This specific activity must also include the rational exploration and exploitation of marine resources.

?  
The socio-economic aspects are important. The European market in environmental protection was estimated in 1987 at 40 billion ECU and it must increase significantly over the next few years, in particular under the increasing effect of Community standardisation and the opening of the large market in 1993.

✓  
The development of the European R&D environmental capacity moreover responds to the need for creating a solid scientific and technological base for putting into place a common set of regulations. This community R&D action, called for by the new provisions of Title VII of the Treaty, will allow a response to the problems which are posed more and more at a European level and the development of a common approach across the international scene.

Between 60 and 70 % of Community resources allocated to environmental research should benefit work on global issues, environmental technologies and engineering, and socio-economic impacts; these activities will be brought together through large integrated projects, to which between 30 and 40 % of the envelope foreseen for the environment action should be allocated.

#### 18. Global Environmental Issues

Over the last few years, it has become clear that some environmental issues have a global dimension and must be approached in a comprehensive way. These include : the greenhouse effect, ozone depletion, acid rain, deforestation,

desertification, etc. The complexity and interdisciplinarity of these problems require co-operation at Community level to preserve the environment in a manner compatible with a sustainable and competitive development of Europe.

Many of the issues are dealt with in the current programmes but sometimes at a sub-critical level. The new activities represent a quantum jump which will allow the global approach demanded by the complexity and size of the problems.

The JRC will contribute to this area notably in its prenormative aspects, with work on atmospheric chemistry, modelling and the application of remote sensing.

*Are we getting too many Global environmental programmes without enough cross coordination?*

#### 19. Environmental Technologies and Engineering

The competitiveness of European industry in this quickly expanding market has to be reinforced by the development of new tools for environmental monitoring and technologies for pollution control, environmental protection and rehabilitation.

The Community dimension of these activities is not only required by the characteristics of the problems, as mentioned above, but also to ensure coherence between the development of science and technology and of European norms and standards. In particular, these research activities will provide necessary support for the European Environmental Agency.

Current programmes allow only a small effort, because of their budgetary limitations. This effort needs to be increased in the new activities.

The JRC will contribute to this action in particular through the support that it gives to the European Environmental Agency (harmonisation of test methodologies, intercalibration, the development of new instruments and of new testing techniques).

20. Large Integrated Projects

The solution of major environmental problems requires large integrated projects pursuing common objectives and dealing not only with scientific, but also with the socio-economic aspects.

The issues addressed by these projects are typically of a transnational nature, or relate to the EC environmental policy and the achievement of the internal market.

In the period 1990-94, large integrated projects will be developed, capitalising on the networking experience gained under the current environmental programmes. They will particularly address desertification of the mediterranean basin, the pollution of Community coastal zones and on the quality of water in streams and rivers.

The JRC will be associated with the actions mainly by application of remote sensing methodologies.

21. Social and Economic Aspects

It is essential for the Community to assess the risks associated with natural or man-made hazards, to evaluate the economic impact of environmental change, the loss of "global commons" and of environmental rehabilitation, and to assess the socio-economic impact of environmental policies.

The growing integration of European economies and the transfrontier character of many environmental problems and hazards require a joint approach at Community-level, specially since problems to be treated in this area will require not only scientific but also political consensus.

This research is insufficiently covered in current environmental programmes.

How can they make this statement without stating what the research is and what the other programmes are?

The JRC contribution will include work on risk assessment and management as well as the exploitation of experimental facilities for evaluating and controlling such risks.

#### 4 LIFE SCIENCES AND TECHNOLOGIES

Progress in understanding the complex mechanisms of living systems creates new opportunities in linking scientific progress to basic, worldwide needs : food, health and a sustainable relationship between man and the biosphere. Moreover the world is now facing the imminent doubling of its population and, even in the industrialised countries, over 40% of manufacturing output is biological in nature or origin.

Europe has been the cradle of the life sciences, but has no monopoly of the resulting worldwide knowledge base; a base underpinning sectors and services now amounting to over 500 billion ECU in added value. These sciences are therefore crucial both for the high technology suppliers and for the primary producers whose access to world markets also depends on the achievement of quality and cost competitiveness.

Community research activities, coordinated with European actions and national programmes, are essential to enable the diverse but dispersed capabilities of Europe's laboratories to provide a base to her bio-industries in terms of knowledge, know-how and trained human resources. This needs transnational cooperation covering support for current economic and social needs, and fundamental research to underpin future performance. Social and ethical aspects related to public acceptance and regulatory regimes must be studied alongside scientific and technological developments.

The financial envelope foreseen for the fourth action should be shared primarily between basic biotechnology (18 to 22 %) and agricultural and agroindustrial

research (48 to 52 %), the remaining part being distributed equally between biomedical and health research (13-17 %), and life sciences and technologies for developing countries (13-17 %).

## 22. Basic Biotechnology

1987 forecasts for new biotechnology's penetration of world markets range from 1.3, 3.3 and 6.3% for depollution, agriculture and chemistry to 18, 20 and 50% for pharmaceuticals, agro-food and the equipment/instrumentation sectors. The market for new biotechnology is expected to increase by 25 % every year, climbing from 2.5 billion ECU in 1985 to 66.1 billion ECU in 2000. Mastering basic biotechnology will be a critical determinant of relative competitive strength in some of the world's largest economic sectors: pharmaceuticals (160 bn ECU in the mid-90s) health care (8-11 % of GNP in developed countries) and agro-food (more than 310 bn ECU of Community Production in 1987). By pooling its resources, Europe still has a chance to contradict the forecast from the Office of Technology Assessment in the US that "Japan will be the most serious competitor of the US in biotechnology". The importance of biotechnology is not only expressed through its economic importance, but also through the incidence (risks and benefits) which it will have upon our environment and the quality of life.

Community action is required where complementary competences are dispersed throughout the Community (e.g. for the detailed understanding of the nature, transformation and control of information in biological systems, neurobiology, immunology), where efforts are needed beyond the capacities of individual Member States (e.g. gene mapping and genome sequencing in representative species, transnational infrastructure projects and concertation with other strategic areas and Member States), where the pooling of methods and data is a prerequisite to sectoral activities which concern the Community as a whole (e.g. pre-normative research, key aspects of nutrition, new testing procedures including the assessment of the quality, safety and efficacy of biologically active compounds).

"Pooling resources" could equally mean removing the competitive edge from individual business like ICI & Glaxo who have stayed ahead precisely because they fastidiously carried out & financed their own research!

This thinking is muddled. Gene mapping is basic science. Quality & safety assessment & control is part of regulation i.e. Govt R+D for its own purposes. Meeting the requirements is industry's job to do & finance itself.

Some of these actions are new developments of specific projects initiated in the second Framework Programme. However, in the majority of cases (study and control of essential biological systems, genome analysis in representative species of animals and cultivated plants, immunology, neurobiology, nutrition) they constitute a clear innovation in response to a need.

### 23. Agricultural and agroindustrial research

Europe's agriculture, food production, forestry and fisheries concern 325 million consumers spending 25% of their annual income on food and a workforce of 27.5 million. The total Gross Added Value of these areas is 105 billion ECU for the Community. **The non-food uses of agricultural products** (e.g. of starch, sugar, cotton, flax, tobacco and ethanol) are still modest in relation to the total output of Community agriculture. However the non-food area is gaining in importance. There is a world-wide trend towards more market driven agriculture, which necessitates

its adaptation to markets evolving towards the requirements of a growing range of **non-food industries**. **Biotechnology can provide new tools to achieve these ends.**

Production of fish and shellfish from aquaculture now represents more than 10 % of the total Community production by weight (fisheries + aquaculture) and possibly as much as 20 % by value.

A Community Research and Development approach in these areas is necessary for several reasons, namely to link the research and industrial applications with the evolution of agriculture and fisheries; to ensure a Community-wide spread of the benefits, especially for SME's and coastal and rural areas; to derive harmonized European guidelines for this sector; to benefit the environment; and to contribute **to knowledge transfer between different countries (cohesion) and disciplines.**

*I hope this doesn't mean forcing those companies & countries which have done the industrial R+D in order to be competitive to share their secrets with those who have not. The EC could become an enormous ADAS with forced subsidies and endless "striped tomatoes" type projects.*

*Pure plea for near market development.*

*Excellent, then let industry develop them, & make money.*

Some of these topics have been initiated in the 2nd Framework Programme but on a limited scale (ECLAIR, FLAIR, Wood, Biomass, Agricultural and Fisheries Research). They will be completed by new R&D areas dealing with demonstration activities for new crop species, remedies for desertification, cleaner energy sources, and biodegradable products.

#### 24. Biomedical and Health research

The social and economic importance of health and health care is clear : 325 million europeans wish to maintain or improve their state of health by way of scientific advances. Furthermore, the annual expenditure on health in the Community is 280 billion ECU of which only 1 % concerns research (nearly 3 billion ECU against 6 billion in the US) which moreover itself is still too fragmented. The role of the Community is to maximize the scientific and economic effectiveness of this investment, mainly through the mechanism of concerted actions; these ensure cross-fertilization of experience and of new ideas, and enable a critical mass to be quickly established, notably in areas such as epidemiology where the availability of a large amount of data, necessary for the construction of an adequate statistical base, is a critical factor.

Beyond the pursuit and reinforcement of the venture aimed at preventing and treating serious illnesses with great social impact (Cancer; AIDS) it is planned, by an appropriate Community activity, to put into place a true European medical space. Such an ambition notably requires harmonisation of clinical protocols, standardisation of medical records and of clinical analysis methods. In this framework, particular attention must be paid to the development of common protocols for clinical pharmacology and testing before and after the launch of new drugs on the single european market.

These activities, by building on the networking experience gained by concerted actions, will be directed through close collaboration with the relevant scientific



associations.

25. Life Sciences and Technologies for Developing Countries

Despite the considerable progress of science and technology which has led to an increase in life expectancy and to agricultural surpluses in industrial countries, one billion people (i.e. 20% of the world population) suffer from disease and/or malnutrition (WHO report 1988). This situation, which continues to deteriorate, occurs principally in developing countries.

In solidarity with these countries Europe has always considered it a political priority to provide assistance in tackling these problems, particularly those affecting human life. One way of taking up the challenge and reversing this deteriorating situation would be to enable developing countries to benefit from the scientific know-how and technological developments available in Europe by transfer and adaptation to the conditions prevailing in those countries. Another concurrent approach would be to promote the development of their own research capacity. Both these objectives can be met by increasing cooperation between scientists in these countries and those in Europe.

✓  
Not via free handouts from UK & Germany to Greece & Portugal!

All of the Community's member countries are involved already at various levels in these activities, either directly through bilateral scientific cooperation (mainly those which have a "tropical tradition"), or indirectly by participating in international initiatives. Better coordination of the different national initiatives, which is feasible at Community level, would, through the greater synergy thus created, result in greater effectiveness both in terms of the scientific results obtained and their impact on development. Consequently research activities could be carried out on a sufficiently large scale to achieve significant advances at the international level.

These R&D activities constitute a continuation and expansion of efforts initiated in agricultural and medical research with the first and second STD programmes, but

take more account of problems associated with degradation of the environment (soils, water, forests), a basic factor in the development of agriculture.

## 5. ENERGY

Two main problems have surfaced during the past decades in this vital area : Europe's dependence on imports (45 %) and the damage to the environment due to energy production and consumption. To assure and improve European competitiveness, the challenge is thus two-fold : **improving supply security and developing economically viable "clean" energy technologies.** In order to optimise the production of energy and its use whilst limiting to a maximum the environmental impact, it is necessary to deploy a panoply of production techniques and to establish a suitable framework for their combined use. In consequence, the Community technological options address various aspects of energy production and use. Their rationale is different for different technologies : for non-nuclear energies, European norms and a common approach as to their impact on the environment; the **development of a common approach to nuclear fission safety; and pooling of resources for fusion development.**

*Safety is OK and  
the R+D a proper  
cost for Government*

It is proposed to maintain a constant level of support for energy research in real terms; in effect, it concerns a sector where the principle of subsidiarity must be fully applied; much of the research is already performed at national level, both public and private. Community resources allocated to fossil and renewable energies and use of energy should represent from 10 to 15 % of the envelope foreseen for the fifth action, 23-27 % being allocated to nuclear fission safety.

*General support for  
fusion has always  
been accepted.*

*However in view  
of recent decisions on  
JET (where our partners don't  
want to know about the vast  
escalation in decommissioning costs!)*

*these figures seem both arbitrary & huge. It is  
by no means certain that the fusion reactor of the  
future will be a TOKAMAK system like JET. There may be  
development of a quite different kind.*

← **Thermonuclear fusion research, in view of the scale of the programme envisaged, should draw on 55 to 60 % of the amounts envisaged for the whole of energy research.**

26. Fossil and renewable energy sources and energy use

Fossil fuels will still cover about 80 % of the EC primary energy balance in 2010. Their efficient use remains an economic and environmental objective, notably due to the role they play in CO<sub>2</sub> emissions. These will have to be reduced, notably in the industrialized countries. In this context, the role of renewable energies must be reinforced.

It is necessary, therefore : firstly, to intensify particularly the conservation of energy in the various sectors : industry (36 % of community needs), transport (25 %) and residential and commercial (39 %) (objective 1995 : an improvement in final energy intensity of 20 %) secondly, to reduce the emission of CO<sub>2</sub> from fossil sources by improvement of power station efficiency (combined cycles), substitution by natural gas, the use of the hydrogen vector, trapping of CO<sub>2</sub>, development of the "Zero Emission Power" concept, etc.; thirdly, by increasing the contribution of renewable energy sources to the energy supply (potential : 15 % - 20 % penetration in 2010 - 2020).

R&D, co-ordinated at the European level, is essential in each case. It must be adjusted to take account of the degree of maturity of each technology and supported by promotional activities and the removal of institutional obstacles to the adoption of the new technologies. Modelling activities must be reinforced in order to integrate all these considerations.

New activities should supplement actions already underway, essentially through the launch of coherent and diverse projects aimed at reducing CO<sub>2</sub> emission.

27. Nuclear Fission Safety

✓ Research on safety and risk remains a prime responsibility of the Community in view of its implications for all its Member States.

Good objectives  
and they can be  
achieved via  
regulation with  
industry doing the  
work (either singly  
or collaboratively) to  
satisfy regulation!

Nuclear fission currently accounts for almost 35 % of all electricity generation. This development has allowed for a significant reduction of energy imports. The development of nuclear fission, however, is not only interwoven with energy policy, but also with environmental and safety policies. Therefore, it is essential to stimulate the further common development of objectives and criteria for an internationally accepted nuclear safety logic. Furthermore, the Community has a unique role to play in this respect.

Moreover, the improvement of nuclear fission safety, which encompasses protection of workers, the public and the environment against radiation is a public service which requires a pooling of resources; such a pooling implies a Community intervention. Community R&D focusses for its part on prenormative issues, thereby ensuring transparency and objectivity for decision making at national authority and industrial level. Finally, Community work in this area maintains the link at technical and scientific level between the Member States which are pursuing the development of this form of energy and those which have not chosen this energy option.

The emerging new priorities in safety research (i.e. new safety criteria and norms for reactors and the fuel cycle) will be transposed to the new activities; on the other hand, radiation protection research should be extended to include natural and medical sources and should emphasise new technologies to assess quickly the radiological consequences of nuclear accidents.

The JRC, in view of its competences, should contribute with work consistent with the new priorities in the areas of reactor safety, radioactive waste management, safeguarding, management of fissile materials and nuclear fuels and actinides research; in all these areas, the prenormative character of the work should be reinforced.

28. Controlled Thermonuclear Fusion

Fusion has the potential to be a major environmentally acceptable source of electricity in mid next century. Its primary fuels are abundant in Europe. The Community has the world's leading Fusion Programme, which, by bringing together European research centres and firms to build large integrated high technology projects, has already given European industry a competitive edge in international fusion research. Furthermore, as a common approach will generate common standards for fusion reactors, European industry will be well-placed to exploit the world market for such power stations.

*This is 'pie in the  
sky'! We are <sup>many</sup> decades  
away from this!*

All European fusion research (including Sweden and Switzerland) is integrated into the one Community Programme; it is executed principally through a network of Associations, JET, NET and the JRC, and it has, as its long-term objective, the joint construction of prototype reactors. The Community dimension is essential for Europe to reach a critical mass, given the complexity, scale and long duration of the effort required and the large scientific, technological and industrial base needed, and to benefit from substantial collaborations with the world's three other large fusion programmes. Indeed, the Community is collaborating with Japan, USSR and USA on the conceptual design of ITER, an experimental reactor; the site for the design is in the Community and there are good prospects that ITER, if built, will also be in the Community.

*pun or cliché?*

The current Fusion Programme runs to March 1992. It will evolve during the 1990-94 period so as to establish, by the mid-1990s, the scientific, technological and industrial base to build a Next Step experimental reactor, be it NET or ITER. This requires the prolongation of JET to 1996. The construction of specialised devices could become necessary to maintain the required breadth of the Programme. During the period, the design of the Next Step will move from the conceptual to the detailed stage.

*We must not  
agree to this  
"by implication"  
unless a full share  
of decommission  
costs are paid and  
own host country premium reduced  
or abolished.*

The JRC contribution will concentrate chiefly on safety, support to NET and certain basic work on materials.

*1st. Next European Town*

### III MANAGEMENT OF INTELLECTUAL RESOURCES

#### 6. HUMAN CAPITAL AND MOBILITY

##### 29 Large mobility project for young researchers

As the development of high technology products, competitive in world markets, becomes both more urgent and expensive, Europe's needs for more and more highly trained researchers is a vital element in its continuing economic development and competitiveness. Even in the more industrialized Community Countries, the number of scientists and engineers engaged in R&D per 10,000 workers under 50 against nearly 65 in Japan and 70 in the USA. The 500,000 European researchers must have an international outlook, be experienced in transfrontier collaboration (as high technology industry takes advantage of the integrated European market) and have the expertise and skills associated with career experience abroad.

These skills can only be acquired through a wide range of scientific training activities, direct experience of research work in an excellent team, access to sophisticated research equipment and through developing scientific infrastructure.

Mobility across countries, sectors and disciplines will help create the critical mass necessary for successful results and avoid fragmentation of efforts, as well as provide high level training for young European scientists through research. Whilst centres of excellence exist in all Member States, none can offer excellence in all fields at the level and with the breadth required for world competitiveness, hence the advantage of providing a European dimension to the advanced training of researchers. Networks of centres of excellence will therefore offer the possibilities for a wide range of high quality training.

*These figures are not in themselves conclusive. It may be that European research is more efficient per capita (just as Japanese industry is supposed to be).*

*We must not train other country's scientists at a discount whether they are from within the EC or not.*

Thus the activities proposed will be complementary to existing national bilateral and multilateral arrangements, many of which are predominantly extra-Community in character. These activities will complement and strengthen very significantly the efforts currently pursued, as well as the systematic training activities included in each Community R&D activity. Together these will be focussed in such a way that scientific cohesion is enhanced by the participation of all scientific communities within Europe.

JRC activities will also contribute to the specialized training of young researchers.

In order to have a rapid impact affecting a significant number of researchers, it is proposed to increase substantially the Community resources allocated to these activities.

*These numbers  
have not changed  
since last time.*

Indicative Breakdown of the Amounts Deemed Necessary for  
the implementation of the various activities envisaged

|      |                                                                                                        | <u>Mio ECU</u> |
|------|--------------------------------------------------------------------------------------------------------|----------------|
| I.   | <b>ENABLING TECHNOLOGIES</b>                                                                           |                |
| 1.   | <b>Information and Communications Technologies</b>                                                     | 3 000 ✓        |
|      | - Information Technologies                                                                             | 59-64%         |
|      | - Communications Technologies                                                                          | 21-23%         |
|      | - General Interest Systems Development                                                                 | 16-20%         |
| 2.   | <b>Industrial and Materials Technologies</b>                                                           | 1 200 ✓        |
|      | - Integrated Projects                                                                                  | 25-30%         |
|      | - Materials, Design and Manufacturing                                                                  | 52-60%         |
|      | - Measurement and Test                                                                                 | 15-17%         |
| II.  | <b>MANAGEMENT OF NATURAL RESOURCES</b>                                                                 |                |
| 3.   | <b>Environment</b>                                                                                     | 700 ✓          |
|      | - Global Environmental Issues, Methods and Engineering of the Environment, Social and Economic Aspects | 60-70%         |
|      | - Large Integrated Projects                                                                            | 30-40%         |
| 4.   | <b>Life Sciences and Technologies</b>                                                                  | 1 000 ✓        |
|      | - Basic Biotechnology                                                                                  | 18-22%         |
|      | - Agricultural & Agroindustrial Research                                                               | 48-52%         |
|      | - Medical and Health Research                                                                          | 13-17%         |
|      | - Life Sciences and Technologies for the Developing countries                                          | 13-17%         |
| 5.   | <b>Energy</b>                                                                                          | 1 100 ✓        |
|      | - Fossil and Renewable Energy Sources and Energy Use                                                   | 15-20%         |
|      | - Nuclear Fission Safety                                                                               | 23-27%         |
|      | - Controlled Thermonuclear Fusion                                                                      | 55-60%         |
| III. | <b>MANAGEMENT OF INTELLECTUAL RESOURCES</b>                                                            |                |
| 6.   | <b>Human Capital and Mobility</b>                                                                      | 700 ✓          |
|      | - Large Mobility Project for Young Researchers                                                         | 100%           |

*But, we did not  
have this breakdown  
before.*

TOTAL = 13



FILE KK

CC PU.



10 DOWNING STREET  
LONDON SW1A 2AA

*From the Private Secretary*

**MR. FAIRCLOUGH  
CABINET OFFICE**

I have not yet put to the Prime Minister your note of 4 December proposing she writes an interim letter to Sir Francis Tombs about the ACOST Report. Given that the Research Council itself will be meeting in ten days time, and bearing in mind the lapse of time since the Council submitted its Report, might it not be better to await the outcome of the Research Council and then send a single reply?

**PAUL GRAY**  
5 December 1989

A handwritten signature, possibly 'W. G.', in the bottom right corner of the page.

W0297

PRIME MINISTER

4 December 1989

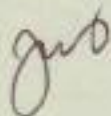
ACOST REPORT ON EUROPEAN FRAMEWORK FOR RESEARCH AND DEVELOPMENT

As you will recall, ACOST was invited to give its advice on the mid-term review of the current EC Research and Development Framework Programme (1987-91) and on the Commission's proposals for a new Programme for the period 1990-94. The Council duly submitted its report on 26 September.

2. While the report recommended that the Commission should be pressed to evaluate the current programme properly, it also suggested that negotiations on the Commission's new Proposal should go ahead. In this context, it underlined the need for more justification of the technical contents of the new Framework Programme. Among its other valuable points, the Council highlighted the need for a full review of the way the Commission manages R & D programmes. Overall, the report has been a useful input to our consideration of the proposed new R & D programme. Many of its conclusions echo points made by Douglas Hogg in the Research Council.

3. It would therefore be appropriate to acknowledge the helpful contribution of ACOST at this stage while reserving judgement on a fuller response until after the Research Council on 15 December.

4. I accordingly submit a draft letter to Sir Francis Tombs.



JOHN W FAIRCLOUGH  
Chief Scientific Adviser

DRAFT LETTER FROM THE PRIME MINISTER TO THE CHAIRMAN OF ACOST

Sir Francis Tombs FEng  
Chairman  
Rolls-Royce plc  
65 Buckingham Gate  
London SW1E 6AT

ACOST REPORT ON EUROPEAN FRAMEWORK PROGRAMME FOR RESEARCH AND  
DEVELOPMENT

I should like to thank the Advisory Council on Science and Technology for preparing its report on the EC R & D Framework Programme. It was an extremely opportune contribution to the Government's thinking not only on the mid term review of the 1987-91 programme but also on the proposal by the Commission for a new programme covering the period 1990-94. The points made in your report were taken into account in Douglas Hogg's presentation at the EC Research Council.

It is perhaps sensible to await the outcome of the next meeting of the Research Council on 15 December before examining whether there are other policy implications which flow from the report.

To:

cc Dr Coleman  
Mr Murray

LIST A: DTI OFFICIALS  
LIST B: OTHER GOVERNMENT  
DEPT OFFICIALS

From:

J D Howarth  
RTP2  
Room 233  
Ashdown house  
215 6709

RA

1 December 1989

**The Enterprise Challenge: Overcoming Barriers to Growth in  
Smaller Firms**

The fourth and final draft (attached) of the Government Response to the above Report has now gone to Mr Hogg's office for approval. I have asked for clearance by lunch-time December 4, after which it will require approval by Ministers of interested Departments. I hope you all agree the text, which is a compromise based on your helpful contribution.

*J Derek Howarth*

J D HOWARTH

DC4AEO

LIST A:

|                 |       |
|-----------------|-------|
| Mr J Healey     | EM1   |
| Mr M Nonhebel   | EcMS1 |
| Mr J Barber     | EcMS2 |
| Dr B Parsons    | RTP3  |
| Mr M D O'Shea   | FRM1  |
| Mr R Upson      | EISD1 |
| Mr Hartnack     | Pats  |
| Mr Brown        | EME4  |
| Mr K Long       | FS    |
| Mr R Carter     | FS1b  |
| Mr S O'Sullivan | EISD  |
| Mr G Walshe     | EcMS2 |
| Mr A Wearing    | EcMS2 |
| Mr G Field      | IDA2  |
| Mr A Jackson    | IDA1  |
| Mrs Bloom       | RTP1  |

LIST B:

|                 |                                                |
|-----------------|------------------------------------------------|
| Ms B St Quintin | Inland Revenue                                 |
| Mr J Reed       | Inland Revenue                                 |
| Mr P Keen       | Department of Employment                       |
| Mr B Orr        | Department of Environment                      |
| Mr J Colston    | Ministry of Defence                            |
| Mr B R Hawtin   | Ministry of Defence                            |
| Mr A Lebrecht   | Ministry of Agriculture,<br>Fisheries and Food |
| Mr M Barnett    | Department of the Environment                  |
| Mr R Bright     | Department of the Environment                  |
| Ms P Buley      | Department of Employment                       |
| Mr B Heatley    | Department of Employment                       |
| Mr J McCann     | Department of Employment                       |
| Mr A Quigley    | Cabinet Office                                 |
| Mr N Hunt       | Ministry of Defence                            |
| Mr S Crowne     | Department of Education and<br>Science         |
| Mr A McKeon     | Department of Health                           |
| Ms C Evans      | Chief Secretary's Office                       |
| Mr J Fairclough | Cabinet Office                                 |
| Mr I Dixon      | Cabinet Office                                 |
| Mr P Wanless    | Chief Secretary of the Treasury                |
| Mr P Gray       | PS/Prime Minister                              |
| Mr J Stephens   | Treasury                                       |
| Mr B McClelland | EDTA                                           |
| P Thorpe        | Department of Education and<br>Science         |
| Mr M Dumbrell   | Department of Education and<br>Science         |

## 5TH DRAFT

### 1. Introduction

1.1 The Government welcomes the attention which ACOST has directed to the constraints which can inhibit the growth of Small and Medium sized Enterprises (SMEs). SMEs have a crucial role to play in bringing about a dynamic and competitive economy. They greatly enhance the flexibility with which supply can respond to changes in the level and pattern of demand, they have a significant role in innovation, and are a major source of new competition and new employment opportunities. Although large firms account for the bulk of output and employment the vast majority of enterprises are SMEs. While most SMEs are likely to remain small the minority which do grow rapidly have a particularly important role to play; amongst other things they have the potential to become the new large firms of tomorrow.

1.2 As the Council acknowledges, the Government has sought to improve the environment in which SMEs operate through a complementary range of fiscal, financial and advisory measures. These measures are designed to encourage smaller businessmen and their backers to make their own decisions, and to take maximum advantage of the opportunities of the market place. Within this strategy the importance of growth businesses is well recognised.

1.3 In considering the implication of barriers to growth for Government policy two important features must be given due

weight. The first is that growth uses up resources which must be drawn from elsewhere in the economy and the need for the firm to overcome resource constraints and to adapt to changing organisational, managerial, technological and market requirements is part of the normal discipline imposed by market forces. The important point is that unnecessary impediments to growth, such as those arising from market failure, should not unduly handicap UK SMEs either absolutely or relatively to their foreign counterparts. The UK business environment should be sufficiently conducive to the growth and qualitative development of SMEs, so that firms can compete effectively in both domestic and international markets.

1.4 The second feature to be considered is the wide range of factors which can present a barrier to rapid growth by SMEs, the complex ways in which they may interact, and the range of different transitions which must be made as a company grows in size. In many instances it will not be possible to overcome the problem by means of direct Government action. In others the appropriate policy response may be far from clear. In any case it is primarily for SMEs to help themselves though it may be appropriate for Government to provide assistance in some circumstances. Where action by Government is appropriate it should continue to take a wide variety of forms. Moreover because of the continually changing nature of the problems faced by SMEs policy towards them must be flexible and kept under review.



1.5 There are a number of existing policy measures already operating which are designed to help small firms to prosper and which are aimed directly at companies with potential for growth. Several practical self-help schemes have been set up by Government to assist UK management improve performance. The Enterprise Initiative for example, launched in 1988 includes a major programme to encourage smaller firms to use expert outside advice to improve business strategy. Others, like the Teaching Company Scheme and Business Growth Training will help the UK business community acquire and develop improved managerial skills. These schemes will re-inforce the employer-led initiatives in this area such as the Management Charter Initiative. The new Training and Enterprise Councils will seek to help the establishment and growth of small businesses through training and promoting enterprise.

1.6 Initial evidence about the effect of the Enterprise Initiative scheme is encouraging. 10,000 consultancy projects have now been completed and a further 16,000 have been commissioned. An independent evaluation study of the scheme's effectiveness among a sample of early projects (published in June 1989) suggests that applicant firms are acquiring an improved understanding of business management coupled with greater expressed willingness to seek expert advice at market prices. Firms also indicated that they expected the implementation of their consultancy projects to produce substantial benefits in terms of net value added.

1.7 The Government believes that initiatives like the Small Firms Merit Award for Research and Technology, SMART, and Business Growth Training will help managers develop a better understanding of their businesses, which in turn will help them persuade the financial community of the validity of their business plans. The various forms of current Government assistance which are aimed at improving the quality of UK management, provide a sound basis for an improved overall economic performance.

1.8 Detailed responses to the individual recommendations contained in the report are given below, in the order they appear in the ACOST Summary of Recommendations (Chapter 9).

## 2. Corporate Venturing

We recommend that DTI investigate ways in which corporate venturing activity may be stimulated in the UK both directly and through linkages with the institutional venture capital industry.

2.1 Corporate venturing may be defined as the taking by an established company of a minority interest in a small, new company, either directly or through the use of a venture capital fund. This subject is of considerable interest to the Government.

2.2 The Government recognises that corporate venturing has been an important source of external equity capital for high tech start-up companies in the United States, and that some British companies have instituted successful corporate venturing programmes. The Government believes that it would probably be advantageous if this form of finance were more widely developed in the UK. The Government therefore welcomes the establishment of a Corporate Venturing Register - an initiative first undertaken by the National Economic Development Office and now transferred to the private sector. A number of private sector financial institutions are also promoting corporate venturing deals between established and new companies. But for each party, the decision between corporate venturing and the alternatives must be a commercial one, taking account of the unique circumstances of each particular case.

2.3 The Government agrees that this is an area that should be looked at most carefully to determine what role Government can play and agrees to do so.

We recommend that consideration be given to refocusing the BES in order to direct funds to companies which fall below the threshold for venture capital funds, and to exclude low risk property related investment

2.4 The Government notes the Council's recommendation and shares the Council's view that the BES should not be available to companies which can raise the finance they need through the

venture capital industry. For this reason the Government introduced the £500,000 annual investment limit for BES companies in 1988. The Government does not believe, however, that a lower limit, as suggested by the Council, would be appropriate. In general, companies seeking to raise amounts between £200,000 and £500,000 from the venture capital industry may still face difficulty.

2.5 Substantial numbers of investments are made through the scheme in smaller sums. Investment through the scheme in companies raising less than £500,000 has remained broadly constant up to 1988-89 at around £50 million per annum. In 1987-88, the most recent year for which a breakdown is available, 85 per cent of companies using the scheme raised sums of £250,000 or less. Investments through Approved Investment funds in 1987-88 amounted to under 10 per cent of total BES investment.

2.6 The Government believes that in the short term the scheme has a wider role to play as a means of helping to revive the market in private rented housing. The scheme was therefore extended in 1988 to include companies specialising in letting residential property. This extension will, however, cease after the end of 1993. For companies other than private renting companies strict property rules apply so that low risk companies do not qualify for the scheme. A substantial part of the investment in assured tenancy companies is likely to have come from investors new to the scheme, who would not otherwise have invested in BES.

2.7 The Government believes that the scheme continues to provide an important encouragement for private investment in small companies. The scheme is kept under close review.

We recommend further that existing company and investor protection legislation be examined to see how the development of local capital markets may be encouraged.

2.8 The Government recognises that the cost of complying with the prospectus requirements of the Companies Act 1985 can be a considerable burden on smaller firms trying to raise funds by issuing securities. This is a problem that is being looked at in connection with the implementation of Part V of the Financial Services Act, which will replace the Companies Act requirements in due course.

2.9 The successful development of local markets in unlisted company securities would rely heavily on their ability to provide access to local sources of finance additional to those available through existing channels. If sufficient interest exists in establishing a local market, those concerned should develop their proposals and submit them to the Securities and Investments Board. However, experience in the past with the Over The Counter market suggests that the trading of securities of this type poses particular problems for the protection of investors.

### 3. Competitive Schemes and Research

We recommend that DTI initiates two competitive schemes to stimulate business experimentation in the Smaller Firm.

3.1 The first of the proposed schemes (Genesis) is aimed at enhancing the creativity of smaller firms by enabling them to compete for R&D contracts to meet the mission needs of government agencies. The Government is fully aware of the desirability of encouraging small firms to advance their technology. As the Council recognises, the Ministry of Defence (MOD) already runs one scheme - the Small Firms Research Initiative (SFRI) - of a similar nature and the DTI has an enlarged SMART now running. Expenditure on the MOD scheme exceeds £1M p.a. whilst expenditure on a 3 year cycle of SMART could reach £29M. In a similar vein the Department of the Environment (DOE) supports collaborative pre-competitive research with the construction industry Research Associations (whose membership mainly comprise smaller companies), the DOE contributing around 50% of the costs amounting to some £2m p.a. Additionally the DOE has planned to provide £10m over 5 years for its Environmental Protection Technology Scheme which is expected to have a good representation of smaller firms in the final tally of participants.

3.2 Nevertheless, in meeting their research mission Government Departments must secure value for money. A formal

set-aside arrangement in favour of SMEs is unlikely to lead to best value for money. However the DTI will consider the need for any further initiatives taking into account the progress of the MOD's SFRI and the implications of the move to put Government Research Establishments on an Agency basis. Also SMART is due to be reviewed next year. The review will determine if changes to the size and scope of the scheme are desirable, and whether such non-mission orientated research (as in the US National Institute of Health and the National Science Foundation arrangements) achieves the leverage required.

3.3 As far as the details of the Council's analyses are concerned the MOD considers that paragraph 4.13, makes an unfair comparison of the proportion of the MOD's procurement expenditure going directly to small firms, with small firms' share of national net output, since the figures are calculated on entirely different bases. The MOD figures are for the gross value of Headquarter's contracts placed directly with small firms, and do not take account of the amount of work reaching small firms acting as sub-contractors to larger main defence contractors, or through the MOD's local purchases. The figures for the percentage of national net output produced by small firms must, presumably, be based on all the work actually carried out by them. However, a useful comparison might be made with the United States, where, despite affirmative action and set-aside policies, the proportion of defence procurement expenditure going directly to small firms (5%) is  $2\frac{1}{2}$  times less than that in the UK.

3.4 In paragraph 4.15, the money spent on the Small Firms Research Initiative (SFRI) is compared with the total expenditure on defence research and development (R&D), and this again is misleading. The SFRI is set in the context of the MOD's research programme, the cost of which is, as stated, in the region of £400m. The largest element by far of the MOD's total spending on research and development (which is about £2.35 bn), is devoted to the development of specific defence equipments, an area which is not addressed by the SFRI. The paragraph implies that expenditure under the SFRI and the MOD's research spending with small firms are identical; this is incorrect, for small firms undertake work in other areas of the research programme.

3.5 Also the Council's figure of £60m p.a. which the Council estimates as the funding for this recommendation is misleading and comparison of like with like would produce a UK figure of about £12m.

3.6 The second of the proposed schemes - the "Accelerator" programme - is designed to help smaller firms make "transitions" in R&D and marketing which require risky and large investments. The Council identify four such transitions but admit that there may be others of equal importance. The Government considers that a competitive scheme as outlined by the Council is not a suitable vehicle for promoting self-help in industry. A competition would imply that the applicants with the best ideas and business plans would receive the



awards and they might not be the firms who would benefit most from assistance. Moreover, as the individual case appraisals would tend to be rather more complex than for SMART, the administrative burden of considering a relatively large number of cases in step with one another could be considerable.

3.7 However, the Council has identified a problem arising from critical transition periods in the growth of companies which may impede growth seriously or may result in the firm having to merge with or sell out to a larger company. While such mergers may be an appropriate solution in many cases, in others they may not be in the long term interest either of the enterprise itself or of the economy as a whole. The risk that growth may result in the firm being acquired or needing to merge may deter many owners from pursuing expansion beyond a certain point.

3.8 The Government accepts that transitions may pose difficulties for some SMEs, but believes it must look first into whether there are any lessons to be learned from existing mechanisms which deal wholly, or in part with some of these problems. The Review of the SMART scheme should provide much useful information.

3.9 The Government will also consider whether there are any lessons to be learned from cases in which schemes of regional assistance - Regional Selective Assistance and Regional Enterprise Grant - have assisted smaller companies faced with transitional difficulties, although there is of course, no

question of such schemes being extended to the country as a whole. The above analyses should lead to consideration of alternative positive courses of action by the DTI, or in conjunction with other Departments, to assist SMEs.

In appropriate circumstances we recommend that smaller firms should be allocated funds to conduct research complementary with the programmes under investigation in IRCs

3.10 IRCs are premier centres of excellence. The Government would welcome SMEs both using the IRCs to conduct research or seconding staff to work at an appropriate centre thereby gaining the benefit of equipment, resources and science contacts which will be second to none. Where appropriate, grants of up to 50% of the cost of such collaborative research activities can be made available through Government approved programmes and/or projects. In particular, the Government is concerned that SMEs should participate as fully as possible in the LINK initiative and hence with research projects that may be undertaken by IRCs and other front rank research centres. To that end, methods of involving many more small/very small companies in individual projects are currently being studied and discussed with industry. In many industries and technologies however, Research & Technology Organisations will remain the main source of R&D expertise for SMEs.

#### 4. IPR

We recommend that awareness of the business role of intellectual property among small firms be promoted through a

new Enterprise Initiative Programme.

4.1 In June 1989 the then Secretary of State for Trade and Industry introduced a few improvements to the Consultancy Initiatives, one of which partly meets the Council's suggestion for help with technology audits. The Scheme now provides for short 5 day consultancy projects as an introduction to the longer projects (up to 15 days) normally available. The terms of reference for a standard 5 day consultancy in manufacturing now provide for an assessment of a firm's current level of technology including recommendations on improvements in technology to meet business goals. Also, under a design consultancy, a firm can obtain an assessment of its products and technology, and advice on improvements including recommendations on intellectual property and technology licensing.

4.2 The Patent Office are strongly in favour of increased emphasis on Intellectual Property Rights (IPR) and are currently considering how best to increase their efforts in this field. The Government has therefore made a start towards meeting the objectives of this recommendation but will need to evaluate the recent changes to the Enterprise Initiative before proceeding further.

We recommend that DTI take the steps necessary to promote awareness of the market in patent litigation insurance among smaller firms and patent agents.

4.3 The Government understands and sympathises with the thinking behind this recommendation. Insurance protection in this particular field is not extensive in the UK and the report rightly stresses the lack of understanding between commercial organisations and patent agents on the one hand and the insurance companies on the other. A better informed market may make greater use of patent litigation insurance and the DTI is prepared to consider how this might be brought about. It has to be pointed out however that examination of this particular problem is not new and the ultimate test of commercial attractiveness and viability will govern the Department's thinking and activities.

## 5. Training

We recommend that the Teaching Company Schemes continues to expand in the future

5.1 The White Paper "DTI - the Department for Enterprise" announced the expansion of the Teaching Company Scheme, and this expansion is continuing.

We recommend that a series of Regional Competitions be established to identify, develop and diffuse best practice methods for delivering training in strategic management skills to the smaller firm.

5.2 The Government welcomes the Council's reference to the importance of training for small companies. The Employment

Department: Training Agency (EDTA) introduced a new programme, Business Growth Training, in April this year. The programme will help employers and small firms to improve their business performance through training and development.

5.3 The Council recommends a series of regional competitions to promote best practice in training for small firms. The EDTA agrees that there is a need to develop and diffuse best practice methods for delivering training to the smaller firms. An important feature of Business Growth Training is the dissemination of successful projects to encourage other firms to improve their training. In addition, the EDTA's prestigious National Training Awards reward those businesses that demonstrate the competitive advantage they have gained through exceptionally effective investment in training. Promotion of the exemplars is achieved through both national and local advertising, and through the national and regional awards ceremonies.

5.4 Training and Enterprise Councils will be responsible for the development and delivery of training and other support for small businesses relevant to local needs. In this they will have flexibility and some may want to sponsor local competitions on the lines proposed.

5.5 The Council recommends that the employer-led Management Charter Initiative (MCI) should pay close attention to the needs of smaller firms in formulating its network proposals. The National Forum for Management Education & Development, which is responsible for the MCI, recognises it needs to take account of the requirements of smaller firms and is encouraging them to join its networks of employers. The EDTA intends, in co-operation with MCI, to publish a series of best practice case studies relating to small firms.

OTO  
TO:

LIST A: DTI OFFICIALS  
LIST B: OTHER GOVERNMENT  
DEPT OFFICIALS

cc Dr Coleman  
Mr Murray  
Mr Chapman  
Mr Foster  
Mrs Bloom

FROM:

J D HOWARTH  
RTP2  
Room 233  
Ashdown House  
215 6709

RH

28 November 1989

THE ENTERPRISE CHALLENGE: OVERCOMING BARRIERS TO GROWTH IN  
SMALLER FIRMS

Attached is a third draft of the Government response to the  
above ACOST Report. It embodies sufficient change for it to  
be decided that it should not go to Ministers without further  
scrutiny from all those who have suggested changes.

However the deadline for further comment/changes has to be by  
Lunchtime 30 November 1989.

*J D Howarth*

J D HOWARTH

M28NOV1 .JDH

LIST A

|                 |       |
|-----------------|-------|
| Mr J Healey     | EME1  |
| Mr M Nonhebel   | EcMS1 |
| Mr J Barber     | EcMS2 |
| Dr B Parsons    | RTP3  |
| Mrs A Taylor    | IDA1  |
| Mr S Spivey     | CU2   |
| Mr D Babb       | CU1   |
| Mr M D O'Shea   | FRM1  |
| Mr R Upson      | EISD1 |
| Mr Hartnack     | Pats  |
| Mr Brown        | EME4  |
| Mr K Long       | FS    |
| Mr R Carter     | FS1b  |
| Mr S O'Sullivan | EISD  |
| Mr G Walshe     | EcMS2 |
| Mr A Wearing    | EcMS2 |
| Mr A Gray       | FS3b  |
| Mr M Murphy     | CU1   |
| Mr G field      | IDA2  |
| Mr A Jackson    | IDA1  |



LIST B

|                 |                                                |
|-----------------|------------------------------------------------|
| Ms B St Quintin | Inland Revenue                                 |
| Mr J Reed       | Inland Revenue                                 |
| Mr P Keen       | Department of Employment                       |
| Mr B Orr        | Department of Environment                      |
| Mr J Colston    | Ministry of Defence                            |
| Mr B R Hawtin   | Ministry of Defence                            |
| Mr A Lebrecht   | Ministry of Agriculture, Fisheries<br>and Food |
| Mr M Barnett    | Department of the Environment                  |
| Mr R Bright     | Department of the Environment                  |
| Ms P Buley      | Department of Employment                       |
| Mr B Heatley    | Department of Employment                       |
| Mr J McCann     | Department of Employment                       |
| Mr A Quigley    | Cabinet Office                                 |
| Mr N Hunt       | Ministry of Defence                            |
| Mr S Crowne     | Department of Education and Science            |
| Mr A McKeon     | Department of Health                           |
| Ms C Evans      | Chief Secretary's Office                       |
| Mr J Fairclough | Cabinet Office                                 |
| Mr I Dixon      | Cabinet Office                                 |
| Mr P Wanless    | Chief Secretary to the Treasury                |
| Mr P Gray       | PS/Prime Minister                              |

### 3RD DRAFT

#### 1. Introduction

1.1 The Government welcomes the attention which ACOST has directed to the constraints which can inhibit the growth of small and medium sized Enterprises (SMEs). SMEs have a crucial role to play in bringing about a dynamic and competitive economy. They greatly enhance the flexibility with which supply can respond to changes in the level and pattern of demand, they have a significant role in innovation, and are a major source of new competition and new employment opportunities. Although large firms account for the bulk of output and employment the vast majority of enterprises are SMEs. While most SMEs are likely to remain small the minority which do grow rapidly have a particularly important role to play; amongst other things they have the potential to become the new large firms of tomorrow.

1.2 As the Council acknowledges, the Government has sought to improve the environment in which SMEs operate through a complementary range of fiscal, financial and advisory measures. These measures are designed to encourage smaller businessmen and their backers to make their own decisions, and to take maximum advantage of the opportunities of the market place. Within this strategy the importance of growth businesses is well recognised. The Government accepts however that progress can only be made if policy measures are regularly critically re-examined in order to determine if changes would be beneficial.

