COMMISSION OF THE EUROPEAN COMMUNITIES

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COMMUNITY POLICY FOR DATA-PROCESSING

COMMISSION OF THE EUROPEAN COMMUNITIES

CORRIGENDUM

to document COM(75) 467 final

COMMUNITY POLICY FOR DATA-PROCESSING

COMMISSION
OF THE
EUROPEAN COMMUNITIES

C O R R I G E N D U M

to document COM (75)467 final
English Edition

Covering :

Additions : First Elements for a Medium-Term Programme.
            Second group of priority proposals.

Text :

p. 20 bis - Add Table II

p. 29 - Cancel the first paragraphe from "purpose" to "form".

p. 78 - Annex 5, point 5.0, read 9.443.000 instead of 9.503.000

p. 80 - Under column Project read see 2 of text instead of 2.8.
                                   see 3 of text instead of 3.6.
                                   see 4 of text instead of 4.9.

p. 81 - Read : see 3.2. in text instead of 6.2. in text;

p. 83 - Point 4.1., under Technical costs + Contracts to industry :
                read 70.000 for year 1976 instead of 10.000

TABLE II

Financial support given in the Community   (in M.U.A.)

in M.U.A.	HARDWARE	
France	1967-70 : 109	1971-75 : 158
Germany	1967-70 : 65	1971-75 : 190
U.K.	1968 - Sept. 1976 : support to ICL = 144	

/¯Source : National delegations_7

N.B. In the area of applications it is difficult to obtain accurate
figures in view of the complex mechanisms for allocation of
budgets.

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COMMUNITY POLICY FOR DATA-PROCESSING

First Elements for a Medium- Term programme
Second Group of Priority Proposals

Following the Resolution of the Council on Data-Processing, of
July 1974, the Commission has proposed a first series of five priority
actions in the field of applications in March 1975. This communication
provides a first outline of a broader strategic approach, which could be
adopted in a pluriannual programme to start in January 1977, and which
offers an immediate framework for a second series of priority actions which
the Commission considers urgent and which should start in 1976.
These actions are attached to this Communication.

A number of factors argue for this more systematic overall approach.:

1) The Commission's initial proposals, though useful, were modest
and will therefore have little impact on the central objectives of the
Resolution of July 1974 : to encourage the European based industry and
create an environment which significantly helps users to apply data-processing
more cheaply and more effectively.

2) The cost of the Community's developing data-processing policy
in future years remains uncertain; so there is no clear view for Member
States, or the European Parliament, of what the programme will cost. Nor
is it possible for Member States, by comparing one objective with another,

to identify priorities. It is also extremely difficult for the Commission
to make effective and fruitful use of its limited manpower if there is no
clear picture of the scale of activity that will be acceptable and indeed
supported by Member States. Objectives need to be set, together with a global
budget, on a rolling basis, over a period of years.

3) The European Parliament, in its opinion on the first five priority
actions, has strongly emphasised the need for a wider overall strategy.

4) The difficulties within the Unidata group, and the doubts they
have raised about the viability of the European-based industry, require a
restatement of Community strategy.

The Computer Scene

Such a strategy must reflect the realities of the data-processing
scene.

The pressures of scale and the competitive difficulties which have,
over the years, eliminated such major enterprises as RCA, General Electric
and now Xerox, from the data-processing business, continue to apply. Yet
the Community's interest is that there should be a variety of competitive
suppliers.

As the Table below shows, sales of systems, including medium to large
data-processors are still responsible for over 50 per cent of sales of data-
processing equipment. It must remain a central objective of Community policy
to promote and encourage the formation of at least one major European-based
grouping capable of sustaining a viable economic existence and of achieving
balanced partnership with partners in the United States and Japan.

Estimated Sector Development of the Community Data Processing Market from 1974 to 1979

Sectors	1974		1979	
	in millions of U.A's	as a percentage	in millions of U.A's	as a percentage
- Computer and data processing systems *)	3,177	57	5,208	51
- Mini and micro-computers	508	9	1,108	11
- Peripheral equipment	1,382	25	2,831	28
- Software **)	474	9	994	10
Total	5,541	100	10,141	100

*) Including software sales by systems companies
**) Sales by the independent software industry

Source :Study by SOBEMAP : Study of the Requirements for Financing the
European Data Processing Industry.

The challenge of IBM however, remains daunting and is taking a new form as it makes rapid progress towards providing customers with a total information system, including telecommunications facilities, and an immense variety of possible online applications systems. Apart from its management skills it is doing this beg means of :its Systems Network Architecture; its PBX3750 telecommunications switching system for private users; the development of its minicomputer business (system 32) and the provision of a very wide range of terminals to suit different applications; and components with a greater power than any other manufacturer in the world can offer.

Community policy must also take account of the rapid transformation of the data-processing scene, in what can be called the era of distributed computing. This has the following characteristics :

a) The explosive development of <u>component technology</u> is making it possible to place on the market an ever-growing range of intelligent devices remote from the central processor and close to the user and his needs. The man in the street has encountered one example of the application of this component technology in the pocket calculator.

b) A continuing more <u>rapid growth in the market for minicomputers, terminals, peripherals and communications equipment</u> than in the market for central processors (See Table I above)

c) An increasingly <u>close relationship between telecommunications and computing.</u> On the one hand, an ever-growing range of computers and terminal devices are being linked through networks; on the other, telecommunications switching exchanges are becoming computers.

This new era opens up two contradictory trends relevant to Community policy :

On the one hand, the immense variety of types of equipment and software now required in systems, could open up opportunities for an ever-growing diversification and decentralisation of data-processing, provided public authorities can create a framework of standards, procurement and aid which prevent monopolisation and assist this process of diversification. Both in the interests of European users and of a healthy and competitive industry, it must be the aim of Community policy to promote such an open market and industry : an industry in which clearly defined and implemented standards permit the assembly of distributed systems from a variety of suppliers and in which the European part of the industry is able to develop its strength in a variety of sectors of the market.

A second and much less attractive possibility is however also opened up. The development by a single dominant company of a comprehensive software and systems network architecture, within which it offers a complete range of equipment to meet a large part of these needs, could lock customers in for many years to come, severely limiting their freedom of choice, if no public framework of standards, and no public policies to provide alternative suppliers with a favourable environment are developed.

In the Commission's view, the basic industrial premises of the
Resolution of July 1974 remain unchallenged :

That it is not acceptable to users or the public interest for a single
company to dominate and control not only the classic world of central processors
but the new world of distributed computing.

That some part, at least, of this key industry must be under European
control.

The European market for data-processing equipment (with some 5 billion
uc. today) is still only half the size of that in the United States. But it
is growing faster. Even given a slower rate of economic growth than in the
past ten years, it could still double in value by 1980.

Given this growth, it is perfectly possible for a variety of European
companies to thrive and become economically viable within the next ten years,
provided they can operate in a favourable European environment and are promited
in the necessary ways. The strategic aim of Community policy must be to maintain
a pluralistic data-processing society, in which, in the era of distributed
computing, users have wide freedom of choice in the purchase of software or
equipment, and a variety of competitive producers thrive.

The Document which follows elaborates some features of the overall
policy needed for this sector. It is followed by a limited number of specific
proposals which, in the view of the Commission, need to be decided in 1975,
to make possible implementation in 1976.

In the light of these comments, and of discussions within Community institutions, the Commission proposes to present to the Council, by April 1976, an overall programme for the development of the data-processing industry in the Community and for the promotion of data-processing applications. This programme, to be based on the report on the data-processing industry which the Commission is at present elaborating, would cover the years 1977 to 1980 and would correspond to the medium-term programme envisaged in the Resolution of the Council of July 1974. The programme will provide both an overall frame‹ work for the policies of Member States and a limited number of priority actions requiring Community funding or artivity.

A. THE ENVIRONMENT OF DATA-PROCESSING AND THE USER

A series of related policies is designed to maintain an open and competitive environment, in which the user is free to buy competitive equipment from a variety of suppliers, conversion costs are reduced, and standardisation in key areas opens up the market to a variety of suppliers and facilities.

1) Standards Policy

The development, maintenance and widespread acceptance of common data-processing standards helps users, by enabling them to combine equipment and software from different suppliers and permitting them to move on to new equipments without high conversion costs. It provides a framework favourable to the existence of a wide range of competitive industrial suppliers, who can offer equipment or software that can be attached to other equipment, without high adaptation costs. It is important that standards are recommended and applied by impartial public bodies, able to represent a wide spectum of industrial and user interests, and are not imposed by an individual dominant concern, whose standards inevitably change without regard to such wider interests (of users and industry).

For these reasons, the Commission established, in February 1975, a Working Group on Standards (NGS), composed of national experts. Its tasks are to make recommendations, on desirable Community standards in the data-processing field, to assist the Commission in formulating policies for their implementation, and to recommend Community positions in world standardisation organisations. The aim of the Commission and the Group is to seek to define a Community strategy which will make maximum use of existing standards and standardisation organisations. On occasion, however, it will be necessary to promote the development of new standards.

The Working Group on Standards has already established two areas of priority activity and set up appropriate working parties :

a) COBOL is the most widely used high level language in Data-Processing. A working party is being created to try to define recommended standard European subsets of COBOL and formulate Community views in relation to international discussions on standards.

b) Network standards. These are critical to the entire development of distributed Data-Processing.

Partly in response to Community initiatives, the CEPT* decided, at its conference in April 1975, to set up a series of working parties to work on harmonisation of future telecommunications services and standards. One of these is concerned with data-communications. The network standards working party set up by WGS will seek to elaborate and put to the CEPT preferred Community solutions with regard to those telecommunications standards which affect data-processing. It will then work to define recommendations on a wider range of data-communication standards.

c) In a third field, that of real time data-processing systems, which should be responsible for about one third of the data-processing market by 1980, the Commission is proposing that the Community should support the development of a new standard language (See Annex I).

This is an area in which there exist a substantial number of separate national languages which will become obsolete within the next five years. A European initiative now, making use of work already undertaken outside the Commission, could create a new European-based international

* Conférence Européenne des Postes et Telecommunications

standard language, to be in use from 1980 onwards, bringing significant advantages to both Community users and industry.

The implementation of recommended standards requires a sustained effort by public authorities, both through public procurement policies and through the provision to private and public users of guidelines, up-to-date documentation, and advice.

During the next six months, the Commission will explore further, with national authorities, what method might most appropriately be adopted to ensure the application of recommended Community standards in public procurement policy.

With regard to implementation and support to users, it would seem sensible to make use of a network of institutions in the Member States as a permanent infrastructure. Certain such institutions already have a similar role with regard to national or international standards. In other cases, the function will need to be developed.

Overall proposals for such a structure will be made in the medium-term programme to be put forward in 1976.

2) <u>Portability</u>

Closely related to standardisation activities are proposals concerning the promotion of portable software (Annex 2).

In its Communication of March 1975, the Commission stressed the economic importance of reducing the high cost to users of data-processing equipment of converting software programmes, when they change from one kind of equipment · to another. This aim will be served if good portable software is available, at relatively low cost, which can be used on different types of machine, and if conversion facilities and tools are readily available at low cost.

The existence and widespread use of portable software also promotes and facilitates competition between different industrial suppliers, enabling non-dominant producers of hardware to penetrate markets more easily. One of the major advantages which scale confers on the dominant manufacturer is its ability to develop and market a very wide range of applications. European-based manufacturers, taken separately, are not in a position to market so wide a range. If applications software were written in portable form, it would be easier to combine equipment from one manufacturer with applications developed by other software and hardware companies.

The existence of standard interfaces and languages is clearly an indirect help to the provision of portable software and the reduction of conversion costs. In addition, however, the Commission proposes that Community funding be made available to support and encourage the development of a limited number of types of portable software.