1.3 In considering the implication of barriers to growth for Government policy two important features of their operation must be given due weight. The first is that growth uses up resources which must be drawn from elsewhere in the economy and the need for the firm to overcome resource constraints and to adapt to changing organisational, managerial, technological, and market requirements is part of the normal discipline imposed by market forces. The important point is that unnecessary impediments to growth such as those arising from market failure, should not unduly handicap UK SMEs either absolutely or relatively to their foreign counterparts. The UK business environment should be sufficiently conducive to the growth and qualitative development of SMEs, so that firms can compete effectively in both domestic and international markets.

1.4 The second feature to be considered is the wide range of factors which can present a barrier to rapid growth by SMEs, the complex ways in which they may interact, and the range of different transitions which must be made as a company grows in size. In many instances it will not be possible to overcome the problem by means of direct Government action. In others the appropriate policy response may be far from clear. In any case it is primarily for SMEs to help themselves though it may be appropriate for Government to provide assistance in some circumstances. Where action by Government is appropriate it should continue to take a wide variety of forms. Moreover because of the continually changing nature of the problems

faced by SMEs policy towards them must be flexible and kept under review.

1.5 There are a number of existing policy measures already operating which are designed to help small firms to prosper and which are aimed directly at companies with potential for growth. Several practical self-help schemes have been set up by Government to assist UK management improve performance. The Enterprise Initiative for example, launched in 1988 includes a major programme to encourage smaller firms to use expert outside advice to improve business strategy. Others, like the Teaching Company Scheme and Business Growth Training will help the UK business community acquire and develop improved managerial skills. The new Training and Enterprise Councils will seek to help the establishment and growth of small businesses through training and promoting enterprise. They will also want to encourage firms to invest in training to meet business needs. These schemes will re-inforce the employer-led initiatives in this area such as the Management Charter Initiative.

1.6 Initial evidence about the effect of the Enterprise Initiative scheme is encouraging. 10,000 consultancy projects have now been completed and a further 26,000 have been commissioned. An independent evaluation study of the scheme's effectiveness among a sample of early projects (published in June 1989,) suggests that applicant firms are acquiring an improved understanding of business management coupled with greater expressed willingness to seek expert advice at market

prices. Firms also indicated that they expected the implementation of their consultancy projects to produce substantial benefits in terms of net value added.

1.7 The Government believes that initiatives like SMART and Business Growth Training will help managers develop a better understanding of their businesses, which in turn will help them persuade the financial community of the validity of their business plans. The various forms of current Government assistance which are aimed at improving the quality of UK management, provide a sound basis for an improved overall economic performance.

1.8 Detailed responses to the individual recommendations are given below, in the order they appear in the ACOST Summary of Recommendations (Chapter 9).

## 2. CORPORATE VENTURING

We recommend that DTI investigate ways in which corporate venturing activity may be stimulated in the UK both directly and through linkages with the institutional venture capital industry.

2.1 Corporate venturing may be defined as the taking by an established company of a minority interest in a small, new company, either directly or through the use of a venture capital fund. This subject is of considerable interest to the Government.

2.2 The Government recognises that corporate venturing has been an important source of external equity capital for high tech start-up companies in the United States, and that some British companies have instituted successful corporate venturing programmes. The Government believes that it would probably be advantageous if this form of finance were more widely developed in the UK. The Government therefore welcomes the initiative of the National Economic Development Office (NEDO) in this field, and is also aware that a number of private sector financial institutions are promoting corporate venturing deals between established and new companies. But for each party, the decision between corporate venturing and the alternatives must be a commercial one, taking account of the unique circumstances of each particular case.

2.3 The Government agrees that this is an area that should be looked at most carefully to determine what role Government can play and agrees to do so, but to favour corporate venturing by financial incentives, whether directly or through the tax system, would cloud the commercial decision and distort the market, with little likelihood of overall benefit.

We recommend that consideration be given to refocusing the BES in order to direct funds to companies which fall below the threshold for venture capital funds, and to exclude low risk property related investment

2.4 The Government notes the Council's recommendation and

shares the Council's view that the BES should not be available to companies which can raise the finance they need through the venture capital industry. For this reason the Government introduced the £500,000 annual investment limit for BES companies in 1988. The Government does not believe, however, that a lower limit, as suggested by the Council, would be appropriate. In general companies seeking to raise amounts between £200,000 and £500,000 from the venture capital industry may still face difficulty.

2.5 Substantial numbers of investments are made through the scheme in smaller sums. The annual investment made through the scheme in companies raising less than £500,000 has remained broadly constant up to 1988-89 at around £50 million per annum. In 1987-88, the most recent year for which a breakdown is available, 85 per cent of companies using the scheme raised sums of £250,000 or less. Investments through Approved Investment funds in 1987-88 amounted to under 10 per cent of total BES investment.

2.6 The Government believes that in the short term the scheme has a wider role to play as a means of helping to revive the market in private rented housing. The scheme was therefore extended in 1988 to include companies specialising in letting residential property. This extension will, however, cease after the end of 1993. For companies other than private renting companies strict property rules apply so that low risk companies do not qualify for the scheme. A substantial part of the investment in assured tenancy companies is likely to

have come from investors new to the scheme, and who would not otherwise have invested in other types of BES company.

2.7 The Government believes that the scheme continues to provide an important encouragement for private investment in small companies and so the scheme is kept under close review.

We recommend further that existing company and investor protection legislation be examined to see how the development of local capital markets may be encouraged.

2.8 The Government recognises that the cost of complying with the prospectus requirements of the Companies Act can be a considerable burden on smaller firms trying to raise funds by issuing securities. This is a problem that is being looked at in connection with the implementation of Part V of the Financial Services Act, which will replace the Companies Act requirements in due course.

2.9 The successful development of local markets in unlisted company securities would rely heavily on their ability to provide access to local sources of finance additional to those available through existing channels. If sufficient interest exists in establishing a local market, those concerned should develop their proposals and submit them to the Securities and Investments Board. However, experience in the past with the Over The Counter market suggests that the trading of securities of this type poses particular problems for the protection of investors.



### 3. Competitive Schemes and Research

We recommend that DTI initiates two competitive schemes to stimulate business experimentation in the Smaller Firm.

3.1 The first of the proposed schemes (Genesis) is aimed at enhancing the creativity of smaller firms by enabling them to compete for R&D contracts to meet the mission needs of government agencies. The Government is fully aware of the desirability of encouraging small firms to advance their technology. As the Council recognises, the Ministry of Defence (MOD) already runs one scheme - the Small Firms Research Initiative (SFRI) - of a similar nature and the DTI has an enlarged Small Firms Merit Award for Research & Technology Scheme (SMART) now running. Expenditure on the MOD scheme exceeds £1M p.a. whilst expenditure on a 3 year cycle of SMART could reach £29M. Similarly (although not mentioned in the Report) the Department of the Environment (DOE) point out that 90% of the firms in the construction industry have fewer than 8 employees. Grant support to such companies for pre-competitive research is available through club type projects at the industry's Research Associations (as it is also at the DTI) and through the Environmental Protection Technology Scheme where the majority of grants have been to smaller firms.

3.2 Nevertheless, in meeting their research mission Government Departments must secure value for money. A formal set-aside arrangement in favour of SMEs is unlikely to lead to best value for money. However the DTI will consider the need for any further initiatives taking into account the progress of the MOD's SFRI and the implications of the move to put Government Research Establishments on an Agency basis. Also SMART is due to be reviewed next year. The review will determine if changes to the size and scope of the scheme is desirable, and whether such non-mission orientated research (as in the US - National Institute of Health and the National Science Foundation arrangements) achieves the leverage required.

3.3 As far as the details of the Councils analysis<sup>e</sup> are concerned the MOD considers that paragraph 4.13, makes an unfair comparison of the proportion of the MOD's procurement expenditure going directly to small firms, with small firms' share of national net output, since the figures are calculated on entirely different bases. The MOD figures are for the gross value of Headquarter's contracts placed directly with small firms, and do not take account of the amount of work reaching small firms acting as sub-contractors to larger main defence contractors, or through the MOD's local purchases. The figures for the percentage of national net output produced by small firms must, presumably, be based on all the work actually carried out by them. However, a useful comparison might be made with the United States, where, despite affirmative action and set-aside policies, the proportion of

defence procurement expenditure going directly to small firms (5%) is  $2\frac{1}{2}$  times less than that in the UK.

3.4 In paragraph 4.15, the money spent on the Small Firms Research Initiative (SFRI) is compared with the total expenditure on defence research and development (R&D), and this again is misleading. The SFRI is set in the context of the MOD's research programme, the cost of which is, as stated, in the region of £400m. The largest element by far of the MOD's total spending on research and development (which is about £2.35 bn), is devoted to the development of specific defence equipments, an area which is not addressed by the SFRI. The paragraph implies that expenditure under the SFRI and the MOD's research spending with small firms are identical; this is incorrect, for small firms undertake work in other areas of the research programme.

3.5 Also the Council's figure of £60m p.a. which the Council estimates as the funding for this recommendation is misleading and comparison of like with like would produce a UK figure of about £12m.

3.6 The second of the proposed schemes - the "Accelerator" programme - is designed to help smaller firms make "transitions" in R&D and marketing which require risky and large investments. The Council identify four such transitions but admit that there may be others of equal importance. The Government considers that a competitive scheme as outlined by the Council is not a suitable vehicle for promoting self-help

in industry. A competition would imply that the applicants with the best ideas and business plans would receive the awards and they might not be the firms who would benefit most from assistance. Moreover, as the individual case appraisals would tend to be rather more complex than in the case of SMART, the administrative burden of considering a relatively large number of cases in step with one another could be considerable.

3.7 However, the Council has identified a problem arising from critical transition periods in the growth of companies which may impede growth seriously or may result in the firm having to merge with or sell out to a larger company. While such mergers may be an appropriate solution in many cases, in others they may not be in the long term interest either of the enterprise itself or of the economy as a whole. The risk that growth may result in the firm being acquired or needing to merge may deter many owners from pursuing expansion beyond a certain point.

3.8 The Government accepts that transitions may pose difficulties for some SMEs, but believes it must look first into whether there are any lessons to be learned from existing mechanisms which deal wholly, or in part with some of these problems. The Review of the SMART scheme should provide much useful information.

3.9 The Government will also consider whether there are any lessons to be learned from cases in which schemes of regional

assistance - Regional Selective Assistance and Regional Enterprise Grant - have assisted smaller companies faced with transitional difficulties, although there is of course, no question of such schemes being extended to the country as a whole. The above analyses should lead to consideration of alternative positive courses of action <sup>by the DTT</sup> to assist SMEs.

In appropriate circumstances we recommend that smaller firms should be allocated funds to conduct research complementary with the programmes under investigation in IRCs

3.10 IRCs are premier centres of excellence. The Government would welcome SMEs both using the IRCs to conduct research or seconding staff to work at an appropriate centre thereby gaining the benefit of equipment, resources and science contacts which will be second to none. Where appropriate, grants of up to 50% of the cost of such collaborative research activities can be made available through Government approved programmes and/or projects. In particular the Government is concerned that SMEs should participate as fully as possible in the LINK initiative and hence with research projects that may be undertaken by IRCs and other front rank research centres. To that end, methods of involving many more small/very small companies in individual projects are currently being studied and discussed with industry. In many industries and technologies however, Research & Technology Organisations will remain the main source of R&D expertise for SMEs.

#### 4. IPR

We recommend that awareness of the business role of intellectual property among small firms be promoted through a new Enterprise Initiative Programme.

4.1 In June 1989 the then Secretary of State for Trade and Industry introduced a few improvements to the Consultancy Initiatives, one of which partly meets the Council's suggestion for help with technology audits. The Scheme now provides for short 5 day consultancy projects as an introduction to the longer projects (up to 15 days) normally available. The terms of reference for a standard 5 day consultancy in manufacturing, now provide for an assessment of a firm's current level of technology including recommendations on improvements in technology to meet business goals. Also, under a design consultancy, a firm can obtain an assessment of its products and technology, and advice on improvements including recommendations on intellectual property and technology licensing.

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We recommend that a series of Regional Competitions be established to identify, develop and diffuse best practice methods for delivering training in strategic management skills to the smaller firm.

The Government welcomes the Council's reference to the

importance of training for small companies. The Employment Department: Training Agency (EDTA) introduced a new programme, Business Growth Training, in April this year. A major aim of this programme is to enhance management skills, particularly in smaller firms.

The Council also recommends a series of regional competitions to promote best practice in training for small firms. The EDTA agrees that there is a need to develop and diffuse best practice methods for delivering training to the smaller firms. An important feature of Business Growth Training, is the dissemination of successful projects to encourage other firms to improve their training. In addition, the EDTA's prestigious National Training Awards reward those businesses that demonstrate the competitive advantage they have gained through exceptionally effective investment in training. Promotion of the exemplars is achieved through both national and local advertising, and through the national and regional awards ceremonies.

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To:

cc Dr Coleman  
Mr Murray  
RTP Branch Hds

List A : DTI Officials  
List B : Other Government  
Dept Officials

From:

RA

J D Howarth  
Hd/RTP2  
Rm 233  
Ashdown House  
215 6709

24 November 1989

**The Enterprise Challenge : Overcoming Barriers to Growth in  
Smaller Firms**

Please substitute the attached for page 7 of the second draft  
(sent out on 23 November).

M. B. Polus

J D HOWARTH

Financial Services Act, which will replace the Companies Act requirements in due course.

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LIST A

|                 |       |
|-----------------|-------|
| Mr J Healey     | EME1  |
| Mr M Nonhebel   | EcMS1 |
| Mr J Barber     | EcMS2 |
| Dr B Parsons    | RTP3  |
| Mrs A Taylor    | IDA1  |
| Mr S Spivey     | CU2   |
| Mr D Babb       | CU1   |
| Mr M D O'Shea   | FRM1  |
| Mr R Upson      | EISD1 |
| Mr Hartnack     | Pats  |
| Mr Brown        | EME4  |
| Mr K Long       | FS    |
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| Mr S O'Sullivan | EISD  |
| Mr G Walshe     | EcMS2 |
| Mr A Wearing    | EcMS2 |
| Mr A Gray       | FS3b  |
| Mr M Murphy     | CU1   |
| Mr C Field      | IDA2  |
| Mr A Jackson    | IDA1  |

LIST B

Ms B St Quintin  
Mr J Reed  
Mr P Keen  
Mr B Orr  
Mr J Colston  
Mr B R Hawtin  
Mr A Lebrecht

Mr M Barnett  
Mr R Bright  
Ms P Buley  
Mr B Heatley  
Mr J McCann  
Mr A Quigley  
Mr N Hunt  
Mr S Crowne  
Mr A McKeon  
Ms C Evans  
Mr J Fairclough  
Mr I Dixon  
Mr P Wanless  
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Inland Revenue  
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Cabinet Office  
Ministry of Defence  
Department of Education and Science  
Department of Health  
Chief Secretary's Office  
Cabinet Office  
Cabinet Office  
Chief Secretary to the Treasury  
PS/Prime Minister

dti

the department for Enterprise

CCPQ  
SA

NBRM  
PLC 6  
2/11

The Hon. Douglas Hogg MP  
Minister for Industry and Enterprise

Rt Hon Sir Geoffrey Howe MP  
Lord President of the Council  
Privy Council Office  
68 Whitehall  
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Department of  
Trade and Industry

1-19 Victoria Street  
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Enquiries  
01-215 5000

Telex 8811074/5 DTHQ G  
Fax 01-222 2629

Direct line 215 5147

Our ref

Your ref

Date

23 November 1989

Dear Geoffrey

SCRUTINY DEBATE ON EC R & D FRAMEWORK PROGRAMME

The Commons Scrutiny Committee on European Legislation has recommended that the Commission's draft R & D Framework Programme should be debated. We had produced our memorandum on this on 2 October, but they have only now taken their decision.

The French Presidency intend to press for agreement on the Programme at the Research Council on 15 December. We therefore need to arrange an early debate on the proposal to ensure that Scrutiny is complete before then. However, the Committee asked for a further memorandum which needed to consider before the debate. I put this to their meeting on 22 November. I would, however, be grateful if you would start putting in hand the arrangements for a debate.

Although the Scrutiny Committee has not recommended that the debate should be in Standing Committee, there would be no objection to that if it allowed the debate to be arranged quickly.

I suggest that the motion should be:

"That this House takes note of European Community Document No. 8375/89 on the Community's R & D Framework Programmes; and supports the Government's view that the Commission's proposals for expenditure need to be more clearly justified before the Programme can be agreed".



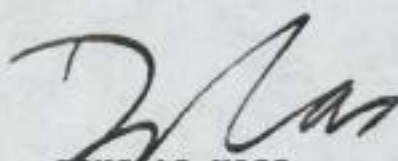
Recycled Paper



The Government's line during the debate will be:

- that we give strong support to those areas of R & D which display good reason for work at the Community level;
- that the original proposal was inadequate as a basis for the expenditure proposed, both in the amount of technical information and the breakdown of the finances proposed;
- that improvements have been achieved, but further issues remain to be resolved (events are moving rapidly on both the technical and institutional fronts, and I may be able to give the House details on the latest position);
- that 7.7 becu for a new programme is an excessive figure; we will develop our response in the light of further proposals expected from the Presidency;
- that the financing of activity in 1993-94 should not prejudice the outcome of the review of the Community's finances in 1992.

I am copying this letter to Members of L, OD(E) and E(ST) Committees, and to the Secretaries of L and OD(E).

*Yours*  


DOUGLAS HOGG

ING848

To:

LA

cc Dr Coleman  
Mr Murray  
RTP Branch Hds

List A - DTI Officials  
List B - Other Government  
Department Officials

From:

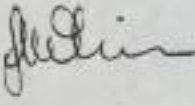
B-11

J D Howarth  
Hd/RTP2  
Room 233  
Ashdown House  
215 6709

15 November 1989

**The Enterprise Challenge: Overcoming Barriers to Growth in  
Smaller Firms**

Attached is a draft Government response to the above ACOST Report. I would welcome comments and modification by close of play Friday 17 November. The draft has not yet been seen by DTI Ministers.

pp 

J D Howarth

DC4ACW



LIST A

|                 |       |
|-----------------|-------|
| Mr J Healey     | EME1  |
| Mr M Nonhebel   | EcMS1 |
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| Mr A Wearing    | EcMS2 |
| Mr A Gray       | FS3b  |
| Mr M Murphy     | CU1   |

LIST B

|                 |                                                |
|-----------------|------------------------------------------------|
| Ms B St Quintin | Inland Revenue                                 |
| Mr J Reed       | Inland Revenue                                 |
| Mr P Keen       | Department of Employment                       |
| Mr B Orr        | Department of Environment                      |
| Mr J Colston    | Ministry of Defence                            |
| Mr B R Hawtin   | Ministry of Defence                            |
| Mr A Lebrecht   | Ministry of Agriculture, Fisheries<br>and Food |
| Mr M Barnett    | Department of the Environment                  |
| Mr R Bright     | Department of the Environment                  |
| Ms P Buley      | Department of Employment                       |
| Mr B Heatley    | Department of Employment                       |
| Mr J McCann     | Department of Employment                       |
| Mr A Quigley    | Cabinet Office                                 |
| Mr N Hunt       | Ministry of Defence                            |
| Mr S Crowne     | Department of Education and Science            |
| Mr A McKeon     | Department of Health                           |
| Ms C Evans      | Chief Secretary's Office                       |
| Mr J Fairclough | Cabinet Office                                 |
| Mr I Dixon      | Cabinet Office                                 |
| Mr P Wanless    | Chief Secretary to the Treasury                |
| Mr P Gray       | PS/Prime Minister                              |

## Introduction

The Government welcomes ACOST focussing attention on the constraints facing small and medium sized Enterprises (SMEs) seeking to grow faster than the norm. In responding, the Government emphasises the dynamic nature of the circumstances influencing the growth of commercial organisations. Because of the continuously changing nature of the problems facing small high-tech companies, measures to help them must also be flexible and modified from time to time as needed.

The Council is concerned about management development in companies which are growing quickly. Several practical self-help schemes have been set up by Government to assist UK management improve it's performance. The Enterprise Initiative - which covers the consultancy initiatives - being an outstanding example. Others like the Management Charter Initiative, the Teaching Company Scheme and Business Growth Training will all help the UK business community acquire and develop improved management skills.

The scope of advice available from the Enterprise Counsellors has widened since the Council looked at the scheme, and further data relating to its application and effectiveness is now available. 10,000 projects have now been completed and a further 26,000 have been approved. External evaluation of the scheme's effectiveness shows that 85% of the firms said they were certain to implement the consultants recommendations within 2 years.: On average the benefits are expected to add

£300,000 to the asset value, and produce a cost saving of £28,000 for each participating company. Perhaps of greater long term significance is the improved understanding of business management, and an increase in the numbers of SMEs willing to use consultants from 50% to 67%. It is worth pointing out that the last three months have seen a significant increase in applications from the South East. The Enterprise Initiative builds on success as well as helping those companies facing difficulties.

One very important topic which has been widely advised upon under the scheme is marketing (30% of all projects), and it is suggested that highly efficient managers with a thorough understanding of their market, will have little difficulty in persuading the financial community of the validity of their business plans. The various forms of current Government assistance which is aimed at improving the quality of UK management, will provide a sound basis for an improved overall economic performance in the future.

Detailed responses to the individual recommendations are given below, and in the order they appear in the ACOST Summary of Recommendations (Chapter 9).

CORPORATE VENTURING

We recommend that DTI investigate ways in which corporate venturing activity may be stimulated in the UK both directly and through linkages with the institutional venture capital industry.

Corporate venturing may be defined as the taking by an established company of a minority interest in a small, new company, either directly or through the use of a venture capital fund.

The DTI recognises that corporate venturing has been an important source of external equity capital for high tech startup companies in the United States, and that some British companies have instituted successful corporate venturing programmes. The Department believes that it would probably be advantageous if this form of finance were more widely developed in the UK. The Department therefore welcomes the initiative of the National Economic Development Office (NEDO) in this field, and is also aware that a number of private sector financial institutions are promoting corporate venturing deals between established and new companies. But for each party, the decision between corporate venturing and the alternatives must be a commercial one, taking account of the unique circumstances of each particular case.

We recommend that consideration be given to refocusing the BES in order to direct funds to companies which fall below the threshold for venture capital funds, and to exclude low cost property related investment.

The Government notes ACOST's recommendation and shares the Council's view that the BES should not be available to companies which can raise the finance they need through the venture capital industry. For this reason the Government introduced the £500,000 annual investment limit for BES companies in 1988. The Government does not believe, however, that a lower limit, as suggested by the Council, would be appropriate. In general companies seeking to raise amounts between £200,000 and £500,000 from the venture capital industry may still face difficulty.

Substantial numbers of investments are made through the BES in smaller amounts. The annual amount of investment made through the BES in companies raising amounts of less than £500,000 has remained broadly constant up to 1988-89 at around £50 million per annum. In 1987-88, the most recent year for which a breakdown is available, 85 per cent of companies using the BES raised sums of £250,000 or less. Investments through Approved Investment funds in 1987-88 amounted to under 10 per cent of total BES investment.

The Government believes that in the short term the BES has a wider role to play as a means of helping to revive the market

in private rented housing. The Scheme was therefore extended in 1988 to include companies specialising in letting residential property. This extension of the BES will, however, cease after the end of 1993. For companies other than private renting companies strict property rules apply so that low risk companies are disqualified from the BES. A substantial part of the investment in assured tenancy companies is likely to have come from investors new to the BES, and who would not otherwise have invested in other types of BES company.

The Government believes that the BES continues to provide an important encouragement for private investment in small companies. The Scheme is kept under close review.

●  
We recommend further that existing company and investor protection legislation be examined to see how the development of local capital markets may be inhibited.

We recognise that the cost of complying with the prospectus requirements of the Companies Act can be a considerable burden on smaller firms trying to raise funds by issuing securities. This is a problem we are looking at in connection with the implementation of Part V of the Financial Services Act, which will replace the Companies Act requirements in due course.

The question of whether local markets in unlisted company securities should be encouraged, is a matter for the Securities and Investments Board, but experience in the past with the Over The Counter market suggests that this area poses particular problems for the protection of investors.



## Competitive Schemes

We recommend that DTI initiates two competitive schemes to stimulate business experimentation in the Smaller Firm.

The first of the proposed schemes (Genesis) is aimed at enhancing the creativity of smaller firms by enabling them to compete for R&D contracts to meet the mission needs of government agencies. As ACOST recognises, the MOD already runs one scheme - the Small Firms Research Initiative (SFIR) - of a similar nature and the DTI has an enhanced Special Merit Award for Research & Technology Scheme (SMART) now running. Expenditure on the MOD scheme exceeds £1M p.a. whilst expenditure on a 3 year cycle of SMART could reach £29M. Recognition by the Government therefore, of the desirability of encouraging small firms to advance their technology is fully accepted. However, in meeting the research mission needs of Government Departments, regard has always to be given to value-for-money implications, and the Government's moves to put its own Research Establishments on an Agency basis (with some possibly privatised) means that the changing situation - mentioned in the introduction - is very relevant to this recommendation. The DTI will review with the MOD how effective the SFIR scheme has been before considering if any changes can be introduced. (Incidentally, the Council figure of £60M p.a. is misleading and comparison of like with like would produce a UK figure of circa £12M).

SMART is due to be reviewed next year. The review will be extremely helpful in determining if further expansion of the scheme is possible, and whether such non-mission orientated research (as per the US National Institute of Health and the National Science Foundation arrangements) achieves the leverage required.

The second of the proposed schemes (the Accelerator programme), is designed to help smaller firms make "transitions" in R&D and marketing which require risky and large investments. The Council identify four such transitions but admit there may be others of equal importance. Although the possible scheme as outlined by the Council is competitive in nature, the government (DTI) feels that it is not a suitable vehicle for promoting self-help in industry. Indeed those applicants with the best ideas and business plans will receive awards, whilst other applicants who might benefit most from an award both with cash and independent scrutiny of their business plans will fail to receive assistance.

However, the Council have identified the problem arising from critical transition periods in the growth of companies which may impede growth seriously or lead to a take-over.

Acquisition of a small cash hungry company by a larger organisation is one solution, <sup>and</sup> ~~but~~ in many cases will be beneficial, but will clearly not be to the liking of many founder Chief Executives. The DTI therefore, proposes to review both its experience on SMART and its Regional Selective

●  
Assistance Scheme to arrive at a balanced understanding of the  
diversity of transition difficulties which can arise, and how  
successful Government assistance has been in helping <sup>JMES</sup> grow more  
quickly.

In appropriate circumstances we recommend that smaller firms should be allocated funds to conduct research complementary with the programmes under investigation in IRCs

This particular recommendation does not seem to evolve from the theology of the text. It also seems to some extent ambiguous. However, it is helpful that this recommendation recognises the importance of the IRCs. As premier centres of excellence the Government would welcome SMEs using the IRCs to conduct research on their behalf or to second their staff to work at an IRC and so gain the benefit of equipment resources and science contacts which will be second to none. Where appropriate grants of up to 50% of the cost of such activities can be made available from DTI approved programmes and/or projects. In particular the DTI is concerned that SMEs should participate as fully as possible in the LINK initiative and hence with research projects that may be undertaken by IRCs. To that end, methods of involving many more small/very small companies in individual projects are currently being studied and discussed with industry.

We recommend that awareness of the business role of intellectual property among small firms be promoted through a new Enterprise Initiative Programme.

DIT has already made some changes to the Consultancy Initiatives and these go some way to meeting the Councils recommendation for a technology audit. The terms of reference for a standard 5 day consultancy on manufacturing now provide for an assessment of a firm's current level of technology including recommendation on improvements in technology to meet business goals. Also under a design consultancy, a firm can obtain an assessment of its products and technology, and advice on improvements including recommendations on intellectual property and technology licensing. The Patent Office are strongly in favour of this increased emphasis in IPR, and are themselves considering how best to increase their efforts in this field. It has to be pointed out however, that expert advice in this field is expensive. The Government has made a start towards fully meeting the objectives of this recommendation but wishes to evaluate the current changes to the Enterprise Initiative before proceeding further.

We recommend that DTI take the steps necessary to promote awareness of the market in patent litigation insurance among smaller firms and patent agents.

The D.T.I. understands and sympathises with the thinking behind this recommendation. Insurance protection in this particular field is not extensive in the UK and the report rightly stresses the lack of understanding between commercial organisations and patent agents on the one hand and the insurance companies on the other. A better informed market may make greater use of patent litigation insurance and the DTI is prepared to consider how this might be brought about. It has to be pointed out however, that examination of this particular problem is not new and the ultimate test of commercial attractiveness and viability will govern the Department's thinking and activities.

●  
We recommend that the Teaching Company Schemes continues to expand in the future

The Government accepts the philosophy behind this recommendation. Over the last few years efforts have been made to steadily increase the scope of the scheme and to widen its applicability. This process will continue commensurate with the resources available from the funding Departments and Research Councils.

We recommend that a series of Regional Competitions be established to identify, develop and diffuse best practice methods for delivering training in strategic management skills to the smaller firm.

The Training Agency welcome the report's reference to the importance of training for small companies. The Agency introduced a new programme, Business Growth Training, in April this year. A major aim of this programme is to enhance management skills, particularly in smaller firms.

The report recommends that the Management Charter Initiative (MCI) should pay close attention to the needs of smaller firms in formulating its network proposals. The Forum for Management Education & Development, which is responsible for the MCI, recognises the need to take account of the needs of smaller firms and is encouraging them to join its networks of employers. The Training Agency intend, in co-operation with MCI, to publish a series of best practice case studies relating to small firms.

Paragraph 9.11 recommends a series of regional competitions to promote best practice in training for small firms. The Training Agency agree that there is a need to develop and diffuse best practice methods for delivering training to the smaller firms. An important feature of Business Growth Training, which the TECs will manage in the future, is the dissemination of successful projects to encourage other firms to improve their training. In addition, the Training Agency's



prestigious National Training Awards reward those businesses that demonstrate the competitive advantage they have gained through exceptionally effective investment in training. Promotion of the exemplars is achieved through both national and local advertising, and through the national and regional awards ceremonies.

C: Economic /  
S+T. Envy

PRIME MINISTER  
\_\_\_\_\_

HOUSE OF LORDS SELECT COMMITTEE ON SCIENCE  
AND TECHNOLOGY: GOVERNMENT RESPONSE TO 1988-  
89 REPORT ON CIVIL R&D

The S&T Secretariat in the Cabinet Office  
have co-ordinated a Government response to  
this House of Lords Select Committee Report.  
The suggestion is that the response should  
take the form of the attached letter from you  
to Lord Sherfield, the Committee Chairman.

Content to sign?

PAUL GRAY

9 November 1989

CONFIDENTIAL

DeA



cdA

10 DOWNING STREET

LONDON SW1A 2AA

*From the Private Secretary*

3 November 1989

Dear Neil,

EC R & D FRAMEWORK PROGRAMME 1990-94

The Prime Minister understands that the French Presidency plan to circulate before the meeting of the Research Council on 15 December some compromise proposals, including the technical contents of the programme. When this is available she would be grateful if DTI Ministers, with the assistance of the S & T Secretariat in the Cabinet Office, could co-ordinate an assessment of the proposals for circulation to E(ST).

I am copying this letter to the Private Secretaries to members of E(ST) and to Trevor Woolley (Cabinet Office).

Yours,  
Paul

(PAUL GRAY)

Neil Thornton, Esq.,  
Department of Trade and Industry.

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10 DOWNING STREET  
LONDON SW1A 2AA

*From the Private Secretary*

MR. FAIRCLOUGH,  
CABINET OFFICE

EC R&D FRAMEWORK PROGRAMME 1990-94

Thank you for your minute of 30 October which I have shown to the Prime Minister. In view of the pressures on her diary, she does not wish to pursue your suggestion of an informal meeting with selected individuals during the run-up to the Research Council on 15 December. She would prefer DTI Ministers to co-ordinate an assessment of the expected compromise proposals from the Commission which could be circulated to E(ST). I will be in touch separately with DTI about this, but you may also wish to make contact with them yourself.

I am copying this minute to Trevor Woolley (Cabinet office).

PAUL GRAY

1 November 1989

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CONFIDENTIAL

*file No*

MR. MILLS  
POLICY UNIT

LOCAL GOVERNMENT FINANCE: STATEMENT

Thank you for your note of 31 October which I showed the Prime Minister last night along with Chris Patten's draft statement. She commented that she thinks you are right but that it is not worth making an issue of the point. She has therefore agreed the original terms of Chris Patten's draft.

PAUL GRAY

1 November 1989

*Sir John Balfour*



*L. Ke  
ds*

10 DOWNING STREET  
LONDON SW1A 2AA

*cc John  
Faulstich*

*From the Private Secretary*

31 October 1989

You wrote to the Prime Minister on 15 September inviting her to attend and chair the meeting of ACOST on 14 March. I can now confirm that the Prime Minister would be pleased to accept this invitation.

PAUL GRAY

Sir Francis Tombs

ECR

Prime Minister's cell

Given the pressures on your diary, I do not feel an informal meeting/hand of this sort would be a good use of your time. It might be better to get DTI

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MR PAUL GRAY - NO. 10

Minister to co-ordinate an assessment of the Commission's compromise for a new R & D programme to E(ST).

30 October 1989

EC R & D FRAMEWORK PROGRAMME 1990-94

Agree?

REC 6 Yes 3/10 ms

As you know, the French Presidency have stated that they want the Research Council on 15 December to reach agreement on the Commission's proposal for a new Framework Programme from 1990 to 1994. Mr Hogg, in company with a number of other Member States, told the Council on 17 October that the UK remained unsatisfied with the level of detail which the Commission had supplied on the proposed technical coverage and contents of the Programme. The Presidency concluded that it, in conjunction with the Commission, would prepare a revised draft to be discussed by scientific advisers. The French are therefore likely to circulate shortly before 15 December a "global compromise" which draws together the issues, including the technical contents of the Programme.

2. At E(ST) on 2 October Ministers raised a number of queries relating to this aspect and, in particular, on the relative value of research work conducted at the Community level compared with domestic R & D. They also discussed the need to distinguish funding appropriate for pre-competitive work, including the necessary definition of standards in the context of the Single Market, from those activities nearer the market which should be more properly led by industry or covered by other mechanisms, notably EUREKA.

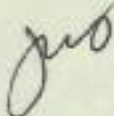
3. Departments have already done considerable work on the shape and contents of a Programme which would best suit our interests. It may however be useful for Ministers to have an opportunity before December to discuss the issues with a representative group of academic and industrial people who have experience of both national and Community R & D.

4. I therefore suggest that the Prime Minister might hold an informal meeting, perhaps over lunch, with four or five individuals together with the Ministers principally involved. This would give an opportunity to explore the questions raised at E(ST) and highlight some of the issues which will feature in the run up to the Research Council on 15 December. The most appropriate timing would accordingly be the second half of November. I have in mind the following:

Sir Francis Tombs, Chairman ACOST  
Dr David Smith, Chairman of International Working Group ACOST  
Sir David Phillips, Chairman ABRC  
Sir Peter Swinnerton-Dyer, Chief Executive UFC  
Sir Robin Nicholson, Chairman CEST

I will liaise more broadly with Departments on a guest list if the Prime Minister considers the idea worth pursuing.

5. I am copying this minute to Sir Robin Butler.

  
JOHN W FAIRCLOUGH  
Chief Scientific Adviser





10 DOWNING STREET  
LONDON SW1A 2AA

cc MOD  
DOE  
DHS  
MAFF  
DOT  
DIN  
FL  
BA  
FLO  
OTH  
CO  
CD  
ST  
PJ

From the Private Secretary

27 October 1989

Dear Gareth,

**EC R & D FRAMEWORK PROGRAMME 1990-94**

The Prime Minister was grateful for your Minister's minute of 23 October. She has noted the position reached at the 17 October Research Council.

I am copying this letter to the Private Secretaries to members of E(ST) and to Trevor Woolley (Cabinet Office).

Yours,  
P.G.

(PAUL GRAY)

Gareth Jones, Esq.,  
Department of Trade and Industry.

dg

**dti**

the department for Enterprise

*celo*

The Rt. Hon. Nicholas Ridley MP  
Secretary of State for Trade and Industry

Paul Gray Esq  
Private Secretary to the  
Prime Minister  
10 Downing Street  
LONDON  
SW1A 2AA



**Department of  
Trade and Industry**

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Direct line 215 5623

Our ref PE3ADW

Your ref

Date 26 October 1989

*PA - no che chg.*

*RLG  
27/10*

*AL Filip*

*Dear Paul,*

**ACOST REPORT: OVERCOMING BARRIERS TO GROWTH IN SMALL FIRMS**

Thank you for your letter of 16 October and the copies of the correspondence between the Prime Minister and Sir Francis Tombs which explain why the Report and the Government's response to it need to be published jointly.

We are now co-ordinating the response with other Departments with a target completion date in early November.

I am copying this letter to Stephen Crowne (Department of Education and Science), Andy McKeon (Department of Health), Roger Bright (Department of the Environment), Brian Hawtin (Ministry of Defence), Andrew Le Brecht (Ministry of Agriculture, Fisheries and Food), Carys Evans (Chief Secretary's Office), John McCann (Department of Employment) and to John Fairclough (Cabinet Office).

*Yours aw,*

*Neil Thornton*

NEIL THORNTON  
Principal Private Secretary



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Support + Innovation  
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MINISTRY OF DEFENCE

MAIN BUILDING WHITEHALL LONDON SW1A 2HB

Telephone 01-218 2111/3



24~~6~~ October 1989

MO 30L

*MBR*  
*PLCB*  
*25/10*

Dear Neil,

ACOST REPORT: OVERCOMING BARRIERS TO GROWTH IN SMALLER FIRMS

I have seen your letter to Paul Gray of 12th October, and his reply to you of 16th October, about joint publication of the ACOST report and the Government's response to it.

As you know, we strongly support joint publication. Although it is unfortunate that so little progress has been made since July on the preparation of the Government response, we will, of course, do all we can to assist you in meeting the timescale proposed by Paul Gray. The main points we would wish to make are contained in Brian Hawtin's letter of 21st July to Andrew Turnbull and mine of 20th September to Dominic Morris, but we cannot take our work much further until we know how you intend to structure the response.

Since time is short, I suggest that your lead division makes contact with the responsible official here, Mr J R C Oughton, Director of Procurement Policy, or his staff on 01-218-7598/2591.

I am copying this letter to Paul Gray (No. 10), Roger Bright (Department of the Environment), Stephen Crowne (Department of Education and Science), Andy McKeon (Department of Health), Andy Lebrecht (MAFF), Carys Evans (Chief Secretary's Office), John McCann (Department of Employment) and John Fairclough (Cabinet Office).

*Yours sincerely*

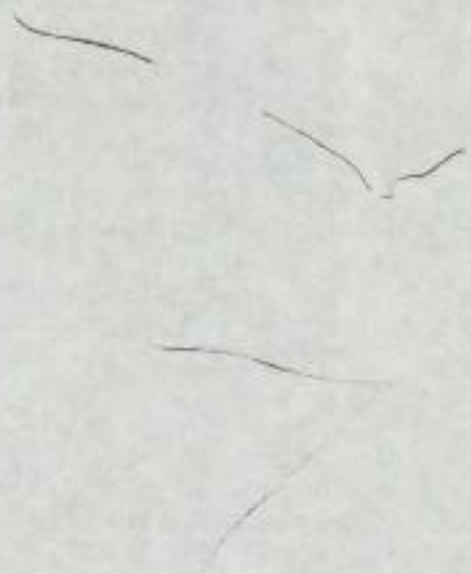
*John Colston*

(J P COLSTON)  
APS/S of S

Neil Thornton Esq  
PPS/Secretary of State for Trade and Industry

AND POL : R+D

A 7



TO:

PRIME MINISTER

FROM:

Prime Minister

DOUGLAS HOGG

Cable to note?

23 October 1989

Rec 6

23/10

York

**EC R & D FRAMEWORK PROGRAMME 1990-94**

Discussion at the Research Council on 17 October went rather well. The Presidency concentrated on institutional and budgetary aspects. In addition, attention was focussed on the inadequate level of information provided by the Commission on the contents and the consequent need for further work on the technical annex.

2. On the financing of the Programme, I was able to form a productive alliance with the Dutch and, rather unexpectedly, with the Spaniards on the procedure for decision-taking. This would involve agreement at this stage only on the amount for the programme between 1990-92. There would be a subsequent decision, by unanimity, in 1992 about the funding for 1993-94. The Dutch proposed that this should compromise two elements:

- a. a sharply tapering allocated provision; and
- b. an unallocated reserve designed to provide flexibility in the overall management of the programme.

3. These last two elements would thus respect the Inter-Institutional Agreement (IIA) and be brought firmly within the ambit of decisions in 1992 on the future financing arrangements for the Community.

4. I stressed that any reserve would have to be included in the total envelope of any decision stemming from the current mid-term review. I also ensured that no specific figures were written into agreed Council conclusions. Permanent Representatives will now need to examine these ideas in detail.

5. We have therefore managed to steer the debate in the direction which E(ST) concluded best met our interests. At the same time, it is clear that we shall come under strong pressure to adopt the proposal at the next Research Council on 15 December. We must avoid being drawn at this stage as to whether or not we will be prepared to give our agreement to the compromise proposal which the French are likely to produce. We now need to concentrate our efforts in the coming weeks on influencing the technical content to suit our requirements and on getting the total sum right.

6. I am copying this letter to members of E(ST) and to Sir Robin Butler.

DH



M&M

10 DOWNING STREET  
LONDON SW1A 2AA

*From the Private Secretary*

**MR. KEVIN THOMAS,  
CABINET OFFICE**

**1989 ANNUAL REVIEW OF  
GOVERNMENT FUNDED R&D**

Thank you for your minute of 20 October.  
Perhaps you could just let me have one copy  
of the 1989 facts sheet when it is available.

**PAUL GRAY  
21 OCTOBER 1989**

KG





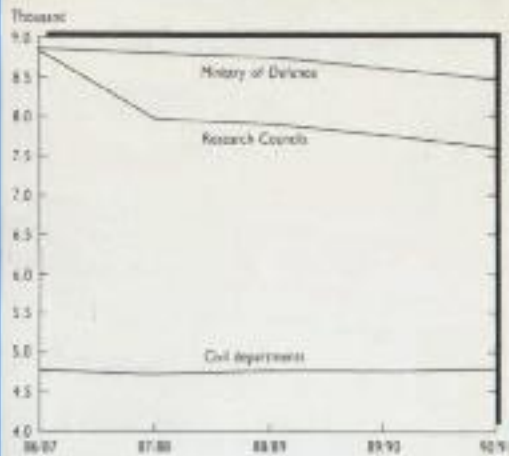


Figure 6

**MANP EMPLOYMENT INTRAMURALLY ON R & D**

In 1986/87 21,566 graduates and technicians were employed by Government for intramural R&D. The figure shows likely trends in this category of employment for the period to 1991. As these numbers are derived from gross running costs they are only indicative rather than planned.

# R&D PERFORMED IN UK INDUSTRY 1986

Over the period 1981 to 1986 the value of R&D conducted by industry increased by over 13 per cent in real terms to stand at £5672.7 million in 1986.

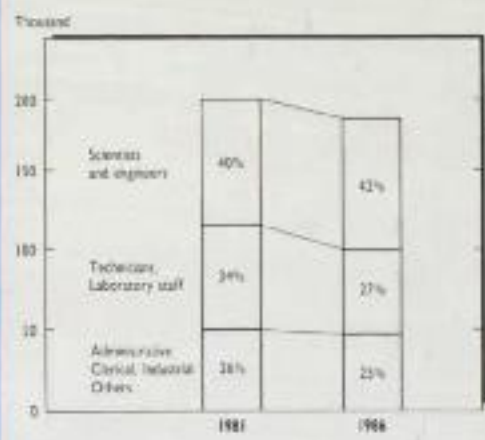


Figure 10

**INTRAMURAL EMPLOYMENT ON R&D**

This figure shows the change in industrial employees on R&D between 1981 and 1986.

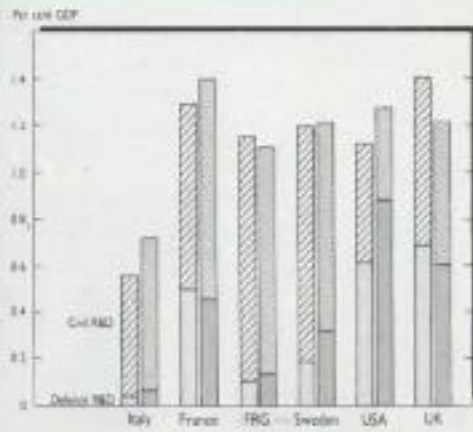


Figure 7

**INTERNATIONAL COMPARISON OF GOVERNMENT FUNDED R&D**

Using OECD data, gives an international comparison civil and defence R&D as a percentage of R&D.

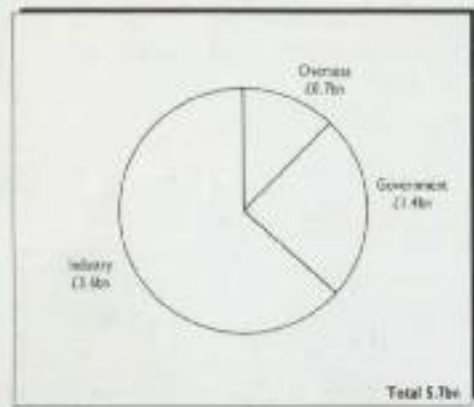


Figure 8

**SOURCE OF FUNDS 1986**

The sample survey of industry commissioned R&D for 1986 showed total expenditure to be £5472.7m. The source of these funds is shown in this figure. The 1986 survey confirmed the trends of recent years of an increasing proportion coming from overseas, it had been 7 per cent in 1981.