3) Collaboration between national centres for research and support to users

The need to develop an infrastructure in the form of a network of institutions for the support of Community standards has already been described. Such an infrastructure for Community policy is also needed in other fields, such as general technical support for users, and basic research. In certain Member States, the three tasks are in fact carried out by the same institution The Commission has held discussions with a number of such institutions who are keen to establish a permanent pattern of collaboration. The proposal (Annex 3) for three collaborative studies by such institutions is the result.

The first study is in the field of the protection of citizen rights. This study is designed to support the hearings organised by the European Parliament and the preparation by the Commission of work on harmonisation in this field.

Studies are also proposed in the fields of programming techniques and the evaluation of characteristics of Data Base Management systems. This study, which would be carried out in the closest collaboration with users, would be designed to evaluate a number of existing DBMS systems and identify desirable characteristics including questions of portability, standards etc. The study would thus provide a research backup to the work done in the framework of 1) and 2) above.

Collaboration in these and other studies, initially proposed by three major Institutions (NCC, IRIA and GMD) will be enlarged as soon as possible to include Institutions in other Member States.

4) Procurement Policy

The Resolution of the Council of July 1974 referred to the need to develop collaboration in the field of public procurement, politics. A working goup of national experts has been set up.

The Commission, intends to develop this work within the next six months. In addition to monitoring the progress of public procurement from European-based companies, important areas for collaboration include unbundling in procurement (hardware and software), evaluation techniques, and contractual procedures.

5) Applications

The Commission has already proposed five applications projects. Studies and discussions have shown that a very wide range of further studies and developments could usefully be supported by the Community. The limitation of resources available suggests that Community support must be highly selective. To achieve this :

i) There is a need to fix an overall budget, so that priorities can be established within it.

ii) In addition to the basic requirement of interest to Community users the following criteria for selection are important in the Commission's view : Applications where study and development will generate a product of widespread interest to users and wide marketability by industry; applications whose implementation at Community level will have a significant impact on standards and wider developments, particularly in the field of networks; applications where there will be a manifest saving in public expenditure through common study or development.

Work in the field of applications has high importance, not merely because it is here that the skills of data-processing can be effectively applied to users' needs, but because it is mainly by developing new and useful applications that the European-based industry can expand its market share.

This is both the testing ground for the competition with IBM and other non-European manufacturers, and an area in which a special European contribution may be made to data-processing because solutions developed in the United States and elsewhere may not correspond to Europe's needs.

The Commission envisages proposing a new general financial mechanism which would be available as from 1977 to support joint applications studies and developments of Community interest. These resources would be available, not merely to finance studies and developments proposed by the Commission, but a part of the cost of proposals from users or industrial companies based in at least three member states of the Community.

In the meantime, and before this general scheme is introduced into operation, two new applications projects of an urgent character are proposed, to start in 1976 (Annex 4). One concerns the development of a new portable data retrieval software to succeed existing products. This is a major requirement of many public users (including such Community projects as Euronet, and legal information systems) as well as a tool of interest throughout data-processing. It is thus of major interest to both users and European industry.

The second concerns an experimental development in the field of highspeed data transmission under which CERN and the European Informatics Network (COST 11) will make use of the European Space Agency's Experimental Telecommunications Satellite. This is a project which the Commission considers important in the wider context of network policy. It will be a pioneering activity binging valuable lessons for both industry and users.

B. - SUPPORT FOR INDUSTRY

General Objectives

Any support provided by the Community to European-based industry must be judged in the light of three objectives :

(i) To place the European-based industry on an equal competitive footing with its competitors, by matching the various financial advantages which they enjoy;

(ii) To encourage and help the industry to pool resources in areas where economies of scale are necessary and thus to increase its productivity and bring nearer full economic viability;

(iii) To promote strength and development in the key areas on which the entire future of the industry depends.

Hitherto, the bulk of aid provided by national Governments to the Data-Processing industry (see Table II) has been devoted to support the main manufacturers of central processors. This is an area in which the Commission continues to believe that industrial associations within Europe are essential, to achieve economies of scale.
This is why it considers that national Governments should only accord further aids in this fields to promote promising associations between European producers.

There are, however, other major areas, described below, in which a Community supporting action is urgent, either because, as in the case of (1) below, (Support for Sales Finance), the general conditions of competition are loaded against the European-based industry and need to be redressed, or, as in the case of (2) Peripherals and (3) Components, they concern key growth areas already touched on in this Communication.

1. **Equivalent Competitive Conditions for Supporting Sales**

   The most urgent need for a Community activity is in the field
   of leasing. Its established market position and gigantic internal rental
   income give IBM a permanent advantage in relation to other competitors
   who must constantly raise new external finance to fund growth. This
   disadvantage is aggravated by inflation and recession, which together
   reducer the amounts of credits which companies can raise in relation to
   their equity base. The problem is particularly acute for small and
   medium-sized companies, for leasing, initially concentrated largely
   on central processors, is increasingly necessary for minicomputers,
   peripherals and terminals of high value.

   In anindustry dependent on direct sales a growing, innovating company,
   starting from a small or nil market share can, after an initial short
   period, say of two years, finance further growth out of sales from income.
   Indeed the faster sales grow, the faster revenues and profits grow.
   In an industry such as data-processing, where leasing or rental prevails,
   the opposite is the case. The faster a company increases its sales, the
   more money it must raise from outside, and the worse its balance sheet.

   In a market growing by some 13 percent per year, it would seem a reasona-
   ble objective for the European-based industry to aim to try to increase
   its market share to 41 % of the European market by 1979 and some 50 per
   cent by 1985. Such a growth would require some 5.000 MUC of finance in
   the next five years. *

   On the basis of these projections,and given present financing arrangements,
   it may be estimated that industry may obtain some 50 % of these funds
   from the private Danking system.For the remainder, further financial
   mechanisms would appear necessary.

   In the framework of the medium-term programme for data-processing, the
   Commission will propose a Community financial mechanism with the aim of
   providing the European-based part of the industry with conditions for
   financing sales to some extent comparable to those available to IBM.

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   *) source : SOBEMAP : Study of the requirements for financing the
           European data processing industry.

2. Peripherals and terminals

Near-in Peripherals (discs, tapes and tapedrives, input-output devices, communications equipment and so on) form an increasingly important part of systems not only in relation to large central processors, but to smaller minicomputers and distributed systems. They formed 25% of sales in 1974, and are expected to grow to 28% by 1979 with the growth trend continuing thereafter. *)

Industrial experience, moreover, confirms the analysis of a study for the Commission that in this sector, as in central processors, costs tend to fall by around 15 per cent as production doubles. The search for economies of scale in production and development has already pushed many companies in the United States to seek to establish joint ventures or to buy out rather than manufacture themselves. European manufacturers, who have not even attained the scale in production of certain of these individual US companies, badly need to develop comparable policies of buying out, or developing and producing jointly, if they are to attain an economic scale of production and development.

At present the most evident method of achieving such economies is to purchase from producers in the United States. One consequence of this policy is to squeeze out of existence the medium-sized European manufacturers who exist in this field. An effort within Europe to achieve rationalisation agreements and joint development of certain products would both strengthen the European industry and place it in a better position to negotiate wider transatlantic rationalisation agreements.

The Commission intends to invite manufacturers both of distributed processors and CPU's to meet with each other in a framework provided by the Commission to discuss, systematically, rationalisation agreements, involving purchase of each others' peripherals or joint production or joint pruchase from third suppliers. This process could develop in 1975 and 1976.

It is also proposed to provide, a s from the start of 1977, a financial incentive to such arrangements in the form of development contracts for key new products (eg. tape-library and high-speed discs) jointly developed by companies based in at least three Community countries under the new financial scheme to be proposed in April 1975 and based on the requirements and needs which the industry, as user, has identified..

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*) Y.S. HU : Towards a European policy on the EDP industry.

Further study may show that it is possible to extend the same kind
of financial incentive to terminals or to modular building-blocks
for terminals. Here, if network and interface standards can be
established at European level, there should be important opportunities
for European manufacturers to develop and sell terminals,
possibly with modular characteristics, to a wide market.

3. Components

Price, performance, and ability to make use of advanced components
are critical features in competitiveness for manufacturers of all
kinds of data-processing equipment.

Their importance grows at an accelerating pace as large scale integration
LSI) makes it possible for entire systems to be grouped on a single
silicium chip and permits the distribution of intelligence to an ever-
widening range of devices.

Advanced electronic components are the technological key also to the
transformation and growth of the telecommunications industry, where
development in the next ten years will be inseparable from that
of distributed computing. This, in short, is a key industry whose
strength and structure are of vital interest to the Community.

Hitherto European DP manufacturers have relied heavily on American
suppliers of mass-produced advanced components who have led
world technology and achieved economies of scale thanks, in part to the
immense size of the US Federal Government market, and the scale and
stimulus provided by research and development under defence and space
programmes.

Japan is also mounting a major national programme of advanced
component development to serve the needs of telecommunications
and data-processing industries.

Though the US component industry is not dominated by a single manufac-
turer and does not therefore pose the same problems of competition,
as data-processing, certain problems, for the European DP industry,
are growing in importance :

a) small to medium-sized manufaoturers of distributed computing
   equipment laok bargaining power in the pruchase of even
   standard components and depend increasingly on their relationship
   with the component manufaoturer for design of their product;

b) relianoe on non-IBM American suppliers of LSI ohips is no longer
   a certain method of obtaining the most advanced components,
   beoause IBM is beooming the most advanoed of these manufacturer components
   in the world. European DP manufaoturers, for whom there is already a
   time lag of, say, a year in ability to inolude the latest component
   developed by other manufaoturers in their systems, may be some
   three years behind IBM in advanced components ;

o) a oritioal feature in leadtime for the development of computer
   systems has beoome the speed with whioh a oompany oan translate
   a system oonoept into a usable oomponent, tested, complete
   with firmware and so on. Design teohniques in the utilisation
   of advanoed oomponents, whether developed in house or provided
   as a kit of tools by oomponent manufaoturers are thus essential
   to the oomputer industry.

In short, as the designer of advanced components takes over an ever-more important part of data-processing systems, it becomes increasingly important for them to be designed, developed and produced in Europe in a close service relationship to the data-processing industry.

The Commission therefore proposes the following measures :

a) To discuss with the industry and implement the most appropriate means of facilitating cooperative procurement of standard components by interested firms throughout the industry.

b) To provide, as from the start of 1977, a financial incentive in the form of development contracts for the joint development by European transnational consortia of advanced components, specified in common by customers in at least three different Community countries with a certain prospective minimum turnover for this component. Two significant objectives here would be the creation of a "second source" for supplies and the promotion of an advanced capability within the European component industry.

c) To conduct a study during 1976 on the best means of building up European LSI development facilities with special regard to the needs of the DP and telecommunications industries. Such facilities ought to bring together the capabilities of leading European component manufacturers to provide a design and development service in the application of LSI components to new DP systems.

Certain member states have already appreciated the strategic importance of the electronic component industry in any industrial policy. In particular the Federal Republic of Germany has communicated to the Commission the major programme of support which it is developing during the years 1974 to 1978, and invited other member states to cooperate. The full benefits of such essential efforts will, in the Commission's view, only be realised if the Community can develop an overall strategy for this sector involving both

coordination of national policies and common actions of the kind outlined above.

During the next six months, the Commission intends to hold discussions with industry and to invite experts from national Governments to confront and compare existing national policies with a view to elaborating an overall Community policy on electronic components annexed to the medium-term programme for dataprocessing which it will put forward in April 1976.

C - GENERAL QUESTIONS

1) Management of Common Programmes

The Consultative Committee, whose establishment has been proposed in connection with the five applications projects currently before the Council, will advise and assist the Commission in the execution of the programmes outlined in this Communication. Specialised technical committees will be set up to guide each programme activity. Their members will be selected by the Commission on the advice of the Consultative Committee.