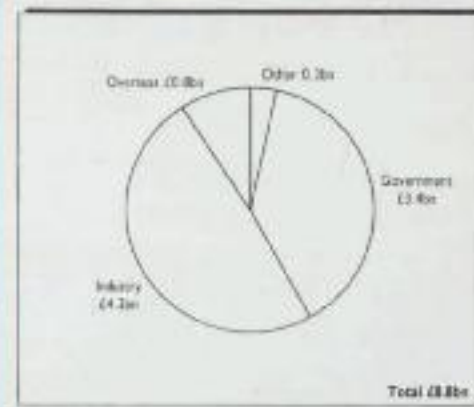


Figure 11

**SUMMARY OF UK R&D**

GERD represents the total R&D activity in a country and is, therefore, a useful measure in international comparisons. This figure shows the source of funding for the 1986 GERD of £8.1bn.

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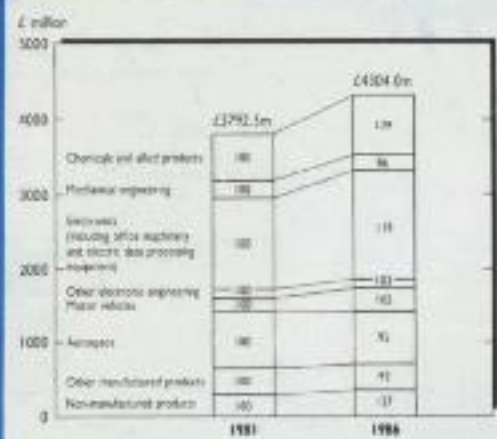


Figure 9

**INTRAMURAL EXPENDITURE ON R&D**

The trend in R&D performed in the major industrial sectors is shown in this figure.

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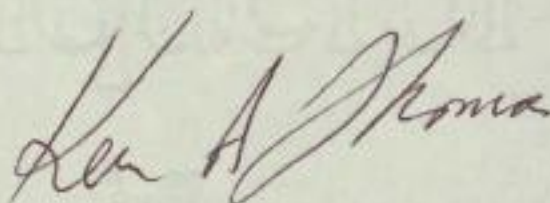
FROM: KEVIN THOMAS  
DATE: 20 OCTOBER 1989

File Ref: ST 134/2

MR PAUL GRAY  
No. 10

1989 ANNUAL REVIEW OF GOVERNMENT FUNDED R&D  
*IN ATTACHED FOLDER*

Herewith a copy of the 1989 review which will be published on 25 October. A facts sheet hand-out will also be available and is expected here on Monday 23 October. By way of example I enclose the 1988 version, I will supply that for 1989 when it arrives. Would you wish to have more copies of either the report or facts sheet?



KEVIN THOMAS  
Science and Technology Assessment Office



Qd0032

MR PAUL GRAY

20 October 1989

HOUSE OF LORDS SELECT COMMITTEE ON SCIENCE AND TECHNOLOGY:  
GOVERNMENT RESPONSE TO 88-89 REPORT ON CIVIL R&D

I attach the Government response to the HoL Select Committee's 88-89 Report on Civil R&D (copy of the Report also attached). Although the Report is relatively minor, being a follow-up commenting on developments since the publication (Cml85) of the Government's response to the Select Committee's 1986-87 substantive Report on Civil R&D, it would seem appropriate for the Prime Minister to respond.

2. The response has been cleared with Departments.
3. I am copying this letter to Richard Wilson and Trevor Woolley.

*Roy Walker*

ROY WALKER  
S&T Secretariat  
Cabinet Office

Em

A: Sherfield

**GOVERNMENT RESPONSE TO HOUSE OF LORDS SELECT COMMITTEE ON SCIENCE AND TECHNOLOGY'S REPORT ON CIVIL R&D: LETTER TO LORD SHERFIELD**

1. I am responding on behalf of the Government to the 3rd Report of the Select Committee on Science and Technology, Session 1988-89.
2. The Government is pleased that the Committee welcomes recent developments since the publication of Cm 185, the Government Response to the 1st Report of the Committee, Session 1986-87, and considers that the Government's new central structure for science and technology is beginning to prove effective.
3. Since the Committee's report reviews a number of issues which were addressed in its earlier report, the Government is confining its response to four subjects - the Science Budget, ACOST, Manpower and Government Research Establishments.

**Science Budget**

4. The Government notes the Committee's warm welcome for the substantial enhancement of the Science Budget which was announced last Autumn for the current year and for the two which follow. The increased resources will sustain top quality science across a broad field of basic and strategic, directed and curiosity-motivated research programmes. They will enable important new scientific opportunities to be grasped and underpin the excellence of UK science into the twenty-first century.

**ACOST**

5. The Committee recommends that ACOST should produce a report to Parliament, perhaps every two years, assessing progress and priorities in Science and Technology. A wide ranging report on progress and priorities in public sector science and technology is of course already made available to Parliament in the Annual Review

of Government Funded R&D. In addition, much of ACOST's advice is already published. However some of ACOST's advice to Government, for example that on priorities for science and technology is confidential. Sir Francis Tombs said in his evidence that he considered much of the influence of such advice came from its confidentiality. The Government agrees with this view and does not consider that ACOST's effectiveness in advising it on progress and priorities would be enhanced if such advice were to be published.

### Manpower

6. The Government fully recognises the importance of maintaining an adequate supply of very highly qualified manpower, both for the science base and for industry. Training and development of such manpower is supported through postgraduate awards, postdoctoral fellowships and research grants - all of which are being increased as a result of the substantial enhancement of the Science Budget we announced last Autumn. The Government welcomes the efforts of the Research Councils, through concentration and selectivity, to train and deploy manpower more effectively.

7. However, as the Committee recognises, the flows into advanced research training depend also on the success of our policies for schools and higher education. The National Curriculum provisions of the Education Reform Act 1988 made science and technology compulsory subjects for all pupils in maintained schools from the age of 5 to 16. The detailed requirements for science in the National Curriculum, which were published in March, cover the key elements of the three main sciences so as to ensure that all pupils have a balanced science education (whereas now, for example, the majority of girls give up study of the physical sciences before the age of 16). We expect that one effect of the new requirements will be to increase the numbers of young people qualified and willing to pursue science-based courses of study beyond the age of 16.

8. The Government has also been taking vigorous action to combat teacher shortages in mathematics, physics and technology. We

launched an action programme 3 years ago to improve recruitment to teacher training courses and into teaching, and to provide training and support for those present teachers of these subjects who are inadequately qualified or experienced. This programme has cost £50m so far and has been successful in improving recruitment. Chemistry was added to the programme earlier this year, and we aim to continue to expand it as necessary to meet future teacher needs.

9. The thrust of the Government's policies for higher education has been to ensure that universities, polytechnics and colleges, and the national funding bodies, are more aware of the needs of the economy, and to give them greater flexibility to respond to those needs. This has already yielded all-time record student numbers and participation rates. Within this expansion there has been a further shift toward science-based courses, assisted by the Government's Engineering and Technology Programme, established in 1985 with the aim of creating 5,000 new university places in these subjects. The Government's policies on higher education will be continued and enhanced.

10. As regards the rewards offered to scientists and engineers, the Government's view is that it is for employers to determine these in the light of their needs for such manpower.

#### **Government Research Establishments (GREs)**

11. The Committee recommends that the links between GREs and Government Departments should be loosened and that Departments should commission work from other Research Establishments as the occasion demands. The Government agrees with this view and is setting in hand arrangements to strengthen the commissioning process within Departments, including the establishment of clearer customer-contractor relationships, and to introduce greater competition into the placing of Government research. These go hand-in-hand with plans to improve the internal management of Research Establishments. To this end, all Research Establishments will be considered for Agency status under the Government's Next

Steps initiative. The Department of Trade and Industry's Warren Spring Laboratory and National Weights and Measures Laboratory became Executive Agencies in April 1989. Other Agency candidates are the Building Research Establishment (DOE), the Central Veterinary Laboratory (MAFF), the Laboratory of the Government Chemist and the National Physical Laboratory (DTI) and the Forensic Science Service (HO).



CEP



Ministry of Agriculture, Fisheries and Food  
Whitehall Place, London SW1A 2HH  
01-270 8709/8667

From the Minister's Private Office

Neil Thornton Esq  
Principal Private Secretary to the  
Secretary of State for the  
Department of Trade and Industry  
Department of Trade and Industry  
1 Victoria Street  
London SW1H 0ET

WBM  
Rico  
20/10

20 October 1989

Dear Neil

ACOST REPORT OVERCOMING BARRIERS TO GROWTH IN SMALLER FIRMS

In response to Paul Gray's letter of 28 September I confirm that, as indicated by Shirley Stagg's letter of 10 August to Andrew Turnbull, we wish to contribute to the formulation of the Government response to the report. A note of our comments is enclosed.

I am copying this letter to Andrew Turnbull (Prime Minister's Office) Roger Bright (Department of the Environment) Stephen Crowne (Department of Education and Science) Andy McKeon (Department of Health) Brian Hawtin (Ministry of Defence) Carys Evans (Chief Secretary's Office) John McCann (Department of Employment) and John Fairclough (Cabinet Office).

Yours sincerely

Andy

A J LEBRECHT  
PRINCIPAL PRIVATE SECRETARY

ACOST REPORT OVERCOMING BARRIERS TO GROWTH IN SMALLER FIRMS

COMMENTS BY MAFF

MAFF has an interest in the report as sponsor Department for the agriculture, fisheries and food industries. Both agriculture and fisheries industries are predominantly composed of small firms; there are also a significant number of small firms in the food industry.

The Genesis Programme

MAFF's principal interest in the report is in the proposed "Genesis" programme (Recommendation 3). As a general principle MAFF considers that Departments, as customers for R&D, should be free to select the most suitable contractor in each case from the standpoint of efficacy and value for money.

If nevertheless the principle of the proposal were accepted, MAFF considers it essential to consider carefully the extent of its application, as the report itself suggests (para 6.28). The US Government's SBIR scheme, on which the proposal is based, applies only to Federal agencies' extra - mural research budgets. It would not be appropriate to take account of in-house expenditure.

Moreover not all R&D is suitable for placing with companies. The nature of MAFF's programmes is such that less than 2% of our external spend is with companies, large or small. The remainder is mainly with research councils, universities and the Food Research Associations. Small firms could not be expected to substitute for these contractors. Indeed many small firms are

/members of the...

members of the Food Research Associations in order to secure their research needs on a collaborative basis.

In addition the joint MAFF-DTI sponsored LINK programme in Food Processing Sciences is specifically designed to stimulate the research base of small companies. MAFF considers that, both through this programme and its support for the Food Research Associations, it is giving full support to research in small food manufacturers. The imposition of a quota for small firms would cause special difficulties for MAFF.

2nd Pol: R+D

P77





CABINET OFFICE

70 Whitehall London SW1A 2AS Telephone 01-270

*File*

*RA*

*MCG*

*18/10*

Our ref: Qe 0068

File ref: ST 140/1

17 October 1989

Mrs M Bloom  
RTPl  
DTI  
Ashdown House

Dear *Margaret,*

ACOST BARRIERS TO GROWTH REPORT: GOVERNMENT RESPONSE

I was disturbed to read in Neil Thornton's letter of 12 October to Paul Gray that 'at the request of the Cabinet Office no work has yet been done on coordinating responses between Departments'.

I recall suggesting to Derek Howarth that he awaited receipt of Paul Gray's letter of 28 September so that it could be referred to in the DTI letter calling for other Departments' contributions. If my suggestion is the basis for Neil Thornton's comment, then it has been misrepresented. Please start coordination work with interested Departments without further delay.

As it is the DTI contribution to the response which forms the critical path in this exercise, the mistaken postponement of contact with other Departments should not affect the overall response time - No harm done!

I am copying this letter to Paul Gray, Neil Thornton, John Fairclough and Derek Howarth.

Yours sincerely,

Ian Dixon

IND POL: R+D prA.





me KK  
ceh

10 DOWNING STREET

LONDON SW1A 2AA

*From the Private Secretary*

16 October 1989

Dear Neil,

ACOST REPORT: OVERCOMING BARRIERS TO GROWTH IN SMALL FIRMS

Thank you for your letter of 12 October, in which you advocate that the Report and the Government's response to it should be published separately.

I see substantial difficulties with that approach. Following my earlier letter to you of 28 September, the Prime Minister wrote to Sir Francis Tombs on 2 October raising the possibility of joint publication. Sir Francis has now replied in his letter of 13 October accepting this approach, while urging that the Government response should be made available by the end of November at the latest. I enclose copies of these two letters.

Against that background, I think it is essential to stick to joint publication. As Sir Francis Tombs' letter indicates, this is not unprecedented, and was followed successfully in the case of ACOST's report on Defence R & D. But in view of Sir Francis' comments on timing, we can perhaps afford slippage of a few days on the target date of the end of October suggested in my 28 September letter.

Subject to that point, I hope you will now agree to proceed on the basis set out in my earlier letter.

I am copying this letter to Stephen Crowne (Department of Education and Science), Andy McKeon (Department of Health), Roger Bright (Department of the Environment), Brian Hawtin (Ministry of Defence), Andrew Le Brecht (Ministry of Agriculture, Fisheries and Food), Carys Evans (Chief Secretary's Office), John McCann (Department of Employment) and to John Fairclough (Cabinet Office).

Yan.  
Paul

(PAUL GRAY)

Neil Thornton, Esq.,  
Department of Trade and Industry.

Paul



# ACOST

Advisory Council on Science and Technology  
70 Whitehall, London SW1A 2AS  
01-270-0109

On 0508

The Rt Hon Margaret Thatcher MP  
The Prime Minister  
10 Downing Street  
London SW1

13 October 1989

Dear Prime Minister,

Thank you very much for your letter of 2 October. I am very pleased that you agree to the publication of our report on Overcoming Barriers to Growth in Small Companies. I shall be very happy to have the Government's response bound in with this, following the similar and successful arrangements for our Defence R & D report. However, I would not like the timing of the availability of the response to delay publication unduly. We would like to receive this by the end of November at the latest as the preparations for publishing the report are already in hand.

Yours sincerely,

*Sir Francis Tombs*

SIR FRANCIS TOMBS

Secretariat  
Telephone 01-270 0105  
Telex 27582 CABOFF G  
Fax 01-270 0074  
Prestel 21 999 3456  
Gold B1 MPO 005





File  
of  
PRM

10 DOWNING STREET  
LONDON SW1A 2AA

THE PRIME MINISTER

2 October 1989

*Dear Sir Francis*

Thank you for your letter of 17 July enclosing the full Report which ACOST has now completed on 'Overcoming Barriers to Growth in Small Companies'. I am content to accept your proposal that the Report should be published and shall write to you again concerning the recommendations in the Report. You may wish to hold back publication of the Report until you are able to attach to it the Government response.

*Yours sincerely*

*Nayanshah*

Sir Francis Tombs

25



*Mr P  
at*

10 DOWNING STREET

LONDON SW1A 2AA

*From the Private Secretary*

16 October 1989

*Dear Gareth,*

EG R&D FRAMEWORK PROGRAMME 1990-94:  
BRIEF FOR RESEARCH COUNCIL

The Prime Minister was grateful for your Minister's minute of 13 October and the attached draft speaking note. She is content with the draft subject to the following points:

- in the first indent on page 2 amend the third and fourth lines to read "supported by industry, either directly or via EUREKA";
- on page 3, first indent, amend the first line to read "can only consider balanced programme ....."
- on page 3, second indent, insert "policy or" at the beginning of the sixth line.

I am copying this letter to the Private Secretaries to members of E(ST) and Trevor Woolley (Cabinet Office).

*Yan,  
P*

PAUL GRAY

Gareth Jones, Esq.  
Office of the Minister for Trade and Industry.

*P*



# ACOST

*pls - CF cc PU*

Advisory Council on Science and Technology

70 Whitehall, London SW1A 2AS

01-270-0109

Qn 0508

*f 14/10*

The Rt Hon Margaret Thatcher MP  
The Prime Minister  
10 Downing Street  
London SW1

13 October 1989

*Dear Prime Minister,*

*- flap*  
Thank you very much for your letter of 2 October. I am very pleased that you agree to the publication of our report on Overcoming Barriers to Growth in Small Companies. I shall be very happy to have the Government's response bound in with this, following the similar and successful arrangements for our Defence R & D report. However, I would not like the timing of the availability of the response to delay publication unduly. We would like to receive this by the end of November at the latest as the preparations for publishing the report are already in hand.

*Yours sincerely,*

*Francis Tombs*

SIR FRANCIS TOMBS

Secretariat

Telephone 01-270 0105

Telex 27562 CAROFF G

Fax 01-270 0074

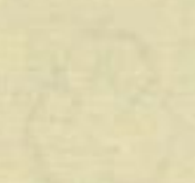
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IND POL: Research + Development p7



INNOVATION



*CEPA*

*Prime Minister*

To:  
PRIME MINISTER  
From:  
DOUGLAS HOGG

*We have passed some minor  
comments on the attached speaking note  
to DTI, as marked in red.*

13 October 1989

*Otherwise, content? Agree from  
changes - they are  
important  
PAC 6 2/10 not*

EC R&D FRAMEWORK PROGRAMME 1990-94: BRIEF FOR RESEARCH COUNCIL

*minutes attached.*

Since our discussion in E(ST) on 2 October about the Commission's proposal for a new Framework Programme for 1990-94 we have received two new documents from Pandolfi, the Commissioner with responsibility for R&D. The first is the Commission's response to the report by external evaluators of the current Programme (the so-called Wise Men's Report); and the second is additional detail on the technical contents of the proposed new Programme. Meanwhile, Permanent Representatives in Brussels have been considering the implications of the proposal for the Inter Institutional Agreement and budget discipline, while scientific advisers have had an initial discussion of the technical coverage of a new Framework Programme.

The French Presidency want the Research Council on 17 October to focus on institutional and budgetary issues and have put forward three specific questions:

- a. how to deal with any 'amount deemed necessary' for the period beyond the Inter Institutional Agreement;



- b. the nature of a subsequent decision in 1992;
- c. whether the profile of expenditure should be bell-shaped, ie. tapering, with a reserve for 1993-94.

As agreed at E(ST), I attach the draft speaking note which I propose to use in the initial round of interventions at the Council. I shall, of course, make more detailed critical comments on the latest papers from the Commission.

I am copying this letter to other members of E(ST) and Sir Robin Butler.



pp DOUGLAS HOGG

DEPARTMENT OF TRADE AND INDUSTRY

(Approved by the minister  
and signed in his absence)

ING410

DRAFT SPEAKING NOTE FOR MR HOGG

- Grateful to Pandolfi for Commission response to Five Wise Men's Report on current Framework Programme; and extra technical detail on their proposal for 1990-94 Framework Programme. Both are central to our work. Unfortunate that should have had to wait so long.

Mid Term Review

- UK has consistently argued that we must have a proper Mid Term Review, an adequate Commission response and action plan as pre-condition for agreeing a new programme. Pandolfi's response represents a serious effort to take account of the important recommendations which external evaluators made. But this is essentially a starting point for the detailed evaluation of progress, priorities and modalities before we move on to consider a new Programme. Commission will need to demonstrate how the general criteria stipulated in report have been followed; in particular, that the principle of subsidiarity~~ty~~ respected in each aspect of the Programme. The proposal does not demonstrate that this principle is being respected e.g. the proposed environment programme, proposals for manpower mobility and basic biotechnology.

- As Report said, EC R&D must focus on pre-competitive activity and technology transfer relating to standards. Product development should be supported by industry or <sup>extensively</sup> via EUREKA. Commission claim to accept Report view that there should be a systematic relationship between the Framework Programme and EUREKA. UK not satisfied that this reflected in latest proposal. Some areas in IT and communications sectors are nearer the market and more appropriate for Eureka-type approach eg peripherals and some aspects of demonstration projects.
- Report stresses need for flexibility. UK agrees. But flexibility requires systematic monitoring and evaluation so that changing requirements can be met within a given financial envelope. The report recommends Selectivity and that programmes should be ended to make way for others. There is little evidence that any serious attempts has been made to do this. The proposal is for the same old products in new packaging.
- Note Commission's intention to appoint management consultants to examine serious criticisms of current Commission practices. Must not be used as excuse for postponing action. Improved co-ordination between Directorates General central aspect of Wise Men's Report.



Expect Commission to Brief Member States as consultancy is completed. In the meantime it would be very helpful if the Commission would circulate the instructions they propose to give to the management consultants.

- Member States should in any case have greater role in management of all programmes, whatever the size. Implementation of mechanism to give member states that increased role should be addressed immediately.

#### Technical Coverage of new Proposal

- Welcome the additional material Commission have now provided. The more detailed breakdown of sub lines and their financial share of overall envelope gives clearer guidance of priorities in new Framework Programme. But falls well short of what we (and other Member States) have been pressing. Namely clearly defined objectives and priorities under each main area of work together with specific goals and priorities under each sub heading. Commission have still only indicated general ambitions in context of Europe's position vis a vis its main competitors. This is not sufficient. Disappointing response therefore after so much prodding. Assume Commission staff have in any case already done this essential preparatory work.

- Can only ~~agree~~<sup>consider</sup> balanced programme on basis of agreed priorities and objectives. Criteria of scientific excellence, subsidiarily and value for money need to be demonstrated before we will be in a position to make overall judgement.
- Budget should be fixed at level justified by component elements best worth pursuing at EC level, rather than one determined by funds available under the IIA. Framework Programme should avoid duplicating or overlapping national activity. Should not cut across national R&D programmes where these already provide demonstrated value for money and scientific excellence, eg, in UK, large areas of biological and molecular sciences, some aspects of materials, pharmaceutical.

## IIA and budget

- Will comment in detail on questions put by Presidency. Some important general observations.
- Commission's proposal of 7.7 becu budget totally unacceptable to my Government. Can only begin to consider possibility of any additional resources when we



have a clear view of what can be most appropriately and effectively achieved at Community level, and of how best to carry it out.

- A clear distinction between budgetary resources in period covered by current IIA and any new commitments beyond 1992. A decision on amount deemed necessary for 1990-92 could be taken in light of mid-term review. But any figures for 1993-94 would be entirely indicative and have to be established by unanimous decision once future financing arrangements for EC settled in 1992.
  
- Profile of expenditure: can obviously not prejudge decision on R&D budget. But three important criteria. First, we must avoid the front-end loading which has characterized the current Programme. Second, commitments in later years of a Programme must taper off to allow room within any financial envelope for any new expenditure Council may agree following further rigorous evaluation of progress and priorities. Finally, need to rule out possibility of another mid term review in 1992 which simply a pretext for further step increase in funding, as Commission currently proposing.

**dti**

the department for Enterprise

*apo*

The Rt. Hon. Nicholas Ridley MP  
Secretary of State for Trade and Industry

Paul Gray Esq  
Private Secretary to the  
Prime Minister  
10 Downing Street  
London SW1A 2AA

**Department of  
Trade and Industry**

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Direct line 01 215 5621  
Our ref JW1ACS  
Your ref  
Date 12 October 1989

*Dear Paul,*

**ACOST REPORT : OVERCOMING BARRIERS TO GROWTH IN SMALL FIRMS**

Your letter <sup>at flap</sup> to me of 28 September suggests that the ACOST Report on Overcoming Barriers to Growth in Small Firms should be published in a combined publication with the Government response. If this approach is to be adopted, you propose that the response (to be coordinated by DTI) should be completed by the end of October. Unfortunately this timetable does not recognise the fact that several months will be required to respond to ACOST's recommendations satisfactorily.

The recommendations range widely, affecting a number of Departments and have significant implications for public expenditure and taxation. At the request of the Cabinet Office no work has as yet been done on coordinating responses between Departments, although individual Departments have given some consideration to the Report.

I recognise that MOD have concerns about a few of the paragraphs of the Report and that they remain of the view it would be better to defer publication until it is possible to issue the response; but this then requires an impracticably hasty response in order not to delay the Report's publication.

All ACOST reports include suggestions for change in Departmental practice and frequently contain criticisms. Nevertheless the normal arrangement is for each ACOST Report to be published on its own with the Government response following some months later. I think there are strong grounds for adopting the normal procedure in this case.

I suggest therefore that the Report and the response should be



# dti

the department for Enterprise

published separately, with publication of the former occurring shortly and the latter several months later.

I am copying this letter, as yours, to Stephen Crowne (Department of Education and Science), Andy McKeon (Department of Health), Roger Bright (Department of the Environment), Brian Hawtin (Ministry of Defence), Andy Lebrecht (Ministry of Agriculture, Fisheries and Food), Carys Evans (Chief Secretary's Office), John McCann (Department of Employment) and John Fairclough (Cabinet Office).

*Yours av,*

*Neil Thornton*

NEIL THORNTON  
Principal Private Secretary



Ind Bc: R+D P 6



CONSERVATION



ofo  
Qc 124

ST: 134/2

CF - BA

cc Ken Office.

mcg

13/10

FROM: KEVIN THOMAS

DATE: 12 October 1989

MR R GRAY

No 10

1989 ANNUAL REVIEW OF GOVERNMENT FUNDED R&D

We spoke briefly. I confirm that the publication date will be 25 October. You were content for Gordon Brown's office to be informed. Copies of this minute go to Trevor Wooley, Roy Walker, Tony Quigley and John Hilton.

*Kevin A Thomas*

KEVIN THOMAS

2nd Bl: Res + Dev

File  
PRM



10 DOWNING STREET  
LONDON SW1A 2AA

THE PRIME MINISTER

2 October 1989

Dear Sir Francis

Thank you for your letter of 17 July enclosing the full Report which ACOST has now completed on 'Overcoming Barriers to Growth in Small Companies'. I am content to accept your proposal that the Report should be published and shall write to you again concerning the recommendations in the Report. You may wish to hold back publication of the Report until you are able to attach to it the Government response.

Yours sincerely

Rajesh Khanna

Sir Francis Tombs

75





file GAT

N.B.  
Report ref'd to PS

10 DOWNING STREET  
LONDON SW1A 2AA

THE PRIME MINISTER

29 September 1989

Dear Sir Francis,

Thank you for your letter of 25 September and for the ACOST Report on the European Framework Programme for Research and Development. The Report gives a valuable analysis of the Framework Programme at a time when the Government is considering its position on the Mid-term Review and I have arranged for copies to be sent to the Ministers concerned as a matter of urgency.

I am grateful for the timely completion of the Report and would like to thank the Council for their advice and congratulate them on a considerable achievement in completing their study over such a short period of time.

Yours sincerely

Margaret Thatcher

Sir Francis Tombs

OTS



*cc/p*

Department of Employment  
Caxton House, Tothill Street, London SW1H 9NF

5803  
Telephone 01-273 . . . . .  
Telex 915564 Fax 01-273 5821

Secretary of State

*mbm*  
*RCG*  
*2/10*

RT Hon Nicholas Ridley MP  
Secretary of State for Trade and Industry  
1 Victoria Street  
LONDON SW1

29 September 1989

*1/200 1/11/89*

*- file on Back up  
for Monday*

**EC RESEARCH AND DEVELOPMENT FRAMEWORK**

I have read your Memorandum on the Framework outlining the issues for consideration at E(ST) on Monday.

I am writing because, while my Department is likely to remain one of the smaller contributors to the Framework, I am concerned by the Commission's continuing ambitions to expand Community intervention and expenditure in this and other areas.

Effects of departmental attributions upon individual domestic programmes cannot properly be assessed without greater detail about the contents of the actions proposed within the new Framework. For example, I recognise that my Department may have an interest if the new action line on Human Capital and Mobility were to include work in the area of vocational training.

On the question of negotiating tactics, I support proposals to reduce funding and to force the Commission to operate within a more tightly controlled financial regime. It is clear that far more details about the content of the Framework are needed and that, as you suggest, a UK view of the priorities for Community action will be required. I also support the proposed attempts to ensure the Commission reacts to criticisms made by external evaluators.

*John*  
*Norman Fowler*

**NORMAN FOWLER**



S.S.

CONFIDENTIAL  
FM BONN  
TO DESKBY 020900Z FCO  
TELNO 933  
OF 291653Z SEPTEMBER 89  
INFO PRIORITY UKREP BRUSSELS  
INFO SAVING OTHER EC POSTS

FRAME INDUSTRIAL

MY TELNO 918

EC R AND D FRAMEWORK PROGRAMME: BILATERAL FRG/UK

SUMMARY

1. FURTHER DETAILS OF THE GERMAN POSITION WHICH IS WELL DEVELOPED. STRONG GERMAN PITCH THAT WE SHOULD CONCERT DETAILED POSITIONS INCLUDING WITH FRANCE AND NETHERLANDS. THEIR JUDGEMENT REMAINS THAT TIME IS SHORT. AGREEMENT ON THE NEED FOR GREATER PRECISION ON GOALS AND PRIORITIES, BUT DIFFERENCES ON THE TACTICS.

DETAIL

2. CHIEF SCIENTIFIC ADVISER, CABINET OFFICE, AND REMBSE, BMFT, LED A USEFUL ROUND OF BILATERAL OFFICIAL DISCUSSIONS HERE TODAY.
3. UK OUTLINED ITS GENERAL APPROACH. THE COMMISSION SHOULD BE PRESSED TO REVISE THEIR DRAFT TO SPECIFY MORE CLEARLY PRIORITIES AND OBJECTIVES. UNTIL THIS WAS DONE IT WAS PREMATURE TO DECIDE ON FIGURES.
4. FRG AGREED THAT THE TEXT NEEDED IMPROVEMENT BUT DOUBTED THE COMMISSION WOULD BE WILLING TO DO IT: THE PUBLIC MOOD IN EUROPE WAS GENERALLY IN FAVOUR OF INCREASED EXPENDITURE ON R AND D. THE FRG JUDGED THERE WAS A RISK IN OPENING UP THE TEXT TO DETAILED DISCUSSION AS THE LARGER MEMBER STATES COULD LOSE INFLUENCE IN RELATION TO THE SMALLER MEMBER STATES. THEIR OWN PREFERENCE THEREFORE WAS TO MAKE LIMITED AMENDMENTS WHICH, IN LINE WITH THE UK'S OBJECTIVE, WOULD TIE DOWN THE RESEARCH MORE EFFECTIVELY. THE FRG HAD NOT HAD DIFFICULTIES IN JUDGING THE APPROPRIATENESS OF THE LEVELS OF EXPENDITURE PROPOSED: THEIR CONTACTS WITH THE COMMISSION AT WORKING LEVEL HAD GIVEN THEM A CLEAR IDEA OF WHAT THEY HAD IN MIND.
5. IT WAS AGREED THAT THE UNANIMOUS DECISION AT THE MID-TERM MUST

TIE THE COMMISSION'S HANDS SO FAR AS POSSIBLE AND NOT PERMIT THEM TO REINTRODUCE PET PROJECTS. THE INITIAL DECISION SHOULD THEREFORE INDICATE THE SCOPE OF THE LATER ONE. THE GERMAN VIEW WAS THAT THERE WOULD BE GREATER SECURITY IN PREVENTING INEXORABLE ANNUAL INCREASES IF THE FIGURES FOR 1993 AND 94 MOVED TANGENTIALLY TOWARDS A AGREED CEILING. THE UK EXPLAINED THE ADVANTAGES OF A DECLINING PROFILE TO PREVENT A STEP-WISE INCREASE IN ANY SUBSEQUENT FRAMEWORK PROGRAMME.

6. FURTHER DETAIL GIVEN ON THE FINANCIAL ALLOCATION THE GERMANS HAVE IN MIND (BY HAND OF THOMAS, CABINET OFFICE, FOSTER DTI). OF THE 800 MECU FOR MICROELECTRONICS (MY REFTEL) 600 SHOULD BE FOR JESSI AND THE REMAINING 200 ALLOCATED TO PROJECTS WHICH WOULD PACIFY THE IRISH AND OTHERS.

7. ON MANAGEMENT, THE GERMANS THOUGHT THAT SOME OF THE DIFFICULTIES WERE LINKED TO THE PARTICULAR STYLE OF DG XIII AT THE MOST SENIOR LEVEL. EISENBEISS, BMFT, EXPRESSED PERSONAL WORRIES ABOUT THE UNWIELDY NATURE OF SIX LARGE PROGRAMMES AND ASSOCIATED COMMITTEES: SUB-COMMITTEES WOULD CERTAINLY BE REQUIRED BUT IT WAS IMPORTANT TO RESIST EXCESSIVE DEMANDS ON EXPERT MANPOWER.

8. AS THEIR DETAILED FINANCIAL BREAK-DOWN MAKES CLEAR, THE GERMANS, LIKE OURSELVES, FAVOUR A SEPARATE LINE FOR THE JRC.

9. THE GERMAN ASSESSMENT WAS THAT THE FRENCH MIGHT BE PREPARED TO GO ALONG WITH IDEAS ON THE GERMAN LINES IF IT WAS CLEAR THAT THE ALTERNATIVE WAS NO FINAL AGREEMENT DURING THEIR PRESIDENCY. THE GERMANS HAD NOT YET HAD A BILATERAL MEETING WITH THE FRENCH ON THIS. THEY STRONGLY FAVOURED MULTILATERAL CONCERTATION INVOLVING ALSO OURSELVES, THE DUTCH AND EVEN POSSIBLY THE BELGIANS, AS THE BEST WAY OF HEADING THE COMMISSION OFF. SUCH AN EXAMINATION SHOULD BEGIN WITH KEY SECTORS. THE UK AGREED TO REFLECT.

10. THE UK STRESSED THE MERITS OF RETAINING THE 17 OCTOBER RESEARCH COUNCIL WITHOUT WHICH PRESSURE ON THE COMMISSION TO REVISE THEIR TEXT WOULD EASE. THE GERMANS AGREED ON THE NEED FOR PRESSURE: THEY HAD MADE IT CLEAR TO THE COMMISSION THAT RIESENHUBER WOULD BE UNLIKELY TO ATTEND UNLESS THE COUNCIL HAD FURTHER PAPERS TO DISCUSS.

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PRIME MINISTER

MEETING OF E(ST): 2 OCTOBER

Monday's meeting of E(ST) is to consider the position on the EC R&D framework programme. In some ways this is a replay of the position you faced at the time of the last R&D framework negotiation in 1987.

The immediate issue is what line Douglas Hogg should take at the Research Council on 17 October. But you will want to have a broad discussion of our attitude towards and general tactics for handling the Commission's latest extravagant package.

The papers are:

Flag A - Nicholas Ridley's paper E(ST) (89)2. This sets out the general background and proposed approach, with annex C giving the proposed specific speaking note for Mr Hogg to use at the Research Council.

Flag B - A minute from the Chief Secretary, setting out his concerns about the Commission's proposals. He does not, however, appear to recommend any radically different line at the Council to that set out in Mr Ridley's paper.

Flag C - Some robust briefing from George Guise which recommends you to adopt a radical and critical approach on the Commission's proposals.

Flag D - The Cabinet Office handling brief.

Flag E - The formal advice from ACOST on the Commission's proposals. You need only look at the covering note from Francis Tombs and the executive summary and recommendations at the beginning of the report.

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- 2 -

There will be a few absences from the meeting. In particular, Mr Ridley cannot attend and Mr Hogg will be deputising. The Paymaster General will deputise for the Chief Secretary, and Mrs Rumbold for John MacGregor.

PP Stan Smith  
Duty Clerk

PAUL GRAY

29 September 1989

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FROM: CHIEF SECRETARY  
DATE: 29 September 1989

PRIME MINISTER

EC RESEARCH AND DEVELOPMENT

The Commission's proposal for a new Framework Programme is to be discussed at E(ST) on 2 October. I am afraid that the public expenditure Survey will prevent me from attending. Although Malcolm Caithness will be representing the Treasury, I thought it would be useful if I recorded my initial thoughts.

2 I broadly agree with the analysis of the issues in Nick Ridley's memorandum. In my view there are four key considerations:

- i The Commission has not lived up to Pandolfi's earlier remarks on the need to ensure that the Community's present research effort was right before any decisions were taken on the size and duration of further activities. In particular, the current Programme has not been properly reviewed. The five wise men were given barely a month to complete their assessment.
- ii The proposed new Programme has been put together top-down rather than bottom-up. The Commission has started from the notional headroom in the relevant line of the financial perspective for 1990-92, has added a round figure of 5 becu for 1993-94, and has then spread the resultant 7.7 becu over six ill-defined lines. I find this unsatisfactory:



- the headroom for R & D in the financial perspective has no objective basis. As you will recall, the figures were not discussed by Ministers before they first appeared in the conclusions of the February 1988 European Council;

- the proposal risks prejudicing the outcome of the 1991 negotiations on EC financing and budget discipline after 1992.

- iii. The absence of detail as to the nature and objectives of the proposed new expenditure makes it virtually impossible to assess value for money, or - in other than broad-brush terms - the implications for domestic public expenditure programmes under the EUROPE arrangements.
- iv. Despite French presidential ambitions, there is no real operational need for agreement on a new Programme by the end of the year. Even the Commission's proposal does not envisage significant new expenditure until 1991.

3 Given these points, my view is that the UK ought to reserve its position on the extent of any additional expenditure until the current Programme has been properly evaluated and detailed justification for new activities presented. It is important to make clear from the outset:


- i. that commitments for R & D after 1992 can be fixed only by unanimous decision following the next round of negotiations on future financing;
- ii. that, if a rolling Programme is to be accepted, commitments must taper off in 1993 and 1994 in order to leave room for any further expenditure which may be agreed after the next mid-term review;

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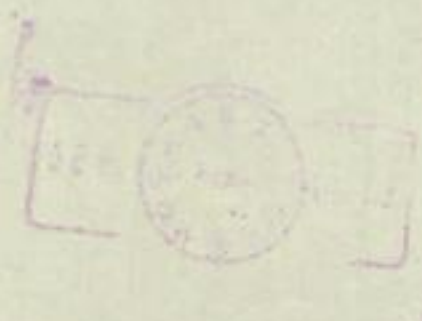
iii. that the Commission is bound by the terms of any new Framework decision to ensure that future mid-term reviews are detailed and systematic.

4 I realise that this approach may well require us to hold out in Brussels beyond the end of this year. But the alternative is that we risk being bounced into a very expensive programme of indeterminate value which would increasingly displace more carefully evaluated domestic expenditure on R & D.

5 I am copying this to members of E(ST).



NORMAN LAMONT



PRIME MINISTER

P 03543

EC RESEARCH AND DEVELOPMENT FRAMEWORK  
[E(ST) (89)2 and minute  
of 29 September from the Chief Secretary]

## DECISIONS

1. The purpose of the discussion is to decide the line Mr Hogg should take at the Research Council on 17 October in response to the European Commission's proposal for a new EC R&D Framework Programme for 1990-94. This is the first round of detailed Council discussions. The next round will be in December.

2. You may wish in particular to discuss:

i. the Commission's proposals. You might discuss the criticisms in paragraph 2 of Mr Lamont's minute. They are likely largely to be shared by other Ministers.

ii. the public expenditure implications. The cost of the Commission's proposals to the UK's Budget contribution would be £1 billion over the next five years, but the net public expenditure effects need clarification.

iii. line to take. Mr Lamont and Mr Ridley appear to be proposing approximately the same line for 17 October, in particular that the UK should reserve its position on the size of the programme until the Commission has done properly the further work required. You will want to check that they accept that this is so, and to see whether other Committee members agree with their line.

3. On the line to take, you may want especially to discuss:

i. whether the UK should give any indication at this stage

of its view on the right level of expenditure, for example on the limit to be put on any increase;

ii. what the UK's objectives should be for the level of expenditure, whether or not disclosed now. If you accept that we should not disclose a figure now, you may be content to discuss its size at the next stage, on the basis of the paper promised by Mr Ridley and further information from the Commission.

#### BACKGROUND

4. The current EC R&D Framework programme runs for the 5 years from 1987 to 1991 with a budget of 6,480 mecu (allowing for sums uncommitted from the previous programme). Of this 6,480 mecu, 3,100 mecu remains to be committed in 1990-1992. At the end of July, the Commission proposed a further Framework for the period from 1990 to 1994 with additional funding of 7,700 mecu. If agreed, this would produce a total budget for 1990-94 of 10,800 mecu.

5. The UK's line so far has been that no extra funding should be considered until a thorough evaluation of the existing programme and an assessment of any new programme had been carried out. There has been a critical report from five external experts to which the Commission has not yet responded; they are expected to do so before the October Council. At the September Research Council a number of Member States criticised particular aspects of the Commission's proposals, but only we and the Germans objected to the overall figure. The Germans indicated however that they might accept a reduction of only 15% to 20%, bringing it down to 6,200-6,500 mecu. The French want to reach agreement on the new framework during their Presidency.

#### ISSUES

##### Analysis of the Commission's proposal

6. In his minute of 29 September the Chief Secretary has made

the following criticisms of the Commission's proposals:

- i. review. They have not properly reviewed the current programme.
- ii. top-down approach. The new programme has been put together top-down rather than bottom-up.
- iii. absence of detail. There is virtually no detail of the nature and objectives of the new spending.
- iv. timing. There is no need for a decision by the end of the year, although the French want it.

You may wish to get views on these criticisms by the Treasury. They are likely largely to be shared by other Ministers.

#### Implications for UK Public Expenditure

7. You may wish to clarify the public expenditure effects of the Commission's proposals. Paragraphs 9 and 10, and Annex B, are not easy to follow. We believe the position to be as follows.

a. The total cost of the proposed new programme to the UK's Budget contribution over the next five or six years would be about £1 billion. This is stated in paragraph 9 of the paper but you may wish to establish it as the starting-point. The UK's receipts could exceed this figure but most would go to the private sector.

b. Under EURO PES arrangements, Departments would have to make a partially offsetting reduction in their domestic expenditure on R & D. On this, you may wish to ask:

- how big the reduction would be (paragraph 10 of the

paper says £665m);

- whether the shift from UK spending to EC spending would be desirable;
- whether Departments could in practice absorb the reduction, or would make further bids in the Survey.

#### Tactics at the Research Council

8. Mr Ridley says that it would be wrong at this stage to come to any view of the overall budget and that we must first insist that the Commission provides the information requested. The Chief Secretary proposes that we should "reserve our position" on new expenditure until the current programme has been evaluated and the new spending has been justified, but that meanwhile we should make clear the points in paragraph 3 of his minute. These approaches seem very close, but you may wish to check with Mr Hogg (on behalf of Mr Ridley) and Lord Caithness (on behalf of Mr Lamont) that there is no substantial disagreement between them.

9. On the tactics, there are two fundamental questions:

i. should the UK give any indication at this stage of its views on the right level of expenditure for example on the limit to be put on any increase? Mr Lamont and Mr Ridley both apparently think it is too early to do so. You may want to check that failure to state a clear view now will not encourage the momentum towards much greater expenditure.

ii. what should the UK's objective be for the level of expenditure, whether or not disclosed now? Neither Mr Lamont nor Mr Ridley discuss the exact figure, although Mr Ridley refers to the danger of isolation. If you accept that we should not disclose a figure now, you may be content to discuss its size at the next stage, on the basis of the

paper promised by Mr Ridley and the further details which the Commission have undertaken to produce.

10. Once the Committee have decided on tactics, you will wish to check that the speaking note for Mr Hogg at Annex C to the paper takes full account of their views. It does not for example exactly cover the points in Mr Lamont's minute, although it is not far from doing so. Unless there are substantial differences you could ask for the note to be settled between Mr Hogg, Mr Lamont and Mr Major.

#### HANDLING

11. You may wish to ask the Minister of State, Department of Trade and Industry (Mr Hogg) to introduce his Secretary of State's paper. The Paymaster General (representing the Chief Secretary) could be asked to respond first. The Foreign and Commonwealth Secretary may wish to comment on the handling of the European negotiations. The following Ministers may wish to comment in view of the likely consequences for their domestic R&D programmes: the Secretaries of State for Education and Science, Energy, the Environment, Health and the Minister of Agriculture, Fisheries and Food. The Chief Scientific Adviser may also wish to comment in the light of his discussions with the Germans this week.

*R.T.J.*

R T J WILSON  
Cabinet Office  
29 September 1989

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PRIME MINISTER

28 September 1989

FRAMEWORK PROPOSALS

The Commission certainly scores high marks for impudence. We are presented with a 7.7 becu proposal with very little analysis of how it will be spent. This ploy is transparent. Overall expenditure requires unanimity whereas individual programmes require only majority votes. No funding should therefore be agreed until the individual programmes are clearly defined.

The Europes mechanism operates by defining a baseline for EC expenditure derived from 1984 figures and then penalising domestic expenditure when these baselines are exceeded. This is why the Chief Secretary rightly warns that such huge commitments to European projects could harm our domestic research.

The original FRAMEWORK concept was for collaboration on strategic and enabling science for which there is sometimes a good case. It was never intended to finance near market and product development work. The excellent EUREKA programme does precisely that, financed mainly from private industry, with Government's role essentially catalytic.

The new FRAMEWORK proposals appear to go beyond strategic work and stray into the domain of industry. In the Annex I have highlighted and commented on the Commission's sketchy programme outlines. Why should EC governments contribute to improved manufacturing practices or better process control? Why should high definition television be a 'subject of great community interest' to be developed by its taxpayers!

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Some of the programme make sense. It is important to have community wide standards for telecoms and IT. Otherwise a cabbal of manufacturers could shut out competition. It is also important to improve energy utilisation and advance our understanding of global environment. But why should the northern countries undertake postgraduate training for countries like Portugal and Greece at community expense? This appears to be the underlying purpose of the vast human capital and mobility programme of 700 mecus.

Until these proposals are set out in a clear manner, which starts from the individual activities themselves and then builds upwards into a proper set of programmes, it will be impossible to separate the wheat from the chaff. It may even be that some of the near market programmes are very good ones but that they should ideally be financed by industry under the EUREKA scheme.

We are being put under unnecessary timing pressure, probably because the French want this agreed under their Presidency. The Treasury points out that the proposal does not call for significant new expenditure before 1991 and therefore there is little operational requirement for agreement by the end of this year.

You may hear the counter-argument that we made a mistake in 1987 by holding out for a 4.5 becu programme for so long and then suddenly accepting the higher level of 5.6. This was not a mistake. The original number proposed was 11 becu and the Foreign Office and UKREP claimed that only a small reduction would be possible. By digging in our heels for so long at a very much lower figure, we held the final programme down. Life was made difficult for our negotiators and bureaucrats perhaps, but costs were contained.

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CONCLUSIONS AND RECOMMENDATIONS

1. We have not been given enough information to agree any target expenditure whatever. It is quite illogical to set an overall figure and then build the house from the roof downwards.

2. Some of the programmes seem to be near market and therefore at odds with our domestic science policy. It may be that parts of the proposed FRAMEWORK programme should be conducted under the industrially financed EUREKA programme (which also includes EFTA and Turkey). You might ask what percentage of framework activity should be transferred. I suspect it is far higher than the 10% figure which the DTI privately gave me.

3. Parts of the proposed programme are probably good. It is important to have EC standards for telecommunications. It is also important to collaborate on environment, energy efficiency and life sciences.

4. The industrial and materials technology budget (1200 mecu), the energy budget (1100 mecu) and the human capital budget (700 mecu) seem outrageous.

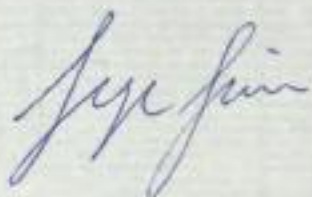
5. Ask why we cannot select specific items from the FRAMEWORK programme. I am told that this is impossible and against European law etc etc. However, we began to make sense of the space programme in 1986 when we sent the total package back and asked for a menu of choices.

6. Although there are many other battles on with the Commission, such as EMU and the Social Charter, this is no case for going soft on FRAMEWORK. Do not buy the argument that a mistake was made in 1986/87 by holding out for a low cost programme and that we are in danger of repeating it.

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7. Eventually, there will be a new programme hopefully at a much lower cost. If this is to represent value for money, with vainglorious and wasteful projects cut to the minimum, the UK had better take a lead now. This woolly set of ideas must be turned into a properly thought out and detailed plan.



GEORGE GUISE

ANNEX: Fuller outline of new FRAMEWORK.

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ANNEX IITHE ACTIVITIES

The third framework programme (1990-1994) defines new objectives for giving an innovatory push to Community action. The orientations defined in the 1987-1991 framework programme remain in force in the implementation of the specific programmes, where an element of continuity is required.

The choice of scientific and technical objectives rests on the principle of Community added value. This principle, and the exercise of selectivity which results, are of vital importance for the efficient use of the limited funds at the Community's disposal. The modification of industrial attitudes towards further transnational initiatives; replying to the essential challenges of industrial competitiveness; implanting European attitudes in the training of young researchers - these are the criteria that have guided the selection of objectives listed in the current annex.

As concerns the preferred means of action, the shared-cost action remains the principal instrument. In those cases where coordination of existing research at the national level is the predominant aspect, concerted action will be used.

The Joint Research Centre participates in the implementation of the framework programme. A new emphasis will be given to this participation by reinforcing research with a prenormative character in the area of industrial and materials technologies; by a reorientation of research on nuclear safety; by the reinforcement of activities linked to the environment and industrial risks; by a new emphasis on technological forecasting. The financing of JRC research activities relevant to the framework programme will be brought about by bringing together funds available from the sums allocated to the specific programmes.

The Council shall define the detailed arrangements for the dissemination of knowledge resulting from the specific programmes. This requires general action and a unified management within the Commission services to achieve coherence. In particular, this management has to provide for diffusion of results through publications as well as by computerised means according to common standards and protocols, the adaptation of industrial and intellectual property rules, innovation transfer and the exploitation of results within the Community. The financing of these activities is achieved by grouping funds deducted from the sums allocated to the specific programmes.

In strict accordance with the guiding character given to the framework programme by the Treaty, the following paragraphs make reference to the strategic elements of the 1990-1994 framework programme.

I. ENABLING TECHNOLOGIES

1. Information and Communications Technologies  
(3000 MECUS)

*Many of these programmes seem to be near market or even product development. Perhaps they could be done under the EUREKA prog.*

The interaction between information and communications technologies, the increased requirements of users and the necessity to constitute a real nerve system for the single European space lead to a re-orientation of efforts along three main lines, while preserving the synergies required for subjects of great Community interest such as high-definition television.

A. Information Technologies

Apart from the research produced inside the ESPRIT Programme, re-oriented towards the new generation of technologies, laying more stress on prototypes and multi-supplier and distributed systems, new activities will receive priority in the following areas.

**Microelectronics.** The objective is to contribute to the creation of a European manufacturing capability for advanced products, in particular integrated circuits in conjunction with the JESSI project. It is crucial to maintain the skills necessary to ensure the survival of the European electronics industry, associating the efforts of suppliers and users, and to enable potential new applications in the most advanced areas.

**Peripherals.** The objective is to produce new generations which are reliable, low-cost and mass produced, taking into consideration for complex systems the most up-to-date technologies and for developing new manufacturing methods. The action should favour the appearance of new in-out and storage arrangements.

**Software.** Systems and tools need to be developed enabling productivity in software production to be increased.

**IT applied to industrial engineering.** The action will contribute to optimizing the use of advanced CAD/CAM systems in strategic industrial sectors.

#### B. Communications Technologies

*The RACE programme\* has been successful in developing common standards for communications.*

In parallel to the continued development of an integrated broadband network, the objective consists of developing intelligent, reliable and secure networks as well as new value-added and profitable services adapted to developing user needs.

Priority has also to be given to the growing demand for mobile telephony services and the integration of these services into networks. The requirements to be taken into account concern those of private life and leisure as well as professional life. To meet these needs and ensure a flexible transition between successive generations of networks, the following actions are foreseen:

\* RACE is part of the present Framework not a separate programme like Enoska.

development of intelligent networks, using new techniques of information transfer, optical communications and artificial intelligence ;

mobile communications: specific issues need to be resolved, such as communication security, saturation of available frequencies, the efficient use of airborne methods of transmission, equipment miniaturisation and the integration of mobile telephony into universal networks ;

image communication: building on numerical image transfer (including HDTV), research efforts are needed to integrate image into multimedia communications and to ensure the development of allied protocols and coders-decoders ;

service engineering: work on architectures and software, realised on basic teleservices and on improved value-added services.

These actions will be accompanied by others, aimed at ensuring the reliability and the security of communications by means of developing verification and testing technologies. Finally, it will be necessary to identify the characteristics and common function of certain model services by realising real scale experiments in advanced communications.

### C. Development of Telematic Systems in Areas of General Interest

The realisation of the large internal market is setting new requirements in the field of information exchange. At the level of public administration, faced with problems determined by the abolition of barriers and the realisation of the single market, these requirements comprise topics such as the interior, justice, customs, and social security. At the level of the individual user, questions of transport, health, distance learning, environmental protection and access to rural areas predominate.

To meet these requirements, beyond the efforts being undertaken within regional or national contexts, additional Community effort is needed. This comprises the development of telematics systems combining information technologies, communications and audio-visual techniques. Industrialists, network users and suppliers throughout the Community will be encouraged to regroup around projects which meet both the requirements of economic development and social demand, thereby cementing a community of interest and spirit.

These projects, the full development of which will take place outside the Framework Programme, require preparatory R&D work, including language research and engineering, of a collaborative nature and including pilot experiments which will act as a catalyst and form the building blocks for future action.

2. Industrial and materials technologies

(1200 MECUS)

*Again, this sounds near market & more appropriate to EUREKA*

The objective is to contribute to the necessary rejuvenation of European manufacturing industry by developing its science base and the advanced technologies required. Technological developments will be integrated with considerations of emerging market requirements and of more severe environmental constraints. Priority will be given to major integrated projects; among these, the development of the "clean car".

*this should be the job of the motor industry in response to regulatory requirements.*

This strategic step leads to a shift in priorities in the areas described below accompanied by the phasing out of areas such as membranes and catalysis.

Materials. Emphasis will be placed on materials with specific properties, exploiting recent breakthroughs in the understanding of microscopic structure;



on materials for use in extreme or unusual conditions, as well as on environmental and whole life cycle aspects of materials, including recovery and recycling.

Design. Reducing "design to product" lead time requires advances in the scientific and technical basis of design, including materials selection, systems analysis, design rules for manufacture, assembly, reliability and maintenance. Emphasis is placed on design-relevant enabling technologies, such as fluid dynamics, power systems and acoustics ; process control, particularly aimed at "zero-defects" products.

Manufacturing. Improvement of the management of manufacturing operations: manufacturing practices must aim at greater efficiency, shorter implementation times, reduced "work in progress" and unit costs, higher quality levels. Research includes mathematical modelling, adaptation of computer-aided design and manufacturing techniques, especially for small and medium-sized enterprises.

Measurement and testing. A new emphasis on the formulation and implementation of common norms, standards and codes of practice is stimulated by the completion of the internal market. This leads to new requirements for scientific and technological know-how to provide an objective base for normative work.

## II MANAGEMENT OF NATURAL RESOURCES

### 3. Environment

(700 MECUS)

*Providing it is not duplication of other programmes much of this could be valuable.*

The purpose is to provide the scientific knowledge and technical know-how needed by the Community to carry out its new role relating to the environment, according to Title VII of the EEC Treaty. In this sector, the research activities

have a common horizontal dimension of prenormative research, aimed at the preparation of environmental quality norms, safety and technical norms, methodologies for environmental impact assessment. The new actions are concerned with the following four areas.

**Participation in the Global Change Programme.** The objective of the programme is to understand the processes governing environmental change and to assess the impact of human activities. European participation will contribute to the development of research on the interaction between biogeochemical cycles, atmospheric chemistry, physical and chemical oceanography, climatic processes.

**Technologies and engineering for the environment.** In addition to research on environmental monitoring, including remote sensing, a specific action will be directed at introducing techniques and engineering systems to protect and rehabilitate the environment.

**Large integrated research projects.** These projects address the whole range of problems arising from major environmental issues. They may concern large coordinated campaigns, from observation and experimentation focusing on the continental or marine environment to integrated operations attacking all aspects of a regional issue.

?  
*Hopefully not a major part of the programme.*  
**Research on economic and social aspects.** This includes the scientific research to support the study of the legal and ethical aspects of environmental policy and management. This deals with risk assessment, perception and management; the economic evaluation of environmental impacts; the socio-economic impact of the implementation of environmental policies; and the effectiveness and consistency of laws and regulations related to environmental matters.

4. Life Sciences and Technologies

(1000 MECUS)

The long-term strategic objective is to contribute, in a selective and integrated way, to the development of Europe's potential for understanding and using the properties and structures of living matter.

Basic biotechnology. Emphasis is shifted towards strengthening the science base, through research centred on understanding biological information, transformation and control systems, whilst keeping in mind the ethical implications of such work. In particular, the research actions will include genome analysis, related to genomes of representative species; neurobiology and immunology; macromolecular modelling; nutrition; testing, also in order to provide the scientific prenormative basis for Community regulations.

Agricultural and agro-industrial research. Research in the agricultural and forestry sectors will include projects on crop and animal production, taking into account the present objectives of the Common Agricultural Policy and of rural development; it will contribute to major interdisciplinary programmes, such as a programme aimed at finding effective remedies for desertification. Research will be developed in the field of aquaculture and fisheries. Research, development and demonstration actions will be taken beyond current activities, exploiting results from plant molecular biology and physiology research, through soil-plant interaction, to harvesting and processing. Emphasis is placed on increasing resistance of plants to adverse agents by genetic means. In the field of industrial utilisation of agricultural raw materials, the strategic priority is to obtain, through chemical and biological processing, new biodegradable products and to provide clean energy sources by exploiting biomass.

←  
Sounds similar to what we cut out in MAFF

Biomedical and health research. The main focus is on new ways of tackling socially and economically relevant diseases, through concerted methodological and protocol studies in epidemiological, experimental and clinical research. For

and protocol studies in epidemiological, experimental and clinical research. For cancer, attention is shifted towards early tracing of carcinogenic factors and the development of new tests for anti-carcinogenic drugs. For AIDS, a new activity aimed at the development of control systems, including chemotherapy and vaccines is developed.

**Life sciences and technologies for developing countries.** Emphasis is placed on tropical agriculture (integrated management of agricultural resources for reducing food shortages in regions at risk whilst protecting the environment) and on tropical health research (efforts are concentrated on new steps to combat some major tropical diseases).

5. Energy

(1100 MECUS)

*Parts of programme seem environmental - but note determination to stay with fusion one leaf.*

Environmental compatibility has become a key element for energy systems. Therefore the central issue of Community action in this field is shifted towards the development of clean and safe energy technologies. This is pursued in the following three areas:

Fossil, renewable energy sources, energy utilization. A diversity of technological options is required, taking into account energy-related environmental problems such as the greenhouse effect and acid rain. The research includes the use of hydrogen and other suitable substitutes for liquid fuels in the transport sector. In-depth analysis is carried out on the concept of "zero emission power", which is focused on electricity generation having a minimal environmental impact. **Certain lines of research inconsistent with this approach are discontinued, such as research on coal liquefaction.** Following recent breakthroughs in the understanding of combustion processes, and of new electrolytes and catalysts, new energy production and saving technologies will be developed.

**Nuclear fission safety.** Community action will put further emphasis on the harmonisation of safety approaches and thus reinforce the prenormative dimension of its research. A new impulse will be given to research on reactor safety, radioactive waste management, fuel elements, actinides and control of fissile materials. Radiation protection research will include radiation from natural and medical sources, a better definition of the risks of low radiation doses, new technologies to assess quickly the radiological consequences of nuclear accidents.

**Controlled nuclear fusion.** The JET Joint Undertaking is prolonged up to 1996, in order to achieve control of plasma in conditions close to those of the Next Step (Engineering fusion test reactor). Work for the detailed design of the Next Step as well as for new systems will be pursued. Some existing fusion devices will be phased out having completed their experimental programmes. The present keep in touch activity in inertial confinement is developed, through fundamental research on the interaction of plasma with laser light and possibly with accelerated heavy particles. Muonic and other cold fusions will be explored.

*Sounds at odds with UK decision on Culham.*

### III MANAGEMENT OF INTELLECTUAL RESOURCES (700 MECUS)

#### 6 Human capital and mobility

The purpose is to provide the European research system with the trained human resources on which it is critically dependent and which are likely to become increasingly scarce in the years to come.

*This has grown enormously from previous proposals of under 500 MECU. This could be a bandwagon for training post grads from Portugal & Greece for free.*

A new initiative characterized by the highest efficiency and Community added value is required. These two requisites are inherent in a major project of mobility of young researchers, at post-doctoral level, in the area of the exact

and natural sciences, technologies and economic science. Training at the interface between basic sciences and technological applications will be pursued.

The Community will finance the cost of training, generally for a period of two years, in centres of excellence of a country different from the country of origin. This is a Community investment in human capital, which will have pervasive effects over the whole research and technological development system and on cohesion and the redressing of intracommunity imbalances. This investment can, where necessary, be complemented by support measures in favour of networks of research training centres.

An important role in the implementation of the programme will be played by the scientific community itself, through its own institutions, particularly for the identification of networks of centres of excellence and the selection of candidates.



↑ G  
EAM.  
cc Policy  
Unit

10 DOWNING STREET

LONDON SW1A 2AA

From the Private Secretary

28 September 1989

Dear Neil,

**ACOST REPORT: EUROPEAN FRAMEWORK PROGRAMME  
FOR RESEARCH AND DEVELOPMENT**

Attached is a copy of Sir Francis Tombs' letter to the Prime Minister, covering the ACOST Report on the European Framework Programme for Research and Development. You should already have received draft copies of the Report itself under cover of a minute of 25 September from John Fairclough. The main differences between the draft and final versions are on page 8, where an additional recommendation has been added, as follows:

- (n) The Treasury system of attribution to individual departments of any increased funding for EC Framework Programmes may be detrimental to the achievement of objectives and should be reviewed (48 ii. and the Executive Summary para xv);

and on page 37, where sub-paragraph (g) has been amended to read:

- (g) ACOST is in broad agreement with the proposals on environmental programmes; those specified are obviously essential and best done on a European basis or by participation on a Community basis in international programmes. It would be useful to develop an understanding of the expertise base already in place in Europe and build on it.

I am copying this letter to the Private Secretaries to members of E(ST).

Yan  
Paul

PAUL GRAY

Neil Thornton Esq  
Department of Trade and Industry

W0235

MR PAUL GRAY

28 September 1989

ACOST REPORT: OVERCOMING BARRIERS TO TRADE IN SMALL FIRMS

I think we can live with the suggestion that the Government's response and the Report itself be published together. It seems the most straightforward way of dealing with MoD's misgivings in this case.

2. As you note in your letter of 21 September, this emphasises the need for a fairly prompt response. Departments received copies of the Report with your letter of 17 July; they will already have looked at it to advise on its publication, so they should have no difficulty in providing contributions to the response in time for this to be issued by the end of October.

3. DTI have the primary interest. I recommend that you ask them to co-ordinate the response in close consultation with my office. I am attaching a draft letter for you to send to Neil Thornton. In Sir Francis Tombs' letter of 17 July he noted that the Department of Health will have an interest in the Report. They were not copied in to your earlier correspondence, but I have added Andrew McKeon's name to the list of your copy addressees.

4. Also attached in draft is a short acknowledgement from the Prime Minister to Sir Francis Tombs' letter of 17 July, responding to his request to publish the Report.

JOHN W FAIRCLOUGH  
Chief Scientific Adviser



DRAFT LETTER FROM PAUL GRAY TO NEIL THORNTON, DTI

ACOST REPORT: OVERCOMING BARRIERS TO TRADE IN SMALL FIRMS

ACOST will be looking to Government for a response to this report. Since the primary interest lies with DTI I would be grateful if your Department would coordinate this in close liaison with the S&T secretariat at the Cabinet Office.

The intention is to attach the response to the Report itself to form a single publication. This means completing it by the end of October. I am aware that this is a shorter timescale than normal, but, given that Departments (apart from the Department of Health) received copies of the Report with my letter of 17 July to Tom Jeffery and have already studied it to recommend whether or not it should be published, this should not prove impossible to meet.

I am copying this letter to Stephen Crowne (DES), Andrew McKeon (DH), Roger Bright (DOE), Brian Hawtin (MoD), Andy Lebrecht (MAFF), Carys Evans (Chief Secretary's Office), John McCann (DEm) and John Fairclough (CO).



DRAFT LETTER FROM THE PM TO SIR FRANCIS TOMBS, ACKNOWLEDGING  
RECEIPT OF THE ACOST REPORT, 'OVERCOMING BARRIERS TO GROWTH IN  
SMALL FIRMS'

Thank you for your letter of 17 July enclosing the full Report  
which ACOST has now completed on 'Overcoming Barriers to Growth in  
Small Companies'. I am content to accept your proposal that the  
Report should be published and shall write to you again concerning  
the recommendations in the Report. You may wish to hold back  
publication of the Report until you are able to attach to it the  
Government response.

Ind Pa: R+D  
Pt 7





*Handwritten:* Vire Pm  
cc MOD

10 DOWNING STREET

LONDON SW1A 2AA

*From the Private Secretary*

28 September 1989

*Dear Neil,*

ACOST REPORT: OVERCOMING BARRIERS TO TRADE IN SMALL FIRMS

You will have seen from John Colston's letter to Dominic Morris of 20 September that the Ministry of Defence remain of the view that it would be better to defer publication of the ACOST Report on Overcoming Barriers to Growth in Small Firms until it is possible to issue a formal Government response.

If this approach is to be adopted, I think it would be necessary, given the lapse of time since the Report was submitted, to prepare the Government response quickly. I would therefore suggest that the intention should now be to combine the Report and the Government response in a single publication, and to complete the preparation of the response by the end of October. I should be grateful if your Department could now co-ordinate the response on this time scale, in close liaison with the S & T Secretariat at the Cabinet Office. Departments have, of course, had copies of the report since they were circulated with my letter to Tom Jeffery at DES, dated 17 July.

I am copying this letter to Stephen Crowne (Department of Education and Science), Andy McKeon (Department of Health), Roger Bright (Department of the Environment), Brian Hawtin (Ministry of Defence), Andy Lebrecht (Ministry of Agriculture, Fisheries and Food), Carys Evans (Chief Secretary's Office), John McCann (Department of Employment) and John Fairclough (Cabinet Office).

*Handwritten:* Yan.  
Paul

PAUL GRAY

Neil Thornton, Esq.,  
Department of Trade and Industry.

*Handwritten signature:* Pm

070  
W0234

MR PAUL GRAY

27 September 1989

**ACOST REPORT: EUROPEAN FRAMEWORK DIRECTIVE FOR R&D**

Sir Francis Tombs will shortly be sending the Prime Minister a copy of ACOST's Report on the European Framework Programme for Research and Development. As agreed with you on Monday I have already distributed draft copies of the Report to the Private Secretaries of EST Ministers to give Departments the maximum time to consider it before the EST meeting scheduled for Monday 2 October. A one-page summary of the main points in the advice is attached.

2. I am also attaching a draft letter for the Prime Minister to send to Sir Francis acknowledging the Report, and a draft minute for you to send to Departments.

3. I am copying this minute to Richard Wilson and Trevor Woolley.

*jub*

JOHN W FAIRCLOUGH  
Chief Scientific Adviser

SUMMARY OF ACOST'S ADVICE: REPORT ON EUROPEAN FRAMEWORK PROGRAMME  
FOR RESEARCH AND DEVELOPMENT

ACOST was asked to advise on the Mid-term Review of the current EC R&D Programme (Framework II, 1987-91) and on the Commission's proposals for a future, overlapping Programme (Framework III, 1990-94).

They make 14 'key' recommendations, several of which relate to the need to improve **administration and communications** with:

better communication between DGs,  
improved structures for managing the research,  
closer links within the programme and with others eg EUREKA,  
simplification of selection procedures,  
higher mobility of research workers,  
greater adoption of standards produced by the programme.

The Commission should identify and support national centres of excellence across the Community. Where appropriate, near market activities (eg in agriculture) should look for support elsewhere (eg EUREKA), but the Programme should embrace high risk ventures in technology. The case for supporting demonstration projects should be examined.

In the UK, a review of the way in which the costs of EC R&D is allocated by the Treasury is proposed.

The Review of Framework II carried out so far is adequate for determining the overall policy for Framework III and negotiations

should proceed, but the Commission should be pressed to carry out further evaluation. A critical review should be carried out on energy research.

SAM. A. Tombs.

DRAFT LETTER FROM THE PRIME MINISTER TO SIR FRANCIS TOMBS

ACOST REPORT: EUROPEAN FRAMEWORK PROGRAMME FOR RESEARCH AND DEVELOPMENT

Thank you for your letter of 25 September and for the ACOST Report on the European Framework Programme for Research and Development. The Report gives a valuable analysis of the Framework Programme at a time when the Government is considering its position on the Mid-term Review and I have arranged for copies to be sent to the Ministers concerned as a matter of urgency.

I am grateful for the timely completion of the Report and would like to thank the Council for their advice and congratulate them on a considerable achievement in completing their study over such a short period of time.



SAM.A.  
ACOST

(PTI)

DRAFT LETTER FROM PAUL GRAY TO THE PRIVATE SECRETARIES OF E(ST) MINISTERS

ACOST REPORT: EUROPEAN FRAMEWORK PROGRAMME FOR RESEARCH AND DEVELOPMENT

Attached is a copy of Sir Francis Tombs' letter to the Prime Minister, covering the ACOST Report on the European Framework Programme for Research and Development. You should already have received draft copies of the Report itself under cover of a minute of 25 September from John Fairclough. The only substantive difference between the draft and final versions is on page 8 where an additional recommendation has been added as follows:

- (n) The Treasury system of attribution to individual departments of any increased funding for EC Framework Programmes may be detrimental to the achievement of objectives and should be reviewed (48 ii. and the Executive Summary para xv.)

The Report provides a timely contribution to the debate on the approach which the Government should adopt to the Commission's Mid-term Review of the Framework Programme.

ADVISORY COUNCIL ON SCIENCE AND TECHNOLOGY

REPORT ON

EUROPEAN FRAMEWORK PROGRAMME FOR RESEARCH AND DEVELOPMENT

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- SECTION 4 - ADVICE ON THE PROPOSED NEW PROGRAMME (1990-94)

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- ANNEXE A - TERMS OF REFERENCE FOR ACOST STUDY
- ANNEXE B - BUDGET ALLOCATIONS FOR CURRENT FRAMEWORK PROGRAMME
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- ANNEXE D - "FIRST REPORT ON THE STATE OF SCIENCE AND TECHNOLOGY IN EUROPE" (OUTLINE)
- ANNEXE E - "THE REPORT OF THE FRAMEWORK REVIEW BOARD" (OUTLINE)
- ANNEXE F - "PROPOSAL FOR A COUNCIL DECISION CONCERNING THE FRAMEWORK OF COMMUNITY ACTIVITIES IN THE FIELD OF RESEARCH AND TECHNOLOGICAL DEVELOPMENT (1990-94) - COM(89)397" (SYNOPSIS)

## EXECUTIVE SUMMARY

i. This report is the result of an invitation to ACOST to advise on the mid-term review of the current EC research and development programme and on the Commission's proposals for the future.

ii. The European Commission has organised and funded collaborative research and development (R&D) under a series of framework programmes since 1984. The first phase, Framework I, ran from 1984-87 with a budget of 3750 mecu and Framework II covers the period 1987-91 with a planned expenditure of 5396 mecu. One requirement of the latter was that a mid-term review should be carried out of the objectives, priorities, activities and financial resources. In order to discharge this task the Commission set up a Framework Review Board comprising five eminent independent individuals who reported in July 1989.

iii. Whilst carrying out the review the Commission has made proposals for a new programme (Framework III) running from 1990-94 with a financial ceiling of 7700 mecu. This would overlap the last two years of Framework II but would be structured quite differently. Apart from an increased rate of spend (1550 mecu for Framework II in 1990 rising to 2600 mecu for Framework III in 1994) there would be six main programme lines instead of the current 37. It is claimed that this would permit the Commission greater flexibility to be responsive to the changing demands of R&D activities. The emphasis of the programme would also be changed away from energy research and towards the environment and life sciences, although information and communication technologies would continue to attract around 40% of the total funds.

iv. On the evidence available to ACOST the current Framework Programme (1987-91) is regarded by participants as generally beneficial and largely well managed. The evident enthusiasm for this collaborative activity is illustrated by the fact that even though it is too early for a proper evaluation of results, many of the major programmes are over-subscribed. There are still some concerns over the administration, particularly at the project proposal stage, and recommendations for improvement are made in the report.

v. At the strategic level ACOST is concerned at the lack of a coherent European policy which guides the programme selection process in Framework II. The structure of the programme is inflexible and its fixed-term nature is inappropriate for pre-competitive R&D which necessarily has uncertain timescales. Attention must be paid to improving the links between those programmes concerned with pure science and those which are industrially oriented, and between Framework and other European programmes such as Eureka.

vi. The mid-term review as carried out by the Commission is not adequate as a detailed management assessment of the programme and the Commission should be pressed to extend the review in this respect. However, ACOST believes that at the strategic level there is sufficient information available (including the views expressed in the Framework Review Board report) to permit sensible initial discussion of programme policy. Further detail will be required to permit determination of the goals and objectives in the specific sectors. ACOST has commented on these sectors in order to assist the Government in establishing a sound negotiating position.

vii. The general structure of the proposed programme (1990-94) is regarded as an improvement over the current one in respect of its rolling nature and its increased flexibility. However, ACOST

is concerned that the need for a large increase in size of the activity has not been demonstrated adequately. The outline proposals for the content require further elucidation; without this detail much of what is proposed could be considered too close to the market place and therefore more appropriate for other initiatives such as Eureka. Also, the balance between the general classes of activity requires examination.

viii. The proposed information and communication technology work contains several elements which read very much like market development activities. In particular the work on peripherals and the application of IT to industrial engineering seem, as stated, inappropriate as Framework activities. The EC-funded part of the microelectronics (JESSI) initiative needs to be separated clearly from the near-market activities which should be funded elsewhere. Similar comments apply to several other sections under the Enabling Technologies heading.

ix. ACOST is in broad agreement with proposals to set up European standards and norms as a result of data from good scientific research and judgements. This is particularly so when they apply to proposed regulations and controls but these are only viable if the political will to enforce them exists.

x. It is debatable how many new data are necessary to optimise the use of CAD/CAM systems, justifying funding by the EC. Before endorsing the modernisation of methods of manufacture and control of production techniques ACOST would need to be satisfied that these could not be more appropriately supported by national or industrial sources.

xi. ACOST is in broad agreement with the proposals on environmental programmes; those specified are obviously essential and best done on a European basis or by participation on a Community basis in international programmes. It would be useful to develop an understanding of the expertise base already in

place in Europe and build on it.

xii. The initiative in the medical research area is generally supported as is that in basic biotechnology, particularly with the emphasis towards strengthening the science base. European led programmes are the appropriate route but recognition of centres of excellence already established in the various fields is essential.

xiii. ACOST has advised the Government that the UK agricultural industry should be encouraged to fund more of its own R&D, particularly where this is focused on near market improvement of yields. This advice is equally applicable to the European Community. All support to this area provided under the Framework Programme should be directed towards long-term research in fields such as genetic manipulation, biodegradable materials and basic molecular biology.

xiv. The proposals for increased mobility of research workers at pre- and post-doctoral level within Europe are endorsed, with the consequent increase in networking and improvement in the science base, particularly in the less favoured member states. There is a danger that this may stimulate migration outside the EC and steps must be taken to avoid this.

xv. ACOST agrees that Government departments should consider both domestic and Community initiatives when planning research programmes in support of departmental policy. However, the benefits can only be maximised if there is freedom to choose how the available budget should be allocated. The Treasury system of apportioning increases in the Framework budget to individual Departments on the basis of percentage share of the programme can frustrate this freedom by requiring funds to be diverted to Community activities when they might be better spent on domestic projects. It is recommended that the Government should review its position on this.

Summary of Key Recommendations

Numbers in brackets are those of the paragraphs in the main text in which the principal references will be found.

- (a) The Commission should be pressed to complete its formal review of the current programme as part of its proper evaluation and to publish the individual Research Evaluation Reports as they become available. Consideration should be given to the establishment of small independent review teams to supervise this task. (37(a)).
- (b) The review conducted to date is adequate for the purposes of determining the overall policy of the proposed new programme, and negotiations in the European Council should proceed (37(b)).
- (c) The management structure of the Commission needs to be reviewed to improve co-ordination between the Directorates General. At the same time the structure and size of the new programme will require an overhaul of the management process in terms of both proper technology audit and the selection of the appropriate human resource (44 and 65(b)).
- (d) The funding balance between proposed programme lines for Framework III should be justified as should the content of those lines, particularly in the IT and communications technology areas. Where appropriate near-market activities should be considered for funding within the Eureka initiative or from national or industrial sources (64, 65(d) and (f))

- (e) There should be closer co-ordination between activities within the Framework and stronger links between Framework and other European programmes such as Eureka (41).
- (f) The case for support to demonstration projects needs to be re-examined, particularly in the technology- or software-based activities, since such projects can be an essential element of pre-competitive development (42).
- (g) Efforts should be made to improve proposal handling by simplification of forms and a two-tier selection process (45/6).
- (h) Mobility of research workers should be encouraged to stimulate improvement of the science base, particularly in the less-favoured states. The number and length of bursaries for scientists should be increased and similar facilities should be extended to technology training (50/1 and 65 (k)).
- (i) The scope of research eligible for Framework funding should be re-examined so that it can embrace high risk ventures in technology development as well as in pure research (53).
- (j) Standards and norms developed as a result of the Framework Programme should be enforced otherwise the funding involved is wasted (65(e)).



- (k) Identification of national centres of excellence to act as nuclei for European research, particularly in the environmental and life sciences areas, should be an aim of the Commission. Research support should be directed to pre-eminent groups of scientists throughout the Community even where there are existing teams at the Joint Research Centre. (52 and 65(g)).
- (l) A critical assessment of the proposals for energy research should be carried out, particularly as regards those for hydrogen fuel and fuel cell research (65(i)).
- (m) Funding for agricultural R&D should be restricted to those areas which are long-term or involve basic science, leaving near-market work to be supported by industry (43 and 65(j)).
- (n) The Treasury system of attribution to individual Departments of any increased funding for EC Framework Programmes may be detrimental to the achievement of objectives and should be reviewed (48 ii. and the Executive Summary para xv.)

SECTION 1 INTRODUCTION

BACKGROUND

1. The Commission of the European Communities is conducting a review of the current (1987-91) Framework Programme for R&D and has proposed a major revision and extension to cover the period 1990-94. The Government invited the Advisory Council on Science and Technology (ACOST) to consider the achievements of the current programme and the proposals for the future, and to develop advice on the UK approach to negotiations. This work was carried out by the Standing Committee on International Collaboration under the terms of reference attached at Annexe A.

2. The review of the current programme (Section 2) was based on work carried out previously by ACOST. The primary source documents for the remainder of the work were all from the Commission:

"First Report on the State of Science and Technology in Europe" - published 1989

"The Report of the Framework Review Board" - unbound document published June 1989

"A Framework for Community RTD Actions in the 90's" - unbound communication dated 6 June 1989

"Proposal for a Council Decision Concerning the Framework of Community Activities in the Field of Research and Technological Development (1990-1994)" - COM(89)397 dated 2 August 1989

An outline description of the first of these documents is given in Annexe D and of the second in Annexe E. The third was superseded by the fourth, and a summary of the latter is presented in Annexe F.

FINANCIAL CONTEXT

3. The Framework Programme is a collaborative initiative to strengthen the competitive position of Europe in science and technology (S&T), with the main focus being on eventual industrial exploitation. In considering both current and future programmes it is useful to compare their scale with individual national activities and other collaborative initiatives. The following figures give some indication of the relative financial magnitudes of the programmes, although as will be seen later the benefits derived cannot be expressed entirely in financial terms.

|     |                                                               |         |     |
|-----|---------------------------------------------------------------|---------|-----|
| (a) | UK                                                            | £M      |     |
|     | Gross domestic product (1987)                                 | 409900  | (1) |
|     | Government-funded civil R&D (1987)                            | 2384    | (1) |
|     |                                                               |         |     |
| (b) | European Community                                            | £M      |     |
|     | Gross domestic product (1988)                                 | 2660500 |     |
|     | Civil R&D funded by governments of<br>EC member states (1987) | 16031   | (1) |
|     | Total EC expenditure on R&D (1987)                            | 817     | (1) |
|     | Estimated total expenditure on<br>framework programmes (1990) | 1072    | (2) |
|     | [Of which UK share at 18.9%                                   | 203]    |     |
|     | Estimated total expenditure on<br>framework programmes (1994) | 1757    | (2) |
|     | [Of which UK share at 18.9%                                   | 332]    |     |

(c) Eureka

Annualised figures for Eureka are not available, but at June 1988 the estimated value of Eureka projects was £2584m. The total UK commitment was £200m of which Government funding accounted for £22m. All these figures are expected to grow significantly, and indeed at August 1989 total anticipated commitment in Eureka projects is £4352m.

SOURCES:

- (1) Annual Review of Government Funded Research and Development, 1989 - to be published
  
- (2) European Commission proposals for a new Framework programme 1990-94 (see Annexe C of this report). Assumed £1 = 1.48 Ecu.

It can be seen that from 1990-94 the annual UK expenditure will rise by £129m, an amount roughly equal to 5% of the current government-funded civil R&D.

REPORT LAYOUT

4. Following this introduction there is a general assessment of the current Framework Programme (Section 2). This reflects the views of ACOST and of some officials (both in the UK and Brussels) and participants concerning the operational aspects. In Section 3 an assessment is made of the strategic aspects, with ACOST's views being compared and contrasted with those of the Framework Review Board which carried out the mid-term review. Section 4 addresses explicitly the Commission proposals for a new Framework Programme, highlighting the key issues which ACOST believes should be brought to the attention of ministers.

CONFIDENTIAL

5. The first three annexes (A, B and C) contain detailed information which is called up in the body of the report. Annexes D, E and F give some insight into the contents of the three main Commission documents which relate to the mid-term review.

CONFIDENTIAL

SECTION 2      REVIEW OF THE CURRENT PROGRAMME (1987-91)

BACKGROUND

6.        The first European Community R&D Framework Programme ran from 1984-87 with a budget of 3750 Mecu. The Single European Act came into force on 1 July 1987. In the Science and Technology area the first major initiative in support of this Act was the adoption of the second Framework Programme by the Council of Research Ministers on 28 September 1987 (see Annexe B). This programme provides the finance for the majority of EC-funded pre-competitive R&D. With a budget of 5396 MECU over five years it accounts for around 5% of the total civil R&D carried out within the twelve member states, although it is larger than the national research budgets of seven of those states.

7.        In setting out this programme the Council had a number of wider objectives in mind as expressed in the Council Decision:

- i.        contribution to the harmonious development of economic activities throughout the Community
- ii.       development of the international competitiveness of European industry by promotion of scientific research and technological development at Community level, thereby complementing member states' activities
- iii.      encouragement of small and medium sized enterprises (SMEs), research institutes and universities in research and technology development, and in their efforts to co-operate with one another
- iv.      particular support of SMEs because of the significance of their place in, and contribution to, the innovative process

- v. strengthening of Community economic and social cohesion and of its science and technology infrastructure, and potential
- vi. definition of common standards as an aid to the completion and efficient operation of the internal market

8. The Framework Programme is divided into eight major lines which are in turn sub-divided as shown in Annexe B. The eight lines can only be created/alterd by unanimity in the Research Council; more flexibility for adjustment is available within the eight lines, though no need for this has arisen yet. The Framework Programme is implemented through specific programmes adopted by negotiation between the Council of Ministers, the Commission and the European Parliament. Within these programmes, individual projects are selected, funded and monitored by Commission staff.

#### ACOST REVIEW

9. ACOST representatives held discussions with UK and EC officials to form views on the overall success of the Framework programme but devoted its detailed investigations to the IT, communications and modernisation of industry sectors which consume around 50% of the total available funding. User views from a SEPSU<sup>(1)</sup> survey were also studied. This grassroots experience coincided very closely with opinions expressed at discussions with officials.

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<sup>1</sup> "European Collaboration in Science and Technology: Pointers to the future for policy makers", Science and Engineering Policy Studies Unit (1988)

10. As a general comment it was noted that European research programmes have been evolving rapidly and the lessons of the first programmes have been incorporated constructively in newer lines. It is encouraging that in general the new shared-cost industrially oriented lines are well focussed, have a genuine European dimension and contain projects which are of high quality, well administered and capable of exploitation. Older lines, some ex-Euratom, brought under the umbrella of the Framework programme are coming more slowly into line with the good practice exemplified by the later programmes. Typical problem areas being addressed in these older programmes are poor CGC<sup>(2)</sup> administration; programme inertia; the influence of strong individual views; project selection, although this is now moving from decisions by member state representatives to expert panel review; JRC<sup>(3)</sup> involvement; lack of coordination between research and policy; a better focus where limited funding is allocated and production of user-friendly digests of research findings.

ESPRIT, RACE & BRITE

11. The lines 'Towards a large market and an information and communications society' and 'Modernisation of industrial sectors' were studied in detail by ACOST, and it has been possible to comment on the sub-line programmes.

UK participation and benefit

12. Involvement of UK organisations is widespread and, if anything, appears to be growing. A healthy pro-active approach

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<sup>2</sup> CGC = Management and Co-ordination Committee for a Research Action programme

<sup>3</sup> JRC = Joint Research Centre. Founded in 1957 under the Euratom Treaty and now wholly funded by DG XII. Consists of four establishments in different countries carrying out in-house research programmes.



is evident from the number of UK prime contractors, and the number of projects with UK partners is impressive. On aggregate the UK comes top in both aspects. Encouragement is needed in three areas, however, to enhance UK benefit - a greater number of industrial partners; participation in more of the larger projects; and the involvement of a UK industrial partner alongside a UK university which is being courted because of its international reputation, so as to prevent our own new science from being syphoned-off abroad.

13. The funding received by UK organisations is somewhat in excess of the notional contribution of 18.9% by the UK Government to the Framework Programme budget which suggests a net benefit. Of more significance is the potential exploitation of results. Hard data are not yet available because few projects have reached this point, but a measure of UK exploitation potential relative to other member states has been derived. This assumes that the potential can be weighted according to the nature of the participating organisation. Thus prime industrial contractors are likely to be more motivated to follow through on projects than other contractors, with research institutes and universities having less ability to achieve an economic impact. Analysis of project participants on this basis shows the UK coming a close second to France, with Germany and Italy behind the UK.

#### Cultural Shift

14. Multi-national programmes have had the effect, surprisingly, of removing the usual over-riding concern of conflict of interest when IPR is shared. The formal programme structure and 50% funding together have opened the door to a serious consideration of collaboration. The pre-competitive nature of the programmes has then provided sufficient initial comfort at the science/business interface to permit experience and further confidence to be gained by active participation. An

Opportunity has thus been provided to break out of the traditional isolationist industrial culture in the UK and, in turn, this is valuable preparation for effective UK participation in the single European market. An additional benefit is that some SMEs not previously involved in R&D have been encouraged to participate.

15. It was expected, and found, that effort would be required to work at trust in European partnerships (such effort for UK collaboration is also required) and potential competitors not currently in home markets were seen as less of a threat. The Commission has noticed that following involvement in these programmes with partners from other countries, UK companies are also beginning to co-operate with each other. This is a further welcome sign of the breaking down of suspicious and narrow attitudes.

#### Programme Quality

16. The quality of the programmes appears to be high and at least equal to that achieved in comparable domestic activity. The elements of competition, international refereeing and heavy over-subscription combine to ensure that projects of excellent quality are generally chosen. Over-subscription (possibly as high as 5:1) also has its downside. It is a strong disincentive for SMEs, research institutes and universities to apply for funds because of the significant cost and effort involved in proposal preparation.

#### Stimuli for Collaboration

17. Funding was a necessary stimulus to collaboration but not the only factor. The main drivers emerge as risk sharing, timeliness of novelty, development of standards, improvement of competitive position, international markets and access to partners' science/technology and complementary skills. From an

academic perspective complementary skills arise not just between disciplines but also within disciplines because of the diversity of training provided by the different schools. The results most often reported by participants were commercial benefits for industrial participants and recognition for the academics; leverage through the application of partners' science and technology; and an improved competitive position derived from the science and technology established.

18. In a qualitative sense the 'brand name' of the particular programme was felt to be good for the subsequent marketing of products.

#### Critical Factors for Success

19. Complementarity of interest in (for example) science, technology or market was vital, as was a high quality of people and pre-established science or technology competence. Good interpersonal relationships at the working level also played their part alongside the right management structure and support systems. Conversely, success was hindered by entry for the wrong reasons (leading to a lack of commitment), lack of leadership, non-assessable objectives, fragmentation of work between too many partners and forced marriages of groups of partners. These factors apply equally to EC and UK collaborative programmes.

#### Administration Issues

20. ACOST's view is that the administration and organisation of those parts of the Framework Programme they examined in detail was generally competent and strongly oriented to achieving a successful European base. Confidentiality was carefully respected. Choice of independent project assessors is extremely wide; for example DG XII now has a list of over 3000 names and is beginning to be able to assess its assessors. In the early days of the preceding Framework programme when the DGs were not fully

staffed the elapsed time between closing date for proposals and ultimate start of successfully negotiated projects could be 18 months. In the latest RACE programme this period had been reduced to a much more acceptable 3 months.

21. There is acknowledgement by users of the helpfulness of EC officials. They showed themselves able to distinguish between straightforward and problem projects and to devote more effort to help the problem ones. By comparison the incidence and quality of official intervention in the UK has been found to be extremely variable. The UK criterion of additionality for project funding in Eureka and some domestic programmes causes considerable problems and the unevenness of funding compared with the known fixed levels in EC programmes introduces uncertainty into the financial planning of non-EC projects.

22. No corpus of information of consensus management (especially for large industrial projects) was available beforehand. For the larger projects a reasonably common management structure evolved - a full time project manager responsible to a senior policy committee, and project co-ordinators responsible for the actions of their own organisations. Very large projects have been found extremely difficult to manage. Team building has been recognised as requiring continuity of personnel and, indeed, some companies view participation as valuable career development for their staff. Higher than normal overheads (at around 10%) for both EC and UK collaborative projects are experienced.

23. Delays to the start of the second Framework Programme proved embarrassing and caused a loss of momentum and credibility. The UK image also suffered, with strong feelings that the Framework Programme exercise had descended to a budget exercise from its higher-minded origins.

24. Exploitation rules for participants are seen to be fair

and even-handed, balancing the primary rights of participants with the need for a wider European gain. ESPRIT and BRITE Technological Days have proved useful fora for networking and display of results; mechanisms to ensure maximum awareness and exploitation of research results are still awaited.

QUALITY OF LIFE, ENERGY AND IMPROVEMENT OF EUROPEAN CO-OPERATION

25. These lines of the Framework Programme were not addressed in detail by ACOST, but the views of participants and officials are summarised here.

26. The Health programme sits uneasily under the Quality of Life line because it is not specifically covered by the Treaty of Rome and this uncertainty hinders the establishment of the right balance of EC/UK activity. Quality of work in concerted action<sup>(4)</sup> areas has been questionable but is greatly improved by the recent Cancer and Aids initiatives which were very well set up. Benefits of collaboration in predictive medicine were not expected by the UK to be significant but full UK involvement was encouraged when the programme was inevitable. The Radiation Protection initiative operates well as a shared cost area and is viewed as very good and largely worthwhile. UK participation is very high; it has the largest number of teams in concerted action programmes. The very large number of declarations of intent for limited post-1990 areas also indicates the strength of grassroots interest.