2) Coordination of National Policies

Proposals for Community policy are already discussed by the Commission with a group of Senior Officials.

To ensure that the medium-term programme reflects the intentions of the Resolution and embodies both common actions and coordination of national policies, a more systematic effort will be made within this group, during the coming six months, to confront and compare national policies particularly in the fields of distributed computing and components,.

3) Preparation of the medium-term programme

In view of the preparation of the medium-term programme, certain studies in the Commission are necessary. With this in mind, a budget of 500.000 UA has been foreseen for 1976 (see Annex 5 of the document).

In April 1976, the Commission will present budget proposals for
the years 1977 to 1980 defining the allocation of funds between the
different classes of user (applications, components, peripherals,
portable software and so on) and specifying the most appropriate finan-
cial mechanisms in such a way that the different activities can start
in January 1977.

4. FINANCING OF PROJECTS

Breakdown of Expenditure

Annex N°	Project	Total Cost	1976	1977	1978	1979	1980
1	Project L T P L	6,703,100	2,433,500	2,213,600	1,394,500	661,500	
2	Portability of Software	9,443,000	823,000	5,455,000	3,165,000		
3	Support for use of data processing	5,029,000	1,064,000	1,555,000	1,555,000	855,000	
4	Applications :						
	a) High Speed data Communications	920,000	500,000	230,000	80,000	80,000	30,000
	b) Information Storage and Retrieval	471,000	133,500	232,500	105,000		
5	c) Studies	500.000	500.000				
	Total :	23.066.100	5.454.000	9,686,100	6,299,500	1,596,500	30.000

PROPOSAL FOR A COUNCIL DECISION

ADOPTING A DEVELOPMENT PROJECT FOR A COMMON LANGUAGE FOR REAL TIME
PROGRAMMING (LTPL-PROJECT)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,
and in particular Article 235 thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Parliament,

Whereas the Council agreed, in its Resolution of 15 July 1974 on a
Community policy on data-processing, with a view to giving a Community orienta-
tion to policy for the encouragement and promotion of data-processing, to
adopt collaborative actions on Standards on the basis of proposals from the
Commission,

Whereas the development of a common language for real-time applica-
tions would enable users to get acess to a vider range of
products and reduce their costs through mutual exchange of programmes and that
to this end it is necessary to provide for the development of such a
language through collaboration at the Community level,

Whereas the project referred to above is seen to be necessary in order
to attain certain Community objectives within the framework of the
Common Market,

Whereas the Treaty establishing the European Economic Community has not
provided the necessary powers of action to this end,

HAS ADOPTED THE DECISION

ARTICLE 1

A project for the development of a common programming language for
real-time applications is hereby adopted to run from 1 January 1976
to December 1979. The project is defined under "Content of the Project"
in the Annex to this decision (see paragraph 3).

ARTICLE 2

The necessary appropriations for carrying out this project shall be
entered in the budget of the European Communities.

ARTICLE 3

The Commission shall be responsible for carrying out the project. It
shall be assisted by the Consultative Committee for Data-Processing
P rojects.

The Commission shall present a report to the Council each year.

                              Done at Brussels
                              FOR THE COUNCIL

                              THE PRESIDENT

DEVELOPMENT PROJECT FOR A COMMON LANGUAGE FOR

REAL TIME PROGRAMMING (LTPL PROJECT)

1.   Introduction

1.1.   The Council Resolution of 15 July 1974 welcomed the Commission's
        intention to submit, after appropriate consultations, priority
        proposals concerning: "Collaboration on standards, applications
        and public procurement policy."

1.2.   This Note will explain the Commission's first proposal in the field
        of standards: for a Community project for the development of a
        standard future language for real-time data processing applications.

1.3.   The proposal in the Commission's view, will fulfil two important aims of
        the Council Resolution:
        (a) to enable users
            - to cut their costs substantially by exchanging important and costly
              software products between one other;
            - to attain greater independence from individual manufacturers and
              their products, and the possibility to buy equipment from a
              variety of suppliers without changing expensive software.
        (b) - to strengthen the European-based computer industry:
            - by helping to eliminate technical obstacles to marketing;
            - by giving the European manufacturers competitive advantages in a
              major section of the world market.

1.4.   Before drafting the proposal, consultations were held with the following
        groups:
        - the Working Group on Standards
        - a group of experts, active in this field, representing users, the
          European Computer industry and universities, who have helped to
          define the technical specifications for the project;

        Thus the proposal outlined in this Note is the outcome of discussions
        with interested (or affected) parties in the Member States, held with a view
        to defining, specifying and assessing the project.

2.   Outline and justification of the project

2.1.   The aim of the proposed project is to develop a standard programming
        language for computers with real-time applications, i.e., applications
        such as industrial process control, laboratory automation, avionics,
        seat reservation, the organisation of processes in electric power stations
        and grids, or the organisation of data flow in telecommunication
        networks with the aid of processors, etc..

        This language, called LTPL (long-term procedural language), is intended
        to be available in the late seventies as an alternative to the existing
        languages, which are not interchangeable.

        Real-time Languages: The situation to day

2.2.   With software products becoming more and more numerous and expensive,
        it has been the practice for some time to use what are known as
        "high-level" languages in the formulation of these products. This
        means that a widely used program need only be written once in one of
        these languages, provided, of course, that the computer on which the
        program is to be run permits the use of the language in question by
        means of a compiler. The cost of developing a compiler is in the order
        of 1 - 2 million u.a. Given the high cost of writing a new programme,
        such an investment in a compiler will quickly pay off, provided that
        there are not too many high-level languages competing with one another.

        There is however no internationally accepted standard for real-time
        languages, today, but rather a considerable number of individual
        languages which are not interchangeable:
                - in Europe : PEARL, CORAL 66, PROCOL, RTL 2, etc.
                - in the USA : PL - 1 and others.
        These languages have been developed primarily at national level, and
        some have been given considerable backing by public purchasing policy
        in their country of origin. Thus a privileged position is enjoyed by
        PEARL in Germany, PROCOL in France and CORAL 66 in England, and this
        position is partly maintained by the attitude of industry. In the
        long term, however, this partial standardisation at national level,
        and the consequent strengthening of the national markets, does not serve
        the best interests of either the manufacturer or the user.

Benefits to users

2.3.   Among computer users, there are some industries in which operating
        costs are appreciably affected by the very substantial outlay for
        software packages. This is true, for instance, of load distribution
        programs for power supply undertakings, programs for safety systems
        in nuclear power stations and process control programs for blast
        furnaces and rolling mills. Consequently, many users have joined
        forces to bring about a standard programming language which will
        enable them to cut their costs by using major programs in common.
        At national level, this procedure is already commonplace. A foreign
        manufacturer, for instance, who is interested in supplying the
        German power supply undertakings, can do so only on the basis of
        PEARL.

        The lack of a standard language therefore is a hind'rance to the
        exchange of experience and programs at European level, and the
        further reduction in costs that would result.

        As a rule, foreign suppliers of real-time data-processing systems
        lose any competitive advantage because of the high cost of conversion
        to what for them is a "foreign" language. For the user, this means
        greater dependence on a limited number of home suppliers. It hinders
        the creation of a European market.

        The user, too, is deterred from converting to a "foreign" language
        by the fact that the program library he has acquired to date, which
        may represent a considerable financial investment, would lose its
        value.

Benefits to manufacturers

2.4.   Manufacturing industry was at one time largely in favour of preferred
        national programming languages, which served a protective function by
        sealing off the national market. However, many companies have now grown
        to a size which compels them to see at least the whole of Europe as their
        market. Yet they find that the existence of different languages, and the
        resulting conversion costs incurred by the manufacturer, act as a tech-
        nical barrier to trade. It is therefore in the interest of the industry that
        this barrier should be removed by the introduction of a standard language.

The existence of a standard real-time language would also improve
the position of the whole European industry on the world market.
Experience has shown the importance of a harmonised product basis
for successfull worldwide marketing.

2.5. General economic benefits

With the European software industry having in 1980 a global annual turnover ⁄
of about 1 Billion u.a. it is generally assumed that the portion of real-
time application software at that time will be 30 %.
On the other hand, present development permit the conclusion that high
level languages where they have replaced the individual assembler-type
languages lead to overall savings of about 20 %. Half that amount, i.e.
10 % could probably be expected when a common standard language is
applied instead of the high level languages now in use. So the annual
savings due to a generally accepted LTPL-standard will be about 30 MUA/year.

A European real-time language may become a world standard

2.6.   Europe would seem an ideal place in which to develop a standard real-
        time language, which would stand an excellent chance of being adopted
        on a worldwide scale.
        No American product satisfies the requirements. In its present form
        at any rate, the real-time version of PL 1 (the language supplied by
        IBM) is technically unsatisfactory. The IBM language System 7-RT is
        geared to IBM products to such an extent that it appears unsuitable
        for general use, and the same is true of the languages developed by
        the other big American computer manufacturers.
        By contrast the real-time languages evolved in Europe were designed
        from the outset not to be specific to a manufacturer, this being one
        favourable consequence of the fragmentation of the European market.

From the European standpoint, there are further important considerations:
The introduction of a standard always gives those concerned in its
development an important marketing advantage compared with those who adopt a
standard developed elsewhere. The ISO is currently exploring the views

of its members with regard to the possible establishment of a world
standard in this field. It is possible that a language developed in
Europe will be officially recognised as an ISO standard; even if this is not
a certainty, a sucessful European standard language would spread beyond
the bounds of Europe strengthening Europe's position in the world market.

Why a Community project

2.7.   In view of the competitive relationship between the European countries
there is no likelihood that a standard European language could be
developed solely on the basis of one of the existing languages; more-
over new and better features will be required of any successor language.
A new standard European language (LTPL) must combine the best features
of the European candidate languages. The language must also have elements
in common with each of the existing languages to permit automatic trans-
lation from the candidate languages into LTPL. As a machine independant
language it will by definition not affect the structure of existing
operating systems. But once a new language standard is put into use it
affects the development of future operating systems.

The timing

2.8.   The success of the project proposed will depend on proper timing. In
the next three or four years many of the languages currently in use
have to be replaced by technically more advanced versions. This in-
creases the scope for general acceptance of a common solution provided
it is available at that time. The timescale of the project (see 3.2),
therefore, calls for a speedy start even if technical progress next
year changes detailed aspects. Care has been taken in the concept of
the project to ensure that changes in technical conditions can be
taken account of up to a very late phase of execution. Moreover, there
are strong indications that efforts to develop a standard in the United
States will be multiplied soon if no European solution is in sight.

The LTPL-E Group (*)

The LTPL-E (Long Term Procedural Language - Europe) originated in the "Purdue
Workshop on Industrial Computers"(an international gathering) at Purdue, USA.
Three technical committees were formed: LTPL-America, LTPL-Japan and LTPL-
Europe. Later on, when "Purdue-Europe" was formed, the LTPL-E Group took
its place there as one of seven technical Committees. The Commission main-
tains close contact with the Purdue-Europe committees, and makes use of their
advisory services in the field of data-processing.

2.9.   For about two years a group of European   international experts from
       research, industry and user circles - the "LTPL-E Group", as it is
       called - has been working towards this goal. The LTPL-E Group maintains
       close contact with all the other groups and organisations interested in,
       or affected by, this work, in particular with the European and American
       national standards authorities and the International Standards Organi-
       sation (ISO). Its international status is best illustrated by the fact
       that ISO recognises the LTPL-E Group as a technical advisory group".

       Given the composition of this Group and the investigations it has al-
       ready conducted on questions of language comparison and language stan-
       dardisation, there is reason to believe that the path it has been following
       will lead to the goal outlined by the Commission in this proposal, provided
       the necessary financial resources are available.