27. Environmental research has its roots in JRC diversification. The JRC executes some good work but can be slow and expensive; it still consumes more than 50% of funds allocated to environmental issues. The UK is influential in the CGC

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<sup>4</sup> Concerted action programmes are those in which member states agree to exchange research results from national programmes; EC funding is limited to the costs of coordination.

regarding policy focus and balance of projects. Both EC and UK work yields reasonable quality output and the reduction of UK funds, balanced by a corresponding increase to EC projects, has not had a noticeable detrimental effect. In the area of atmospheric pollution good work has been done but a lot more progress is required.

28. The Energy line is another major consumer of funds, the bulk of which are allocated to 'Fission: nuclear safety' work by the JRC and 'Controlled thermonuclear fusion' centred on the JET (Joint European Torus) facility and the establishment of the design basis for NET (Next European Torus). A recent report by senior industrialists has made recommendations for changes and cost reductions at the JRC, which are being implemented. Fusion still has a highly speculative long term outcome and additional international collaboration between the EC and USA, USSR and Japan might sensibly be attempted.

29. In the non-nuclear energy field developments have focussed on two areas - renewable sources of energy and the rational use of energy. Multi-national collaboration has been optional rather than mandatory with the result that collaboration is growing from a relatively small base. This area is also characterised by the nature of the organisations involved - some two thirds are non-industrial - and by the small average size of projects. Expectation of successful exploitation is dampened on both counts. The UK has been well represented across the spectrum of projects. Outside the Framework programme, DG XVII has funded a large number of supporting Demonstration projects. One notable point is that credible demonstration appears to require installations in several member states.

30. Improvement of European S&T co-operation is represented largely by the 'Science' programme aimed at stimulating cooperation and mobility of researchers in exact and natural science. This programme is greatly valued by UK universities,

particularly with overseas travel falling victim to financial pressures on UK budgets for small science. EC grants have played a vital role in facilitating transnational visits, exchanges and collaboration. The very act of collaboration has been found to impose extra academic rigour and provide greater commitment to achieve targets and overcome problems. Transnational visits by academics would be further helped by funding for specialist technicians when necessary for efficient full-time running of equipment.

SUMMARY

31. Collaboration is not a new concept, even when given multi-national status. Alvey generated a groundswell of interest in the UK in the IT area and JOERS continues it in optoelectronics, but the industrially oriented programmes in the first and second EC Framework Programmes have broken through traditional reserve to create a supportive climate for sharing of IPR on a scale that would previously have seemed most unlikely.

32. Overall, more has been gained than lost by participants, UK organisations included. This, together with the generally high quality of science and technology, represents a heartening response to the objectives which were in the mind of the Council when it initiated the Framework Programmes. The challenge of extensive exploitation for economic impact remains.

SECTION 3 COMMENTS ON THE CURRENT PROGRAMME

BACKGROUND

33. The purpose of this section is to consider the adequacy of the mid-term review carried out by the Commission, and to make recommendations based on the lessons learned from the current programme. In this task ACOST has been assisted by the documents listed in the Introduction (section 1) and reference is made to these as appropriate. Brief descriptions of the two primary documents are given in Annexes D and E.

EXECUTION OF THE MID-TERM REVIEW

34. The Report of the Framework Review Board, which constitutes the bulk of the mid-term review, was compiled in a period of a few weeks and is necessarily superficial in some areas. The report is nevertheless of extreme importance since it constitutes the sole view and assessment of the total Framework Programme, so far, undertaken by outsiders. It is thus most certainly a valuable contribution to both the assessment of the present Framework Programme and to consideration of future actions. It is a matter of regret that the Board was not given more time to complete the task.

35. In view of the size of the Board and the limited time available for the review, the report is not entirely adequate either as a review of the current programme (Framework II) nor as preparation for discussion of the Commission proposals for a revision. There are, however, additional sources of material available which complement the Review Board's report. At the overview level the 'First Report on the State of S&T in Europe' is intended as an assessment of European Science and Technology to date but also identifies technological needs for the future. Also available are the Research Evaluation Reports, of which ACOST has looked particularly at:



Report No. 24 - Evaluation of the R&D Programme in the field of Non-Nuclear Energy

Report No. 25 - Evaluation of the first BRITE Programme.

Report No. 32 - Evaluation of the Biomolecular Engineering Programme - BEP (1982-1986) and the Biotechnology Action Programme - BAP (1985-1989).

Report No. 34 - Evaluation of the Programme on Science and Technology for Development STD.

36. With regard to the assessment of the present Framework Programme this series of reports provides a source of expert opinion drawn from a variety of backgrounds: industrial managers, research scientists from industry and academia, industrial consultants and senior officials. The evaluations are part of the set of 'vertical' evaluations of individual R&D programmes which should take place during each 4 or 5 year programme (Council Resolution of Dec.1986). The evaluation of BRITE is a comprehensive account, including all the data, of the evaluation exercise and as such constitutes an adequate source of information upon which to assess that particular programme. The evaluation of BAP-BEP is a model evaluation of projects which are carried out under the principal of 'concertation'. The ELWW (European Laboratory without Walls) concept is reviewed and assessed in practice. The reports concerning Non-Nuclear Energy and Development are typical of Executive Summaries in the series of 'vertical' evaluations providing the key observations made in the full report, naturally including those points which would figure in decision-making on future programmes. The complete series of 'vertical' reports can be expected to provide the detailed background data necessary to support evaluation exercises.

37. ACOST's recommendations on the adequacy of the execution of the mid-term review fall into two parts:

- (a) The review does not meet the full requirements of Article 4 in the sense that a detailed assessment of all aspects of the programme has not been carried out. Such an assessment, reviewing objectives, achievements and financial expenditure, is a necessary part of any programme, and must be instituted. A 'snapshot' exercise by a small team, such as that conducted by the Framework Review Board, is not sufficient on its own to discharge the requirements of a formal review. ACOST recommends, therefore, that the Commission should be pressed for a formal review as part of the proper evaluation of the Framework Programme.

A review of this sort should be conducted on a continuous basis over a period of several years. The Research Evaluation Reports are an important constituent and the series should be completed to provide the necessary evaluation data. Consideration should be given by the Commission to the establishment of a small team of independent assessors, reporting to the Vice-President, to oversee the review process.

- (b) The extent to which the strategic plan for a new programme could benefit from a detailed examination of the current one (beyond what has been achieved by the Board) is considered to be limited. Notwithstanding the need for a detailed review as part of the proper management of the current programme, ACOST recommends that the Report of the Framework Review Board, together with other documents, constitutes an adequate review for the purposes of planning the proposed new programme. The report gives good coverage at a strategic level in

sufficient detail for the principles of the new programme to be established. The admitted shortcomings of the report do not constitute a justification for delaying the progress of negotiations.

RECOMMENDATIONS DERIVED FROM THE CURRENT FRAMEWORK PROGRAMME

38. In arriving at its own conclusions ACOST has used as a reference the Report of the Framework Review Board. The Review Board makes 42 recommendations concerning the conduct of the programme, some of which are also applicable to the proposed new programme. These are summarised in Annexe F. ACOST endorses the majority of the recommendations but key issues are discussed below under the headings used by the Board.

Political climate

39. The Framework Programme has laudable objectives. However, it is not always clear that the collection of individual programmes and projects add up to the Grand European ideal. The Review Board have some unease about this. The problem is serious, at least in terms of expectations, because Europe is sandwiched between the well-established national programmes of the member states and the much larger but similarly well-established programmes in USA and Japan. Without any clear statement of European policy the Commission will almost inevitably resort to EEC programmes with two characteristics:

- i. Catch-up. This is the temptation to put in place a Japanese-sized research programme but without the business follow-up to exploit it.
- ii. Subsidy. Framework is often seen as another source of subsidy which preferably complements state funding.

40. It is essential that at both national and European levels the objectives of the programme should be clearly understood and that the structure and content should be tailored accordingly. It should be part of the Commission's role to show how each programme supports the objectives and is a part of an integrated structure.

Criteria in research

41. ACOST endorses strongly the Board's recommendations that the Framework Programme should only be invoked in areas where some perceived added value (in its widest sense, not just financial) is obtainable from doing so. This applies both to the avoidance of duplication of national programmes (subsidiarity) and to overlap with other, pre-existing collaborative activities. In particular ACOST would like to see stronger links between EC programmes which are complementary in the research-to-product sequence. There does not seem to be adequate machinery for feeding the results of the strategic research funded by SCIENCE into the various applied programmes downstream from it. Indeed there seems to be an intellectual gap between where support from SCIENCE is expected to end (and for budgetary reasons must do so) and where programmes downstream from it are expected to begin. ACOST recommends stronger links between Framework and other relevant European programmes such as Eureka so that the research, development and exploitation phases of successful projects could be properly integrated. This should be complemented by companies improving strategic links between research activities and product strategy.

42. The case for demonstration projects needs to be re-examined, particularly for technology or software-based activities, since any research on such topics usually requires some feasibility or demonstration vehicle.

43. ACOST does not necessarily agree with the recommendation that more emphasis should be placed on R&D relevant to the restructuring and modernisation of the agricultural sector. Reductions in UK spend in this area have been urged regularly in advice to Ministers, with the object of increasing industrial funding. This principle should be extended to Europe, with Framework funding being used only for long-term R&D which is not aimed at increased yields.

Management and administration issues

44. There is a serious lack of co-ordination between DGXII and DGXIII. Since DGXII appears to be able to co-operate reasonably well with other DGs, the fault probably lies largely with DGXIII. The Board's report recommends redrawing the boundaries between the two, but this would involve interminable bureaucratic infighting and wherever the boundary was drawn there would need to be a great deal of co-operation across it. Ideally they should be merged, but that is certainly unrealistic. Whatever solution is adopted, it should be underpinned by a change in staffing policy. Commission staff should be moved regularly between posts and between directorates as recommended by the Board to reduce proprietorial attitudes and increase communication.

45. In Section 2 of this report ACOST welcomed the improvement in the speed of response by the DGs in handling proposals. Nevertheless there are further improvements to be made and ACOST endorses the recommendations (primarily number 22) of the Board on this issue. The forms which have to be filled in and the contracts which have to be negotiated are clumsy and do discourage a great many applicants - particularly small manufacturing enterprises and academic institutions, which it is considered particularly important to involve. Resolution of this problem may rest more with DGXX and the Court of Auditors than DGXII and DGXIII.

46. Coupled to the bureaucracy is the level of oversubscription, quoted in Section 2 as approaching 5:1 in certain programmes. ACOST believes that a certain level of oversubscription is desirable to give Commission officials the scope to maintain a high level of quality. However, this needs to be balanced against the cost and frustration experienced by those not selected, many of whom (SMEs and academic institutions) cannot afford repeated applications. The Board's recommendation for a two-tier selection process, with a low-cost outline proposal as the first stage, merits close attention. The level of oversubscription is also necessarily a parameter to be taken into account when the levels of programme funding are determined.

47. Whilst ACOST recognises the desirability of developing a fully integrated European Community, there is a possible conflict with the principle of subsidiarity; that is, the Commission may choose to instigate collaborative programmes in support of cohesion<sup>(5)</sup> which the more developed member states are quite capable of executing as national projects. The Board's recommendation in this respect (number 16) implies that cohesion should be subordinate to subsidiarity and ACOST endorses this.

#### Funding

48. The Review Board recommends that the level of funding be increased to the threshold permissible under the Inter-Institutional Agreement. It also stresses the need for flexibility in the management of this funding. ACOST's views on this increase are supportive in the main but certain specific recommendations need to be made:

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<sup>5</sup> Cohesion is the principle by which emphasis is given to the technological development of less favoured member states such as Portugal and Greece.

- i. As proposed by the Commission the increased funding should be regarded as a ceiling and not a budget until proper justification for expenditure has been received.
- ii. the increase should not be funded by reductions in domestic departmental budgets except where there is potential for programme integration

49. The need for a separate fund for dissemination of results was challenged by ACOST in its earlier studies, particularly at the level of 38 mecu. It was felt that this activity should be an integral part of individual programmes. The Board's recommendation for an increase in the funding of VALUE would not be endorsed by ACOST without further debate.

Encouragement to the scientific humus

50. The role of the EC programmes in the areas of training and the improvement of communication between scientists cannot be overstated. The most important programme in this context is SCIENCE which complements the Research Councils of the member states. In the long run its most valuable activity will turn out to be the provision of bursaries, because of the effect which these will have in bringing European scientists into a single community. It is highly desirable that the number of bursaries be increased, and urgent that the recent ruling which limited the tenure of bursaries to two years (instead of three) be reversed. The DELTA programme, which concerns computer-aided education, is of particular importance to the UK in view of the crisis in the supply of teachers in key subjects.

51. In contrast with the science base, the relative weakness of the European technology base receives less attention. European programmes could do a great deal to improve technology competence, particularly in the provision of manpower and

appropriate industrial training facilities. Unfortunately the educational establishments tend to be academic and out of touch with industrial priorities. There is enormous potential for a major European initiative in technology training coupled to R&D.

52. There is certainly a need for European centres of excellence in research, but monolithic centres such as the Joint Research Centre (JRC) are not the answer. All indications so far are that these centres are even more resistant to change than their national equivalents, and the costs of re-structuring are exorbitant. It is ACOST's view that research would be better directed to collaborative groups of scientists of recognised standing who could form a nucleus of European excellence. One mechanism for this could be an enhancement of the SCIENCE laboratory twinning programme with perhaps four or five partners. Apart from some base-level funding the centres would have to bid for research funds and they would therefore remain responsive to national and community priorities. Another mechanism is the 'research hotel' concept favoured by some UK Interdisciplinary Research Centres (IRCs) under which an establishment provides research facilities which are then used by visiting researchers for the period necessary to complete their work. The important element is to avoid a permanent commitment on the part of the Commission to maintain buildings, equipment and salaried researchers.

#### Programmes

53. ACOST's views on the major programmes of BRITE, RACE and ESPRIT are generally favourable. The opportunity is taken here to re-emphasise that research conducted within the Framework Programme cannot be considered in isolation from the development and exploitation phases which follow. The development phase of any programme is much bigger than many have been prepared to recognise. The 'research' required by topics such as IT is a case in point; the biggest advances, which are sometimes the



riskiest, often come through the refinement of existing ideas for new applications. It is recommended that the term 'pre-competitive' should be re-examined so that it can embrace high risk ventures in technology development as well as pure research.

The Joint Research Centre

54. ACOST is firmly of the opinion that the role and organisation of the JRC must be overhauled as a matter of urgency, and endorses the Board's views.

Dissemination

55. The Board's concern over the 'open door' policy to the dissemination of research results is recognised, but the practicality of restricting such dissemination is questionable. Proper protection of intellectual property by means of patenting, copyright etc is essential, but it is considered unlikely that any attempt to control information at the working level will be effective nor, indeed, is it even desirable. The secrecy and end user restrictions imposed by the USA are of concern in this context, and the European authorities could do considerably more to persuade the USA to withdraw them. However, ACOST feels that 'tit for tat' retaliation is not a proper route to follow and would, in any case, result in a Fortress Europe which has thus far been eschewed.

SECTION 4      ADVICE ON THE PROPOSED NEW PROGRAMME (1990-94)

BACKGROUND

56.       The Commission has proposed a programme for revision of the Framework programme up to 1992 and a rolling programme covering the period 1990-94.    The proposal anticipates an expenditure of 7700 Mecus for 1990-94 and reserves 5000 Mecus specifically for 1993/4.    The whole expenditure is seen as an upper limit and actual programme expenditures will be the subject of future Commission proposals.    The amount of 7700 Mecus was extrapolated from the level permitted under the Inter-Institutional Agreement of June 1988.

57.       In broad terms the proposals incorporate many of the suggestions included in the mid-term review and the concept of future reviews is included.    There is a plan to reduce the multiplicity of projects included and the rigidity involved in their administration.    This will result in more discretion and freedom of action for the various research managers.    In support of these changes the Commission undertakes to improve the efficiency of its management and to introduce control and evaluation methodology to improve productivity.

58.       More emphasis is given to the environment and to ways of improving the 'quality of life' in the Community.    The need is also seen to increase the quantity and quality of research manpower by increasing the mobility of post doctorate research workers between member states.

59.       These changes of emphasis will be at the expense of information and communication technology and energy.    In the latter regard work to develop more environmentally acceptable methods of energy generation receives more attention.    Reference is also made to the need to establish a series of norms or standards covering many of the technological areas covered in the

whole programme.

60. The choices of the Commission have been guided by three considerations. The accelerating pace of technological progress and sustained economic growth in the more industrialised countries; the necessity for strengthening competitiveness of European industry at the worldwide level; and the need to respond to the directions fixed by the Single European Act.

61. The new Framework programme is characterised by three strategic areas and subdivided into six main programme areas as shown in Annexe C. The proposed expenditures for individual years including 3125 Mecus uncommitted from the 1987-91 programme are also given in Annexe C.

62. The choice of the scientific and technological objectives rests on the principle of community added value, building on the activities within the individual member states - subsidiarity. The changes in industrial attitudes towards further transnational initiatives, replying to the challenges of industrial competitiveness and the need to train young scientists are the main guiding principles which have been used to select the particular programme objectives. Expenditure on the Joint Research Centre, in a new modified role is to be included as part of the new programme.

63. A summary of the contents of the proposals is given in Annexe F. The rest of this section gives ACOST's reactions to the proposals.

#### ACOST'S VIEWS ON THE COMMISSION PROPOSALS

64. ACOST endorses the Commission action in initiating a forward look at European collaborative R&D, and welcomes the proposals for a new framework programme as a discussion document. However, there are some reservations both about the pace at which

it is proposed to introduce Framework III and about the detailed content of the programme lines. Two crucial issues which need to be addressed are whether a significant increase of R&D effort at this stage can be justified, and whether this increased effort can be managed effectively. On both counts the Commission proposals acknowledge their importance, but do not produce evidence to show that they have been resolved.

65. Specific points are raised in the following paragraphs:

- (a) The new proposals represent an improvement of those contained in Framework II. A reduction in the rigidity of the system by the use of broader subject headings for the programme lines, and the consequential flexibility to move money to needed areas is endorsed.
- (b) The rolling programme has merits as far as research management is concerned, minimising discontinuities. However this, together with the detailed programme flexibility, puts much more responsibility on programme managers. The Community's plan to introduce evaluation and more modern methods of management is essential and it is hoped that objectives and goals will be properly defined. A proper technology audit, perhaps conducted by an independent panel, should be an integral part of each programme. The proposal to decentralise programme management is particularly welcome, but this will change the nature of the task of the Commission staff and this must be recognised. The recruitment of able managers, rather than R&D specialists, should be implemented. Appointments should be for a fixed term, with transfers between DGs being encouraged.
- (c) More information is clearly required to judge the overall level of spending proposed. The 7700 Mecu budget is a ceiling derived from the Inter-Institutional

Agreement, but some rationale is required to show that the proposed funding is appropriate to Europe's needs, and more of the reasoning for the allocation to the six individual lines is essential. For example, the funding for information and communication technologies continues at 39-40% of the total as in Framework II but without justification. Also the funding profile is not consistent with the style of rolling programme proposed; it continues building to a peak in the final year rather than tailing off and allowing flexibility in the review/overlap of the next phase. This suggests that the Commission anticipates a monotonic increase in European R&D expenditure levels, something which their proposals simply do not justify.

- (d) The proposed information and communication technology work contains several elements which look very much like market development activities. In particular the work on peripherals and the application of IT to industrial engineering seem, as stated, inappropriate as Framework activities. The EC-funded part of the microelectronics (JESSI) initiative needs to be separated clearly from the near-market activities which should be funded elsewhere. Similar comments apply to several other sections under the Enabling Technologies heading.
- (e) ACOST is in broad agreement with proposals to set up European standards and norms as a result of good, scientific data and judgements. This is particularly so when they apply to proposed regulations and controls but these are only viable if the political will to enforce them exists. The work on the 'clean car' should be seen as developing and setting appropriate standards, not as the manufacture of a prototype model.

- (f) It is debatable how many new data are necessary to optimise the use of CAD/CAM systems, justifying funding by the EC. Before endorsing the modernisation of methods of manufacture and control of production techniques ACOST would need to be satisfied that these would not be more appropriately supported by national or industrial sources.
- (g) ACOST is in broad agreement with the proposals on environmental programmes; those specified are obviously essential and best done on a European basis or by participation on a Community basis in international programmes. It would be useful to develop an understanding of the expertise base already in place in Europe and build on it.
- (h) The initiative in the medical research area is generally supported as is that in basic biotechnology, particularly with the emphasis towards strengthening the science base. European led programmes are the appropriate route but recognition of centres of excellence already established in the various fields is essential.
- (i) The energy programme is predictable and acceptable in part. Eventually there has to be a recognition of the cost of an environmentally clean atmosphere. Clean up of exhaust products from fossil fuel combustion is understood scientifically but reliable, efficient technology solutions are some way from being ready to be installed.

Hydrogen fuels are only realistic when one knows more of price and availability. Engine technology could soon be adapted.

There is some scepticism about more fuel cell research. The technology has been proven in non-cost-limited situations such as space craft, but despite many years' work has shown little promise for commercial exploitation.

- (j) ACOST has advised the Government that the UK agricultural industry should be encouraged to fund more of its own R&D, particularly where this is focused on near market improvement of yields. This advice is equally applicable to the European Community. All support to this area provided under the Framework Programme should be directed towards long-term research in fields such as genetic manipulation, biodegradable materials and basic molecular biology.

- (k) The proposals for increased mobility of research workers at both pre- and post-doctoral level within Europe are endorsed, with the consequent increase in networking and improvement in the science base, particularly in the less favoured member states. There is a danger that this may stimulate migration outside the EC and steps must be taken to avoid this.

ADVISORY COUNCIL ON SCIENCE AND TECHNOLOGY  
STANDING COMMITTEE ON INTERNATIONAL COLLABORATION  
STUDY ON

EUROPEAN FRAMEWORK PROGRAMME FOR RESEARCH AND DEVELOPMENT

TERMS OF REFERENCE

In conformity with Article 4 of the Decision which established the EC 1987-91 Framework Programme for R&D, the European Commission is conducting a mid-term review of the programme and intends, probably in July 1989, to propose a revision. This revision will include proposals for the future direction of European R&D beyond the end of the current programme.

The Standing Committee on International Collaboration is invited to advise the ACOST on aspects of this review, with the following terms of reference:

1. To study available documents ("First Report on the State of S&T in Europe", "A Framework for Community RTD Actions in the 90s", "Report of the Framework Review Board") and any other relevant documents which may become available during the study and advise on:
  - the success of existing EC research programmes (in relation to each other and to comparable national programmes)
  - the adequacy of the documents as an assessment of the present Framework Programme and as a basis for decision-making on future R&D programmes
  - the aptness of the recommendations made by the Framework Review Board
2. To examine (when available, probably late July) the Commission's proposals for a revised Framework Programme and advise on:
  - the suitability of the proposed structure for meeting the R&D objectives of both the Community and the UK
  - the appropriateness of the programme content in terms of both its coverage and the balance between subject areas and activities



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- the scale of the programme in relation to perceived needs for collaborative R&D and its balance in relation to comparable national or other existing international collaborative programmes

3. To report to ACOST at the 12 September meeting (subject to availability of the Commission's proposals).

Cabinet Office  
19 July 1989

**CONFIDENTIAL**

FRAMEWORK PROGRAMME OF COMMUNITY ACTIVITIES IN THE FIELD OF  
RESEARCH AND TECHNOLOGICAL DEVELOPMENT (1987-91)

Breakdown of the amount deemed necessary in 1987

|    |                                                                                  |      |
|----|----------------------------------------------------------------------------------|------|
| 1. | QUALITY OF LIFE                                                                  | MECU |
|    | 1.1 Health                                                                       | 80   |
|    | 1.2 Radiation protection                                                         | 34   |
|    | 1.3 Environment                                                                  | 261  |
| 2. | TOWARDS A LARGE MARKET AND AN INFORMATION AND COMMUNICATIONS SOCIETY             |      |
|    | 2.1 Information technologies (ESPRIT)                                            | 1600 |
|    | 2.2 Telecommunications (RACE)                                                    | 550  |
|    | 2.3 New services of common interest (including DRIVE/DELTA/AIM)                  | 125  |
| 3. | MODERNISATION OF INDUSTRIAL SECTORS                                              |      |
|    | 3.1 S&T for manufacturing (BRITE)                                                | 400  |
|    | 3.2 S&T for advanced materials                                                   | 220  |
|    | 3.3 Raw materials and recycling                                                  | 45   |
|    | 3.4 Technical standards, measurement methods and reference materials             | 180  |
| 4. | EXPLOITATION AND OPTIMUM USE OF BIOLOGICAL RESOURCES                             |      |
|    | 4.1 Biotechnology                                                                | 120  |
|    | 4.2 Agro-industrial technologies (ECLAIR)                                        | 105  |
|    | 4.3 Competitiveness of agriculture and management of agricultural resources      | 55   |
| 5. | ENERGY                                                                           |      |
|    | 5.1 Fission: nuclear safety                                                      | 440  |
|    | 5.2 Controlled thermonuclear fusion                                              | 611  |
|    | 5.3 Non-nuclear energies and rational use of energy                              | 122  |
| 6. | SCIENCE AND TECHNOLOGY FOR DEVELOPMENT                                           | 80   |
| 7. | EXPLOITATION OF THE SEA BED AND USE OF MARINE RESOURCES                          |      |
|    | 7.1 Marine science and technology                                                | 50   |
|    | 7.2 Fisheries                                                                    | 30   |
| 8. | IMPROVEMENT OF EUROPEAN S&T CO-OPERATION                                         |      |
|    | 8.1 Stimulation, enhancement and use of human resources (SCIENCE)                | 180  |
|    | 8.2 Use of major installations                                                   | 30   |
|    | 8.3 Forecasting and assessment and other back-up measures (including statistics) | 23   |
|    | 8.4 Dissemination and utilisation of S&T research results                        | 55   |
|    |                                                                                  | 5396 |

**FRAMEWORK PROGRAMME OF COMMUNITY ACTIVITIES IN THE FIELD OF  
RESEARCH AND TECHNOLOGICAL DEVELOPMENT (1990-94)**

Breakdown of the amount deemed necessary

|      |                                               |       |
|------|-----------------------------------------------|-------|
| I.   | ENABLING TECHNOLOGIES                         | MECU  |
|      | 1. Information and communication technologies | 3000  |
|      | 2. Industrial and materials technologies      | 1200  |
| II.  | MANAGEMENT OF NATURAL RESOURCES               |       |
|      | 3. Environment                                | 700   |
|      | 4. Life sciences and technologies             | 1000  |
|      | 5. Energy                                     | 1100  |
| III. | MANAGEMENT OF INTELLECTUAL RESOURCES          |       |
|      | 6. Human capital and mobility                 | 700   |
|      |                                               | ----- |
|      |                                               | 7700  |

**PROPOSED ANNUAL EXPENDITURE (MECU)**

|                       | 1990   | 1991   | 1992   | 1993   | 1994   | TOTAL  |
|-----------------------|--------|--------|--------|--------|--------|--------|
| Financial perspective | 2071   | 2422   | 2796   |        |        |        |
| IMP*                  | 344.0  | 355.0  | 196.1  |        |        |        |
| Framework Prog 84-87  | 4.2    |        |        |        |        |        |
| Framework Prog 87-91  | 1552.3 | 709.7  | 831.7  |        |        |        |
| Framework Prog 90-94  | 29.5   | 1200.5 | 1470.0 | 2400.0 | 2600.0 | 7700.0 |
| Outside Frame Prog    | 137.0  | 150.0  | 165.0  |        |        |        |
| Total                 | 2067.0 | 2415.2 | 2662.8 |        |        |        |

\*Integrated Mediterranean Programme

FIRST REPORT ON THE STATE OF SCIENCE AND TECHNOLOGY IN EUROPE

(Outline)

This document, published by the European Commission in December 1988, is the first response to the request of the European Parliament for regular reviews by the Commission of the state of science and technology (S&T) in Europe. It aims to provide a factual basis for further reflection, both inside and outside the Community institutions, on Europe's needs in S&T and how best they can be satisfied. It is planned to be updated in 1989 and thereafter published at two-yearly intervals.

The comprehensive nature of the document is illustrated by the headings of its main sections:

- I. Science, Technology and Europe's Economic and Social Needs
- II. European Science and Technology from a Comparative Perspective: Trends in Our Main Competitors
- III. Mobilising Europe's Resources
- IV. Research Issues for the Future
- V. Key Issues for Science and Technology Policy in Europe

It is very much a compendium of useful information rather than a critical appraisal of Europe's S&T. It contains a wealth of data covering the S&T scene both in Europe and the rest of the world. It draws heavily on available comparative data drawn up by the OECD, data from Community members assembled by the Statistical Office of the European Community and, for example, the paper for CREST covering the USA, Japan and Europe. Chapters IV and V of

the report deal with 'Research Issues for the Future' and 'Key Issues' respectively and as such provide good contributions to consideration of future programmes.

On the negative side, much of the statistical data is out of date (and pre-Framework II) and compounded by inconsistency (data of mixed vintage presented for comparison purposes). Recommendations for EC S&T activity are not selective and lean heavily on "me too" for justification (eg "A concerted research effort on superconducting materials is particularly necessary. Large financial resources are being mobilised in the USA and Japan.")

Nevertheless, it is a useful background reference produced under difficult circumstances, and it is hoped that the next revision will result in significant improvements.

## THE REPORT OF THE FRAMEWORK REVIEW BOARD

(Outline)

A panel of five independent experts was tasked by Vice-President Pandolfi with "...examining whether the priorities, activities and financial resources designated for the eight areas of the Framework Programme are still appropriate". The five were Pierre Aigrain, Sir Geoffrey Allen, Eduardo de Arantes e Oliveira, Umberto Colombo, Hubert Markl.

Within the period of a few weeks they reviewed, at strategic level, the ideal aims of a framework programme, and then assessed how the current EC programme measured up to them. They concluded with a list of 42 recommendations covering both the current programme and any future developments of it, together with a brief assessment of the eight lines of activity. The document, released in June 1989, comprises the only critical review of the total Framework Programme currently available.

A synopsis of the forty-two recommendations is given below:

**THE POLITICAL CLIMATE**

1. Improve political understanding of the Framework Programme's (FP) potential
2. Improve coordination between activities of different Directorates General (DGs)
3. Expedite political procedures regulating the application of the FP
4. Apply subsidiarity to avoid duplication with national programmes

**CRITERIA IN RESEARCH**

5. Concentrate on areas of added value (details given)
6. FP research to remain pre-competitive; attenuate funding as research approaches market; strengthen links with Eureka
7. Synergy with (rather than duplication of) existing collaborative programmes
8. More consideration of user demands; pre-competitiveness to embrace pre-standardisation and pre-normative research
9. Greater emphasis on agriculture, raw materials, renewable energy, waste management
10. Increase involvement of SMEs
11. Rejuvenation of mature industries implies greater contact between DG XII and other DGs

**MANAGEMENT AND ADMINISTRATION ISSUES**

12. Reorganise DG XII and DG XIII
13. Increase communication between DG XII and other DGs
14. Improve flexibility and response to changing circumstances
15. Reduce the number of lines to increase flexibility (examples given)
16. Emphasise principle of 'cohesion'
17. DGs XII and XIII both to be involved in all lines of new programme
18. 'Higher profile integrated overseer' role for Commissioner
19. More extensive delegation to external management
20. Rotate project managers and increase mobility between DGs
21. Consider management committees of independent experts vs committees of member states to speed up response times
22. Reduce bureaucracy whilst retaining good features
23. Inject new blood

FUNDING

24. Increase funds
25. Increase financial flexibility via a rolling programme
26. Improve diffusion of results
27. Encourage use of venture capital for commercialisation of R&D results

ENCOURAGEMENT TO THE SCIENTIFIC HUMUS

28. Increase communication between scientists
29. Encourage European centres of excellence
30. Tap the under-utilised talent in the peripheral regions of the Community
31. Increase participation of universities
32. Increased attention to training (mechanisms suggested)

PROGRAMMES

33. Evaluate BRITE and BRITE-EURAM
34. Expand use of ESPRIT to serve user applications
35. Involve the market in funding and direction of RACE
36. Expand international collaboration in fusion research
37. Ensure FP contribution to JESSI is used on pre-competitive research

THE JOINT RESEARCH CENTRE

38. Sort out the JRC (examples given)
39. Examine a change in status of the JRC

DISSEMINATION

40. Examine international practice in diffusion of results to avoid placing the Community at a disadvantage

EVALUATION, ASSESSMENT, FORECASTING

41. Commission studies to provide an information base for the next FP



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42. Address the problem of R&D evaluation in Europe

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PROPOSAL FOR A COUNCIL DECISION CONCERNING THE FRAMEWORK OF  
COMMUNITY ACTIVITIES IN THE FIELD OF RESEARCH AND TECHNOLOGICAL  
DEVELOPMENT (1990-94) - COM(89)397

(Synopsis)

STRUCTURE

The Commission has proposed a revision of the Framework programme up to 1992 and a rolling programme covering the period 1990-94. The proposal anticipates an expenditure of 7700 Mecus for 1990-94 and reserves 5000 Mecus specifically for 1993/4. The whole expenditure is seen as an upper limit and actual programme expenditures will be the subject of future Commission proposals. The amount of 7700 Mecus was extrapolated from the level permitted under the Inter-Institutional Agreement of June 1988.

In broad terms the proposals incorporate many of the suggestions included in the mid-term review and the concept of future reviews is included. They plan to reduce the multiplicity of projects included and the rigidity involved in their administration. This will result in more discretion and freedom of action for the various research managers. In support of these changes the Commission undertakes to improve the efficiency of its management and to introduce control and evaluation methodology to improve productivity.

More emphasis is given to the environment and to ways of improving the 'quality of life' in the Community. The need is also seen to increase the quantity and quality of research manpower by increasing the mobility of post doctorate research workers between member states.

These changes of emphasis will be at the expense of information and communication technology and energy. In the latter regard work to develop more environmentally acceptable methods of energy generation receives more attention. Reference is also made to the need to establish a series of norms or standards covering many of the technological areas covered in the whole programme.

The choices of the Commission have been guided by three considerations. The accelerating pace of technological progress and sustained economic growth in the more industrialised countries; the necessity for strengthening competitiveness of European industry at the worldwide level; and the need to respond to the directions fixed by the Single European Act.

The new Framework programme is characterised by three strategic areas and subdivided into six main programme areas as shown in Annexe C. The proposed expenditures for individual years including 3125 Mecus uncommitted from the 1987-91 programme are also given in Annexe C.

The choice of the scientific and technological objectives rests on the principle of community added value, building on the activities within the individual member states - subsidiarity. The changes in industrial attitudes towards further transnational initiatives, replying to the challenges of industrial competitiveness and the need to train young scientists are the main guiding principles which have been used to select the particular programme objectives. Expenditure on the Joint Research Centre, in a new modified role is to be included as part of the new programme.

CONTENT

(a) Enabling Technology

i. Information and communications technology

The interaction between information and communications technology and the necessity to build a unified network information nerve across Europe dominates the proposals in this field. Building on the results of the ESPRIT programme there will be a shift of emphasis toward prototypes, demonstrator projects, with multi-supplier and distribution systems. In microelectronics there is a need to create a European manufacturing capability. This will be done through a closer collaboration with the Eureka program and specifically in the JESSI project. Information system technology will also be directed toward the use of advanced CAD/CAM systems in strategic industrial systems.

In the communications field priorities will be given to the growing demand for mobile communication systems of telephony and in specific issues such as communication security, availability of frequencies, airborne methods of transmissions, miniturisation and integration of mobile systems into the basic networks. Image communication building on numerical image transfer, including High Definition Television (HDTV) requires research to ensure appropriate equipment development.

The realisation of the large internal market will set new requirements in the field of information

technology in such areas as justice, Social Security and customs as well as between industries and individuals.

ii. Industrial and materials technology

The objective is to contribute to the necessary rejuvenation of European manufacturing industry by developing its science base and the advanced technology required. Technology developments will be integrated with the considerations of emerging market requirements and more severe environmental constraints. An example of this will be the development of the "clean car" as a major project initiative. Work on membranes and catalysts will be phased out.

Improvements in design and manufacturing techniques to achieve greater efficiency through a variety of initiatives are proposed together with improved standards of measurement and testing.

(b) Management of Natural Resources

i. Environment

Work on this area will include Community participation in the global change programme such as contributions to research on biochemical cycles; atmospheric physics and chemistry; oceanography and climatic processes. Research will be carried out on environmental monitoring and more engineering systems to protect and rehabilitate the environment. Studies will also include a substantial new area on the economic and social aspects, including legal

and ethical considerations of environmental policies.

ii. Life sciences and technologies

The long term strategy is to contribute in a selective integrated way to the development of Europe's potential for understanding and using the properties and structures of living matter.

Efforts will be directed to strengthening the science base through new activities in biotechnology. Work is proposed on the human genome and the ethical implications of such work. Studies in neurobiology and immunology, nutrition and the testing of new products will be expected to provide a scientific pre-normative base for future Community regulations.

Agricultural research programmes are proposed of an inter-disciplinary nature to combat the spread of deserts; improve the knowledge of plant genetics to obtain more resistant plants; to improve harvesting and processing. Improved biodegradable products and the production of clean energy through biomass technology will also be included.

Medical research will include a new focus on ways to deal with socially and economically relevant diseases. In cancer research there will be a shift of emphasis toward the early tracing of carcinogenic factors and the development of new tests for anti-carcinogenic drugs. Work is proposed on AIDS aimed at the development of control systems including chemotherapy and vaccines.

Programmes for life sciences and technologies for developing countries are included covering health research into tropical diseases and land management which will allow for food production consistent with environmental protection.

iii. Energy

Environmental compatibility has become the key element for energy systems. The programmes therefore are directed to clean and safe energy systems.

For fossil fuels more has to be done on the greenhouse effect and acid rain. Alternate fuels such as hydrogen will be investigated as a fuel with "Zero emissive power". Also more work on fuel cells using new electrolytes and catalysts will replace previous programmes on coal liquefaction and hydrogenation.

Nuclear fission programmes will put further emphasis on safety standards and then harmonisation across the community. A new impulse will be given to work on reactor safety, waste management, fuel elements and control of other fissile materials. Another new area is concerned with measurement of levels from natural and medical radiation sources and the risks of such low level sources. Also the radiological consequences of nuclear accidents.

(c) Management Of Intellectual Resources

i. Human capital and mobility

The purpose is to provide Europe with the trained human resources on which it is critically dependent and which will become increasingly scarce.

A new initiative is proposed to increase the mobility of young researchers, at post doctoral level, in the area of natural science, technologies and economic science. Training at the interface between natural science and technology will be included.

This will be achieved through a community financed programme providing for a two year assignment in a country different from a person's country of origin. This investment can, where necessary, be supported by a network of research training centres.

The scientific community itself will be encouraged to identify centres of scientific excellence and in the choice of candidates for the programme.

Cabinet Office  
26 September 1989





# ACOST

*ccp  
Secretary*

Advisory Council on Science and Technology  
70 Whitehall, London SW1A 2AS  
01-270- 0109

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Qn 0481

The Rt Hon Margaret Thatcher MP  
The Prime Minister  
10 Downing Street  
London SW1

25 September 1989

*Dear Prime Minister,*

I am submitting to you a report by ACOST on the European Commission's mid-term review of the Framework Programme and their further proposals for 1990-1994. You may recall that ACOST was asked to provide advice in time for the negotiations in the Council of Ministers which start this Autumn. We have had relatively little time to study the Commission's papers but I believe that we have arrived at advice which will be of value to you.

Essentially ACOST believes that the Commission has failed to complete a satisfactory detailed review of its current programme from a management and budgetary control point of view. However, we feel that enough information is available from this review and the Commission paper for the UK to start negotiations at a policy level for the new Framework Programme 1990-1994. As we advised in our National Priorities paper sent to you in June ACOST favours a rolling programme because of its advantages in a field where by its very nature scientific progress cannot be accurately predicted. We believe that less emphasis should be placed on agriculture R & D funded by the Community except for very basic research. This is in line with our advice last year that in the UK the industries concerned should provide more support themselves. We also question the continuing high level of commitment of around 40% to information and communication technologies. There should be more emphasis in these areas on programmes like EUREKA which more accurately reflect near market developments and are industry-led. We believe that a closer link between EUREKA and the Framework Programme is necessary so that the latter can concentrate more on far-market research and topics such as the environment and the development of young scientists.

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ACOST agrees with the principle that Government Departments should consider at the same time domestic and Community initiatives in establishing their future research programmes. However, the process through EURO-PES mechanisms for distributing costs between Departments can cause considerable difficulties and potentially harm to domestic programmes. We suggest that the Government review its position on this.

*Yours sincerely,*

*Francis Tombs*

SIR FRANCIS TOMBS

Enc

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CABINET OFFICE

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From John W Fairclough FEng  
Chief Scientific Adviser

W0229

Circulated to all  
Private Secretaries of  
members of E(ST)

25 September 1989

EC FRAMEWORK PROGRAMME - ACOST

The Advisory Council on Science and Technology was asked by the Government to comment on the Mid-Term Review of the EC Framework Programme and the Commission's proposals for a future programme. ACOST's report is expected to be considered at the Ministerial Meeting on 2 October. In order to give Departments as much time as possible to brief their Ministers I am enclosing a copy of the report in advance of its formal submission to the Prime Minister which will be on 26 or 27 September. The report has been reviewed by Sir Francis Tombs and we expect only minor changes if any at all in the final version.

I am copying this letter and report to Paul Gray.

A handwritten signature in cursive script, appearing to read 'John W Fairclough'.

JOHN W FAIRCLOUGH  
Chief Scientific Adviser

att:

ADVISORY COUNCIL ON SCIENCE AND TECHNOLOGY

REPORT ON

EUROPEAN FRAMEWORK PROGRAMME FOR RESEARCH AND DEVELOPMENT

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- SECTION 1 - INTRODUCTION
- SECTION 2 - REVIEW OF THE CURRENT PROGRAMME (1987-91)
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- - - - -
- ANNEXE A - TERMS OF REFERENCE FOR ACOST STUDY
- ANNEXE B - BUDGET ALLOCATIONS FOR CURRENT FRAMEWORK PROGRAMME
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- ANNEXE F - "PROPOSAL FOR A COUNCIL DECISION CONCERNING THE FRAMEWORK OF COMMUNITY ACTIVITIES IN THE FIELD OF RESEARCH AND TECHNOLOGICAL DEVELOPMENT (1990-94) - COM(89)397" (SYNOPSIS)

EXECUTIVE SUMMARY

i. This report is the result of an invitation to ACOST to advise on the mid-term review of the current EC research and development programme and on the Commission's proposals for the future.

ii. The European Commission has organised and funded collaborative research and development (R&D) under a series of framework programmes since 1984. The first phase, Framework I, ran from 1984-87 with a budget of 3750 mecu and Framework II covers the period 1987-91 with a planned expenditure of 5396 mecu. One requirement of the latter was that a mid-term review should be carried out of the objectives, priorities, activities and financial resources. In order to discharge this task the Commission set up a Framework Review Board comprising five eminent independent individuals who reported in July 1989.

iii. Whilst carrying out the review the Commission has made proposals for a new programme (Framework III) running from 1990-94 with a financial ceiling of 7700 mecu. This would overlap the last two years of Framework II but would be structured quite differently. Apart from an increased rate of spend (1550 mecu for Framework II in 1990 rising to 2600 mecu for Framework III in 1994) there would be six main programme lines instead of the current 37. It is claimed that this would permit the Commission greater flexibility to be responsive to the changing demands of R&D activities. The emphasis of the programme would also be changed away from energy research and towards the environment and life sciences, although information and communication technologies would continue to attract around 40% of the total funds.

iv. On the evidence available to ACOST the current Framework Programme (1987-91) is regarded by participants as generally beneficial and largely well managed. The evident enthusiasm for this collaborative activity is illustrated by the fact that even though it is too early for a proper evaluation of results, many of the major programmes are over-subscribed. There are still some concerns over the administration, particularly at the project proposal stage, and recommendations for improvement are made in the report.

v. At the strategic level ACOST is concerned at the lack of a coherent European policy which guides the programme selection process in Framework II. The structure of the programme is inflexible and its fixed-term nature is inappropriate for pre-competitive R&D which necessarily has uncertain timescales. Attention must be paid to improving the links between those programmes concerned with pure science and those which are industrially oriented, and between Framework and other European programmes such as Eureka.

vi. The mid-term review as carried out by the Commission is not adequate as a detailed management assessment of the programme and the Commission should be pressed to extend the review in this respect. However, ACOST believes that at the strategic level there is sufficient information available (including the views expressed in the Framework Review Board report) to permit sensible initial discussion of programme policy. Further detail will be required to permit determination of the goals and objectives in the specific sectors. ACOST has commented on these sectors in order to assist the Government in establishing a sound negotiating position.

vii. The general structure of the proposed programme (1990-94) is regarded as an improvement over the current one in respect of

its rolling nature and its increased flexibility. However, ACOST is concerned that the need for a large increase in size of the activity has not been demonstrated adequately. The outline proposals for the content require further elucidation; without this detail much of what is proposed could be considered too close to the market place and therefore more appropriate for other initiatives such as Eureka. Also, the balance between the general classes of activity requires examination.

viii. The proposed information and communication technology work contains several elements which read very much like market development activities. In particular the work on peripherals and the application of IT to industrial engineering seem, as stated, inappropriate as Framework activities. The EC-funded part of the microelectronics (JESSI) initiative needs to be separated clearly from the near-market activities which should be funded elsewhere. Similar comments apply to several other sections under the Enabling Technologies heading.

ix. ACOST is in broad agreement with proposals to set up European standards and norms as a result of data from good scientific research and judgements. This is particularly so when they apply to proposed regulations and controls but these are only viable if the political will to enforce them exists.

x. It is debatable how many new data are necessary to optimise the use of CAD/CAM systems, justifying funding by the EC. Before endorsing the modernisation of methods of manufacture and control of production techniques ACOST would need to be satisfied that these could not be more appropriately supported by national or industrial sources.

xi. ACOST is in broad agreement with the proposals on environmental programmes; those specified are obviously essential and best done on a European basis or by participation on a

Community basis in international programmes. It would be useful to develop an understanding of the expertise base already in place in Europe and build on it.

xii. The initiative in the medical research area is generally supported as is that in basic biotechnology, particularly with the emphasis towards strengthening the science base. European led programmes are the appropriate route but recognition of centres of excellence already established in the various fields is essential.

xiii. ACOST has advised the Government that the UK agricultural industry should be encouraged to fund more of its own R&D, particularly where this is focused on near market improvement of yields. This advice is equally applicable to the European Community. All support to this area provided under the Framework Programme should be directed towards long-term research in fields such as genetic manipulation, biodegradable materials and basic molecular biology.

xiv. The proposals for increased mobility of research workers at pre- and post-doctoral level within Europe are endorsed, with the consequent increase in networking and improvement in the science base, particularly in the less favoured member states. There is a danger that this may stimulate migration outside the EC and steps must be taken to avoid this.

xv. ACOST agrees that Government departments should consider both domestic and Community initiatives when planning research programmes in support of departmental policy. However, the benefits can only be maximised if there is freedom to choose how the available budget should be allocated. The Treasury system of apportioning increases in the Framework budget to individual Departments on the basis of percentage share of the programme can frustrate this freedom by requiring funds to be diverted to Community activities when they might be better spent on domestic



projects. It is recommended that the Government should review its position on this.