       The position of the group in an informal world-wide organisation and its
       good relations with the International Standards Organisation, fit in with
       the Commission's view that the results envisaged for this project should
       be regarded as a European contribution to worldwide efforts. The work al-
       ready done by the LTPL-E group provides an opportunity for the Community.
       In order to exploit it and to serve the wider need and to develop a
       standard language, it is proposed that the LTPL-E development work
       described in 3.1. should be financed from Community resources in accordance
       with the schedule under Annex 5.

3.   Content of the project

       Project phases and working modules

3.1.1. The definition phase
       Comparison of all relevant candidate languages:theoretical work leading
       to a common language proposal.

3.1.2. The implementation phase
             - test implementation of the common language (feasability, utility,acceptability)
             - construction of a portable compiler
             - adaptation to the structures of different machines.

purpose a compiler has to be constructed. In order to see how the
language works on different machine structures, more than one test
implementation needs to be made. So it is proposed to develop two
different compilers. In order to extend the range of application of the
language as far as possible from the very beginning, it is intended to
design these compilers in a portable form.

3.1.3. The evaluation phase

- in depth application tests (viability and practicality of the

  language).

The different tasks which will have to be carried out are :

a. in the definition phase:
- Language comparison (already done by the LTPL-E-Group
- Proposal for syntactic method for language description
- Formal description of the language
- Raw proposal for the language kernel
- Language adaptation study
- Final proposal for the language kernel
- Description of the language kernel in provisional syntax

- Development of $\left\{ \begin{array}{l} \text{algorithmic semantics} \\ \text{tasking semantics} \\ \text{Input/Output semantics} \\ \text{configuration description semantics} \end{array} \right.$

b. in the implementation phase
- Development of two compilers for different machines, comprising

- test implementation of the $\left\{ \begin{array}{l} \text{language kernel} \\ \text{tasking semantics} \\ \text{Input/Output semantics} \\ \text{algorithmic semantics} \\ \text{configuration semantics} \end{array} \right.$

c. in the evaluation phase
- different application tests

Planning

3.2. Most of the work tasks depend on the results of other tasks, but
not in the sense that all the definition phase has to be completed before
implementation can begin; even testing can partly be undertaken at a rela-
tively early stage.
This results form the decision scheme that is being incorporated in the
planning; with programmes of such complexity straightforward strategies
excluding feedback loops will be unrealistic. In innovative development
work of this kind it must be possible to redefine certain modules in the
light of work on others.
The time scales assigned for the three phases are:

Definition phase   Jan. 1976 – Dec. 1978
Implementation phase   Jan. 1976 – Dec. 1978
Evaluation phase   Jan. 1977 – Dec. 1979

PROPOSAL FOR A COUNCIL DECISION ADOPTING A GROUP OF PROJECTS
IN DATA-PROCESSING CONCERNING SOFTWARE PORTABILITY

THE COUNCIL OF THE EUROPEAN COMMUNITIES

Having regard to the Treaty establishing the European Economic Community,
and in particular Article 235 thereof;

Having regard to the proposal from the Commission;

Having regard to the Opinion of the European Parliament;

Whereas the Council agreed in its Resolution of 15 July 1974 on a Community
policy for data-processing, with a view to giving a Community orientation to
policies for encouraging and promoting data-processing, to adopt, on a propo-
sal of the Commission, industrial development projects in areas of common
interest involving transnational cooperation.

Whereas the portability of software will benefit users by substantially
reducing conversion costs when changing over from one type of equipment to
another; and that to this end it is required to promote a group of projects
with the object of the industrial development of languages, systems and por-
table products, in the field of software.

Whereas the projects referred to above are seen to be necessary in order
to attain certain Community objectives within the framework of the common
market;

Whereas the Treaty establishing the European Economic Community makes no
provision for the powers required for these purposes;

HAS ADOPTED THIS DECISION :

ARTICLE 1

Five common projects are adopted for the period from 1 January 1976
namely :

 (a) Design and development of portable compilers; (4.3.a to 4.5.a)

 (b) Design and development of a software writing language (4.5.b to 4.8.b)

 (o) Design and development of subsystems for the management of
   data banks and transaction processing (4.4.c, to 4.6.c)

 (d) Design and development of conversion tools; (4.4.a to 4.5.d)

 (e) A preliminary study on the basic nucleus of an operating
   system for minicomputers; (4.3.c)

The indications in brackets refer to the paragraphs of the Annex to the
present decision defining the different projects.

ARTICLE 2

The appropriations required for the implementation of these projects
shall be shown in the budget of the European Communities.

ARTICLE 3

The Commission shall be responsible for the implementation of the
projects. It shall be assisted in this task by the Consultative Committee
on Data Processing Projects.

The Commission shall present an annual report to the Council.

Done at Brussels

FOR THE COUNCIL

THE PRESIDENT

A GROUP OF PROJECTS IN DATA PROCESSING
CONCERNING SOFTWARE PORTABILITY.

1. INTRODUCTION

1.1. The fact that the computer market is shared by different manufacturers
gives rise to numerous difficulties for the user who wishes to transfer
his applications to a new, more powerful machine, or to use several
incompatible items of equipment simultaneously.

1.2. The latter case will arise where the user has a large pool of
miscellaneous equipment, because, for obvious reasons, he does not
wish to be tied to a single manufacturer.

1.3. Accordingly, when applications are transferred to a new machine,
or when they are processed simultaneously by different equipment,
the degree of difficulty encountered by the user will depend on what,
for the sake of convenience, will be called their "portability".

1.4. It should be noted that similar problems arise in regard to
intercommunication between different machines, and these will have
to be dealt with at the same time.

1.5. At present on the computer market, there is little or no portability
of applications, and this is a constant source of annoyance to the
user; changing manufacturers becomes a major problem which many prefer
to avoid by opting once and for all for the leading world manufacturer
who can guarantee a measure of homogeneity in the equipment.

1.6. The cost of converting programs and the disturbance caused in the
operation of the system are considerable.

1.7. A preliminary estimate of the costs that are likely to be incurred
in the Community for program conversion over the next five years
would be somewhere in the region of 1,000 million u.a.

1.8 This is an unhealthy situation both for the user and for the European computer industry, whose lack of homogeneity is a major handicap in face of the monolithic organization of its main competitor.

1.9. Taking a wider view, it is worth pointing out that any scheme likely to give greater portability to software products would help at the same time in removing technical barriers to trade within the Community.

1.10. The purpose of this proposal, then, is to set up a programme of projects aimed at giving a greater measure of portability to computer software.

2. BASIS FOR THE PROPOSALS

2.1. These proposals come within the general framework of the Council Resolution on a Community policy for data processing of July 1974 (Doc. R/1793/74 (ECO 211).

2.2. They are based primarily on two studies carried out for the Commission during the years 1974-75 on the portability of applications software[1] and on the views of computer users concerning the problems associated with portability.[2]

2.3. Many consultations have also been held with hardware and software manufacturers.

2.4. Finally, the subject has been discussed on various occasions by a Committee of Senior Officials of the Member States, which assists the Commission in matters concerning the Community policy on data processing.

3. OUTLINE OF THE PROPOSALS

3.1. The proposals which have evolved from the studies and consultations mentioned above are as follows :

---

1) CAP SOGETI : The portability of application software.
2) CAP SOGETI : Inquiry on the portability of software.

(a) Design and development of portable compilers;

(b) Design and development of a software writing language;

(c) Design and development of subsystems for data base management and transaction processing;

(d) Design and development of conversion tools;

(e) Preliminary study on the basic nucleus of an operating system for minicomputers;

3.2. All the projects listed above will be conducted bearing in mind not only the interests of users but also those of interested industrial parties (manufacturers of large and medium-size machines, minicomputers and possibly microcomputers,as well as software)

3.3. The resources required are summarized in the following table and presented in a detailed form in Annex 5 :

| Project | Budget in u.a. | | | |
	1976	1977	1978	Total per project
3.1.a.	223,000	1,600,000	960,000	2,783,000
3.1.b.	75,000	550,000	500,000	1,125,000
3.1.c.	250,000	1,200,000	300,000	1,750,000
3.1.d.	60,000	1,050,000	1,050,000	2,160,000
3.1.e.	30,000	600,000	–	630,000
General expenses Total	185,000	455,000	355,000	995,000
Totals	823,000	5,455,000	3,165,000	9,443,000

3.4. The amount of the 1976 budget can be regarded as final; the budgets for 1977 and 1978 are approximate and give some idea of the overall cost of the operation. They will have to be reviewed in the light of the studies carried out in 1976 and the negotiations which will be held with the interested circles in 1975 and 1976.

3.5. The funds which will be allocated to industrial consortia for the
manufacture of portable products resulting from the scheme will
be reimbursed to the Community, if the products prove commercially
successful, under a scheme to be defined within the general framework
of the management of the projects and of the medium-term programme.

3.6. The implementation of the projects will be entrusted to the Commission,
assisted by the Consultative Committee on Data Processing Projects.

4.   CONTENT OF THE PROJECTS

4.1.a. Design and development of portable compilers

The survey carried out among computer users in 1975 has revealed that
one project which they regarded as extremely important was the development
of portable compilers. This can be easily explained by the fact that
most of the troubles that occur during program conversion are due to
incompatibility between the languages supplied by the various
manufacturers.

4.2.a. A preliminary study followed by the development of portable compilers
would therefore satisfy a requirement that has been clearly indicated
by a large number of users.

4.3.a. A study aimed at defining portable compilers would be carried out in
1976 on the following lines :

- examination of the existing languages that might be eligible (COBOL,
FORTRAM, FL 1, etc.) and selection of one or more languages;

- study of the architecture to be adopted in developing the compiler(s),
i.e. analysis of existing compilers, choice of structure, nature
of object programs (Assembler, binary, etc..) This study could be
accompanied by test runs on the computer.

- preparation of detailed specifications for the development
of the portable compilers.

4.4.a. With specifications resulting from the preparatory study, a start
will be made in 1977 on the development of portable compilers. The
work will be carried out during 1977 and 1978.

4.5.a. For this operation, the following guidelines have been retained :

- two portable compilers will be developed (or chosen from existing
  compilers) for use with two languages and one type of computer;

- the portability of these compilers - either singly or in combination -
  will then be extended to cover six different types of computers.

4.1.b. <u>Design and development of a software writing language</u>

This language, together with the compilers required for use on
various equipment, is a prerequisite for the implementation
of all the portable products forming the subject of these projects.

4.2.b. Its development must therefore be regarded as a matter of the greatest
<u>urgency.</u>

4.3.b. The main problem is not to define a new language for handling elementary
binary items, but to develop an effective portable compiler.

4.4.b. Rather than attempting to develop something completely new, therefore,
it is preferable to take   existing languages as the starting point.
By so doing, one can avoid :

- long-drawn-out discussions on the specifications for a language;

- new developments based on techniques that might not have been
  time-tested and would result in products that are unacceptable from
  the point of view of performance.

It is proposed, therefore, that the project should be carried out in three
phases :

4.5.b. The first phase would be that of selecting an existing language (or two) according to very strict criteria. The following would be the minimum requirements :

- compilers of this language must exist on different types of machines;

- the compilers must be effective in generating object programs of the "system" type;

- the costs of development of new versions of compilers for other machines must be low;

- portable products must exist in this language that have given proof of their efficiency and portability.

4.6.b. This selection procedure, which ought to be carried out very rapidly in 1976, will result in the definition of a language known as ESL_0, from which the future ESL language (European System Language) will be derived.

4.7.b. The second phase of the project, scheduled for 1977, will be concerned with the adaptation of ESL_0 to various European computers; those of the machines in question, which at present have no compiler for the ESL_0 language, will be provided with one. With these compilers it will be possible to push forward with the development of portable products without waiting until the final version of ESL is available. For each language selected, six adaptations of ESL_0 would be made.