Summary of Key Recommendations

Numbers in brackets are those of the paragraphs in the main text in which the principal references will be found.

- (a) The Commission should be pressed to complete its formal review of the current programme as part of its proper evaluation and to publish the individual Research Evaluation Reports as they become available. Consideration should be given to the establishment of small independent review teams to supervise this task. (37(a)).
- (b) The review conducted to date is adequate for the purposes of determining the overall policy of the proposed new programme, and negotiations in the European Council should proceed (37(b)).
- (c) The management structure of the Commission needs to be reviewed to improve co-ordination between the Directorates General. At the same time the structure and size of the new programme will require an overhaul of the management process in terms of both proper technology audit and the selection of the appropriate human resource (44 and 65(b)).
- (d) The funding balance between proposed programme lines for Framework III should be justified as should the content of those lines, particularly in the IT and communications technology areas. Where appropriate near-market activities should be considered for funding within the Eureka initiative or from national or industrial sources (64, 65(d) and (f))

- (e) There should be closer co-ordination between activities within the Framework and stronger links between Framework and other European programmes such as Eureka (41).
- (f) The case for support to demonstration projects needs to be re-examined, particularly in the technology- or software-based activities, since such projects can be an essential element of pre-competitive development (42).
- (g) Efforts should be made to improve proposal handling by simplification of forms and a two-tier selection process (45/6).
- (h) Mobility of research workers should be encouraged to stimulate improvement of the science base, particularly in the less-favoured states. The number and length of bursaries for scientists should be increased and similar facilities should be extended to technology training (50/1 and 65 (k)).
- (i) The scope of research eligible for Framework funding should be re-examined so that it can embrace high risk ventures in technology development as well as in pure research (53).
- (j) Standards and norms developed as a result of the Framework Programme should be enforced otherwise the funding involved is wasted (65(e)).
- (k) Identification of national centres of excellence to act as nuclei for European research, particularly in the environmental and life sciences areas, should be an aim of the Commission. Research support should be directed to pre-eminent groups of scientists throughout the Community

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even where there are existing teams at the Joint Research Centre. (52 and 65(g)).

- (l) A critical assessment of the proposals for energy research should be carried out, particularly as regards those for hydrogen fuel and fuel cell research (65(i)).
  
- (m) Funding for agricultural R&D should be restricted to those areas which are long-term or involve basic science, leaving near-market work to be supported by industry (43 and 65(j)).

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SECTION 1 INTRODUCTION

BACKGROUND

1. The Commission of the European Communities is conducting a review of the current (1987-91) Framework Programme for R&D and has proposed a major revision and extension to cover the period 1990-94. The Government invited the Advisory Council on Science and Technology (ACOST) to consider the achievements of the current programme and the proposals for the future, and to develop advice on the UK approach to negotiations. This work was carried out by the Standing Committee on International Collaboration under the terms of reference attached at Annexe A.

2. The review of the current programme (Section 2) was based on work carried out previously by ACOST. The primary source documents for the remainder of the work were all from the Commission:

"First Report on the State of Science and Technology in Europe" - published 1989

"The Report of the Framework Review Board" - unbound document published June 1989

"A Framework for Community RTD Actions in the 90's" - unbound communication dated 6 June 1989

"Proposal for a Council Decision Concerning the Framework of Community Activities in the Field of Research and Technological Development (1990-1994)" - COM(89)397 dated 2 August 1989

An outline description of the first of these documents is given in Annexe D and of the second in Annexe E. The third was superseded by the fourth, and a summary of the latter is presented in Annexe F.

FINANCIAL CONTEXT

3. The Framework Programme is a collaborative initiative to strengthen the competitive position of Europe in science and technology (S&T), with the main focus being on eventual industrial exploitation. In considering both current and future programmes it is useful to compare their scale with individual national activities and other collaborative initiatives. The following figures give some indication of the relative financial magnitudes of the programmes, although as will be seen later the benefits derived cannot be expressed entirely in financial terms.

|     |                                                            |         |     |
|-----|------------------------------------------------------------|---------|-----|
| (a) | UK                                                         | £M      |     |
|     | Gross domestic product (1987)                              | 409900  | (1) |
|     | Government-funded civil R&D (1987)                         | 2384    | (1) |
|     |                                                            |         |     |
| (b) | European Community                                         | £M      |     |
|     | Gross domestic product (1988)                              | 2660500 |     |
|     | Civil R&D funded by governments of EC member states (1987) | 16031   | (1) |
|     | Total EC expenditure on R&D (1987)                         | 817     | (1) |
|     | Estimated total expenditure on framework programmes (1990) | 1072    | (2) |
|     | [Of which UK share at 18.9%                                | 203]    |     |
|     | Estimated total expenditure on framework programmes (1994) | 1757    | (2) |
|     | [Of which UK share at 18.9%                                | 332]    |     |

(c) Eureka

Annualised figures for Eureka are not available, but at June 1988 the estimated value of Eureka projects was £2584m. The total UK commitment was £200m of which Government funding accounted for £22m. All these figures are expected to grow significantly, and indeed at August 1989 total anticipated commitment in Eureka projects is £4352m.

SOURCES:

- (1) Annual Review of Government Funded Research and Development, 1989 - to be published
- (2) European Commission proposals for a new Framework programme 1990-94 (see Annexe C of this report). Assumed £1 = 1.48 Ecu.

It can be seen that from 1990-94 the annual UK expenditure will rise by £129m, an amount roughly equal to 5% of the current government-funded civil R&D.

REPORT LAYOUT

4. Following this introduction there is a general assessment of the current Framework Programme (Section 2). This reflects the views of ACOST and of some officials (both in the UK and Brussels) and participants concerning the operational aspects. In Section 3 an assessment is made of the strategic aspects, with ACOST's views being compared and contrasted with those of the Framework Review Board which carried out the mid-term review. Section 4 addresses explicitly the Commission proposals for a new Framework Programme, highlighting the key issues which ACOST believes should be brought to the attention of ministers.

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5. The first three annexes (A, B and C) contain detailed information which is called up in the body of the report. Annexes D, E and F give some insight into the contents of the three main Commission documents which relate to the mid-term review.

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SECTION 2 REVIEW OF THE CURRENT PROGRAMME (1987-91)

BACKGROUND

6. The first European Community R&D Framework Programme ran from 1984-87 with a budget of 3750 Mecu. The Single European Act came into force on 1 July 1987. In the Science and Technology area the first major initiative in support of this Act was the adoption of the second Framework Programme by the Council of Research Ministers on 28 September 1987 (see Annexe B). This programme provides the finance for the majority of EC-funded pre-competitive R&D. With a budget of 5396 MECU over five years it accounts for around 5% of the total civil R&D carried out within the twelve member states, although it is larger than the national research budgets of seven of those states.

7. In setting out this programme the Council had a number of wider objectives in mind as expressed in the Council Decision:

- i. contribution to the harmonious development of economic activities throughout the Community
- ii. development of the international competitiveness of European industry by promotion of scientific research and technological development at Community level, thereby complementing member states' activities
- iii. encouragement of small and medium sized enterprises (SMEs), research institutes and universities in research and technology development, and in their efforts to co-operate with one another
- iv. particular support of SMEs because of the significance of their place in, and contribution to, the innovative process



- v. strengthening of Community economic and social cohesion and of its science and technology infrastructure, and potential
- vi. definition of common standards as an aid to the completion and efficient operation of the internal market

8. The Framework Programme is divided into eight major lines which are in turn sub-divided as shown in Annexe B. The eight lines can only be created/alterd by unanimity in the Research Council; more flexibility for adjustment is available within the eight lines, though no need for this has arisen yet. The Framework Programme is implemented through specific programmes adopted by negotiation between the Council of Ministers, the Commission and the European Parliament. Within these programmes, individual projects are selected, funded and monitored by Commission staff.

#### ACOST REVIEW

9. ACOST representatives held discussions with UK and EC officials to form views on the overall success of the Framework programme but devoted its detailed investigations to the IT, communications and modernisation of industry sectors which consume around 50% of the total available funding. User views from a SEPSU<sup>(1)</sup> survey were also studied. This grassroots experience coincided very closely with opinions expressed at discussions with officials.

10. As a general comment it was noted that European research

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<sup>1</sup> "European Collaboration in Science and Technology: Pointers to the future for policy makers", Science and Engineering Policy Studies Unit (1988)

programmes have been evolving rapidly and the lessons of the first programmes have been incorporated constructively in newer lines. It is encouraging that in general the new shared-cost industrially oriented lines are well focussed, have a genuine European dimension and contain projects which are of high quality, well administered and capable of exploitation. Older lines, some ex-Euratom, brought under the umbrella of the Framework programme are coming more slowly into line with the good practice exemplified by the later programmes. Typical problem areas being addressed in these older programmes are poor CGC<sup>(2)</sup> administration; programme inertia; the influence of strong individual views; project selection, although this is now moving from decisions by member state representatives to expert panel review; JRC<sup>(3)</sup> involvement; lack of coordination between research and policy; a better focus where limited funding is allocated and production of user-friendly digests of research findings.

**ESPRIT, RACE & BRITE**

11. The lines 'Towards a large market and an information and communications society' and 'Modernisation of industrial sectors' were studied in detail by ACOST, and it has been possible to comment on the sub-line programmes.

UK participation and benefit

12. Involvement of UK organisations is widespread and, if anything, appears to be growing. A healthy pro-active approach is evident from the number of UK prime contractors, and the number of projects with UK partners is impressive. On aggregate

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<sup>2</sup> CGC = Management and Co-ordination Committee for a Research Action programme

<sup>3</sup> JRC = Joint Research Centre. Founded in 1957 under the Euratom Treaty and now wholly funded by DG XII. Consists of four establishments in different countries carrying out in-house research programmes.

the UK comes top in both aspects. Encouragement is needed in three areas, however, to enhance UK benefit - a greater number of industrial partners; participation in more of the larger projects; and the involvement of a UK industrial partner alongside a UK university which is being courted because of its international reputation, so as to prevent our own new science from being syphoned-off abroad.

13. The funding received by UK organisations is somewhat in excess of the notional contribution of 18.9% by the UK Government to the Framework Programme budget which suggests a net benefit. Of more significance is the potential exploitation of results. Hard data are not yet available because few projects have reached this point, but a measure of UK exploitation potential relative to other member states has been derived. This assumes that the potential can be weighted according to the nature of the participating organisation. Thus prime industrial contractors are likely to be more motivated to follow through on projects than other contractors, with research institutes and universities having less ability to achieve an economic impact. Analysis of project participants on this basis shows the UK coming a close second to France, with Germany and Italy behind the UK.

#### Cultural Shift

14. Multi-national programmes have had the effect, surprisingly, of removing the usual over-riding concern of conflict of interest when IPR is shared. The formal programme structure and 50% funding together have opened the door to a serious consideration of collaboration. The pre-competitive nature of the programmes has then provided sufficient initial comfort at the science/business interface to permit experience and further confidence to be gained by active participation. An opportunity has thus been provided to break out of the traditional isolationist industrial culture in the UK and, in

turn, this is valuable preparation for effective UK participation in the single European market. An additional benefit is that some SMEs not previously involved in R&D have been encouraged to participate.

15. It was expected, and found, that effort would be required to work at trust in European partnerships (such effort for UK collaboration is also required) and potential competitors not currently in home markets were seen as less of a threat. The Commission has noticed that following involvement in these programmes with partners from other countries, UK companies are also beginning to co-operate with each other. This is a further welcome sign of the breaking down of suspicious and narrow attitudes.

#### Programme Quality

16. The quality of the programmes appears to be high and at least equal to that achieved in comparable domestic activity. The elements of competition, international refereeing and heavy over-subscription combine to ensure that projects of excellent quality are generally chosen. Over-subscription (possibly as high as 5:1) also has its downside. It is a strong disincentive for SMEs, research institutes and universities to apply for funds because of the significant cost and effort involved in proposal preparation.

#### Stimuli for Collaboration

17. Funding was a necessary stimulus to collaboration but not the only factor. The main drivers emerge as risk sharing, timeliness of novelty, development of standards, improvement of competitive position, international markets and access to partners' science/technology and complementary skills. From an academic perspective complementary skills arise not just between disciplines but also within disciplines because of the diversity

of training provided by the different schools. The results most often reported by participants were commercial benefits for industrial participants and recognition for the academics; leverage through the application of partners' science and technology; and an improved competitive position derived from the science and technology established.

18. In a qualitative sense the 'brand name' of the particular programme was felt to be good for the subsequent marketing of products.

Critical Factors for Success

19. Complementarity of interest in (for example) science, technology or market was vital, as was a high quality of people and pre-established science or technology competence. Good interpersonal relationships at the working level also played their part alongside the right management structure and support systems. Conversely, success was hindered by entry for the wrong reasons (leading to a lack of commitment), lack of leadership, non-assessable objectives, fragmentation of work between too many partners and forced marriages of groups of partners. These factors apply equally to EC and UK collaborative programmes.

Administration Issues

20. ACOST's view is that the administration and organisation of those parts of the Framework Programme they examined in detail was generally competent and strongly oriented to achieving a successful European base. Confidentiality was carefully respected. Choice of independent project assessors is extremely wide; for example DG XII now has a list of over 3000 names and is beginning to be able to assess its assessors. In the early days of the preceding Framework programme when the DGs were not fully staffed the elapsed time between closing date for proposals and ultimate start of successfully negotiated projects could be 18

months. In the latest RACE programme this period had been reduced to a much more acceptable 3 months.

21. There is acknowledgement by users of the helpfulness of EC officials. They showed themselves able to distinguish between straightforward and problem projects and to devote more effort to help the problem ones. By comparison the incidence and quality of official intervention in the UK has been found to be extremely variable. The UK criterion of additionality for project funding in Eureka and some domestic programmes causes considerable problems and the unevenness of funding compared with the known fixed levels in EC programmes introduces uncertainty into the financial planning of non-EC projects.

22. No corpus of information of consensus management (especially for large industrial projects) was available beforehand. For the larger projects a reasonably common management structure evolved - a full time project manager responsible to a senior policy committee, and project co-ordinators responsible for the actions of their own organisations. Very large projects have been found extremely difficult to manage. Team building has been recognised as requiring continuity of personnel and, indeed, some companies view participation as valuable career development for their staff. Higher than normal overheads (at around 10%) for both EC and UK collaborative projects are experienced.

23. Delays to the start of the second Framework Programme proved embarrassing and caused a loss of momentum and credibility. The UK image also suffered, with strong feelings that the Framework Programme exercise had descended to a budget exercise from its higher-minded origins.

24. Exploitation rules for participants are seen to be fair and even-handed, balancing the primary rights of participants with the need for a wider European gain. ESPRIT and BRITE

Technological Days have proved useful fora for networking and display of results; mechanisms to ensure maximum awareness and exploitation of research results are still awaited.

QUALITY OF LIFE, ENERGY AND IMPROVEMENT OF EUROPEAN CO-OPERATION

25. These lines of the Framework Programme were not addressed in detail by ACOST, but the views of participants and officials are summarised here.

26. The Health programme sits uneasily under the Quality of Life line because it is not specifically covered by the Treaty of Rome and this uncertainty hinders the establishment of the right balance of EC/UK activity. Quality of work in concerted action<sup>(4)</sup> areas has been questionable but is greatly improved by the recent Cancer and Aids initiatives which were very well set up. Benefits of collaboration in predictive medicine were not expected by the UK to be significant but full UK involvement was encouraged when the programme was inevitable. The Radiation Protection initiative operates well as a shared cost area and is viewed as very good and largely worthwhile. UK participation is very high; it has the largest number of teams in concerted action programmes. The very large number of declarations of intent for limited post-1990 areas also indicates the strength of grassroots interest.

27. Environmental research has its roots in JRC diversification. The JRC executes some good work but can be slow and expensive; it still consumes more than 50% of funds allocated to environmental issues. The UK is influential in the CGC regarding policy focus and balance of projects. Both EC and UK work yields reasonable quality output and the reduction of UK

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<sup>4</sup> Concerted action programmes are those in which member states agree to exchange research results from national programmes; EC funding is limited to the costs of coordination.

funds, balanced by a corresponding increase to EC projects, has not had a noticeable detrimental effect. In the area of atmospheric pollution good work has been done but a lot more progress is required.

28. The Energy line is another major consumer of funds, the bulk of which are allocated to 'Fission: nuclear safety' work by the JRC and 'Controlled thermonuclear fusion' centred on the JET (Joint European Torus) facility and the establishment of the design basis for NET (Next European Torus). A recent report by senior industrialists has made recommendations for changes and cost reductions at the JRC, which are being implemented. Fusion still has a highly speculative long term outcome and additional international collaboration between the EC and USA, USSR and Japan might sensibly be attempted.

29. In the non-nuclear energy field developments have focussed on two areas - renewable sources of energy and the rational use of energy. Multi-national collaboration has been optional rather than mandatory with the result that collaboration is growing from a relatively small base. This area is also characterised by the nature of the organisations involved - some two thirds are non-industrial - and by the small average size of projects. Expectation of successful exploitation is dampened on both counts. The UK has been well represented across the spectrum of projects. Outside the Framework programme, DG XVII has funded a large number of supporting Demonstration projects. One notable point is that credible demonstration appears to require installations in several member states.

30. Improvement of European S&T co-operation is represented largely by the 'Science' programme aimed at stimulating cooperation and mobility of researchers in exact and natural science. This programme is greatly valued by UK universities, particularly with overseas travel falling victim to financial pressures on UK budgets for small science. EC grants have played



a vital role in facilitating transnational visits, exchanges and collaboration. The very act of collaboration has been found to impose extra academic rigour and provide greater commitment to achieve targets and overcome problems. Transnational visits by academics would be further helped by funding for specialist technicians when necessary for efficient full-time running of equipment.

SUMMARY

31. Collaboration is not a new concept, even when given multi-national status. Alvey generated a groundswell of interest in the UK in the IT area and JOERS continues it in optoelectronics, but the industrially oriented programmes in the first and second EC Framework Programmes have broken through traditional reserve to create a supportive climate for sharing of IPR on a scale that would previously have seemed most unlikely.

32. Overall, more has been gained than lost by participants, UK organisations included. This, together with the generally high quality of science and technology, represents a heartening response to the objectives which were in the mind of the Council when it initiated the Framework Programmes. The challenge of extensive exploitation for economic impact remains.

SECTION 3 COMMENTS ON THE CURRENT PROGRAMME

BACKGROUND

33. The purpose of this section is to consider the adequacy of the mid-term review carried out by the Commission, and to make recommendations based on the lessons learned from the current programme. In this task ACOST has been assisted by the documents listed in the Introduction (section 1) and reference is made to these as appropriate. Brief descriptions of the two primary documents are given in Annexes D and E.

EXECUTION OF THE MID-TERM REVIEW

34. The Report of the Framework Review Board, which constitutes the bulk of the mid-term review, was compiled in a period of a few weeks and is necessarily superficial in some areas. The report is nevertheless of extreme importance since it constitutes the sole view and assessment of the total Framework Programme, so far, undertaken by outsiders. It is thus most certainly a valuable contribution to both the assessment of the present Framework Programme and to consideration of future actions. It is a matter of regret that the Board was not given more time to complete the task.

35. In view of the size of the Board and the limited time available for the review, the report is not entirely adequate either as a review of the current programme (Framework II) nor as preparation for discussion of the Commission proposals for a revision. There are, however, additional sources of material available which complement the Review Board's report. At the overview level the 'First Report on the State of S&T in Europe' is intended as an assessment of European Science and Technology to date but also identifies technological needs for the future. Also available are the Research Evaluation Reports, of which ACOST has looked particularly at:

Report No. 24 - Evaluation of the R&D Programme in the field of Non-Nuclear Energy

Report No. 25 - Evaluation of the first BRITE Programme.

Report No. 32 - Evaluation of the Biomolecular Engineering Programme - BEP (1982-1986) and the Biotechnology Action Programme - BAP (1985-1989).

Report No. 34 - Evaluation of the Programme on Science and Technology for Development STD.

36. With regard to the assessment of the present Framework Programme this series of reports provides a source of expert opinion drawn from a variety of backgrounds: industrial managers, research scientists from industry and academia, industrial consultants and senior officials. The evaluations are part of the set of 'vertical' evaluations of individual R&D programmes which should take place during each 4 or 5 year programme (Council Resolution of Dec.1986). The evaluation of BRITE is a comprehensive account, including all the data, of the evaluation exercise and as such constitutes an adequate source of information upon which to assess that particular programme. The evaluation of BAP-BEP is a model evaluation of projects which are carried out under the principal of 'concertation'. The ELWW (European Laboratory without Walls) concept is reviewed and assessed in practice. The reports concerning Non-Nuclear Energy and Development are typical of Executive Summaries in the series of 'vertical' evaluations providing the key observations made in the full report, naturally including those points which would figure in decision-making on future programmes. The complete series of 'vertical' reports can be expected to provide the detailed background data necessary to support evaluation exercises.

37. ACOST's recommendations on the adequacy of the execution of the mid-term review fall into two parts:

- (a) The review does not meet the full requirements of Article 4 in the sense that a detailed assessment of all aspects of the programme has not been carried out. Such an assessment, reviewing objectives, achievements and financial expenditure, is a necessary part of any programme, and must be instituted. A 'snapshot' exercise by a small team, such as that conducted by the Framework Review Board, is not sufficient on its own to discharge the requirements of a formal review. ACOST recommends, therefore, that the Commission should be pressed for a formal review as part of the proper evaluation of the Framework Programme.

A review of this sort should be conducted on a continuous basis over a period of several years. The Research Evaluation Reports are an important constituent and the series should be completed to provide the necessary evaluation data. Consideration should be given by the Commission to the establishment of a small team of independent assessors, reporting to the Vice-President, to oversee the review process.

- (b) The extent to which the strategic plan for a new programme could benefit from a detailed examination of the current one (beyond what has been achieved by the Board) is considered to be limited. Notwithstanding the need for a detailed review as part of the proper management of the current programme, ACOST recommends that the Report of the Framework Review Board, together with other documents, constitutes an adequate review for the purposes of planning the proposed new programme. The report gives good coverage at a strategic level in

sufficient detail for the principles of the new programme to be established. The admitted shortcomings of the report do not constitute a justification for delaying the progress of negotiations.

RECOMMENDATIONS DERIVED FROM THE CURRENT FRAMEWORK PROGRAMME

38. In arriving at its own conclusions ACOST has used as a reference the Report of the Framework Review Board. The Review Board makes 42 recommendations concerning the conduct of the programme, some of which are also applicable to the proposed new programme. These are summarised in Annexe F. ACOST endorses the majority of the recommendations but key issues are discussed below under the headings used by the Board.

Political climate

39. The Framework Programme has laudable objectives. However, it is not always clear that the collection of individual programmes and projects add up to the Grand European ideal. The Review Board have some unease about this. The problem is serious, at least in terms of expectations, because Europe is sandwiched between the well-established national programmes of the member states and the much larger but similarly well-established programmes in USA and Japan. Without any clear statement of European policy the Commission will almost inevitably resort to EEC programmes with two characteristics:

- i. Catch-up. This is the temptation to put in place a Japanese-sized research programme but without the business follow-up to exploit it.
- ii. Subsidy. Framework is often seen as another source of subsidy which preferably complements state funding.

40. It is essential that at both national and European levels the objectives of the programme should be clearly understood and that the structure and content should be tailored accordingly. It should be part of the Commission's role to show how each programme supports the objectives and is a part of an integrated structure.

Criteria in research

41. ACOST endorses strongly the Board's recommendations that the Framework Programme should only be invoked in areas where some perceived added value (in its widest sense, not just financial) is obtainable from doing so. This applies both to the avoidance of duplication of national programmes (subsidiarity) and to overlap with other, pre-existing collaborative activities. In particular ACOST would like to see stronger links between EC programmes which are complementary in the research-to-product sequence. There does not seem to be adequate machinery for feeding the results of the strategic research funded by SCIENCE into the various applied programmes downstream from it. Indeed there seems to be an intellectual gap between where support from SCIENCE is expected to end (and for budgetary reasons must do so) and where programmes downstream from it are expected to begin. ACOST recommends stronger links between Framework and other relevant European programmes such as Eureka so that the research, development and exploitation phases of successful projects could be properly integrated. This should be complemented by companies improving strategic links between research activities and product strategy.

42. The case for demonstration projects needs to be re-examined, particularly for technology or software-based activities, since any research on such topics usually requires some feasibility or demonstration vehicle.

43. ACOST does not necessarily agree with the recommendation that more emphasis should be placed on R&D relevant to the restructuring and modernisation of the agricultural sector. Reductions in UK spend in this area have been urged regularly in advice to Ministers, with the object of increasing industrial funding. This principle should be extended to Europe, with Framework funding being used only for long-term R&D which is not aimed at increased yields.

Management and administration issues

44. There is a serious lack of co-ordination between DGXII and DGXIII. Since DGXII appears to be able to co-operate reasonably well with other DGs, the fault probably lies largely with DGXIII. The Board's report recommends redrawing the boundaries between the two, but this would involve interminable bureaucratic infighting and wherever the boundary was drawn there would need to be a great deal of co-operation across it. Ideally they should be merged, but that is certainly unrealistic. Whatever solution is adopted, it should be underpinned by a change in staffing policy. Commission staff should be moved regularly between posts and between directorates as recommended by the Board to reduce proprietorial attitudes and increase communication.

45. In Section 2 of this report ACOST welcomed the improvement in the speed of response by the DGs in handling proposals. Nevertheless there are further improvements to be made and ACOST endorses the recommendations (primarily number 22) of the Board on this issue. The forms which have to be filled in and the contracts which have to be negotiated are clumsy and do discourage a great many applicants - particularly small manufacturing enterprises and academic institutions, which it is considered particularly important to involve. Resolution of this problem may rest more with DGXX and the Court of Auditors than DGXII and DGXIII.

46. Coupled to the bureaucracy is the level of oversubscription, quoted in Section 2 as approaching 5:1 in certain programmes. ACOST believes that a certain level of oversubscription is desirable to give Commission officials the scope to maintain a high level of quality. However, this needs to be balanced against the cost and frustration experienced by those not selected, many of whom (SMEs and academic institutions) cannot afford repeated applications. The Board's recommendation for a two-tier selection process, with a low-cost outline proposal as the first stage, merits close attention. The level of oversubscription is also necessarily a parameter to be taken into account when the levels of programme funding are determined.

47. Whilst ACOST recognises the desirability of developing a fully integrated European Community, there is a possible conflict with the principle of subsidiarity; that is, the Commission may choose to instigate collaborative programmes in support of cohesion<sup>(5)</sup> which the more developed member states are quite capable of executing as national projects. The Board's recommendation in this respect (number 16) implies that cohesion should be subordinate to subsidiarity and ACOST endorses this.

#### Funding

48. The Review Board recommends that the level of funding be increased to the threshold permissible under the Inter-Institutional Agreement. It also stresses the need for flexibility in the management of this funding. ACOST's views on this increase are supportive in the main but certain specific recommendations need to be made:

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<sup>5</sup> Cohesion is the principle by which emphasis is given to the technological development of less favoured member states such as Portugal and Greece.



- i. As proposed by the Commission the increased funding should be regarded as a ceiling and not a budget until proper justification for expenditure has been received.
- ii. the increase should not be funded by reductions in domestic departmental budgets except where there is potential for programme integration

49. The need for a separate fund for dissemination of results was challenged by ACOST in its earlier studies, particularly at the level of 38 mecu. It was felt that this activity should be an integral part of individual programmes. The Board's recommendation for an increase in the funding of VALUE would not be endorsed by ACOST without further debate.

Encouragement to the scientific humus

50. The role of the EC programmes in the areas of training and the improvement of communication between scientists cannot be overstated. The most important programme in this context is SCIENCE which complements the Research Councils of the member states. In the long run its most valuable activity will turn out to be the provision of bursaries, because of the effect which these will have in bringing European scientists into a single community. It is highly desirable that the number of bursaries be increased, and urgent that the recent ruling which limited the tenure of bursaries to two years (instead of three) be reversed. The DELTA programme, which concerns computer-aided education, is of particular importance to the UK in view of the crisis in the supply of teachers in key subjects.

51. In contrast with the science base, the relative weakness of the European technology base receives less attention. European programmes could do a great deal to improve technology

competence, particularly in the provision of manpower and appropriate industrial training facilities. Unfortunately the educational establishments tend to be academic and out of touch with industrial priorities. There is enormous potential for a major European initiative in technology training coupled to R&D.

52. There is certainly a need for European centres of excellence in research, but monolithic centres such as the Joint Research Centre (JRC) are not the answer. All indications so far are that these centres are even more resistant to change than their national equivalents, and the costs of re-structuring are exorbitant. It is ACOST's view that research would be better directed to collaborative groups of scientists of recognised standing who could form a nucleus of European excellence. One mechanism for this could be an enhancement of the SCIENCE laboratory twinning programme with perhaps four or five partners. Apart from some base-level funding the centres would have to bid for research funds and they would therefore remain responsive to national and community priorities. Another mechanism is the 'research hotel' concept favoured by some UK Interdisciplinary Research Centres (IRCs) under which an establishment provides research facilities which are then used by visiting researchers for the period necessary to complete their work. The important element is to avoid a permanent commitment on the part of the Commission to maintain buildings, equipment and salaried researchers.

#### Programmes

53. ACOST's views on the major programmes of BRITE, RACE and ESPRIT are generally favourable. The opportunity is taken here to re-emphasise that research conducted within the Framework Programme cannot be considered in isolation from the development and exploitation phases which follow. The development phase of any programme is much bigger than many have been prepared to recognise. The 'research' required by topics such as IT is a

case in point; the biggest advances, which are sometimes the riskiest, often come through the refinement of existing ideas for new applications. It is recommended that the term 'pre-competitive' should be re-examined so that it can embrace high risk ventures in technology development as well as pure research.

The Joint Research Centre

54. ACOST is firmly of the opinion that the role and organisation of the JRC must be overhauled as a matter of urgency, and endorses the Board's views.

Dissemination

55. The Board's concern over the 'open door' policy to the dissemination of research results is recognised, but the practicality of restricting such dissemination is questionable. Proper protection of intellectual property by means of patenting, copyright etc is essential, but it is considered unlikely that any attempt to control information at the working level will be effective nor, indeed, is it even desirable. The secrecy and end user restrictions imposed by the USA are of concern in this context, and the European authorities could do considerably more to persuade the USA to withdraw them. However, ACOST feels that 'tit for tat' retaliation is not a proper route to follow and would, in any case, result in a Fortress Europe which has thus far been eschewed.

SECTION 4      ADVICE ON THE PROPOSED NEW PROGRAMME (1990-94)

BACKGROUND

56.       The Commission has proposed a programme for revision of the Framework programme up to 1992 and a rolling programme covering the period 1990-94.    The proposal anticipates an expenditure of 7700 Mecus for 1990-94 and reserves 5000 Mecus specifically for 1993/4.    The whole expenditure is seen as an upper limit and actual programme expenditures will be the subject of future Commission proposals.    The amount of 7700 Mecus was extrapolated from the level permitted under the Inter-Institutional Agreement of June 1988.

57.       In broad terms the proposals incorporate many of the suggestions included in the mid-term review and the concept of future reviews is included.    There is a plan to reduce the multiplicity of projects included and the rigidity involved in their administration.    This will result in more discretion and freedom of action for the various research managers.    In support of these changes the Commission undertakes to improve the efficiency of its management and to introduce control and evaluation methodology to improve productivity.

58.       More emphasis is given to the environment and to ways of improving the 'quality of life' in the Community.    The need is also seen to increase the quantity and quality of research manpower by increasing the mobility of post doctorate research workers between member states.

59.       These changes of emphasis will be at the expense of information and communication technology and energy.    In the latter regard work to develop more environmentally acceptable methods of energy generation receives more attention.    Reference is also made to the need to establish a series of norms or standards covering many of the technological areas covered in the

whole programme.

60. The choices of the Commission have been guided by three considerations. The accelerating pace of technological progress and sustained economic growth in the more industrialised countries; the necessity for strengthening competitiveness of European industry at the worldwide level; and the need to respond to the directions fixed by the Single European Act.

61. The new Framework programme is characterised by three strategic areas and subdivided into six main programme areas as shown in Annexe C. The proposed expenditures for individual years including 3125 Mecus uncommitted from the 1987-91 programme are also given in Annexe C.

62. The choice of the scientific and technological objectives rests on the principle of community added value, building on the activities within the individual member states - subsidiarity. The changes in industrial attitudes towards further transnational initiatives, replying to the challenges of industrial competitiveness and the need to train young scientists are the main guiding principles which have been used to select the particular programme objectives. Expenditure on the Joint Research Centre, in a new modified role is to be included as part of the new programme.

63. A summary of the contents of the proposals is given in Annexe F. The rest of this section gives ACOST's reactions to the proposals.

#### ACOST'S VIEWS ON THE COMMISSION PROPOSALS

64. ACOST endorses the Commission action in initiating a forward look at European collaborative R&D, and welcomes the proposals for a new framework programme as a discussion document. However, there are some reservations both about the pace at which

it is proposed to introduce Framework III and about the detailed content of the programme lines. Two crucial issues which need to be addressed are whether a significant increase of R&D effort at this stage can be justified, and whether this increased effort can be managed effectively. On both counts the Commission proposals acknowledge their importance, but do not produce evidence to show that they have been resolved.

65. Specific points are raised in the following paragraphs:
- (a) The new proposals represent an improvement of those contained in Framework II. A reduction in the rigidity of the system by the use of broader subject headings for the programme lines, and the consequential flexibility to move money to needed areas is endorsed.
  - (b) The rolling programme has merits as far as research management is concerned, minimising discontinuities. However this, together with the detailed programme flexibility, puts much more responsibility on programme managers. The Community's plan to introduce evaluation and more modern methods of management is essential and it is hoped that objectives and goals will be properly defined. A proper technology audit, perhaps conducted by an independent panel, should be an integral part of each programme. The proposal to decentralise programme management is particularly welcome, but this will change the nature of the task of the Commission staff and this must be recognised. The recruitment of able managers, rather than R&D specialists, should be implemented. Appointments should be for a fixed term, with transfers between DGs being encouraged.
  - (c) More information is clearly required to judge the overall level of spending proposed. The 7700 Mecu budget is a ceiling derived from the Inter-Institutional

Agreement, but some rationale is required to show that the proposed funding is appropriate to Europe's needs, and more of the reasoning for the allocation to the six individual lines is essential. For example, the funding for information and communication technologies continues at 39-40% of the total as in Framework II but without justification. Also the funding profile is not consistent with the style of rolling programme proposed; it continues building to a peak in the final year rather than tailing off and allowing flexibility in the review/overlap of the next phase. This suggests that the Commission anticipates a monotonic increase in European R&D expenditure levels, something which their proposals simply do not justify.

- (d) The proposed information and communication technology work contains several elements which look very much like market development activities. In particular the work on peripherals and the application of IT to industrial engineering seem, as stated, inappropriate as Framework activities. The EC-funded part of the microelectronics (JESSI) initiative needs to be separated clearly from the near-market activities which should be funded elsewhere. Similar comments apply to several other sections under the Enabling Technologies heading.
- (e) ACOST is in broad agreement with proposals to set up European standards and norms as a result of good, scientific data and judgements. This is particularly so when they apply to proposed regulations and controls but these are only viable if the political will to enforce them exists. The work on the 'clean car' should be seen as developing and setting appropriate standards, not as the manufacture of a prototype model.
- (f) It is debatable how many new data are necessary to

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optimise the use of CAD/CAM systems, justifying funding by the EC. Before endorsing the modernisation of methods of manufacture and control of production techniques ACOST would need to be satisfied that these would not be more appropriately supported by national or industrial sources.

- (g) ACOST is in broad agreement with proposals to set up European standards and norms as a result of data from good scientific research and judgements. This is particularly so when they apply to proposed regulations and controls but these are only viable if the political will to enforce them exists.
  
- (h) The initiative in the medical research area is generally supported as is that in basic biotechnology, particularly with the emphasis towards strengthening the science base. European led programmes are the appropriate route but recognition of centres of excellence already established in the various fields is essential.
  
- (i) The energy programme is predictable and acceptable in part. Eventually there has to be a recognition of the cost of an environmentally clean atmosphere. Clean up of exhaust products from fossil fuel combustion is understood scientifically but reliable, efficient technology solutions are some way from being ready to be installed.

Hydrogen fuels are only realistic when one knows more of price and availability. Engine technology could soon be adapted.

There is some scepticism about more fuel cell research. The technology has been proven in non-cost-limited situations such as space craft, but despite many years'



work has shown little promise for commercial exploitation.

- (j) ACOST has advised the Government that the UK agricultural industry should be encouraged to fund more of its own R&D, particularly where this is focused on near market improvement of yields. This advice is equally applicable to the European Community. All support to this area provided under the Framework Programme should be directed towards long-term research in fields such as genetic manipulation, biodegradable materials and basic molecular biology.
- (k) The proposals for increased mobility of research workers at both pre- and post-doctoral level within Europe are endorsed, with the consequent increase in networking and improvement in the science base, particularly in the less favoured member states. There is a danger that this may stimulate migration outside the EC and steps must be taken to avoid this.

ADVISORY COUNCIL ON SCIENCE AND TECHNOLOGY  
STANDING COMMITTEE ON INTERNATIONAL COLLABORATION  
STUDY ON  
EUROPEAN FRAMEWORK PROGRAMME FOR RESEARCH AND DEVELOPMENT

TERMS OF REFERENCE

In conformity with Article 4 of the Decision which established the EC 1987-91 Framework Programme for R&D, the European Commission is conducting a mid-term review of the programme and intends, probably in July 1989, to propose a revision. This revision will include proposals for the future direction of European R&D beyond the end of the current programme.

The Standing Committee on International Collaboration is invited to advise the ACOST on aspects of this review, with the following terms of reference:

1. To study available documents ("First Report on the State of S&T in Europe", "A Framework for Community RTD Actions in the 90s", "Report of the Framework Review Board") and any other relevant documents which may become available during the study and advise on:
  - the success of existing EC research programmes (in relation to each other and to comparable national programmes)
  - the adequacy of the documents as an assessment of the present Framework Programme and as a basis for decision-making on future R&D programmes
  - the aptness of the recommendations made by the Framework Review Board
2. To examine (when available, probably late July) the Commission's proposals for a revised Framework Programme and advise on:
  - the suitability of the proposed structure for meeting the R&D objectives of both the Community and the UK
  - the appropriateness of the programme content in terms of both its coverage and the balance between subject areas and activities

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- the scale of the programme in relation to perceived needs for collaborative R&D and its balance in relation to comparable national or other existing international collaborative programmes

3. To report to ACOST at the 12 September meeting (subject to availability of the Commission's proposals).

Cabinet Office  
19 July 1989

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**FRAMEWORK PROGRAMME OF COMMUNITY ACTIVITIES IN THE FIELD OF  
RESEARCH AND TECHNOLOGICAL DEVELOPMENT (1987-91)**

Breakdown of the amount deemed necessary in 1987

|    |                                                                                     |      |
|----|-------------------------------------------------------------------------------------|------|
| 1. | QUALITY OF LIFE                                                                     | MECU |
|    | 1.1 Health                                                                          | 80   |
|    | 1.2 Radiation protection                                                            | 34   |
|    | 1.3 Environment                                                                     | 261  |
| 2. | TOWARDS A LARGE MARKET AND AN INFORMATION AND<br>COMMUNICATIONS SOCIETY             |      |
|    | 2.1 Information technologies (ESPRIT)                                               | 1600 |
|    | 2.2 Telecommunications (RACE)                                                       | 550  |
|    | 2.3 New services of common interest<br>(including DRIVE/DELTA/AIM)                  | 125  |
| 3. | MODERNISATION OF INDUSTRIAL SECTORS                                                 |      |
|    | 3.1 S&T for manufacturing (BRITE)                                                   | 400  |
|    | 3.2 S&T for advanced materials                                                      | 220  |
|    | 3.3 Raw materials and recycling                                                     | 45   |
|    | 3.4 Technical standards, measurement methods<br>and reference materials             | 180  |
| 4. | EXPLOITATION AND OPTIMUM USE OF BIOLOGICAL RESOURCES                                |      |
|    | 4.1 Biotechnology                                                                   | 120  |
|    | 4.2 Agro-industrial technologies (ECLAIR)                                           | 105  |
|    | 4.3 Competitiveness of agriculture and management<br>of agricultural resources      | 55   |
| 5. | ENERGY                                                                              |      |
|    | 5.1 Fission: nuclear safety                                                         | 440  |
|    | 5.2 Controlled thermonuclear fusion                                                 | 611  |
|    | 5.3 Non-nuclear energies and rational use of energy                                 | 122  |
| 6. | SCIENCE AND TECHNOLOGY FOR DEVELOPMENT                                              | 80   |
| 7. | EXPLOITATION OF THE SEA BED AND USE OF MARINE<br>RESOURCES                          |      |
|    | 7.1 Marine science and technology                                                   | 50   |
|    | 7.2 Fisheries                                                                       | 30   |
| 8. | IMPROVEMENT OF EUROPEAN S&T CO-OPERATION                                            |      |
|    | 8.1 Stimulation, enhancement and use of human<br>resources (SCIENCE)                | 180  |
|    | 8.2 Use of major installations                                                      | 30   |
|    | 8.3 Forecasting and assessment and other back-up<br>measures (including statistics) | 23   |
|    | 8.4 Dissemination and utilisation of S&T research<br>results                        | 55   |
|    |                                                                                     | 5396 |

FRAMEWORK PROGRAMME OF COMMUNITY ACTIVITIES IN THE FIELD OF  
RESEARCH AND TECHNOLOGICAL DEVELOPMENT (1990-94)

Breakdown of the amount deemed necessary

|      |                                               |       |
|------|-----------------------------------------------|-------|
| I.   | ENABLING TECHNOLOGIES                         | MECU  |
|      | 1. Information and communication technologies | 3000  |
|      | 2. Industrial and materials technologies      | 1200  |
| II.  | MANAGEMENT OF NATURAL RESOURCES               |       |
|      | 3. Environment                                | 700   |
|      | 4. Life sciences and technologies             | 1000  |
|      | 5. Energy                                     | 1100  |
| III. | MANAGEMENT OF INTELLECTUAL RESOURCES          |       |
|      | 6. Human capital and mobility                 | 700   |
|      |                                               | ----- |
|      |                                               | 7700  |

PROPOSED ANNUAL EXPENDITURE (MECU)

|                       | 1990   | 1991   | 1992   | 1993   | 1994   | TOTAL  |
|-----------------------|--------|--------|--------|--------|--------|--------|
| Financial perspective | 2071   | 2422   | 2796   |        |        |        |
| IMP*                  | 344.0  | 355.0  | 196.1  |        |        |        |
| Framewk Prog 84-87    | 4.2    |        |        |        |        |        |
| Framewk Prog 87-91    | 1552.3 | 709.7  | 831.7  |        |        |        |
| Framewk Prog 90-94    | 29.5   | 1200.5 | 1470.0 | 2400.0 | 2600.0 | 7700.0 |
| Outside Frame Prog    | 137.0  | 150.0  | 165.0  |        |        |        |
| Total                 | 2067.0 | 2415.2 | 2662.8 |        |        |        |

\*Integrated Mediterranean Programme

FIRST REPORT ON THE STATE OF SCIENCE AND TECHNOLOGY IN EUROPE

(Outline)

This document, published by the European Commission in December 1988, is the first response to the request of the European Parliament for regular reviews by the Commission of the state of science and technology (S&T) in Europe. It aims to provide a factual basis for further reflection, both inside and outside the Community institutions, on Europe's needs in S&T and how best they can be satisfied. It is planned to be updated in 1989 and thereafter published at two-yearly intervals.

The comprehensive nature of the document is illustrated by the headings of its main sections:

- I. Science, Technology and Europe's Economic and Social Needs
- II. European Science and Technology from a Comparative Perspective: Trends in Our Main Competitors
- III. Mobilising Europe's Resources
- IV. Research Issues for the Future
- V. Key Issues for Science and Technology Policy in Europe

It is very much a compendium of useful information rather than a critical appraisal of Europe's S&T. It contains a wealth of data covering the S&T scene both in Europe and the rest of the world. It draws heavily on available comparative data drawn up by the OECD, data from Community members assembled by the Statistical Office of the European Community and, for example, the paper for CREST covering the USA, Japan and Europe. Chapters IV and V of

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the report deal with 'Research Issues for the Future' and 'Key Issues' respectively and as such provide good contributions to consideration of future programmes.