The extension of ESL_0 to obtain the final ESL language will also be included in the second phase and will be completed in 1977.

4.8 .b. Finally, in the third phase, which will cover the year 1978, adaptations will be made to ESL on the same basis as for ESL$_0$.

4.1.c. Design and development of subsystems for data base management and transaction processing

This type of product is somewhere in between an application program and an operating system. In the years ahead, subsystems of this kind will come to be more and more widely used.

4.2.c. Rather than embark on new developments which might prove long, costly and of doubtful efficiency, it is proposed to select from the existing systems those which experience bas shown to be the best, and re-write them in ESL (see 4.6.b.) so that they can be used on a variety of European hardware systems.

4.3.c. The advantages of this approach are obvious :

- all the European computers would be able to benefit from the best products in every category of software at reasonable cost;

- any new software product that is developed and marketed would be available for use with a number of different computers. This would enable the European manufacturers to share the cost of developing new products;

- each manufacturer would have at his disposal a number of different products in each category, which would enable him to cater for a wider market. A data base management subsystem, for instance, may not cover all possible applications, and the fact that two complementary systems are available could be a powerful selling point.

4.4.o. The projects would be completed in two phases for each of the products considered.

4.5.o. The first phase, which will be completed in 1976, will comprise a survey of existing systems for data base management and transaction processing, and a selection will be made. The existing products will be compared from the point of view of the market they cater for, their capacity, and the user facilities they offer. Tests will be carried out.

4.6.o. The second phase, scheduled for 1977 and 1978, will consist primarily
       of converting the selected products first to ESL$_0$ and afterwards to ESL.
       These conversions would be in respect of two subsystems for data
       base management and two for transaction processing.

4.1.d. Design and development of conversion tools.

       In the medium and long term , the development of portable products of
       the kind envisaged in these proposals would reduce incompatibilities
       between equipment and favour portability of new applications.
       More immediately, however, there is a large body of existing computer
       applications which require conversion whenever the user changes his
       equipment.

4.2.d. This means that this project for the development of conversion tools
       is designed to meet a need that is felt by any present user wishing to change
       over to a different computer, and it therefore has a high degree of
       urgency.

4.3.d. If conversion is to be carried out in the way that is most advantageous
       to the user both technically and financially, there are a certain number
       of tools that must be available such as COBOL and FORTRAN translators,
       translators for assembler languages, translators for control languages,
       file converters, etc..

4.4.d. The projects will be executed in two consecutive phases.
       The first phase, to be completed as early as possible in 1976, will
       be an investigation of the requirements followed by the preparation
       of specifications for the conversion tools and facilities that are
       found to be necessary.

4.5.d. The second phase, covering the years 1977 and 1978, will be concerned
with the development of the tools that are considered necessary, and
also with the adaptation of these, which will take place mainly in 1978 .

4.1.e. A preliminary study on the basic nucleus of an operating system for
minicomputers

This proposal must be viewed in the light, of the current trend in data
processing towards systems of the distributed type. It is conceivable
that the functions that have to be performed in a network may be
undertaken by different computers at the various nodal centres, and may
in some cases be handled by minicomputers.

4.2.e. In view of this trend, the creation of a basic nucleus for an operating sys-
tem for minicomputers (common supervisor) would be likely to have considerable
interest for minicomputer manufacturers, as this basic nucleus could
be linked up with a number of sophisticated subsystems.

4.3.e. A study on the development of a minimum nucleus for an operating
system for minicomputers (common supervisor) is proposed for 1976
with the aim of analysing the situation and evaluating specifications.

PROPOSAL FOR A COUNCIL DECISION ADOPTING

A GROUP OF STUDIES IN SUPPORT OF THE USE OF

DATA PROCESSING

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic
Community, and in particular Article 235 thereof;

Having regard to the proposal from the Commission;

Having regard to the Opinion of the European Parliament;

Whereas the Council Resolutions of 15 July 1974 on a Community
policy on data processing intends to give a Community orientation
to policies for encouraging and promoting data processing;

Whereas the development of applications software raises a number
of problems of a general nature concerning programming techniques, and
relations between manufacturers and users

Whereas the development of data processing applications calls for an examination of the problems regarding data security and confidentiality from the technical, legal and social aspects, in particular in order to provide protection for citizens in respect of the use of data processing facilities;

Whereas the efficient use of computers is of considerable economic importance; and that to increase this efficiency programming techniques must be improved;

Whereas data base software and systems should be systematically examined and instruments developed to help users to select, implement and operate these systems and to facilitate standardization at a later stage;

Whereas the above projects appear necessary in order to achieve certain Community objectives in the operation of the common market;

Whereas the Treaty establishing the European Economic Community makes no provision for the powers required for these purposes,

HAS ADOPTED THIS DECISION:

Article 1

Three joint data processing projects are hereby adopted to run from 1 January 1976.

(a)   Study of data security and confidentiality (2.4 to 2.7)

(b)   Study on programming techniques (3.5)

(c)   Study on the evaluation and implementation of data base
      systems (4.7).

The indications in brackets refer to the paragraphs of the Annex to the
present decision defining the different studies.

Article 2

The appropriations necessary for the implementation of the studies
shall be entered in the budget of the European Communities.

Article 3

The Commission shall be responsible for implementation of the studies
and shall be assisted by the consultative Committee on Data-Processing
Projects.

The Commission shall present an annual report to the Council.

                                          Done at Brussels

                                          FOR THE COUNCIL

                                          THE PRESIDENT

Studies in support of the use of data processing

1. ## Introduction

1.1 The development of applications software gives rise to a number
of problems which mainly affect the users of data processing
systems. Some attempts to overcome these problems have been
made by hardware or software producers or users, depending
on their capabilities or the advantages to themselves, but
not in any coherent fashion.

1.2 The resultant confusion in the situation, which shows no sign
of being resolved, is harmful to the development of the sector
as a whole and to the proper use of data processing.

1.3 Consequently some effort, especially of a methodological nature,
at Community level would be helpful in order to define in the
medium or long term more suitable approaches to the use or
design of data processing systems.

1.4 This effort, which would be of definite advantage to users,
would also be helpful to the industries concerned as it would
enable them to manufacture products better suited to actual
needs, using more appropriate instruments.

1.5 The projects contemplated should be carried out as far as possible
by competent centres independent of the user or producer sectors
concerned.

1.6   It is therefore proposed that the execution of these studies
       be entrusted to national computer research centres working in
       close cooperation so as to ensure that the state of the art in
       all the Community countries is clearly established as a
       starting point and that the results obtained are adequately
       disseminated.

1.7   In addition, one of the main effects of the launching of these
       projects will be to promote cooperation between public
       institutes in Member States that are responsible for research
       and user support, thus helping to provide an infrastructure
       for the Community data-processing policy. The projects that
       follow, were defined in collaborationbetween certain of these
       Institutes and the Commission, which desires the extension of
       such collaboration to other Institutes in the Community.

1.8   These results will be disseminated to the user and producer
       sectors.

1.9   The Commission has selected the subjects for which a general approach
       at Community level would appear to offer the most obvious advantages.

1.10   The subjects selected are as follows :

              (a) Data security and confidentiality

              (b) Programming techniques

              (c) Evaluation and implementation of data base systems.

1.11   These subjects and the methods to be used are described briefly
       in the following sections 2, 3 and 4.

1.12   These studies are accompanied by a systematic action for the disse-
       mination of information.

2.   **Data security and confidentiality (study a)**

2.1   In its document on a Community data processing policy, the Commission
       drew attention to the importance of this question and the advantages
       of reconciling the Member States'views on it in advance rather than
       trying to harmonize national laws later. At the request of the
       Commission, the European Parliament has initiated a study of the subject
       and in most Member States legislation is under way. The Commission also
       intends to invite the authorities in Member States to provide it with
       information on the progress of work in this field so that it can prepare
       any proposals it considers useful.

2.2.   There is no doubt that the methods used to ensure that data remains
       confidential and secure will affect the design, use and economics of
       future data processing systems and consequently they are of vital
       importance to the producers and users of such systems.

       It is equally important not only for citezens privacy but also for
       free competition, that the proposed solutions emanate from impartial
       organisations.

2.3.   The study proposed below, which will cover the technical, legal, social
       and political aspects of data security and confidentiality, is in the
       Commission's view a vital technical supplement to the work to be under-
       taken in this field by the European Parliament, government authorities
       and the Commission and by the computer industry. The study will provide
       basic data in the Community.

for a political debate to establish guidelines for legislation
and practices regarding security and the protection of
citizens' rights.

2.4 Content of project (a)

The study will be carried out in two stages.

The first preparatory phase covering three closely linked
subjects (A, B and C below) will make it possible to define
specifications for the second phase comprising the main
study which should provide the following results :

- a comparative analysis of legislation, recommendations
  and standards notably in countries of the Community, with a view to
  their harmonious development (A);

- improvement of security control in installations (B);

- improvement in the assessment of the impact of measures
  to ensure security and confidentiality on the public in
  general and on the functioning and structure of organizations (C).

2.5 Subject A consists essentially of :

- a study of the various national legislations and concepts
  regarding security and confidentiality;

- an examination of current practices regarding international
  data circulation, especially in multinational companies.

2.6 Subject B will consist essentially of:

- a study of methods, means and techniques (from the point of view of efficiency, facility, cost, acceptability etc.) based on an inventory of faults that could cause the break-down of security;

- a study of practices in different organizations;

- research into methods helping organizations to design optimum systems as regards security and confidentiality;

- suggestions on training, publications, information on existing techniques, violations, etc.

2.7 Subject C will consist essentially of:

- an analysis of existing data circulation systems and security measures in various national environments;

- an analysis of the attitude and behaviour of users and the general public in relation to existing data circulation systems and existing measures to preserve confidentiality and security;

- an analysis of possible developments resulting from the increasing use of data processing and the new techniques and rules regarding confidentiality and security.

3. Programming techniques (Study b)

3.1 In recent years great efforts have been made to improve the efficiency of programs and programmers. Nevertheless it is still difficult to be certain that, for example, the specifications describe the problem correctly or programs have been fully tested and are reliable and portable. Major efforts to date have concentrated on creating specific tools such as high-level languages.

3.2 More recently, attention has been focussed on program writing techniques rather than the tools used. In particular efforts have been made to obtain an understanding of the processes of designing and constructing programs.

3.3 The general situation is however confused although there have been suggestions from various quarters on programming techniques to be used. There are also communication problems between researchers and users and between different users. In addition, it appears that techniques have been commercially exploited before being impartially checked for validity.

3.4 It is therefore essential to carry out a study of:

- the precise nature of programming problems;

- the relative value and validity of current proposals on the subject;

- the requirements for research, development and dissemination.

3.5. Content of the study (b)

The initial study on programming techniques has the following
main aims :
- to identify fields of special importance to users;
- to develop proposals for the fields in which the greatest
  needs are felt;
- to define specifications for a possible future study.

4. Evaluation and implementation of data base systems (Study c)

4.1 The use of data base systems is increasing. Some experience
has been obtained, but it has never been properly documented
and disseminated.

4.2 There is a need for a systematic study and for the production
of tools for the selection, establishment and operation of
data base systems.

4.3 Users would benefit most from the proposed project. It
would provide them with assistance, obviate duplication of
effort by proper dissemination of information and enable
them to use the systems more professionally and more
effectively.

4.4 The study may also be of benefit to producers by
supplying them with information on users' real needs and with
instruments for the evaluation of data base systems.

4.5 Finally, the study could provide a useful stimulus for the
identification of fields in which standardization or portability
projects would be desirable.

4.6 A study for the evaluation and implementation of
data base systems is described below, with
the main aim of providing those concerned with information
on the selection, establishment and operation of these systems.

4.7 Content of the study (c)

The main features of the study are the following :

- to examine existing data base systems;

- to produce detailed descriptions and analyses of data base systems;

- to test and evaluate nine data base systems in association with
a certain number of users.

- on the basis of this experience and analysis to develop guidelines
for the selection and implementation of data base systems;

- to provide information regarding standardization.

4.8 The results of the project will be written up in reports and
possibly courses will be held or advisory services provided.
One important outcome will be the creation of centres of
expertise on data bases in the Community at the disposal of users and
industry.

5. Dissemination of information

5.1 The dissemination of research information is of vital
importance to research centres in general and computer
research centres in particular.

5.2 One of the Community Member States has published a year
book on public research in automation and computer science..
This gives for each research subject the location, duration,
nature and content of the projects, the composition of the
team, the reasons for and results of the work, publications
and contacts.

5.3 A working party in which several Member States participate
has taken on the task of producing a trilingual glossary of
automation and computer science (German-English-French).
This glossary relates each subject to a major research heading
by means of an unambiguous tree structure.

5.4 There can be no doubt that if they are expanded to a European
level the year book and glossary would considerably facilitate
exchanges, contacts, coordination, etc. between research
centres and interested circles in the Member States and would
usefully contribute towards developing Community cooperation
in research on automation and computer science.

5.5 It is therefore proposed that a concerted action project
in they framework of CREST be carried out to extend the
yearbook and glossary to a Community level.

5.6 No financing at Community level is required for this project.

PROPOSAL FOR A COUNCIL DECISION ADOPTING A NUMBER OF PROJECTS
FOR APPLICATIONS AND STUDIES IN THE FIELD OF DATA PROCESSING

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,
and in particular Article 235 thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Parliament,

Whereas the Council agreed, in its Resolution of 15 July 1974 on a Community
policy for data-processing, with a view to giving a Community orientation to
policies for encouraging and promoting data-processing, to adopt, on a
proposal of the Commission, common projects of European interest in the
field of applications of data-processing.

Whereas, to this end, a priority should be granted to projects likely to
help to meet the needs of users and increase the capacity of the European-
based data-processing industry to satisfy these needs on the European and
world markets;

Whereas, the evolution of computer-based information storage and retrieval
has necessitated the provision of improved software to fulfil the growing
needs of users in different professions.

Whereas the evolution of ground networks and satellite links for data
communications requires the development of advanced techniques and procedures
to provide the reliability required for transmitting large quantities of
data at high speeds.

Whereas the development of further projects of Community interest and of a medium
term programme in data processing requires systematic exploratory study.

Whereas the projects and studies referred to above are seen to be necessary
in order to attain certain Community objectives within the framework
of the Common Market,

Whereas the Treaty establishing the European Economic Community has not provided the necessary powers of actions to this end,

HAS ADOPTED THE DECISION

Article 1 :

Two joint data-processing projects and a set of exploratory studies are hereby adopted to run from 1 January 1976 with the following objectives :

1) the specification of a computer-based information and storage retrieval system (3.3. Annex A)

2) Experimental application in high speed data communication techniques
(3.1.1. and 3.2.1. Annex B)

3) A set of exploratory studies required to complete the definition of actions in the framework of a medium-term programme.

The indications in brackets refer to the paragraphs of the Annex to the present decision defining the projects.

Article 2

The necessary appropriations for carrying out these projects and studies shall be entered in the budget of the European Communities.

Article 3

The Commission shall be responsible for carrying out the projects and studies. It shall be assisted by the Consultative Committee on Data-Processing Projects.

The Commission shall present a report to the Council each year.

Done at Brussels

FOR THE COUNCIL,

THE PRESIDENT

PROJECT FOR THE SPECIFICATION AND DEVELOPMENT OF A COMPUTER-
BASED INFORMATION STORAGE AND RETRIEVAL SYSTEM

Project Summary

The project covers the specification, design and development of a generalised
computer software package of advanced design for the storage and retrieval
of information. It covers two phases :

- in the first phase the characteristics desired by users in all fields
  (legal, scientific documentation, economic documentation, environmental
  information, etc.) will be identified and analysed; the package to meet
  these needs will be specified and the means of implementation defined.

- in the second phase, the generalised package for use on a number of
  manufacturers computers will be developed, and for some specific fields
  of use special additional modules will be designed and developed to
  enable the package to be used in these applications.

The duration of the project is expected to be 3 1/2 years.

The decision of the Council concerns only the cost of the specification
phase. The financing of the development phase will be covered under the
general financial mechanism, which will be proposed by the Commission in
the framework of the medium term programme and which envisages financial
participation from industry.

In view of urgent industrial need a rapid Council decision for funding the
specification phase is required so that work may start in early 1976.

1. Statement of the Problem

1.1. Modern society generates a vast quantity of information which tradi-
     tional techniques cannot handle. The quantity of information genera-
     ted in all fields of technology, business, law, medicine and other fields
     is expected to increase at an accelerating rate in future years. Users
     are also demanding better quality information, as a basis for business
     decisions or research plans, as a guide to precedents in law or medicine
     or simply as source of press and learned references to a particular
     topic.

5

Even with a good index and reference library the task of retrieval of
information is daunting, yet the value of stored information depends,in
many cases critically, on the ease and speed with which it can be
sifted, selected and retrieved. The problem of information retrieval
is thus fundamental to modern industrial Society.

1.2.Recognizing this market need, computer manufacturers have attempted to
fulfil it by offering information and text retrieval packages on their
large computers.

1.3.None of these packages has however wholly satisfied the requirements
of users in the professions concerned. One
manufacturer who has the advantage of an established world market has met
greater success than others in fulfilling user needs and in market
penetration. Even in this case, however, the package is available only
on large machines , though an evolution of the software is to be expected
within the next two years in order to consolidate the position held.

Users claim that problems are still posed by the high cost and complexity
of data entry and updating, by inadequate ease and speed of access to
information,by shortcomings and differences in searching and enquiry
facilities. And they dislike the precondition that they must invest in a large
computer. Users require a transparent computer-based information storage and
retrieval system to which the non-expert can easily have access. In order to
overcome some of these problems large users in Member States have attempted to
produce their own software, thus multiplying the costs of development
of such systems in the Community.

1.4.Those European-based manufacturers who have
invested in producing specialised information and text retrieval
packages have found the venture a limited commercial success due to
a lack of market penetration.

Each of the European manufacturers has faced, on the one hand, the solid block of IBM's established market and on the other a wide and disparate variety of relatively small public and private users.

In this, as in other applications fields, both users and the European industry could benefit from a systematic effort at European level to coordinate and then translate into specifications users needs followed by the development of a family of portable products, available on a variety of computers, and embodying those qualities which present products lack.

2. Proposed solution :

2.1. It is proposed that at the European level, the design and development of an advanced software package of modular construction which would be implemented on different European computers, both large and small, be undertaken. This software should be substantially computer independent and thus make it easier for users to move from one kind of equipment to another.

2.2. The computer software so designed should be capable of analysing indexing and storing large amounts of information and should also confer on all foreseeable users, whatever their discipline, a powerful searching capability. While the basic system would be common, specific modules should be provided to meet the particular working environment of special classes of users.

2.3. The proposed solution envisages a close and ongoing user and industry participation from the outset through the design and development stages of the software package. Systems already in being following other Community projects (Legal Information Systems and Import/Export, etc.) must be examined and taken into consideration to ensure continuity of exploitation of the data.

In view of the high risk of the product and the need to bring together both users and industry at Community level it is proposed to fund the specification phase through the Community budget.

In the development phase, a financial contribution to development costs
is expected from industry. The maintenance of the package should be
entrusted to an industrial organization which would provide equal
access to the different manufacturers and users alike in return
for an appropriate rental.

3. Content of the Project

3.1. The project covers the design, specification and
development of an advanced European software package which will
have maximum portability between different manufacturers' computers.
This package will not only be better than existing software products
for this application sector but should have an effective product
cycle of around ten years.

3.2. It is proposed to carry out the project in two phases :
a specification phase and a development phase. In view of the
critical time constraints imposed by the evolution of competitive
products it is essential that development be undertaken immediately
after the specification phase. It is assumed that in view of the
strategic importance of this project, a council decision will be
taken soon so that work can commence on June 1, 1976.

3.3. Specification Phase

The specification phase will have the following main objectives :

- to gather adequate knowledge of the characteristics of existing
  systems

- to gather information about the needs of users and potential
  users and, if they are users, to obtain their reactions to
  the system they are using

- to determine target machine configurations for different
  manufacturers

- to determine bridging requirements for users of existing
  systems

- to draw up the package specification on the basis of the users views
  and design the method of constructing the package

- to select up to four specific information fields and specify and
  design the special modules needed

- to study the possible impact of the evolution of competing technologies
  over the life of the package.

The specification phase comprises a series of technical studies, user
and market surveys requiring highly experienced personnel in various disci-
plines. This work would be coordinated by the Project Leader in close
consultation with and guidance from the Technical Committee. Systems
already in operation following other Community projects (Legal
documentation and Import/Export for example) would be examined and
taken into consideration.

3.4. The Development Phase

This phase will have two main objectives :

- to develop the specified package and test it with pilot users before
  final release

- to produce documentation about all aspects of the end product
  including manuals for both users and suppliers and to hand over the
  product maintenance and distribution responsibility to the organisation
  chosen.

4. Project Method

4.1. It is proposed that a project leader be appointed on a full-ime
  basis by 1st June 1976. With assistance from the Consultative Committee,
  and major users he would establish a Technical Committee which
  would work with him on a continuous basis during the evolution
  and completion of the project.

  In addition to his normal responsibilities (described in
  doc. COM 1191/III 74 E) the Project Leader will :

  - take account in the specification phase of related information coming
    from other Community Projects
  - assist in the selection of an industrial organisation for the
    maintenance and distribution of the products

  - assist in handing over the package to this organisation.

4.4. At the beginning of the specification phase a Technical Committee composed of experts from industry and major users would be established. In addition to the normal functions (described in Doc 1191/III/74 E) the Committee will have the following tasks :

it will act as workshop where the contractors staff can hear about the latest experiences in information retrieval developments and requirements;

it can nominate suitable users within the group and outside to try out the package before it is finally released ;

it will be used to broadcast the existence of the work that is being done to avoid unnecessary duplication of effort elsewhere.

5. Time Scale :

5.1. There is currently a need for the proposed package and it should be produced at the earliest opportunity. It is understood that world's largest manufacturer's package is currently being upgraded and for some users this could be a deciding factor in their future planning and choice of hardware. The schedule summarised below assumes the appointment of a Project Leader by 1st June 1976 and all other quoted dates are relative to this point.

5.2. It is proposed that suitable Contractors be appointed by 1 September 1976 and that the design specification phase would commence as soon as practical after this date.

5.3. Except for the selection and specification of the applications modules, which is not expected before April 1978, all of the specification phase would be expected to be complete by June 1977.

5.4. In the development phase it is planned that documentation work would commence in April 1977 but the development phase proper would not commence until July 1977. At this point, a four month crash programme would begin to produce a very rough working model of the package so that potential users will have a chance to experience the broad aspects of the package in operation.

5.5. The members of the Technical Committee will use the rough of the package for scrutiny and comment. Detailed specifications of some of the modules would be modified to take account of their comments, as late as May 1978. It is expected that the development and distribution responsibility will be handed over to the organisation chosen by the Commission on the advice of the Consultative Committee.