On the negative side, much of the statistical data is out of date (and pre-Framework II) and compounded by inconsistency (data of mixed vintage presented for comparison purposes). Recommendations for EC S&T activity are not selective and lean heavily on "me too" for justification (eg "A concerted research effort on superconducting materials is particularly necessary. Large financial resources are being mobilised in the USA and Japan.")

Nevertheless, it is a useful background reference produced under difficult circumstances, and it is hoped that the next revision will result in significant improvements.

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THE REPORT OF THE FRAMEWORK REVIEW BOARD

(Outline)

A panel of five independent experts was tasked by Vice-President Pandolfi with "...examining whether the priorities, activities and financial resources designated for the eight areas of the Framework Programme are still appropriate". The five were Pierre Aigrain, Sir Geoffrey Allen, Eduardo de Arantes e Oliveira, Umberto Colombo, Hubert Markl.

Within the period of a few weeks they reviewed, at strategic level, the ideal aims of a framework programme, and then assessed how the current EC programme measured up to them. They concluded with a list of 42 recommendations covering both the current programme and any future developments of it, together with a brief assessment of the eight lines of activity. The document, released in June 1989, comprises the only critical review of the total Framework Programme currently available.

A synopsis of the forty-two recommendations is given below:

THE POLITICAL CLIMATE

1. Improve political understanding of the Framework Programme's (FP) potential
2. Improve coordination between activities of different Directorates General (DGs)
3. Expedite political procedures regulating the application of the FP
4. Apply subsidiarity to avoid duplication with national programmes



CRITERIA IN RESEARCH

5. Concentrate on areas of added value (details given)
6. FP research to remain pre-competitive; attenuate funding as research approaches market; strengthen links with Eureka
7. Synergy with (rather than duplication of) existing collaborative programmes
8. More consideration of user demands; pre-competitiveness to embrace pre-standardisation and pre-normative research
9. Greater emphasis on agriculture, raw materials, renewable energy, waste management
10. Increase involvement of SMEs
11. Rejuvenation of mature industries implies greater contact between DG XII and other DGs

MANAGEMENT AND ADMINISTRATION ISSUES

12. Reorganise DG XII and DG XIII
13. Increase communication between DG XII and other DGs
14. Improve flexibility and response to changing circumstances
15. Reduce the number of lines to increase flexibility (examples given)
16. Emphasise principle of 'cohesion'
17. DGs XII and XIII both to be involved in all lines of new programme
18. 'Higher profile integrated overseer' role for Commissioner
19. More extensive delegation to external management
20. Rotate project managers and increase mobility between DGs
21. Consider management committees of independent experts vs committees of member states to speed up response times
22. Reduce bureaucracy whilst retaining good features
23. Inject new blood

FUNDING

24. Increase funds
25. Increase financial flexibility via a rolling programme
26. Improve diffusion of results
27. Encourage use of venture capital for commercialisation of R&D results

ENCOURAGEMENT TO THE SCIENTIFIC HUMUS

28. Increase communication between scientists
29. Encourage European centres of excellence
30. Tap the under-utilised talent in the peripheral regions of the Community
31. Increase participation of universities
32. Increased attention to training (mechanisms suggested)

PROGRAMMES

33. Evaluate BRITE and BRITE-EURAM
34. Expand use of ESPRIT to serve user applications
35. Involve the market in funding and direction of RACE
36. Expand international collaboration in fusion research
37. Ensure FP contribution to JESSI is used on pre-competitive research

THE JOINT RESEARCH CENTRE

38. Sort out the JRC (examples given)
39. Examine a change in status of the JRC

DISSEMINATION

40. Examine international practice in diffusion of results to avoid placing the Community at a disadvantage

EVALUATION, ASSESSMENT, FORECASTING

41. Commission studies to provide an information base for the next FP

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42. Address the problem of R&D evaluation in Europe

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PROPOSAL FOR A COUNCIL DECISION CONCERNING THE FRAMEWORK OF  
COMMUNITY ACTIVITIES IN THE FIELD OF RESEARCH AND TECHNOLOGICAL  
DEVELOPMENT (1990-94) - COM(89)397

(Synopsis)

STRUCTURE

The Commission has proposed a revision of the Framework programme up to 1992 and a rolling programme covering the period 1990-94. The proposal anticipates an expenditure of 7700 Mecus for 1990-94 and reserves 5000 Mecus specifically for 1993/4. The whole expenditure is seen as an upper limit and actual programme expenditures will be the subject of future Commission proposals. The amount of 7700 Mecus was extrapolated from the level permitted under the Inter-Institutional Agreement of June 1988.

In broad terms the proposals incorporate many of the suggestions included in the mid-term review and the concept of future reviews is included. They plan to reduce the multiplicity of projects included and the rigidity involved in their administration. This will result in more discretion and freedom of action for the various research managers. In support of these changes the Commission undertakes to improve the efficiency of its management and to introduce control and evaluation methodology to improve productivity.

More emphasis is given to the environment and to ways of improving the 'quality of life' in the Community. The need is also seen to increase the quantity and quality of research manpower by increasing the mobility of post doctorate research workers between member states.

These changes of emphasis will be at the expense of information and communication technology and energy. In the latter regard work to develop more environmentally acceptable methods of energy generation receives more attention. Reference is also made to the need to establish a series of norms or standards covering many of the technological areas covered in the whole programme.

The choices of the Commission have been guided by three considerations. The accelerating pace of technological progress and sustained economic growth in the more industrialised countries; the necessity for strengthening competitiveness of European industry at the worldwide level; and the need to respond to the directions fixed by the Single European Act.

The new Framework programme is characterised by three strategic areas and subdivided into six main programme areas as shown in Annexe C. The proposed expenditures for individual years including 3125 Mecus uncommitted from the 1987-91 programme are also given in Annexe C.

The choice of the scientific and technological objectives rests on the principle of community added value, building on the activities within the individual member states - subsidiarity. The changes in industrial attitudes towards further transnational initiatives, replying to the challenges of industrial competitiveness and the need to train young scientists are the main guiding principles which have been used to select the particular programme objectives. Expenditure on the Joint Research Centre, in a new modified role is to be included as part of the new programme.

CONTENT

(a) Enabling Technology

i. Information and communications technology

The interaction between information and communications technology and the necessity to build a unified network information nerve across Europe dominates the proposals in this field. Building on the results of the ESPRIT programme there will be a shift of emphasis toward prototypes, demonstrator projects, with multi-supplier and distribution systems. In microelectronics there is a need to create a European manufacturing capability. This will be done through a closer collaboration with the Eureka program and specifically in the JESSI project. Information system technology will also be directed toward the use of advanced CAD/CAM systems in strategic industrial systems.

In the communications field priorities will be given to the growing demand for mobile communication systems of telephony and in specific issues such as communication security, availability of frequencies, airborne methods of transmissions, miniturisation and integration of mobile systems into the basic networks. Image communication building on numerical image transfer, including High Definition Television (HDTV) requires research to ensure appropriate equipment development.

The realisation of the large internal market will set new requirements in the field of information

technology in such areas as justice, Social Security and customs as well as between industries and individuals.

ii. Industrial and materials technology

The objective is to contribute to the necessary rejuvenation of European manufacturing industry by developing its science base and the advanced technology required. Technology developments will be integrated with the considerations of emerging market requirements and more severe environmental constraints. An example of this will be the development of the "clean car" as a major project initiative. Work on membranes and catalysts will be phased out.

Improvements in design and manufacturing techniques to achieve greater efficiency through a variety of initiatives are proposed together with improved standards of measurement and testing.

(b) Management of Natural Resources

i. Environment

Work on this area will include Community participation in the global change programme such as contributions to research on biochemical cycles; atmospheric physics and chemistry; oceanography and climatic processes. Research will be carried out on environmental monitoring and more engineering systems to protect and rehabilitate the environment. Studies will also include a substantial new area on the economic and social aspects, including legal

and ethical considerations of environmental policies.

ii. Life sciences and technologies

The long term strategy is to contribute in a selective integrated way to the development of Europe's potential for understanding and using the properties and structures of living matter.

Efforts will be directed to strengthening the science base through new activities in biotechnology. Work is proposed on the human genome and the ethical implications of such work. Studies in neurobiology and immunology, nutrition and the testing of new products will be expected to provide a scientific pre-normative base for future Community regulations.

Agricultural research programmes are proposed of an inter-disciplinary nature to combat the spread of deserts; improve the knowledge of plant genetics to obtain more resistant plants; to improve harvesting and processing. Improved biodegradable products and the production of clean energy through biomass technology will also be included.

Medical research will include a new focus on ways to deal with socially and economically relevant diseases. In cancer research there will be a shift of emphasis toward the early tracing of carcinogenic factors and the development of new tests for anti-carcinogenic drugs. Work is proposed on AIDS aimed at the development of control systems including chemotherapy and vaccines.



Programmes for life sciences and technologies for developing countries are included covering health research into tropical diseases and land management which will allow for food production consistent with environmental protection.

iii. Energy

Environmental compatibility has become the key element for energy systems. The programmes therefore are directed to clean and safe energy systems.

For fossil fuels more has to be done on the greenhouse effect and acid rain. Alternate fuels such as hydrogen will be investigated as a fuel with "Zero emissive power". Also more work on fuel cells using new electrolytes and catalysts will replace previous programmes on coal liquefaction and hydrogenation.

Nuclear fission programmes will put further emphasis on safety standards and then harmonisation across the community. A new impulse will be given to work on reactor safety, waste management, fuel elements and control of other fissile materials. Another new area is concerned with measurement of levels from natural and medical radiation sources and the risks of such low level sources. Also the radiological consequences of nuclear accidents.

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(c) Management Of Intellectual Resources

i. Human capital and mobility

The purpose is to provide Europe with the trained human resources on which it is critically dependent and which will become increasingly scarce.

A new initiative is proposed to increase the mobility of young researchers, at post doctoral level, in the area of natural science, technologies and economic science. Training at the interface between natural science and technology will be included.

This will be achieved through a community financed programme providing for a two year assignment in a country different from a person's country of origin. This investment can, where necessary, be supported by a network of research training centres.

The scientific community itself will be encouraged to identify centres of scientific excellence and in the choice of candidates for the programme.

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ADVISORY COUNCIL ON SCIENCE AND TECHNOLOGY

REPORT ON

EUROPEAN FRAMEWORK PROGRAMME FOR RESEARCH AND DEVELOPMENT

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EXECUTIVE SUMMARY

i. This report is the result of an invitation to ACOST to advise on the mid-term review of the current EC research and development programme and on the Commission's proposals for the future.

ii. The European Commission has organised and funded collaborative research and development (R&D) under a series of framework programmes since 1984. The first phase, Framework I, ran from 1984-87 with a budget of 3750 mecu and Framework II covers the period 1987-91 with a planned expenditure of 5396 mecu. One requirement of the latter was that a mid-term review should be carried out of the objectives, priorities, activities and financial resources. In order to discharge this task the Commission set up a Framework Review Board comprising five eminent independent individuals who reported in July 1989.

iii. Whilst carrying out the review the Commission has made proposals for a new programme (Framework III) running from 1990-94 with a financial ceiling of 7700 mecu. This would overlap the last two years of Framework II but would be structured quite differently. Apart from an increased rate of spend (1550 mecu for Framework II in 1990 rising to 2600 mecu for Framework III in 1994) there would be six main programme lines instead of the current 37. It is claimed that this would permit the Commission greater flexibility to be responsive to the changing demands of R&D activities. The emphasis of the programme would also be changed away from energy research and towards the environment and life sciences, although information and communication technologies would continue to attract around 40% of the total funds.

iv. On the evidence available to ACOST the current Framework Programme (1987-91) is regarded by participants as generally beneficial and largely well managed. The evident enthusiasm for this collaborative activity is illustrated by the fact that even though it is too early for a proper evaluation of results, many of the major programmes are over-subscribed. There are still some concerns over the administration, particularly at the project proposal stage, and recommendations for improvement are made in the report.

v. At the strategic level ACOST is concerned at the lack of a coherent European policy which guides the programme selection process in Framework II. The structure of the programme is inflexible and its fixed-term nature is inappropriate for pre-competitive R&D which necessarily has uncertain timescales. Attention must be paid to improving the links between those programmes concerned with pure science and those which are industrially oriented, and between Framework and other European programmes such as Eureka.

vi. The mid-term review as carried out by the Commission is not adequate as a detailed management assessment of the programme and the Commission should be pressed to extend the review in this respect. However, ACOST believes that at the strategic level there is sufficient information available (including the views expressed in the Framework Review Board report) to permit sensible initial discussion of programme policy. Further detail will be required to permit determination of the goals and objectives in the specific sectors. ACOST has commented on these sectors in order to assist the Government in establishing a sound negotiating position.

vii. The general structure of the proposed programme (1990-94) is regarded as an improvement over the current one in respect of its rolling nature and its increased flexibility. However, ACOST

is concerned that the need for a large increase in size of the activity has not been demonstrated adequately. The outline proposals for the content require further elucidation; without this detail much of what is proposed could be considered too close to the market place and therefore more appropriate for other initiatives such as Eureka. Also, the balance between the general classes of activity requires examination.

viii. The proposed information and communication technology work contains several elements which read very much like market development activities. In particular the work on peripherals and the application of IT to industrial engineering seem, as stated, inappropriate as Framework activities. The EC-funded part of the microelectronics (JESSI) initiative needs to be separated clearly from the near-market activities which should be funded elsewhere. Similar comments apply to several other sections under the Enabling Technologies heading.

ix. ACOST is in broad agreement with proposals to set up European standards and norms as a result of data from good scientific research and judgements. This is particularly so when they apply to proposed regulations and controls but these are only viable if the political will to enforce them exists.

x. It is debatable how many new data are necessary to optimise the use of CAD/CAM systems, justifying funding by the EC. Before endorsing the modernisation of methods of manufacture and control of production techniques ACOST would need to be satisfied that these could not be more appropriately supported by national or industrial sources.

xi. ACOST is in broad agreement with the proposals on environmental programmes; those specified are obviously essential and best done on a European basis or by participation on a Community basis in international programmes. It would be useful to develop an understanding of the expertise base already in

place in Europe and build on it.

xii. The initiative in the medical research area is generally supported as is that in basic biotechnology, particularly with the emphasis towards strengthening the science base. European led programmes are the appropriate route but recognition of centres of excellence already established in the various fields is essential.

xiii. ACOST has advised the Government that the UK agricultural industry should be encouraged to fund more of its own R&D, particularly where this is focused on near market improvement of yields. This advice is equally applicable to the European Community. All support to this area provided under the Framework Programme should be directed towards long-term research in fields such as genetic manipulation, biodegradable materials and basic molecular biology.

xiv. The proposals for increased mobility of research workers at pre- and post-doctoral level within Europe are endorsed, with the consequent increase in networking and improvement in the science base, particularly in the less favoured member states. There is a danger that this may stimulate migration outside the EC and steps must be taken to avoid this.

xv. ACOST agrees that Government departments should consider both domestic and Community initiatives when planning research programmes in support of departmental policy. However, the benefits can only be maximised if there is freedom to choose how the available budget should be allocated. The Treasury system of apportioning increases in the Framework budget to individual Departments on the basis of percentage share of the programme can frustrate this freedom by requiring funds to be diverted to Community activities when they might be better spent on domestic projects. It is recommended that the Government should review its position on this.

Summary of Key Recommendations

Numbers in brackets are those of the paragraphs in the main text in which the principal references will be found.

- (a) The Commission should be pressed to complete its formal review of the current programme as part of its proper evaluation and to publish the individual Research Evaluation Reports as they become available. Consideration should be given to the establishment of small independent review teams to supervise this task. (37(a)).
  
- (b) The review conducted to date is adequate for the purposes of determining the overall policy of the proposed new programme, and negotiations in the European Council should proceed (37(b)).
  
- (c) The management structure of the Commission needs to be reviewed to improve co-ordination between the Directorates General. At the same time the structure and size of the new programme will require an overhaul of the management process in terms of both proper technology audit and the selection of the appropriate human resource (44 and 65(b)).
  
- (d) The funding balance between proposed programme lines for Framework III should be justified as should the content of those lines, particularly in the IT and communications technology areas. Where appropriate near-market activities should be considered for funding within the Eureka initiative or from national or industrial sources (64, 65(d) and (f))



- (e) There should be closer co-ordination between activities within the Framework and stronger links between Framework and other European programmes such as Eureka (41).
- (f) The case for support to demonstration projects needs to be re-examined, particularly in the technology- or software-based activities, since such projects can be an essential element of pre-competitive development (42).
- (g) Efforts should be made to improve proposal handling by simplification of forms and a two-tier selection process (45/6).
- (h) Mobility of research workers should be encouraged to stimulate improvement of the science base, particularly in the less-favoured states. The number and length of bursaries for scientists should be increased and similar facilities should be extended to technology training (50/1 and 65 (k)).
- (i) The scope of research eligible for Framework funding should be re-examined so that it can embrace high risk ventures in technology development as well as in pure research (53).
- (j) Standards and norms developed as a result of the Framework Programme should be enforced otherwise the funding involved is wasted (65(e)).

- (k) Identification of national centres of excellence to act as nuclei for European research, particularly in the environmental and life sciences areas, should be an aim of the Commission. Research support should be directed to pre-eminent groups of scientists throughout the Community even where there are existing teams at the Joint Research Centre. (52 and 65(g)).
- (l) A critical assessment of the proposals for energy research should be carried out, particularly as regards those for hydrogen fuel and fuel cell research (65(i)).
- (m) Funding for agricultural R&D should be restricted to those areas which are long-term or involve basic science, leaving near-market work to be supported by industry (43 and 65(j)).
- (n) The Treasury system of attribution to individual Departments of any increased funding for EC Framework Programmes may be detrimental to the achievement of objectives and should be reviewed (48 ii. and the Executive Summary para xv.)

SECTION 1 INTRODUCTION

BACKGROUND

1. The Commission of the European Communities is conducting a review of the current (1987-91) Framework Programme for R&D and has proposed a major revision and extension to cover the period 1990-94. The Government invited the Advisory Council on Science and Technology (ACOST) to consider the achievements of the current programme and the proposals for the future, and to develop advice on the UK approach to negotiations. This work was carried out by the Standing Committee on International Collaboration under the terms of reference attached at Annexe A.

2. The review of the current programme (Section 2) was based on work carried out previously by ACOST. The primary source documents for the remainder of the work were all from the Commission:

"First Report on the State of Science and Technology in Europe" - published 1989

"The Report of the Framework Review Board" - unbound document published June 1989

"A Framework for Community RTD Actions in the 90's" - unbound communication dated 6 June 1989

"Proposal for a Council Decision Concerning the Framework of Community Activities in the Field of Research and Technological Development (1990-1994)" - COM(89)397 dated 2 August 1989

An outline description of the first of these documents is given in Annexe D and of the second in Annexe E. The third was superseded by the fourth, and a summary of the latter is presented in Annexe F.

FINANCIAL CONTEXT

3. The Framework Programme is a collaborative initiative to strengthen the competitive position of Europe in science and technology (S&T), with the main focus being on eventual industrial exploitation. In considering both current and future programmes it is useful to compare their scale with individual national activities and other collaborative initiatives. The following figures give some indication of the relative financial magnitudes of the programmes, although as will be seen later the benefits derived cannot be expressed entirely in financial terms.

|     |                                                            |         |     |
|-----|------------------------------------------------------------|---------|-----|
| (a) | UK                                                         | £M      |     |
|     | Gross domestic product (1987)                              | 409900  | (1) |
|     | Government-funded civil R&D (1987)                         | 2384    | (1) |
|     |                                                            |         |     |
| (b) | European Community                                         | £M      |     |
|     | Gross domestic product (1988)                              | 2660500 |     |
|     | Civil R&D funded by governments of EC member states (1987) | 16031   | (1) |
|     | Total EC expenditure on R&D (1987)                         | 817     | (1) |
|     | Estimated total expenditure on framework programmes (1990) | 1072    | (2) |
|     | [Of which UK share at 18.9%                                | 203]    |     |
|     | Estimated total expenditure on framework programmes (1994) | 1757    | (2) |
|     | [Of which UK share at 18.9%                                | 332]    |     |

(c) Eureka

Annualised figures for Eureka are not available, but at June 1988 the estimated value of Eureka projects was £2584m. The total UK commitment was £200m of which Government funding accounted for £22m. All these figures are expected to grow significantly, and indeed at August 1989 total anticipated commitment in Eureka projects is £4352m.

**SOURCES:**

- (1) Annual Review of Government Funded Research and Development, 1989 - to be published
  
- (2) European Commission proposals for a new Framework programme 1990-94 (see Annexe C of this report). Assumed £1 = 1.48 Ecu.

It can be seen that from 1990-94 the annual UK expenditure will rise by £129m, an amount roughly equal to 5% of the current government-funded civil R&D.

**REPORT LAYOUT**

4. Following this introduction there is a general assessment of the current Framework Programme (Section 2). This reflects the views of ACOST and of some officials (both in the UK and Brussels) and participants concerning the operational aspects. In Section 3 an assessment is made of the strategic aspects, with ACOST's views being compared and contrasted with those of the Framework Review Board which carried out the mid-term review. Section 4 addresses explicitly the Commission proposals for a new Framework Programme, highlighting the key issues which ACOST believes should be brought to the attention of ministers.

**CONFIDENTIAL**

5. The first three annexes (A, B and C) contain detailed information which is called up in the body of the report. Annexes D, E and F give some insight into the contents of the three main Commission documents which relate to the mid-term review.

**CONFIDENTIAL**

SECTION 2      REVIEW OF THE CURRENT PROGRAMME (1987-91)

BACKGROUND

6.            The first European Community R&D Framework Programme ran from 1984-87 with a budget of 3750 Mecu. The Single European Act came into force on 1 July 1987. In the Science and Technology area the first major initiative in support of this Act was the adoption of the second Framework Programme by the Council of Research Ministers on 28 September 1987 (see Annexe B). This programme provides the finance for the majority of EC-funded pre-competitive R&D. With a budget of 5396 MECU over five years it accounts for around 5% of the total civil R&D carried out within the twelve member states, although it is larger than the national research budgets of seven of those states.

7.            In setting out this programme the Council had a number of wider objectives in mind as expressed in the Council Decision:

- i.            contribution to the harmonious development of economic activities throughout the Community
  
- ii.           development of the international competitiveness of European industry by promotion of scientific research and technological development at Community level, thereby complementing member states' activities
  
- iii.           encouragement of small and medium sized enterprises (SMEs), research institutes and universities in research and technology development, and in their efforts to co-operate with one another
  
- iv.           particular support of SMEs because of the significance of their place in, and contribution to, the innovative process

- v. strengthening of Community economic and social cohesion and of its science and technology infrastructure, and potential
- vi. definition of common standards as an aid to the completion and efficient operation of the internal market

8. The Framework Programme is divided into eight major lines which are in turn sub-divided as shown in Annexe B. The eight lines can only be created/alterd by unanimity in the Research Council; more flexibility for adjustment is available within the eight lines, though no need for this has arisen yet. The Framework Programme is implemented through specific programmes adopted by negotiation between the Council of Ministers, the Commission and the European Parliament. Within these programmes, individual projects are selected, funded and monitored by Commission staff.

#### ACOST REVIEW

9. ACOST representatives held discussions with UK and EC officials to form views on the overall success of the Framework programme but devoted its detailed investigations to the IT, communications and modernisation of industry sectors which consume around 50% of the total available funding. User views from a SEPSU<sup>(1)</sup> survey were also studied. This grassroots experience coincided very closely with opinions expressed at discussions with officials.

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<sup>1</sup> "European Collaboration in Science and Technology: Pointers to the future for policy makers", Science and Engineering Policy Studies Unit (1988)



10. As a general comment it was noted that European research programmes have been evolving rapidly and the lessons of the first programmes have been incorporated constructively in newer lines. It is encouraging that in general the new shared-cost industrially oriented lines are well focussed, have a genuine European dimension and contain projects which are of high quality, well administered and capable of exploitation. Older lines, some ex-Euratom, brought under the umbrella of the Framework programme are coming more slowly into line with the good practice exemplified by the later programmes. Typical problem areas being addressed in these older programmes are poor CGC<sup>(2)</sup> administration; programme inertia; the influence of strong individual views; project selection, although this is now moving from decisions by member state representatives to expert panel review; JRC<sup>(3)</sup> involvement; lack of coordination between research and policy; a better focus where limited funding is allocated and production of user-friendly digests of research findings.

ESPRIT, RACE & BRITE

11. The lines 'Towards a large market and an information and communications society' and 'Modernisation of industrial sectors' were studied in detail by ACOST, and it has been possible to comment on the sub-line programmes.

UK participation and benefit

12. Involvement of UK organisations is widespread and, if anything, appears to be growing. A healthy pro-active approach

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<sup>2</sup> CGC = Management and Co-ordination Committee for a Research Action programme

<sup>3</sup> JRC = Joint Research Centre. Founded in 1957 under the Euratom Treaty and now wholly funded by DG XII. Consists of four establishments in different countries carrying out in-house research programmes.

is evident from the number of UK prime contractors, and the number of projects with UK partners is impressive. On aggregate the UK comes top in both aspects. Encouragement is needed in three areas, however, to enhance UK benefit - a greater number of industrial partners; participation in more of the larger projects; and the involvement of a UK industrial partner alongside a UK university which is being courted because of its international reputation, so as to prevent our own new science from being syphoned-off abroad.

13. The funding received by UK organisations is somewhat in excess of the notional contribution of 18.9% by the UK Government to the Framework Programme budget which suggests a net benefit. Of more significance is the potential exploitation of results. Hard data are not yet available because few projects have reached this point, but a measure of UK exploitation potential relative to other member states has been derived. This assumes that the potential can be weighted according to the nature of the participating organisation. Thus prime industrial contractors are likely to be more motivated to follow through on projects than other contractors, with research institutes and universities having less ability to achieve an economic impact. Analysis of project participants on this basis shows the UK coming a close second to France, with Germany and Italy behind the UK.

#### Cultural Shift

14. Multi-national programmes have had the effect, surprisingly, of removing the usual over-riding concern of conflict of interest when IPR is shared. The formal programme structure and 50% funding together have opened the door to a serious consideration of collaboration. The pre-competitive nature of the programmes has then provided sufficient initial comfort at the science/business interface to permit experience and further confidence to be gained by active participation. An

opportunity has thus been provided to break out of the traditional isolationist industrial culture in the UK and, in turn, this is valuable preparation for effective UK participation in the single European market. An additional benefit is that some SMEs not previously involved in R&D have been encouraged to participate.

15. It was expected, and found, that effort would be required to work at trust in European partnerships (such effort for UK collaboration is also required) and potential competitors not currently in home markets were seen as less of a threat. The Commission has noticed that following involvement in these programmes with partners from other countries, UK companies are also beginning to co-operate with each other. This is a further welcome sign of the breaking down of suspicious and narrow attitudes.

#### Programme Quality

16. The quality of the programmes appears to be high and at least equal to that achieved in comparable domestic activity. The elements of competition, international refereeing and heavy over-subscription combine to ensure that projects of excellent quality are generally chosen. Over-subscription (possibly as high as 5:1) also has its downside. It is a strong disincentive for SMEs, research institutes and universities to apply for funds because of the significant cost and effort involved in proposal preparation.

#### Stimuli for Collaboration

17. Funding was a necessary stimulus to collaboration but not the only factor. The main drivers emerge as risk sharing, timeliness of novelty, development of standards, improvement of competitive position, international markets and access to partners' science/technology and complementary skills. From an

academic perspective complementary skills arise not just between disciplines but also within disciplines because of the diversity of training provided by the different schools. The results most often reported by participants were commercial benefits for industrial participants and recognition for the academics; leverage through the application of partners' science and technology; and an improved competitive position derived from the science and technology established.

18. In a qualitative sense the 'brand name' of the particular programme was felt to be good for the subsequent marketing of products.

Critical Factors for Success

19. Complementarity of interest in (for example) science, technology or market was vital, as was a high quality of people and pre-established science or technology competence. Good interpersonal relationships at the working level also played their part alongside the right management structure and support systems. Conversely, success was hindered by entry for the wrong reasons (leading to a lack of commitment), lack of leadership, non-assessable objectives, fragmentation of work between too many partners and forced marriages of groups of partners. These factors apply equally to EC and UK collaborative programmes.

Administration Issues

20. ACOST's view is that the administration and organisation of those parts of the Framework Programme they examined in detail was generally competent and strongly oriented to achieving a successful European base. Confidentiality was carefully respected. Choice of independent project assessors is extremely wide; for example DG XII now has a list of over 3000 names and is beginning to be able to assess its assessors. In the early days of the preceding Framework programme when the DGs were not fully

staffed the elapsed time between closing date for proposals and ultimate start of successfully negotiated projects could be 18 months. In the latest RACE programme this period had been reduced to a much more acceptable 3 months.

21. There is acknowledgement by users of the helpfulness of EC officials. They showed themselves able to distinguish between straightforward and problem projects and to devote more effort to help the problem ones. By comparison the incidence and quality of official intervention in the UK has been found to be extremely variable. The UK criterion of additionality for project funding in Eureka and some domestic programmes causes considerable problems and the unevenness of funding compared with the known fixed levels in EC programmes introduces uncertainty into the financial planning of non-EC projects.

22. No corpus of information of consensus management (especially for large industrial projects) was available beforehand. For the larger projects a reasonably common management structure evolved - a full time project manager responsible to a senior policy committee, and project co-ordinators responsible for the actions of their own organisations. Very large projects have been found extremely difficult to manage. Team building has been recognised as requiring continuity of personnel and, indeed, some companies view participation as valuable career development for their staff. Higher than normal overheads (at around 10%) for both EC and UK collaborative projects are experienced.

23. Delays to the start of the second Framework Programme proved embarrassing and caused a loss of momentum and credibility. The UK image also suffered, with strong feelings that the Framework Programme exercise had descended to a budget exercise from its higher-minded origins.

24. Exploitation rules for participants are seen to be fair

and even-handed, balancing the primary rights of participants with the need for a wider European gain. ESPRIT and BRITE Technological Days have proved useful fora for networking and display of results; mechanisms to ensure maximum awareness and exploitation of research results are still awaited.

QUALITY OF LIFE, ENERGY AND IMPROVEMENT OF EUROPEAN CO-OPERATION

25. These lines of the Framework Programme were not addressed in detail by ACOST, but the views of participants and officials are summarised here.

26. The Health programme sits uneasily under the Quality of Life line because it is not specifically covered by the Treaty of Rome and this uncertainty hinders the establishment of the right balance of EC/UK activity. Quality of work in concerted action<sup>(4)</sup> areas has been questionable but is greatly improved by the recent Cancer and Aids initiatives which were very well set up. Benefits of collaboration in predictive medicine were not expected by the UK to be significant but full UK involvement was encouraged when the programme was inevitable. The Radiation Protection initiative operates well as a shared cost area and is viewed as very good and largely worthwhile. UK participation is very high; it has the largest number of teams in concerted action programmes. The very large number of declarations of intent for limited post-1990 areas also indicates the strength of grassroots interest.

27. Environmental research has its roots in JRC diversification. The JRC executes some good work but can be slow and expensive; it still consumes more than 50% of funds allocated to environmental issues. The UK is influential in the CGC

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<sup>4</sup> Concerted action programmes are those in which member states agree to exchange research results from national programmes; EC funding is limited to the costs of coordination.

regarding policy focus and balance of projects. Both EC and UK work yields reasonable quality output and the reduction of UK funds, balanced by a corresponding increase to EC projects, has not had a noticeable detrimental effect. In the area of atmospheric pollution good work has been done but a lot more progress is required.

28. The Energy line is another major consumer of funds, the bulk of which are allocated to 'Fission: nuclear safety' work by the JRC and 'Controlled thermonuclear fusion' centred on the JET (Joint European Torus) facility and the establishment of the design basis for NET (Next European Torus). A recent report by senior industrialists has made recommendations for changes and cost reductions at the JRC, which are being implemented. Fusion still has a highly speculative long term outcome and additional international collaboration between the EC and USA, USSR and Japan might sensibly be attempted.

29. In the non-nuclear energy field developments have focussed on two areas - renewable sources of energy and the rational use of energy. Multi-national collaboration has been optional rather than mandatory with the result that collaboration is growing from a relatively small base. This area is also characterised by the nature of the organisations involved - some two thirds are non-industrial - and by the small average size of projects. Expectation of successful exploitation is dampened on both counts. The UK has been well represented across the spectrum of projects. Outside the Framework programme, DG XVII has funded a large number of supporting Demonstration projects. One notable point is that credible demonstration appears to require installations in several member states.

30. Improvement of European S&T co-operation is represented largely by the 'Science' programme aimed at stimulating cooperation and mobility of researchers in exact and natural science. This programme is greatly valued by UK universities,

particularly with overseas travel falling victim to financial pressures on UK budgets for small science. EC grants have played a vital role in facilitating transnational visits, exchanges and collaboration. The very act of collaboration has been found to impose extra academic rigour and provide greater commitment to achieve targets and overcome problems. Transnational visits by academics would be further helped by funding for specialist technicians when necessary for efficient full-time running of equipment.

SUMMARY

31. Collaboration is not a new concept, even when given multi-national status. Alvey generated a groundswell of interest in the UK in the IT area and JOERS continues it in optoelectronics, but the industrially oriented programmes in the first and second EC Framework Programmes have broken through traditional reserve to create a supportive climate for sharing of IPR on a scale that would previously have seemed most unlikely.

32. Overall, more has been gained than lost by participants, UK organisations included. This, together with the generally high quality of science and technology, represents a heartening response to the objectives which were in the mind of the Council when it initiated the Framework Programmes. The challenge of extensive exploitation for economic impact remains.



SECTION 3 COMMENTS ON THE CURRENT PROGRAMME

BACKGROUND

33. The purpose of this section is to consider the adequacy of the mid-term review carried out by the Commission, and to make recommendations based on the lessons learned from the current programme. In this task ACOST has been assisted by the documents listed in the Introduction (section 1) and reference is made to these as appropriate. Brief descriptions of the two primary documents are given in Annexes D and E.

EXECUTION OF THE MID-TERM REVIEW

34. The Report of the Framework Review Board, which constitutes the bulk of the mid-term review, was compiled in a period of a few weeks and is necessarily superficial in some areas. The report is nevertheless of extreme importance since it constitutes the sole view and assessment of the total Framework Programme, so far, undertaken by outsiders. It is thus most certainly a valuable contribution to both the assessment of the present Framework Programme and to consideration of future actions. It is a matter of regret that the Board was not given more time to complete the task.

35. In view of the size of the Board and the limited time available for the review, the report is not entirely adequate either as a review of the current programme (Framework II) nor as preparation for discussion of the Commission proposals for a revision. There are, however, additional sources of material available which complement the Review Board's report. At the overview level the 'First Report on the State of S&T in Europe' is intended as an assessment of European Science and Technology to date but also identifies technological needs for the future. Also available are the Research Evaluation Reports, of which ACOST has looked particularly at:

Report No. 24 - Evaluation of the R&D Programme in the field of Non-Nuclear Energy

Report No. 25 - Evaluation of the first BRITE Programme.

Report No. 32 - Evaluation of the Biomolecular Engineering Programme - BEP (1982-1986) and the Biotechnology Action Programme - BAP (1985-1989).

Report No. 34 - Evaluation of the Programme on Science and Technology for Development STD.

36. With regard to the assessment of the present Framework Programme this series of reports provides a source of expert opinion drawn from a variety of backgrounds: industrial managers, research scientists from industry and academia, industrial consultants and senior officials. The evaluations are part of the set of 'vertical' evaluations of individual R&D programmes which should take place during each 4 or 5 year programme (Council Resolution of Dec.1986). The evaluation of BRITE is a comprehensive account, including all the data, of the evaluation exercise and as such constitutes an adequate source of information upon which to assess that particular programme. The evaluation of BAP-BEP is a model evaluation of projects which are carried out under the principal of 'concertation'. The ELWW (European Laboratory without Walls) concept is reviewed and assessed in practice. The reports concerning Non-Nuclear Energy and Development are typical of Executive Summaries in the series of 'vertical' evaluations providing the key observations made in the full report, naturally including those points which would figure in decision-making on future programmes. The complete series of 'vertical' reports can be expected to provide the detailed background data necessary to support evaluation exercises.

37. ACOST's recommendations on the adequacy of the execution of the mid-term review fall into two parts:

- (a) The review does not meet the full requirements of Article 4 in the sense that a detailed assessment of all aspects of the programme has not been carried out. Such an assessment, reviewing objectives, achievements and financial expenditure, is a necessary part of any programme, and must be instituted. A 'snapshot' exercise by a small team, such as that conducted by the Framework Review Board, is not sufficient on its own to discharge the requirements of a formal review. ACOST recommends, therefore, that the Commission should be pressed for a formal review as part of the proper evaluation of the Framework Programme.

A review of this sort should be conducted on a continuous basis over a period of several years. The Research Evaluation Reports are an important constituent and the series should be completed to provide the necessary evaluation data. Consideration should be given by the Commission to the establishment of a small team of independent assessors, reporting to the Vice-President, to oversee the review process.

- (b) The extent to which the strategic plan for a new programme could benefit from a detailed examination of the current one (beyond what has been achieved by the Board) is considered to be limited. Notwithstanding the need for a detailed review as part of the proper management of the current programme, ACOST recommends that the Report of the Framework Review Board, together with other documents, constitutes an adequate review for the purposes of planning the proposed new programme. The report gives good coverage at a strategic level in

sufficient detail for the principles of the new programme to be established. The admitted shortcomings of the report do not constitute a justification for delaying the progress of negotiations.

RECOMMENDATIONS DERIVED FROM THE CURRENT FRAMEWORK PROGRAMME

38. In arriving at its own conclusions ACOST has used as a reference the Report of the Framework Review Board. The Review Board makes 42 recommendations concerning the conduct of the programme, some of which are also applicable to the proposed new programme. These are summarised in Annexe F. ACOST endorses the majority of the recommendations but key issues are discussed below under the headings used by the Board.

Political climate

39. The Framework Programme has laudable objectives. However, it is not always clear that the collection of individual programmes and projects add up to the Grand European ideal. The Review Board have some unease about this. The problem is serious, at least in terms of expectations, because Europe is sandwiched between the well-established national programmes of the member states and the much larger but similarly well-established programmes in USA and Japan. Without any clear statement of European policy the Commission will almost inevitably resort to EEC programmes with two characteristics:

- i. Catch-up. This is the temptation to put in place a Japanese-sized research programme but without the business follow-up to exploit it.
- ii. Subsidy. Framework is often seen as another source of subsidy which preferably complements state funding.

40. It is essential that at both national and European levels the objectives of the programme should be clearly understood and that the structure and content should be tailored accordingly. It should be part of the Commission's role to show how each programme supports the objectives and is a part of an integrated structure.

Criteria in research

41. ACOST endorses strongly the Board's recommendations that the Framework Programme should only be invoked in areas where some perceived added value (in its widest sense, not just financial) is obtainable from doing so. This applies both to the avoidance of duplication of national programmes (subsidiarity) and to overlap with other, pre-existing collaborative activities. In particular ACOST would like to see stronger links between EC programmes which are complementary in the research-to-product sequence. There does not seem to be adequate machinery for feeding the results of the strategic research funded by SCIENCE into the various applied programmes downstream from it. Indeed there seems to be an intellectual gap between where support from SCIENCE is expected to end (and for budgetary reasons must do so) and where programmes downstream from it are expected to begin. ACOST recommends stronger links between Framework and other relevant European programmes such as Eureka so that the research, development and exploitation phases of successful projects could be properly integrated. This should be complemented by companies improving strategic links between research activities and product strategy.

42. The case for demonstration projects needs to be re-examined, particularly for technology or software-based activities, since any research on such topics usually requires some feasibility or demonstration vehicle.

43. ACOST does not necessarily agree with the recommendation that more emphasis should be placed on R&D relevant to the restructuring and modernisation of the agricultural sector. Reductions in UK spend in this area have been urged regularly in advice to Ministers, with the object of increasing industrial funding. This principle should be extended to Europe, with Framework funding being used only for long-term R&D which is not aimed at increased yields.

Management and administration issues

44. There is a serious lack of co-ordination between DGXII and DGXIII. Since DGXII appears to be able to co-operate reasonably well with other DGs, the fault probably lies largely with DGXIII. The Board's report recommends redrawing the boundaries between the two, but this would involve interminable bureaucratic infighting and wherever the boundary was drawn there would need to be a great deal of co-operation across it. Ideally they should be merged, but that is certainly unrealistic. Whatever solution is adopted, it should be underpinned by a change in staffing policy. Commission staff should be moved regularly between posts and between directorates as recommended by the Board to reduce proprietorial attitudes and increase communication.

45. In Section 2 of this report ACOST welcomed the improvement in the speed of response by the DGs in handling proposals. Nevertheless there are further improvements to be made and ACOST endorses the recommendations (primarily number 22) of the Board on this issue. The forms which have to be filled in and the contracts which have to be negotiated are clumsy and do discourage a great many applicants - particularly small manufacturing enterprises and academic institutions, which it is considered particularly important to involve. Resolution of this problem may rest more with DGXX and the Court of Auditors than DGXII and DGXIII.

46. Coupled to the bureaucracy is the level of oversubscription, quoted in Section 2 as approaching 5:1 in certain programmes. ACOST believes that a certain level of oversubscription is desirable to give Commission officials the scope to maintain a high level of quality. However, this needs to be balanced against the cost and frustration experienced by those not selected, many of whom (SMEs and academic institutions) cannot afford repeated applications. The Board's recommendation for a two-tier selection process, with a low-cost outline proposal as the first stage, merits close attention. The level of oversubscription is also necessarily a parameter to be taken into account when the levels of programme funding are determined.

47. Whilst ACOST recognises the desirability of developing a fully integrated European Community, there is a possible conflict with the principle of subsidiarity; that is, the Commission may choose to instigate collaborative programmes in support of cohesion<sup>(5)</sup> which the more developed member states are quite capable of executing as national projects. The Board's recommendation in this respect (number 16) implies that cohesion should be subordinate to subsidiarity and ACOST endorses this.

#### Funding

48. The Review Board recommends that the level of funding be increased to the threshold permissible under the Inter-Institutional Agreement. It also stresses the need for flexibility in the management of this funding. ACOST's views on this increase are supportive in the main but certain specific recommendations need to be made:

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<sup>5</sup> Cohesion is the principle by which emphasis is given to the technological development of less favoured member states such as Portugal and Greece.

- i. As proposed by the Commission the increased funding should be regarded as a ceiling and not a budget until proper justification for expenditure has been received.
  
- ii. the increase should not be funded by reductions in domestic departmental budgets except where there is potential for programme integration

49. The need for a separate fund for dissemination of results was challenged by ACOST in its earlier studies, particularly at the level of 38 mecu. It was felt that this activity should be an integral part of individual programmes. The Board's recommendation for an increase in the funding of VALUE would not be endorsed by ACOST without further debate.

Encouragement to the scientific humus

50. The role of the EC programmes in the areas of training and the improvement of communication between scientists cannot be overstated. The most important programme in this context is SCIENCE which complements the Research Councils of the member states. In the long run its most valuable activity will turn out to be the provision of bursaries, because of the effect which these will have in bringing European scientists into a single community. It is highly desirable that the number of bursaries be increased, and urgent that the recent ruling which limited the tenure of bursaries to two years (instead of three) be reversed. The DELTA programme, which concerns computer-aided education, is of particular importance to the UK in view of the crisis in the supply of teachers in key subjects.

51. In contrast with the science base, the relative weakness of the European technology base receives less attention. European programmes could do a great deal to improve technology competence, particularly in the provision of manpower and



appropriate industrial training facilities. Unfortunately the educational establishments tend to be academic and out of touch with industrial priorities. There is enormous potential for a major European initiative in technology training coupled to R&D.

52. There is certainly a need for European centres of excellence in research, but monolithic centres such as the Joint Research Centre (JRC) are not the answer. All indications so far are that these centres are even more resistant to change than their national equivalents, and the costs of re-structuring are exorbitant. It is ACOST's view that research would be better directed to collaborative groups of scientists of recognised standing who could form a nucleus of European excellence. One mechanism for this could be an enhancement of the SCIENCE laboratory twinning programme with perhaps four or five partners. Apart from some base-level funding the centres would have to bid for research funds and they would therefore remain responsive to national and community priorities. Another mechanism is the 'research hotel' concept favoured by some UK Interdisciplinary Research Centres (IRCs) under which an establishment provides research facilities which are then used by visiting researchers for the period necessary to complete their work. The important element is to avoid a permanent commitment on the part of the Commission to maintain buildings, equipment and salaried researchers.

#### Programmes

53. ACOST's views on the major programmes of BRITE, RACE and ESPRIT are generally favourable. The opportunity is taken here to re-emphasise that research conducted within the Framework Programme cannot be considered in isolation from the development and exploitation phases which follow. The development phase of any programme is much bigger than many have been prepared to recognise. The 'research' required by topics such as IT is a case in point; the biggest advances, which are sometimes the

riskiest, often come through the refinement of existing ideas for new applications. It is recommended that the term 'pre-competitive' should be re-examined so that it can embrace high risk ventures in technology development as well as pure research.

The Joint Research Centre

54. ACOST is firmly of the opinion that the role and organisation of the JRC must be overhauled as a matter of urgency, and endorses the Board's views.

Dissemination

55. The Board's concern over the 'open door' policy to the dissemination of research results is recognised, but the practicality of restricting such dissemination is questionable. Proper protection of intellectual property by means of patenting, copyright etc is essential, but it is considered unlikely that any attempt to control information at the working level will be effective nor, indeed, is it even desirable. The secrecy and end user restrictions imposed by the USA are of concern in this context, and the European authorities could do considerably more to persuade the USA to withdraw them. However, ACOST feels that 'tit for tat' retaliation is not a proper route to follow and would, in any case, result in a Fortress Europe which has thus far been eschewed.