It is not expected that the project can be accelerated to complete it in under $3\frac{1}{2}$ years. Provided that the Council adopts the project in time, the time-table is :

<u>Specification Phase</u>

General Package   September 1976 - June 1977
Applications modules   September 1977 - March 1978

<u>Development Phase</u>

Documentation work   April 1977 - July 1979
Programming   June 1977 - December 1979

EXPERIMENTAL APPLICATION IN HIGH SPEED DATA COMMUNICATION

Project Summary

The project covers an experimental development for a computer application comprising a series of experiments conducted by users in computer-to-computer communication using the European Informatics Network (EIN) and the orbital test satellite planned by the European Space Agency (ESA). The application provides for experiments in advanced data communications techniques in high speed transmission using communication facilities planned by the different participants in the project : EIN, ESA, European Organisation for Nuclear Research (CERN) and its collaborating laboratories.

The duration of the project is expected to be five years . A Council decision on a Community contribution to the Cost is required before the end of 1975 so that the project may commence in January 1976 to fit in with the development programs of ESA and EIN.

1. Statement of the Requirement

1.1 Introduction

The impact of new data communications techniques is already having an effect on almost all aspects of human affairs. The conduct of experiments in the use of the EIN communications sub-network and the ESA test satellite (OTS) in the demanding area of data processing for high energy physics research will be of great mutual benefit to the organisations involved, and should provide valuable information as a basis to judge the likely impact elsewhere of new developments in data communications and its applications.

1.2. Background - EIN

EIN is expected to become operational in 1976. It is designed to provide experience in computer network technology which could pave the way for other international computer networks. However, no provision has yet been made to augment the research work of the initial centres by pilot user-applications involving real traffic which could help in initial debugging and test out reliability of service, system capacity and the like. As the EIN project is an experiment in computer networking it is important to attract users who can benefit from the experimental environment.

1.2.1 Requirement - EIN

Pilot users with operational requirements for data Communication are needed to check out the system performance from the point of view of such users.

The experience gained from EIN should help in evolving guide-lines and standards that can be applied when designing new computer networks. This could include :

a)- performance e.g., reliability, load factor, etc.

b)- user-interface hardware and software techniques

c)- distributed processing techniques

1.3 Background - OTS

The Orbital Test Satellite (OTS) is an experimental communications satellite being built by the European Space Agency (ESA) and scheduled for launching in mid-1977. The satellite contains two narrow band channels which are available for use in high speed data transmission experiments. The purpose of OTS is to act as a forerunner to the planned European Communications Satellite and to try out the new ideas and techniques which the latter will use.

1.3.1 Requirement - OTS

The development of the satellite along with its powerful communications
capability is already being funded by ESA. Users and potential users
with computer to computer applications requiring high speed data trans-
mission facilities are needed   to explore the capability provided by
OTS. Practical experiments should be conducted in bulk data transfer
with particular reference to error-checking and error procedures.
Such experiments would be valuable as a source of early operational
data based on real usage of a satellite link and in the planning and
design of standard equipment by industry. Simple, low cost, earth
stations handling data rates not in routine use today, will require
the development of appropriate antennae, radio frequency amplifiers
and receivers, data transmission equipment and formats.

1.4. Background - CERN

Hundreds of scientists from Member Countries come to CERN to carry
out high energy experiments. Experimental data on bubble chamber
film and on tens of thousands of magnetic tapes is collected every
year at CERN and the great majority is eventually analysed on
computers in the experimenters' home laboratories. At present the
means of transport of the data (by aircraft or by road) is inadequate.
This constraint makes it impossible to use computers in the scientist's
home laboratories to control the running of their experiments at CERN,
by analysing significant sized samples of data and returning the
results in time to correct errors or malfunctions. These sample
calculations have, therefore, to be done at CERN. The physicists
have to develop and maintain two sets of programs, possibly for
different makes of computers, with all the extra work and possibilities
of error which this entails.

1.4.1 Requirement - CERN

A developed and economical system of data communication between the
various laboratories allowing remote use of computers would increase
the efficiency of CERN's operation, and make for a better balance

CERN is thus very interested in current developments towards
international data networks and is ready to participate in their
development in any way consistent with the mission and resources
of the organisation. Several other high energy physics laboratories
have indicated similar interest and desire to join in experiments
on international data transmission.

2. Proposal

2.1 CERN and its collaborating laboratories are particularly well
placed to help in tests involving realistic heavy traffic, since
the high energy physicists form a community accustomed to exploiting
large quantities of data, while working with equipment and services
which do not have public service reliability and availability.
They will not therefore be deterred from using an experimental
network such as EIN. It is therefore proposed as a first stage
that the EIN network be extended to include a node at CERN which
would enable the scientific community to make such experiments
using the network.

2.2 As a second stage, CERN and interested associated laboratories
will be provided with the necessary equipment to establish a
satellite link. This would require the provision of a transmit/
receive earth station at CERN and appropriate earth stations at
the various laboratories. Experiments using the OTS satellite
are proposed as a continuation of the series of planned traffic
experiments at much lower speed using the EIN. Several associated
laboratories of CERN have shown interest in these experiments,
notably RHEL in the UK, and DESY in Germany who are advanced in
their arrangements. Other possibilities are Centres in Amsterdam,
Bologna and Paris.

RHEL : Rutherford High Energy Laboratory
DESY : Deutsche Elektronen Synchrotron

3.   Content of the Project

There are two stages in the project which are described below.

3.1.   Stage 1

3.1.1.   Content

- Installation of data transmission equipment to
  extend EIN   to CERN and to permit experiments   in computer
  to computer communication between CERN and Rutherford Laboratory.'

- The key elements of stage 1 of the project include work :

  - to establish and test at saturation capacity with real data
    a computer-to-computer link between CERN and Rutherford Lab.
    using EIN, EPSS and the necessary interconnecting computers.

  - to assess how the results of these experiments influence
    the organisation and implementation of high energy physics
    research and other applications.

3.1.2.   Time Scales

EIN is due to start initial operation in mi-1976. Allowing
several months for testing by its designers, the testing phase
of CERN experiments using the network could start around
end-1976. Before then, the CERN node should be installed, checked
out, and the first experiments prepared at CERN and Rutherford
Laboratory. This implies that the node computer should be pur-
chased and installed at CERN early in 1976.

The traffic experiments will have, on this time scale, a testing
phase during the early months of 1977, after which the network
should be made available on a suitable planned schedule for use
by the physics groups concerned. The duration of a particular
group's use of EIN should be planned for around two years till 1979),
this being the typical time scale for a high energy experiment.
When other laboratories participate the duration of the experiments
may be prolonged.

3.2   Stage 2

3.2.1   Content

It is proposed to install transmitting/receiving equipment at
CERN and a receiver at RHEL, thus providing a one-way transmission
link via the satellite. The satellite earth station at CERN
will be interfaced to the equipment already installed for
connection to EIN (in Stage 1).

The key elements of stage 2 include :

- The development and testing of the equipment necessary to
  establish a computer to computer link via the OTS system
  at high data transmission rates.

- The experimental use of the OTS satellite for bulk transfer
  of data with particular emphasis given to developing error
  checking techniques and error control procedures.

- The feasibility of using a terrestrial data network to
  control bulk data transfer through a satellite channel.

3.2.2. Time Scales

The satellite is due to be launched in mid-1977 and tests by
CERN and its partners could commence, on a partial basis, during
the following 6 months. The main data experiments can only
begin in 1978.

In order to match this schedule the following succession of events
is foreseen :

- order of equipment	mid-1976
- delivery of equipment	Spring 1977
- testing and commissioning of equipment	mid-1977
- duration of experiments (3 years)	1977-1980

PROJECT MANAGEMENT AND BUDGET REQUIREMENTS

The following pages set out, under the heading of actions or groups of actions, the methods of project management envisaged by the Commission, as well as an estimate of financial expenditure; the latter is summarised in each case by one or more brief financial summaries. It is noted that the project expenditure is of non-obligatory character.

1. **Development project for a common language for real time programming**
   (LTPL-Project)

1.1. The Commission will be responsable for implementation of the project and will be assisted by the Consultative Committee on Data-Processing Projects.

1..2. A technical Committee will be set up. This will be a small working party of international experts selected from among the users and the industry, which will meet regularly and provide a close liaison with the project leader on technical and development questions. Its actual function is to translate user requirements into technical specification, and provide a channel of communication between the users and the project. Composition and experiences make it highly recommendable to use LTPL-E group in this function.

1.3. The project leader will be a person with high-level training appropriate to the nature and scope of the project. The project leader will be assigned to the implementation of the project on a full-time basis.

.1.4. Contractors will be responsible for the execution of technical work. These will be consortia of European companies especially software houses.

Financial implications

1.5.   The total cost of the project will be 6.703.100 Units of accounts,
        distributed over four years.
        The estimated costs are shown in the tables on the following two pages.
        The financial summary form corresponding to this action is shown on
        page 74.

        The expenditure has been estimated on the basis of price forecasts at
        the middle of 1975. The Commission may decide to adjust the amounts,
        depending on the actual date of the Council decision, in the light of
        the economic situation.

ESTIMATED COSTS OF LTPL PROJECT

I. General expenses (in Units of Account)

	1976	1977	1978	1979	TOTAL
Project leader à 60.000 per year	60.000	60.000	60.000	60.000	240.000
Assistant à 30.000 per year	30.000	30.000	30.000	30.000	120.000
Travel costs Project leader + assistant 2 per year USA : 1.500 10 per year Europe : 250	5.500	5.500	5.500	5.500	22.000
Management and Administration − 1 Secretary − Overhead costs for office and other administration expenses − Printing and publication of Documents	80.000	80.000	80.000	80.000	320.000
Committee travel costs 4 per year, 20 attendants at 200	16.000	16.000	16.000	16.000	64.000
Total per year	191.500 +	191.500 +	191.500 +	191.500 =	766.000

II.   Expenses for working contracts and technical computing time (LTPL-Project)

A.   Definition phase

		1976	1977	1978	1979	Total
Technical manpower 35 men year at 40.000	--	1.032.000	302.100	83.000	-	1.417.100
Computing time		10.000	10.000	10.000	-	30.000

B.   Implementation phase

		1976	1977	1978	1979	Total
Technical manpower 60 men year at 40.000		900.000	1.000.000	500.000	-	2.400.000
Computing time		300.000	300.000	200.000	-	800.000

C.   Evaluation phase

		1976	1977	1978	1979	Total
Technical manpower 22 men year at 40.000		-	280.000	280.000	320.000	880.000
Computing time		-	130.000	130.000	150.000	410.000
Total costs						
a. general costs		191.500	191.500	191.500	191.500	766.000
b. contracts + computing time		2.242.000	2.022.100	1.203.000	470.000	5.937.100

Total Project costs	6.703.100 U.A.

FINANCIAL SUMMARY FORM

1. Budgetary post concerned: Article 321

2. Title of project: Development of a common language for real
time programming-LTPL Project

3. Legal basis: Article 235 of the Treaty
Decision of the Council dated ....

4. Objective of the Action: Development of a common language for
real time programming in view of
standardisation

5. Total cost of Action and annual payments foreseen,

    5.0. Total cost: 6,702,750 U.A.

    5.1. Time-table for payments:

	1976	1977	1978
U.A.	2.433.150	2.213.600	1.394.500

	1979
U.A.	661.500

6. Financing: Provisions to be made in   future budgets.

2. Software Portability (Annex 2)

2,1.   The Commission will be responsable for the implementation of the
        projects and will be assisted by the Consultative Committee on Data
        Projects.

2.2.   Day-to-day project management will be entrusted to a project leader
        selected for his knowledge of the subject.

2.3.   The projects will be developed in close collaboration with the
        interested parties, i.e; hardware and software manufacturers, users and
        computer research centres. The membership of the technical committees
        will be determined by the nature of the product and the special
        knowledge required.

2.4.   With regard to product policy, the Commission will collaborate closely
        with the Consultative Committee and the interested parties in working out
        a suitable policy to cover :

        - the recovery of public investments in the event of a product proving
          commercially successful;

        - industrial ownership;

        - distribution and maintenance of the products;

        - recommendations for the use of products (possibly standardization)
          within the framework of a Community policy on public contracts.