SECTION 4      ADVICE ON THE PROPOSED NEW PROGRAMME (1990-94)

BACKGROUND

56.      The Commission has proposed a programme for revision of the Framework programme up to 1992 and a rolling programme covering the period 1990-94. The proposal anticipates an expenditure of 7700 Mecus for 1990-94 and reserves 5000 Mecus specifically for 1993/4. The whole expenditure is seen as an upper limit and actual programme expenditures will be the subject of future Commission proposals. The amount of 7700 Mecus was extrapolated from the level permitted under the Inter-Institutional Agreement of June 1988.

57.      In broad terms the proposals incorporate many of the suggestions included in the mid-term review and the concept of future reviews is included. There is a plan to reduce the multiplicity of projects included and the rigidity involved in their administration. This will result in more discretion and freedom of action for the various research managers. In support of these changes the Commission undertakes to improve the efficiency of its management and to introduce control and evaluation methodology to improve productivity.

58.      More emphasis is given to the environment and to ways of improving the 'quality of life' in the Community. The need is also seen to increase the quantity and quality of research manpower by increasing the mobility of post doctorate research workers between member states.

59.      These changes of emphasis will be at the expense of information and communication technology and energy. In the latter regard work to develop more environmentally acceptable methods of energy generation receives more attention. Reference is also made to the need to establish a series of norms or standards covering many of the technological areas covered in the

whole programme.

60. The choices of the Commission have been guided by three considerations. The accelerating pace of technological progress and sustained economic growth in the more industrialised countries; the necessity for strengthening competitiveness of European industry at the worldwide level; and the need to respond to the directions fixed by the Single European Act.

61. The new Framework programme is characterised by three strategic areas and subdivided into six main programme areas as shown in Annexe C. The proposed expenditures for individual years including 3125 Mecus uncommitted from the 1987-91 programme are also given in Annexe C.

62. The choice of the scientific and technological objectives rests on the principle of community added value, building on the activities within the individual member states - subsidiarity. The changes in industrial attitudes towards further transnational initiatives, replying to the challenges of industrial competitiveness and the need to train young scientists are the main guiding principles which have been used to select the particular programme objectives. Expenditure on the Joint Research Centre, in a new modified role is to be included as part of the new programme.

63. A summary of the contents of the proposals is given in Annexe F. The rest of this section gives ACOST's reactions to the proposals.

#### ACOST'S VIEWS ON THE COMMISSION PROPOSALS

64. ACOST endorses the Commission action in initiating a forward look at European collaborative R&D, and welcomes the proposals for a new framework programme as a discussion document. However, there are some reservations both about the pace at which

it is proposed to introduce Framework III and about the detailed content of the programme lines. Two crucial issues which need to be addressed are whether a significant increase of R&D effort at this stage can be justified, and whether this increased effort can be managed effectively. On both counts the Commission proposals acknowledge their importance, but do not produce evidence to show that they have been resolved.

65. Specific points are raised in the following paragraphs:

- (a) The new proposals represent an improvement of those contained in Framework II. A reduction in the rigidity of the system by the use of broader subject headings for the programme lines, and the consequential flexibility to move money to needed areas is endorsed.
  
- (b) The rolling programme has merits as far as research management is concerned, minimising discontinuities. However this, together with the detailed programme flexibility, puts much more responsibility on programme managers. The Community's plan to introduce evaluation and more modern methods of management is essential and it is hoped that objectives and goals will be properly defined. A proper technology audit, perhaps conducted by an independent panel, should be an integral part of each programme. The proposal to decentralise programme management is particularly welcome, but this will change the nature of the task of the Commission staff and this must be recognised. The recruitment of able managers, rather than R&D specialists, should be implemented. Appointments should be for a fixed term, with transfers between DGs being encouraged.
  
- (c) More information is clearly required to judge the overall level of spending proposed. The 7700 Mecu budget is a ceiling derived from the Inter-Institutional

Agreement, but some rationale is required to show that the proposed funding is appropriate to Europe's needs, and more of the reasoning for the allocation to the six individual lines is essential. For example, the funding for information and communication technologies continues at 39-40% of the total as in Framework II but without justification. Also the funding profile is not consistent with the style of rolling programme proposed; it continues building to a peak in the final year rather than tailing off and allowing flexibility in the review/overlap of the next phase. This suggests that the Commission anticipates a monotonic increase in European R&D expenditure levels, something which their proposals simply do not justify.

- (d) The proposed information and communication technology work contains several elements which look very much like market development activities. In particular the work on peripherals and the application of IT to industrial engineering seem, as stated, inappropriate as Framework activities. The EC-funded part of the microelectronics (JESSI) initiative needs to be separated clearly from the near-market activities which should be funded elsewhere. Similar comments apply to several other sections under the Enabling Technologies heading.
- (e) ACOST is in broad agreement with proposals to set up European standards and norms as a result of good, scientific data and judgements. This is particularly so when they apply to proposed regulations and controls but these are only viable if the political will to enforce them exists. The work on the 'clean car' should be seen as developing and setting appropriate standards, not as the manufacture of a prototype model.

- (f) It is debatable how many new data are necessary to optimise the use of CAD/CAM systems, justifying funding by the EC. Before endorsing the modernisation of methods of manufacture and control of production techniques ACOST would need to be satisfied that these would not be more appropriately supported by national or industrial sources.
- (g) ACOST is in broad agreement with proposals to set up European standards and norms as a result of data from good scientific research and judgements. This is particularly so when they apply to proposed regulations and controls but these are only viable if the political will to enforce them exists.
- (h) The initiative in the medical research area is generally supported as is that in basic biotechnology, particularly with the emphasis towards strengthening the science base. European led programmes are the appropriate route but recognition of centres of excellence already established in the various fields is essential.
- (i) The energy programme is predictable and acceptable in part. Eventually there has to be a recognition of the cost of an environmentally clean atmosphere. Clean up of exhaust products from fossil fuel combustion is understood scientifically but reliable, efficient technology solutions are some way from being ready to be installed.

Hydrogen fuels are only realistic when one knows more of price and availability. Engine technology could soon be adapted.

There is some scepticism about more fuel cell research. The technology has been proven in non-cost-limited situations such as space craft, but despite many years' work has shown little promise for commercial exploitation.

- (j) ACOST has advised the Government that the UK agricultural industry should be encouraged to fund more of its own R&D, particularly where this is focused on near market improvement of yields. This advice is equally applicable to the European Community. All support to this area provided under the Framework Programme should be directed towards long-term research in fields such as genetic manipulation, biodegradable materials and basic molecular biology.
  
- (k) The proposals for increased mobility of research workers at both pre- and post-doctoral level within Europe are endorsed, with the consequent increase in networking and improvement in the science base, particularly in the less favoured member states. There is a danger that this may stimulate migration outside the EC and steps must be taken to avoid this.



ADVISORY COUNCIL ON SCIENCE AND TECHNOLOGY  
STANDING COMMITTEE ON INTERNATIONAL COLLABORATION

STUDY ON

EUROPEAN FRAMEWORK PROGRAMME FOR RESEARCH AND DEVELOPMENT

TERMS OF REFERENCE

In conformity with Article 4 of the Decision which established the EC 1987-91 Framework Programme for R&D, the European Commission is conducting a mid-term review of the programme and intends, probably in July 1989, to propose a revision. This revision will include proposals for the future direction of European R&D beyond the end of the current programme.

The Standing Committee on International Collaboration is invited to advise the ACOST on aspects of this review, with the following terms of reference:

1. To study available documents ("First Report on the State of S&T in Europe", "A Framework for Community RTD Actions in the 90s", "Report of the Framework Review Board") and any other relevant documents which may become available during the study and advise on:
  - the success of existing EC research programmes (in relation to each other and to comparable national programmes)
  - the adequacy of the documents as an assessment of the present Framework Programme and as a basis for decision-making on future R&D programmes
  - the aptness of the recommendations made by the Framework Review Board
2. To examine (when available, probably late July) the Commission's proposals for a revised Framework Programme and advise on:
  - the suitability of the proposed structure for meeting the R&D objectives of both the Community and the UK
  - the appropriateness of the programme content in terms of both its coverage and the balance between subject areas and activities

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- the scale of the programme in relation to perceived needs for collaborative R&D and its balance in relation to comparable national or other existing international collaborative programmes

3. To report to ACOST at the 12 September meeting (subject to availability of the Commission's proposals).

Cabinet Office  
19 July 1989

**CONFIDENTIAL**

**FRAMEWORK PROGRAMME OF COMMUNITY ACTIVITIES IN THE FIELD OF  
RESEARCH AND TECHNOLOGICAL DEVELOPMENT (1987-91)**

Breakdown of the amount deemed necessary in 1987

|    |                                                                                     | MECU |
|----|-------------------------------------------------------------------------------------|------|
| 1. | QUALITY OF LIFE                                                                     |      |
|    | 1.1 Health                                                                          | 80   |
|    | 1.2 Radiation protection                                                            | 34   |
|    | 1.3 Environment                                                                     | 261  |
| 2. | TOWARDS A LARGE MARKET AND AN INFORMATION AND<br>COMMUNICATIONS SOCIETY             |      |
|    | 2.1 Information technologies (ESPRIT)                                               | 1600 |
|    | 2.2 Telecommunications (RACE)                                                       | 550  |
|    | 2.3 New services of common interest<br>(including DRIVE/DELTA/AIM)                  | 125  |
| 3. | MODERNISATION OF INDUSTRIAL SECTORS                                                 |      |
|    | 3.1 S&T for manufacturing (BRITE)                                                   | 400  |
|    | 3.2 S&T for advanced materials                                                      | 220  |
|    | 3.3 Raw materials and recycling                                                     | 45   |
|    | 3.4 Technical standards, measurement methods<br>and reference materials             | 180  |
| 4. | EXPLOITATION AND OPTIMUM USE OF BIOLOGICAL RESOURCES                                |      |
|    | 4.1 Biotechnology                                                                   | 120  |
|    | 4.2 Agro-industrial technologies (ECLAIR)                                           | 105  |
|    | 4.3 Competitiveness of agriculture and management<br>of agricultural resources      | 55   |
| 5. | ENERGY                                                                              |      |
|    | 5.1 Fission: nuclear safety                                                         | 440  |
|    | 5.2 Controlled thermonuclear fusion                                                 | 611  |
|    | 5.3 Non-nuclear energies and rational use of energy                                 | 122  |
| 6. | SCIENCE AND TECHNOLOGY FOR DEVELOPMENT                                              | 80   |
| 7. | EXPLOITATION OF THE SEA BED AND USE OF MARINE<br>RESOURCES                          |      |
|    | 7.1 Marine science and technology                                                   | 50   |
|    | 7.2 Fisheries                                                                       | 30   |
| 8. | IMPROVEMENT OF EUROPEAN S&T CO-OPERATION                                            |      |
|    | 8.1 Stimulation, enhancement and use of human<br>resources (SCIENCE)                | 180  |
|    | 8.2 Use of major installations                                                      | 30   |
|    | 8.3 Forecasting and assessment and other back-up<br>measures (including statistics) | 23   |
|    | 8.4 Dissemination and utilisation of S&T research<br>results                        | 55   |
|    |                                                                                     | 5396 |

**FRAMEWORK PROGRAMME OF COMMUNITY ACTIVITIES IN THE FIELD OF  
RESEARCH AND TECHNOLOGICAL DEVELOPMENT (1990-94)**

Breakdown of the amount deemed necessary

|      |                                               |       |
|------|-----------------------------------------------|-------|
| I.   | ENABLING TECHNOLOGIES                         | MECU  |
|      | 1. Information and communication technologies | 3000  |
|      | 2. Industrial and materials technologies      | 1200  |
| II.  | MANAGEMENT OF NATURAL RESOURCES               |       |
|      | 3. Environment                                | 700   |
|      | 4. Life sciences and technologies             | 1000  |
|      | 5. Energy                                     | 1100  |
| III. | MANAGEMENT OF INTELLECTUAL RESOURCES          |       |
|      | 6. Human capital and mobility                 | 700   |
|      |                                               | ----- |
|      |                                               | 7700  |

**PROPOSED ANNUAL EXPENDITURE (MECU)**

|                       | 1990          | 1991          | 1992          | 1993   | 1994   | TOTAL  |
|-----------------------|---------------|---------------|---------------|--------|--------|--------|
| Financial perspective | 2071          | 2422          | 2796          |        |        |        |
| IMP*                  | 344.0         | 355.0         | 196.1         |        |        |        |
| Framework Prog 84-87  | 4.2           |               |               |        |        |        |
| Framework Prog 87-91  | 1552.3        | 709.7         | 831.7         |        |        |        |
| Framework Prog 90-94  | 29.5          | 1200.5        | 1470.0        | 2400.0 | 2600.0 | 7700.0 |
| Outside Frame Prog    | 137.0         | 150.0         | 165.0         |        |        |        |
| <b>Total</b>          | <b>2067.0</b> | <b>2415.2</b> | <b>2662.8</b> |        |        |        |

\*Integrated Mediterranean Programme

**FIRST REPORT ON THE STATE OF SCIENCE AND TECHNOLOGY IN EUROPE**

(Outline)

This document, published by the European Commission in December 1988, is the first response to the request of the European Parliament for regular reviews by the Commission of the state of science and technology (S&T) in Europe. It aims to provide a factual basis for further reflection, both inside and outside the Community institutions, on Europe's needs in S&T and how best they can be satisfied. It is planned to be updated in 1989 and thereafter published at two-yearly intervals.

The comprehensive nature of the document is illustrated by the headings of its main sections:

- I. Science, Technology and Europe's Economic and Social Needs
- II. European Science and Technology from a Comparative Perspective: Trends in Our Main Competitors
- III. Mobilising Europe's Resources
- IV. Research Issues for the Future
- V. Key Issues for Science and Technology Policy in Europe

It is very much a compendium of useful information rather than a critical appraisal of Europe's S&T. It contains a wealth of data covering the S&T scene both in Europe and the rest of the world. It draws heavily on available comparative data drawn up by the OECD, data from Community members assembled by the Statistical Office of the European Community and, for example, the paper for CREST covering the USA, Japan and Europe. Chapters IV and V of

the report deal with 'Research Issues for the Future' and 'Key Issues' respectively and as such provide good contributions to consideration of future programmes.

On the negative side, much of the statistical data is out of date (and pre-Framework II) and compounded by inconsistency (data of mixed vintage presented for comparison purposes). Recommendations for EC S&T activity are not selective and lean heavily on "me too" for justification (eg "A concerted research effort on superconducting materials is particularly necessary. Large financial resources are being mobilised in the USA and Japan.")

Nevertheless, it is a useful background reference produced under difficult circumstances, and it is hoped that the next revision will result in significant improvements.

THE REPORT OF THE FRAMEWORK REVIEW BOARD

(Outline)

A panel of five independent experts was tasked by Vice-President Pandolfi with "...examining whether the priorities, activities and financial resources designated for the eight areas of the Framework Programme are still appropriate". The five were Pierre Aigrain, Sir Geoffrey Allen, Eduardo de Arantes e Oliveira, Umberto Colombo, Hubert Markl.

Within the period of a few weeks they reviewed, at strategic level, the ideal aims of a framework programme, and then assessed how the current EC programme measured up to them. They concluded with a list of 42 recommendations covering both the current programme and any future developments of it, together with a brief assessment of the eight lines of activity. The document, released in June 1989, comprises the only critical review of the total Framework Programme currently available.

A synopsis of the forty-two recommendations is given below:

THE POLITICAL CLIMATE

1. Improve political understanding of the Framework Programme's (FP) potential
2. Improve coordination between activities of different Directorates General (DGs)
3. Expedite political procedures regulating the application of the FP
4. Apply subsidiarity to avoid duplication with national programmes

CRITERIA IN RESEARCH

5. Concentrate on areas of added value (details given)
6. FP research to remain pre-competitive; attenuate funding as research approaches market; strengthen links with Eureka
7. Synergy with (rather than duplication of) existing collaborative programmes
8. More consideration of user demands; pre-competitiveness to embrace pre-standardisation and pre-normative research
9. Greater emphasis on agriculture, raw materials, renewable energy, waste management
10. Increase involvement of SMEs
11. Rejuvenation of mature industries implies greater contact between DG XII and other DGs

MANAGEMENT AND ADMINISTRATION ISSUES

12. Reorganise DG XII and DG XIII
13. Increase communication between DG XII and other DGs
14. Improve flexibility and response to changing circumstances
15. Reduce the number of lines to increase flexibility (examples given)
16. Emphasise principle of 'cohesion'
17. DGs XII and XIII both to be involved in all lines of new programme
18. 'Higher profile integrated overseer' role for Commissioner
19. More extensive delegation to external management
20. Rotate project managers and increase mobility between DGs
21. Consider management committees of independent experts vs committees of member states to speed up response times
22. Reduce bureaucracy whilst retaining good features
23. Inject new blood



FUNDING

24. Increase funds
25. Increase financial flexibility via a rolling programme
26. Improve diffusion of results
27. Encourage use of venture capital for commercialisation of R&D results

ENCOURAGEMENT TO THE SCIENTIFIC HUMUS

28. Increase communication between scientists
29. Encourage European centres of excellence
30. Tap the under-utilised talent in the peripheral regions of the Community
31. Increase participation of universities
32. Increased attention to training (mechanisms suggested)

PROGRAMMES

33. Evaluate BRITE and BRITE-EURAM
34. Expand use of ESPRIT to serve user applications
35. Involve the market in funding and direction of RACE
36. Expand international collaboration in fusion research
37. Ensure FP contribution to JESSI is used on pre-competitive research

THE JOINT RESEARCH CENTRE

38. Sort out the JRC (examples given)
39. Examine a change in status of the JRC

DISSEMINATION

40. Examine international practice in diffusion of results to avoid placing the Community at a disadvantage

EVALUATION, ASSESSMENT, FORECASTING

41. Commission studies to provide an information base for the next FP

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42. Address the problem of R&D evaluation in Europe

**CONFIDENTIAL**

PROPOSAL FOR A COUNCIL DECISION CONCERNING THE FRAMEWORK OF  
COMMUNITY ACTIVITIES IN THE FIELD OF RESEARCH AND TECHNOLOGICAL  
DEVELOPMENT (1990-94) - COM(89)397

(Synopsis)

STRUCTURE

The Commission has proposed a revision of the Framework programme up to 1992 and a rolling programme covering the period 1990-94. The proposal anticipates an expenditure of 7700 Mecus for 1990-94 and reserves 5000 Mecus specifically for 1993/4. The whole expenditure is seen as an upper limit and actual programme expenditures will be the subject of future Commission proposals. The amount of 7700 Mecus was extrapolated from the level permitted under the Inter-Institutional Agreement of June 1988.

In broad terms the proposals incorporate many of the suggestions included in the mid-term review and the concept of future reviews is included. They plan to reduce the multiplicity of projects included and the rigidity involved in their administration. This will result in more discretion and freedom of action for the various research managers. In support of these changes the Commission undertakes to improve the efficiency of its management and to introduce control and evaluation methodology to improve productivity.

More emphasis is given to the environment and to ways of improving the 'quality of life' in the Community. The need is also seen to increase the quantity and quality of research manpower by increasing the mobility of post doctorate research workers between member states.

These changes of emphasis will be at the expense of information and communication technology and energy. In the latter regard work to develop more environmentally acceptable methods of energy generation receives more attention. Reference is also made to the need to establish a series of norms or standards covering many of the technological areas covered in the whole programme.

The choices of the Commission have been guided by three considerations. The accelerating pace of technological progress and sustained economic growth in the more industrialised countries; the necessity for strengthening competitiveness of European industry at the worldwide level; and the need to respond to the directions fixed by the Single European Act.

The new Framework programme is characterised by three strategic areas and subdivided into six main programme areas as shown in Annexe C. The proposed expenditures for individual years including 3125 Mecu\$ uncommitted from the 1987-91 programme are also given in Annexe C.

The choice of the scientific and technological objectives rests on the principle of community added value, building on the activities within the individual member states - subsidiarity. The changes in industrial attitudes towards further transnational initiatives, replying to the challenges of industrial competitiveness and the need to train young scientists are the main guiding principles which have been used to select the particular programme objectives. Expenditure on the Joint Research Centre, in a new modified role is to be included as part of the new programme.

CONTENT

(a) Enabling Technology

i. Information and communications technology

The interaction between information and communications technology and the necessity to build a unified network information nerve across Europe dominates the proposals in this field. Building on the results of the ESPRIT programme there will be a shift of emphasis toward prototypes, demonstrator projects, with multi-supplier and distribution systems. In microelectronics there is a need to create a European manufacturing capability. This will be done through a closer collaboration with the Eureka program and specifically in the JESSI project. Information system technology will also be directed toward the use of advanced CAD/CAM systems in strategic industrial systems.

In the communications field priorities will be given to the growing demand for mobile communication systems of telephony and in specific issues such as communication security, availability of frequencies, airborne methods of transmissions, miniturisation and integration of mobile systems into the basic networks. Image communication building on numerical image transfer, including High Definition Television (HDTV) requires research to ensure appropriate equipment development.

The realisation of the large internal market will set new requirements in the field of information

technology in such areas as justice, Social Security and customs as well as between industries and individuals.

ii. Industrial and materials technology

The objective is to contribute to the necessary rejuvenation of European manufacturing industry by developing its science base and the advanced technology required. Technology developments will be integrated with the considerations of emerging market requirements and more severe environmental constraints. An example of this will be the development of the "clean car" as a major project initiative. Work on membranes and catalysts will be phased out.

Improvements in design and manufacturing techniques to achieve greater efficiency through a variety of initiatives are proposed together with improved standards of measurement and testing.

(b) Management of Natural Resources

i. Environment

Work on this area will include Community participation in the global change programme such as contributions to research on biochemical cycles; atmospheric physics and chemistry; oceanography and climatic processes. Research will be carried out on environmental monitoring and more engineering systems to protect and rehabilitate the environment. Studies will also include a substantial new area on the economic and social aspects, including legal

and ethical considerations of environmental policies.

ii. Life sciences and technologies

The long term strategy is to contribute in a selective integrated way to the development of Europe's potential for understanding and using the properties and structures of living matter.

Efforts will be directed to strengthening the science base through new activities in biotechnology. Work is proposed on the human genome and the ethical implications of such work. Studies in neurobiology and immunology, nutrition and the testing of new products will be expected to provide a scientific pre-normative base for future Community regulations.

Agricultural research programmes are proposed of an inter-disciplinary nature to combat the spread of deserts; improve the knowledge of plant genetics to obtain more resistant plants; to improve harvesting and processing. Improved biodegradable products and the production of clean energy through biomass technology will also be included.

Medical research will include a new focus on ways to deal with socially and economically relevant diseases. In cancer research there will be a shift of emphasis toward the early tracing of carcinogenic factors and the development of new tests for anti-carcinogenic drugs. Work is proposed on AIDS aimed at the development of control systems including chemotherapy and vaccines.

Programmes for life sciences and technologies for developing countries are included covering health research into tropical diseases and land management which will allow for food production consistent with environmental protection.

iii. Energy

Environmental compatibility has become the key element for energy systems. The programmes therefore are directed to clean and safe energy systems.

For fossil fuels more has to be done on the greenhouse effect and acid rain. Alternate fuels such as hydrogen will be investigated as a fuel with "Zero emissive power". Also more work on fuel cells using new electrolytes and catalysts will replace previous programmes on coal liquefaction and hydrogenation.

Nuclear fission programmes will put further emphasis on safety standards and then harmonisation across the community. A new impulse will be given to work on reactor safety, waste management, fuel elements and control of other fissile materials. Another new area is concerned with measurement of levels from natural and medical radiation sources and the risks of such low level sources. Also the radiological consequences of nuclear accidents.



(c) Management Of Intellectual Resources

i. Human capital and mobility

The purpose is to provide Europe with the trained human resources on which it is critically dependent and which will become increasingly scarce.

A new initiative is proposed to increase the mobility of young researchers, at post doctoral level, in the area of natural science, technologies and economic science. Training at the interface between natural science and technology will be included.

This will be achieved through a community financed programme providing for a two year assignment in a country different from a person's country of origin. This investment can, where necessary, be supported by a network of research training centres.

The scientific community itself will be encouraged to identify centres of scientific excellence and in the choice of candidates for the programme.

Cabinet Office

26 September 1989



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MJ  
c: ACOST

10 DOWNING STREET

LONDON SW1A 2AA

*From the Private Secretary*

21 September 1989

ACOST REPORT; OVERCOMING BARRIERS TO GROWTH IN SMALLER FIRMS

I attach the latest letter from the MOD about this report which has now belatedly arrived.

You will see that the MOD are still concerned about publication of the full report and indeed about one of the recommendations. They suggest that the best way round their difficulties would be to issue a formal Government response at the same time as the report is published.

BU Do you think this would be a feasible approach? And, if so, what would it imply for the timetable?

Paul Gray

J. W. Fairclough, Esq.,  
Cabinet Office.

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*qcl u.*

MO 30L

MINISTRY OF DEFENCE

MAIN BUILDING WHITEHALL LONDON SW1A 2HB

Telephone 01-218 2111/3

20~~th~~ September 1989*Dear Dominic,*ACOST REPORT : OVERCOMING BARRIERS TO GROWTH IN SMALLER FIRMS

Thank you for your letter of 2nd August to Brian Hawtin in which you sought further comments on the ACOST report on Overcoming Barriers to Growth in Small Firms, in the light of ACOST's wish to publish the whole of it, rather than just the recommendations. My apologies for the delay in replying.

As Brian mentioned in his letter of 21st July, there are a number of points in the body of the report on which we would wish to comment. Although they are not so fundamental as to lead us to object to the publication of the report, we remain of the view that it would be better to make our case public at the same time as the report. This could be achieved in the same way as with the ACOST report on Defence R&D, by issuing a formal Government response when the report is published.

I attach our comments on the sections of the report with which we are not content. In a published Government response we would of course wish to balance these essentially negative points with other material highlighting the areas where we agree with the Committee's comments. And other Departments (particularly the DTI, to which most of the recommendations are directed) will have points to raise.

I am copying this letter to the Private Secretaries to the members of E(ST).

*Yours sincerely,**John Colston*(J P COLSTON)  
Private SecretaryDominic Morris Esq  
10 Downing Street

ACOST REPORT : OVERCOMING BARRIERS TO GROWTH IN SMALLER FIRMSPOINTS WITH WHICH THE MOD IS NOT CONTENTParagraph 4.13

1. This paragraph makes an unfavourable comparison of the proportion of MOD's procurement expenditure going directly to small firms with small firms' share of national net output. Since, however, the figures are calculated on entirely different bases, the implied criticism is not firmly founded.

2. The MOD figures are for the gross value of HQ contracts placed directly with small firms, and do not take account of the amount of work reaching small firms acting as sub-contractors to our larger main contractors, or through the MOD's local purchases. The figures for the percentage of national net output produced by small firms must, presumably, be based on all the work actually carried out by them; only if the MOD's expenditure were followed down through the chain of sub-contractors to determine the value added at each stage (an exercise that would impose a considerable burden on both the Department and the firms involved) would it be possible to produce comparable figures. And even those figures might require adjustment to take account of any structural differences between the companies undertaking defence work and those involved in the rest of the economy.

3. At least as useful would be a comparison with the United States, where, despite affirmative action and set-side policies, a much smaller proportion of procurement expenditure (about 5% compared with 13% in the UK) goes direct to small firms.

4. The last point in the paragraph is that more should be done to enhance the knowledge and skill base of smaller firms through R&D contracts. It would be appropriate to mention here the Small Firms Research Initiative (SFRI), which is discussed more fully in paragraph 4.15.

#### Paragraph 4.15

5. The money spent on the SFRI is compared with the total expenditure on defence research and development (R&D), and this is misleading. The SFRI is set in the context of the MOD's research programme, the cost of which is, as stated, in the region of £400m. The largest element by far of the MOD's total R&D spending (which is about £2.35 bn, and not £4.5 bn as the report states), is devoted to the development of specific defence equipments, an area which is not addressed by the SFRI. The paragraph implies that expenditure under the SFRI and the MOD's research spending with small firms are identical; this is misleading, for small firms undertake work in other areas of the research programme.

The Genesis Programme (Paragraphs 6.27 - 6.31)

6. The MOD believes that it is right that small firms should be able to compete for public sector R&D contracts (paragraph 6.27). But those contracts should be awarded on the basis of value-for-money, rather than as a result of some arbitrary set-aside (paragraph 6.28).

Recommendation 3 (paragraph 9.11)

7. The MOD believes that small firms should compete for all Government contracts on an equal basis, and that all bids should be assessed against the same value-for-money criteria. Any set-aside arrangement is likely to lead to poor value-for-money, and is thus not an appropriate measure.



2nd Pol: Research +  
Development  
R6 ●



# ACOST

Advisory Council on Science and Technology  
70 Whitehall, London SW1A 2AS  
01-270-0109

R18/9

Ack'd 19/8

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NDM

Price mistake  
We are assuming you will  
want to do this.

→ 1990 date

PPS

On 0458

File ST 310/10

The Rt Hon Margaret Thatcher MP  
The Prime Minister  
10 Downing Street  
London SW1A 2AA

R266

30/10

15 September 1989

Dear Prime Minister,

### COUNCIL MEETING

We are very grateful for your hospitality at the seminar for Young Scientists on 13 September. All the ACOST Members present very much enjoyed the occasion and appreciated the interest you took in the topics presented. The young scientists are to be congratulated on presenting their research so well.

I should like to invite you to attend and chair our regular Council meeting on Wednesday 14th March 1990 at 2.30 pm. We greatly value your participation and hope that you will be able to join us again then.

Yours sincerely,

Francis Tombs

SIR FRANCIS TOMBS

Secretary at:  
Telephone 01-270 0105  
Telex 27582 CABOFF G  
Fax 01-270 0074  
Prestel 21 999 3466  
Gold 81 MPO 005



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*File EM  
cpc*



10 DOWNING STREET

LONDON SW1A 2AA

12 September 1989

*From the Private Secretary*

*See steps.*

EC RESEARCH AND DEVELOPMENT FRAMEWORK

The Prime Minister has seen the Foreign Secretary's minute of 10 September about OD(E)'s discussion of the Commission's proposals for a second Research and Development Framework programme. She agrees that there will need to be a discussion in E(ST) before the Research Council on 17 October.

I am copying this letter to the Private Secretaries to members of OD(E) and to Sir Robin Butler.

*you send  
Charles Powell*

CHARLES POWELL

Stephen Wall Esq  
Foreign and Commonwealth Office

CONFIDENTIAL

*M*



CONFIDENTIAL

*CCP (1)*

Prime Minister

PM/89/043

*This is a familiar battle, which will need to be fought once again this autumn.*

PRIME MINISTER

EC Research and Development Framework

*Agree to chair a discussion in E(S) before the October Council?*

On 7 September OD(E) discussed the Commission's proposals for a second R & D Framework Programme on the basis of the attached letter from Nicholas Ridley.

*with CCP*

*CCP 14/9*

The Commission have produced these proposals following their mid-term review of the present (1987-1991) Framework Programme. As Nicholas' letter explains, they have proposed a substantial increase in R & D expenditure, overlapping the existing programme, without an adequately detailed justification. Nor are we satisfied that they have adequately assessed the experience so far of the existing programme. Nicholas is therefore proposing that we take a strongly critical line at the first Council discussion next week, making clear our concerns both about the scale and the justification of the proposals. The line is set out in the final paragraph of the DTI paper annexed to his letter. In the light of the Council discussion we will need to decide on our substantive negotiating line, in the knowledge that the French will be pressing strongly for a conclusion to be reached by the end of their Presidency.

*Yes MS*

OD(E) colleagues were content with the general approach proposed by Nicholas. It was recognised that the negotiations are bound to be difficult: we know from

/the

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the discussions on the first programme that other member states generally support high levels of EC R & D expenditure. So, as we saw in 1987, does UK industry (the UK is a substantial net beneficiary receiving about 23% of the present programme, most of this going to the private sector). There will also be a difficult judgement to take on the balance, through the EUROPES system, between domestic and EC R & D expenditure.

The Cabinet Office is coordinating an initial assessment of the potential financial implications of the draft Framework Programme as background to Ministerial consideration of our detailed negotiating position before the next Council on 17 October. You may wish to discuss the issues in E(ST) before that Council.

I am copying this minute to those present at the OD(E) discussion, and to Sir Robin Butler.

A handwritten signature in blue ink, appearing to read 'John H.'.

10 September 1989

(JOHN MAJOR)

A

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**dti**

the department for Enterprise

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The Rt. Hon. Nicholas Ridley MP  
Secretary of State for Trade and Industry

Rt Hon John Major MP  
Secretary of State for  
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31 August 1989

cc Mr Mogg  
Mr Parker

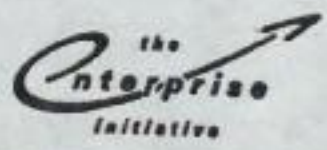
See Secretary of State + for me

EC FRAMEWORK PROGRAMME FOR RESEARCH AND DEVELOPMENT

We have now received the Commission's formal proposal for a new Framework Programme for research and development. My officials have prepared the attached note which colleagues may find helpful as a basis for discussion at OD(E) on 7 September as a forward look item. The note outlines the issues and suggests the line for the Research Council on 18 September which Douglas Hogg will be attending. I am not at this stage recommending a formal negotiating mandate. This would be premature ahead of the Research Council meeting at which Member States will be giving their first reactions to the Commission's proposal.

The Commission has recommended new commitments of 7.7 BECU during the period 1990-1994 in addition to the 3.1 BECU which remain to be committed in the EC budget under the current Framework Programme which runs from 1987 to 1991. The proposed new commitments would be 50% greater than the step change in 1987 between the previous and current programme. The Commission's proposals are far too thin in detail to justify an increase of this scale. Nor do the proposals respond to the issues raised in the report of the external review board; a fuller response by the Commission to the report should be regarded as being an essential part of the review of current programmes before considering a new programme. Such a review is clearly vital to ensure that we obtain good value for money from Community programmes.

Hence in my view it is not possible to agree any further extension of the Framework Programme until we are satisfied that a proper review of current programmes has taken place and we have



more detailed and thought through proposals from the Commission (particularly as some of the detailed activities are likely to be more appropriate as industry driven EUREKA projects). On this basis it is very unlikely that the timetable suggested by the Commission and French Presidency for agreement by the end of this year can be achieved - though tactically we should not say so. We must also insist on a firm overall commitment profile (requiring unanimous agreement) with tapering down at the end of the period.

However, we need to be careful in putting over our position not to become isolated so that we fail to influence the developing details of the programme in a way which reflects UK interests and priorities. The French and Germans both support a further programme in principle, though the Germans also pointed out at the last Research Council the need for proper review of current programmes before next steps are taken. To persuade the Commission and other Member States that we intend to play a constructive role in shaping a new Framework Programme, while pressing the line above, we will also need to put forward specific detailed proposals to the Commission indicating priorities for Community R&D. The implications for UK domestic expenditure on science and technology will of course be an important aspect of this process.

I am copying this letter to members of OD(E), John MacGregor, Kenneth Clarke, Cecil Parkinson, John Wakeham, Norman Lamont, John Fairclough and Sir Robin Butler.

Yours sincerely

for David

(Approved by the Secretary of State  
and signed in his absence)

CONFIDENTIAL

COMMISSION PROPOSAL FOR A NEW COMMUNITY R&D FRAMEWORK  
PROGRAMME 1990-1994: THE UK NEGOTIATING POSITION

NOTE BY THE DEPARTMENT OF TRADE AND INDUSTRY

Issue

1. The Commission has circulated its proposal for a new Community Framework Programme in the field of Research and Technological Development. The proposal envisages new commitments of 7.7 BECU over the five year period 1990-1994. This is over and above the 3.1 Becu which remain to be committed in the EC budget under the current Framework Programme which runs from 1987 to 1991. The Commission and French Presidency wish an agreement to be reached by the end of 1989. The proposals contain insufficient detail of the new programmes or sufficient evaluation of current programmes to justify such a large increase and a decision in this timescale is unrealistic. This paper sets out a negotiating strategy for HMG at the Research Council, including a line to take at the next meeting on 18 September, for Ministers to consider (paragraphs 9-12).

Commission's Proposals

2. The Commission proposes that the new programme should consist of six major activities grouped under three headings. These are listed below along with the proposed funding for each activity (in MECU).

|                                                | Proposed Funding<br>Mecu |
|------------------------------------------------|--------------------------|
| a) Information and communications technologies | 3,000                    |
| b) Industrial and materials technologies       | 1,200                    |
| c) Environment                                 | 700                      |
| d) Life sciences and technologies              | 1,000                    |
| e) Energy                                      | 1,100                    |
| f) Human capital and mobility                  | 700                      |
| TOTAL                                          | 7,700 MECU               |

These areas includes a number of importance for the UK, for example in the case of the DTI the Commission is running useful EC R/D programmes in the field of information and communication technologies (eg ESPRIT and RACE).

3. The Commission calls this a 7.7 Becu proposal, but in practice it represents a total commitment of 10.8 Becu over the period 1990-94 taking into account the 3.1 Becu from the current Framework Programme to be committed in the EC budget in 1990-91. The proposed new commitments would be 50% greater than the increase in 1987 for the current programme.

4. The proposal outlines these six activities but fails to give a detailed breakdown of the areas concerned. The descriptions are superficial and quite inadequate to justify increased expenditure of the scale proposed. Indeed a number of the activities proposed are likely to turn out to be more appropriate as industry driven EUREKA projects. We need to ensure that the principle of subsidiarity (the Community only undertaking what is not appropriate at a national level or by other international means) is being applied and that Community programmes demonstrate added value. The Commission indicates that it intends to produce the full details of the six programmes only after the Framework Programme has been approved by the Council. Article 130 of the Treaty of Rome stipulates that the adoption of the multiannual Framework Programme requires a unanimous decision in the Council, but that individual programmes within the Framework can be adopted by the Council acting on a qualified majority. The lack of detail in the proposals gives far too much discretion to the Commission on the content of the individual programmes and we will need to insist that the Commission produces more details of proposed activities before any agreement.

#### Inter Institutional Agreement

5. Article 4 of the current Framework Programme decision (87/516/Euratom/EEC) provides for a mid-term review of the Framework to be carried out in its third year. The Commission has taken this opportunity to propose a significant increase in expenditure. The proposed funding for the new Framework in the years 1990-92 would use the entire headroom under the Inter Institutional Agreement (IIA) which created an indicative budgetary framework for the period 1988-92.

6. The IIA expires at the end of 1992, and there is no agreement on a successor. To avoid prejudicing a successor IIA the Commission proposal suggests that in 1992 the Council should take further decisions in the light of the 'current budgetary discipline' on the allocation of expenditure between each of the six individual programmes. While another IIA would be expected to require unanimous agreement, the further decisions on individual programmes would require only a qualified majority and our control over expenditure in the Framework after 1992 would be limited. We should therefore aim to have the proposed decision on the Framework limited to the period 1990-92 with a further unanimous decision required in 1992 for the remainder of the period. This decision should form part of the mid-term review of the proposed Framework Programme scheduled to take place during 1992. This arrangement might, for example, treat indicative funding levels for 1993-4 on the basis that commitments could only be released if the prevailing budget discipline permitted.

#### UK line at the last Research Council

7. At the Research Council on 20 June, Mr Newton for the UK stressed the need for a full review of current programmes and for the Commission to respond in detail (which it still has not done) to the report of the external review board before

presenting its proposals. He pointed out that resources from lower priority activities should be released for new programmes before considering further funding. While reserving the UK's position on a rolling programme, Mr Newton made it clear that any such mechanism would need to be accompanied by a commitment profile to leave unallocated resources for a mid term review so that any funding proposed after 1992 should not prejudice future overall Community funding decisions.

8. However, at the Research Council on 20 June other Member States supported the principle of a rolling programme. Most favoured broader action lines such as the Commission now propose, though the Germans in particular also took the view that there should be thorough evaluation before decisions on the next steps are taken.

#### RECOMMENDATION TO MINISTERS ON UK OBJECTIVES AND STRATEGY

9. Our overall objective should be to ensure that any increase in EC R&D expenditure is dependent on a review of current and past programmes and is strictly limited to areas which provide good value for money and avoid as far as possible any prejudice to future budgetary and financing decisions after 1992. But we would be very unlikely to muster support from any other Member States if the UK were to oppose a new Framework Programme outright. If we appear unconstructive we may find ourselves marginalised and at the end of the day faced with a decision to accept or reject a programme which insufficiently reflects UK interests in size and content. We need a flexible and positive line to retain sufficient influence in the Council to ensure that the balance and content of a new Framework Programme reflect UK priorities including technical content and subsidiarity.

10. We need to make it clear that the Commission proposal as it stands is deficient in detail and fails to justify the proposed level of increased expenditure. Any programme needs to have a firm commitment profile without front loading and with tapering towards the end of the 5 year period. We shall therefore need to move in early with a detailed critique of the proposal as it stands and with our own positive ideas on content and balance. We should insist that the Commission develops properly thought through plans with discussion of these and agreement in a more realistic timescale almost certainly moving well into 1990. While the communique from the Madrid European Council was intended to introduce a new impetus into European R/D and "notes" the Commission's intention to submit a new Framework Programme for the period 1990-1994, it is helpful in committing the Community neither to a particular form of Framework nor to a timetable for future developments in this area although it does imply a positive decision of some kind.

11. Lobbying at all levels will be important in putting across our message. Research, economics and particularly finance ministries in EC capitals should all be approached, with appropriate lobbying material. It will also be



particularly important to sustain a good working relationship with Vice President Pandolfi.

RECOMMENDATION TO MINISTERS ON LINE TO TAKE AT RESEARCH COUNCIL ON 18 SEPTEMBER

12. At the Research Council on 18 September we should make clear our concerns about the Commission's proposal. These are, principally:

- a) that the proposal does not give sufficient detail on the individual programmes;
- b) that the overall level of expenditure proposed is too high and that the UK can see no justification for an increase on the scale proposed;
- c) that we are not satisfied with the Commission's view that the mid-term review of the current Framework Programme is now complete; and that we need to see a more thorough review of the current Framework, taking account of the report of the external review board;
- d) that any agreement on a new Framework Programme cannot be made until both this evaluation has taken place and much fuller technical details are available within the proposal;
- e) that any decision on financing after 1992 must be based on unanimity in the Council in the light of the prevailing budgetary discipline;
- f) that we wish to know how the Commission's proposals have taken account of subsidiarity; the need for greater selectivity identified by the external review board; and to suggest that some of the activities in individual programmes are likely to turn out to be more appropriate as EUREKA projects;
- g) that any programme must have a firm commitment profile which avoids front end loading and allows for tapering down towards the end of the five year period.

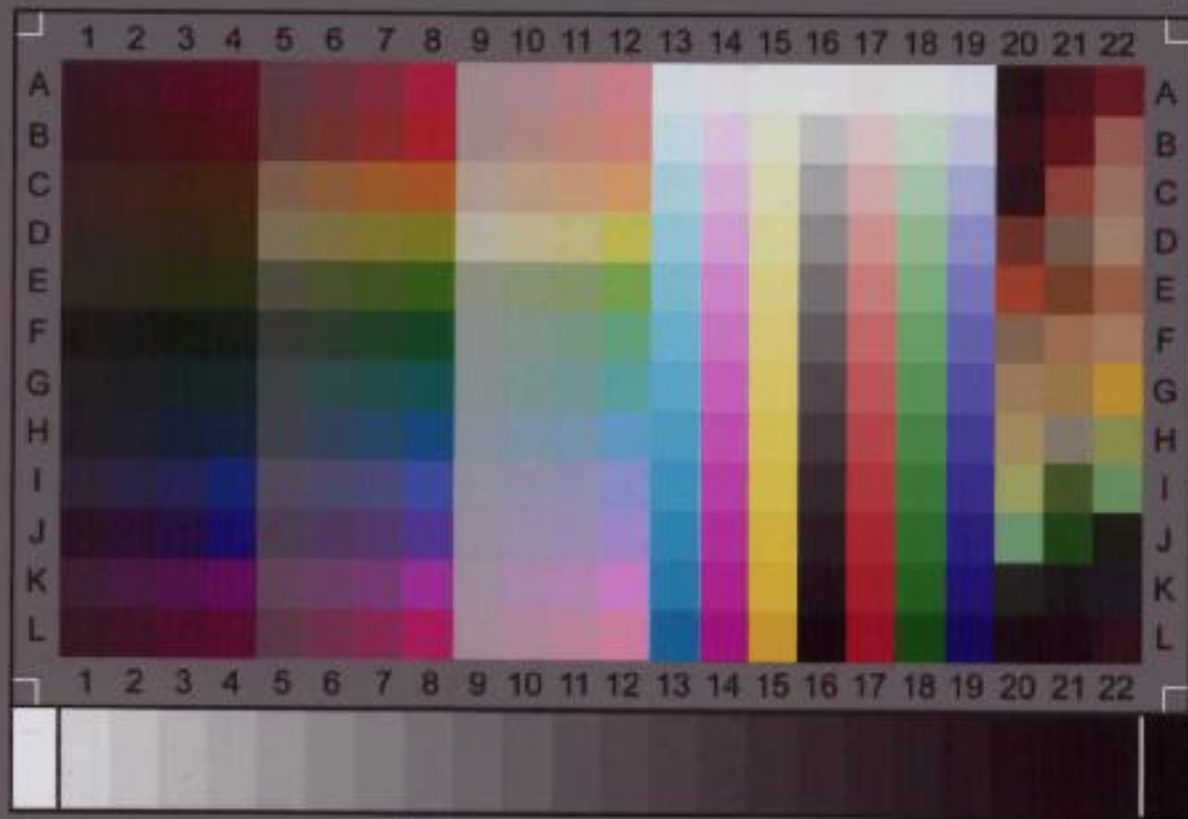
DEPARTMENT OF TRADE AND INDUSTRY  
SEPTEMBER 1989

PART 6 ends:-

PA 15 CDP 7/9/89 .

PART 7 begins:-

For See 15 10/9/89 .



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