2.5.   The estimated costs are shown in tne tables on the following three
        pages.
        The financial summary form corresponding to this action is shown on
        page 78.

Cost Estimate

PORTABILITY

Project	Nature of work	Period (months)	Cost per man-year in u.a.	Work (man-months)	Computer costs	Total
Compilers						
4.4.a. (year 1976)	(See 4.3.a of text) – Study of existing languages	6	60,000	1 x 6	–	30,000
	– Study of Architecture;	6	60,000	3 x 6	23,000	113,000
	– Preparation of specifications 2 languages	4		4 x 4		80,000
					Total	223,000
4.6.a. (years 1977 and 1978)	(Sec 4.6.a of text) – design of 2 portable compilers (1977);	24	40,000	16 x 24	320,000	1,600,000
	– extension for 6 types of machines (1978);					960,000
	Est. cost per version 10% of cost of compiler				Total	2,560,000
Language 4.7.b. (year 1976)	(See 4.5.6. of text) – analysis of existing languages and selection (ESL$_0$)	6	60,000	2 x 6	15,000	75,000
4.10.b. (year 1977)	– adaptation of ESL$_0$;	12	40,000	7 x 12	70,000	350,000
	– modification of ESL$_0$ to obtain ESL	12	40,000	4 x 12	40,000	200,000
					Total	550,000
4.11.b. (year 1978	– Modification of ESL	12	40,000	10 x 12	100,000	500,000

Subsystems

4.6.c. (year 1976)	Selection of products : – Data bank – Transactions	6 6	60,000 60,000	4 x 6 3 x 6	30,000 20,000		150,000 100,000
						Total	250,000
4.8.c. (years 1977 et 1978)	Conversion to ESL$_0$ – Data bank – Transactions – Conversion to ESL (est. cost 25 % of ESL$_0$)	12 12	40,000 40,000	14 x 12 10 x 12	240,000		1,200,000 (1977 300,000 (1978
						Total	1,500,000
Conversion tools 4.5.d. (year 1976)	(See 4.4.d. of text) – Specification of tools	6	60,000	2 x 6	–		60,000
4.6.d. (years 1977-78)	(See 4.7.d. of text) – Design of tools and modification	24	40,000	20 x 24	500,000		2,10C 000
O.S. for mini-computers 4.4.e (year 1975)	(See 4.3.e of text) – Study and specifications	6	60,000	1 x 6	–		30,000
(year 1977)	(See 4.5.e of text) – Design						600,000

General expenses

The overall annual costs are as follows :

	1976	1977	1978
Project Leader	60,000	60,000	60,000
Assistant project Leaders	-	120,000	120,000
Secretariat Services	50,000	200,000	100,000
Travel expenses for technical Committees	50,000	50,000	50,000
Travel expenses for Advisory Committee	25,000	25,000	25,000
Total	185,000 u.o.	455,000 u.o.	355,000 u.c.

Summary

Projects	Budget in u.a. 1976	1977	1978	Total per project in u.a.
a	223,000	1,600,000	960,000	2,783,000
b	75,000	550,000	500,000	1,125,000
c	250,000	1,200,000	300,000	1,750,000
d	60,000	1,050,000	1,050,000	2,160,000
e	30,000	600,000	-	630,000
General expenses	185,000	455,000	355,000	995,000
Total	823.000	5,455,000	3,165,000	9,443,000

SUMMARY OF FINANCIAL RECORD SHEET

*

1. Relevant budget heading : Article 321

2. Title of project : **Projects in Data Processing concerning Software**
                                                          portability

3. Legal basis : - Article 235 of the Treaty

   - Council Decision of ....

4. Aim of project : Design and development of portable compilers, a **software**
   writing language, subsystems for data base management
   and transaction processing, conversion tools, a basic
   operating system for minicomputers.

5. Total cost of project and annual appropriations required

   5.0. Total cost :   9,503,000 u.a.

   5.1. Time scale :

	1976	1977	1978
u.a.	823,000	5.455,000	3,165,000

6. Finance : **provisions to be made in future budgets.**

3. Studies in support of the use of data-processing (Annex 3).

3.1. The Commission will be responsible for the implementation of the project and will be assisted by the Consultive Committee Data Processing Projects

3.2. A project manager will be given the day to day management of the various actions. It is proposed that this role is combined with project leader of the "portability" project since several aspects öf these two projects are complementary. The project manager will be assisted by a deputy for the individual projects.

3.3. The Commission will take care that a close liaison is established between the Institutes directly charged with carrying out the work and all interested organisations whether research, user or industrial. These Institutes will be selected by virtue of their experience in the areas being considered and their willingness to cooperate with each other in the framework of the Community.

3.4. The estimated costs are shown in the tables on the two following pages.
The financial summary form corresponding to these studies is shown on page 82.

Cost estimate

Studies in support of the use of data processing

Project			
Data security and confidentiality (see 2.8 of text)			
First phase	A -	29 000 u.a.	
	B -	26 000 u.a.	
	C -	32 000 u.a.	
		87 000 u.a. from 1976 budget	
Second phase	A -	600 000 u.a.	
	B -	500 000 u.a.	
	C - 1	000 000 u.a.	
		2 100 000 u.a.	budget estimates for 1977, 1978 and 1979 at 700 000 u.a. per annum
Programming techniques (see 3.6 of text)			
Initial study	87 000 u.a. from 1976 budget		
Evaluation and implementation of data base systems (see 4.9 of text)	staff costs	1 250 000 u.a.	
	travel	50 000	
	costs of reports, translation	125 000	
	printing costs	75 000	
	computer time	435 000	} for 9 data
	management of data bank systems	200 000	} base systems
	Total	2 135 000 u.a. for 1977, 1978 and 1979	

	annual budget 735 000 u.a. in 1976	
	700 000 u.a. in 1977	
	700 000 u.a. in 1978	
	Budgets may be corrected by the inflation rate.	
	Estimates are based on prices at the beginning	
	of 1975.	
General costs	one deputy project leader*	40 000 u.a.
	secretarial costs	40 000 u.a.
	costs of technical committee meetings	50 000 u.a.
	costs of Advisory Committee meetings	25 000 u.a.
	Total	155 000 u.a. per annum
	* see 6.2 in text.	

Summary

Project	Budgets				
	1976	1977	1978	1979	Totals by project
Data security and confidentiality	87 000	700 000	700 000	700 000	2 187 000
Programming techniques	87 000	–	–	–	87 000
Evaluation and implementation of data bases	735 000	700 000	700 000	–	2 135 000
General costs	155 000	155 000	155 000	155 000	620 000
Totals	1 064 000	1 555 000	1 555 000	855 000	5 029 000

SUMMARY FINANCIAL RECORD SHEET

1. Relevant budget heading: Article 321

2. Title of project: Studies in support of the use of data processing

3. Legal basis: Article 235 of the Treaty
   Council Decision of ......

4. Aim of the project: To carry out a study on data security
   and confidentiality

   Study   on programming techniques

   To evaluate and implement data base systems

5. Cost of the project and annual appropriations provided:

   5.0 Total cost: 5 029 000 u.a.

   5.1 Timetable: 1976   1977   1978   1979

                    1 064 000 u.a.   1 555 000 u.a.   1 555 000 u.a.   855 000 u.a.

6. Financing: provisions to be made in future budgets.

4. Applications and studies in the field of data-processing (Annex 4)

4.1. Project for the specification and development of a computer-based information storage and retrieval system (Annex A to Annex 4)

FINANCIAL RECORD SHEET
Cost estimate

1. **Cost of specification phase:** .... 471.000 u.a.

	1976	1977	1978
Technical costs:			
- Contracts to industry personnel and computer time:	10,000	170,000	
- Users technical Group	5,000	10,000	20,000
- Project management			
Project leader:	30,000	25,000	55,000
Travel costs:	3,500	2,500	5,000
Total Technical costs			
- Administration costs	25,000	25,000	25,000
Total costs/year	133,500	232,500	105,000

2. The cost of the development phase is estimated at 1,6 M.U.A.

FINANCIAL SUMMARY FORM

1. Budgetary post concerned : Article 321

2. Title of Project : Project for the specification and development of a
Computer-based Information Storage and Retrieval
System (Annex A to Annex 4)

3. Legal Basis : Article 235 of the Treaty
Decision of the Council dated 15th July 1974

4. Objectives of the Action : The specification of a Computer-based Information
Storage and retrieval system usable for many
applications and over a wide range of computers.

5. Total cost of Action and annual payments forseen

    5.0 Total Cost 471,000

    5.1. Time-table for payments :

	1976	1977
U.A.	133,500	232,500

	1978
U.A.	105,000

6. Financing : Provisions to be made in future budgets.

4.2. **Experimental application in high speed data transmission** (Annex B to Annex 4).

4.2.1. **Cost of Stage 1 - Extension of EIN**

a) **Design and Installation Phase**

(i) **Capital Costs :**

	u.a.	total cost u.a.
- Supply and installation of network Switching Centre	170,000	
- Modems	65,0000	
- Remote Gateway computer (common to stage 2) and other equipment at CERN	95,000	
TOTAL	330,000	330,000

(ii) **Other costs during design,**
Installation and Commissioning (1976)

- Staff - 6 man years by EIN, CERN and RHEL at 40,000 u.a.	240,000	
- Travel and administration	30,000	
- maintenance of switching centre ($\frac{1}{2}$ year)	10,000	
TOTAL COSTS 1976	280,000	280,000
		610,000

b) **Transmission experiments phase :**

- Operation and maintenance of Switching Centre	20,000	
- Data links to other centres	30,000	
- Staff for conduct and evaluation of experiments (4,5 from EIN, CERN, RHEL)	180,000	
- Travel and administration	30,000	
TOTAL COSTS PER YEAR	260,000	

c) Cost for 3 years 1977, 1978 and 1979   780,000

TOTAL COST OF PROJECT STAGE 1   1,390,000

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* Financing required
from the Community : 490,000 u.a.
This includes the cost of equipment, maintenance and the cost
of data links.

4.2.2. Cost of Stage 2 : Extension to use (OTS) Satellite

a) Design and Installation Phase
(i) Capital Costs :

		u.a.	Total cost u.a.

- Supply and Installation of 3
simple earth stations at

	CERN	110,000	
	RHEL	50,000	
	DESY	110,000	

- Equipment modifications ... 50,000

× TOTAL 320,000

320,000

(ii) Other Costs during design,
installation and commissioning

- Staff - 8 man years by ESA, CERN, RHEL,
DESY at 40.000 u.a.   320,000

- Travel and administration   30,000

× - equipment maintenance (2/3 year)   20,000

370,000

370,000

690,000

b) Transmission experiments phase (for three years)

Cost per year

× - operation and maintenance of earth
stations   30,000

- Staff for conduct and evaluation of
experiments : 7 staff per year   280,000

- Travel and administration   30,000

- Cost per year   340,000

Cost for 3 years (1978,1979, 1980)   1,020,000

TOTAL COST   1,710,000

× Financing required from the Community 430,000.
This includes the cost of equipment and maintenan:

4.2.3. <u>Community Funding Required and schedule of Payment</u> :

	Total Funding	<u>Payment Schedule by Year</u>				
		1976	1977	1978	1979	1980
Stage 1	490,000	340,000	50,000	50,000	50,000	
Stage 2	430,000	160,000	180,000	30,000	30,000	30,000
TOTAL	920,000	500,000	230,000	80,000	80,000	30,000

A contribution of 920,000 u.a. from the Community represents 34 % of the total cost of the project.

4.3. The financial summary form is on page 88.

FINANCIAL SUMMARY FORM

1. Budgetary post concerned : Article 321

2. Title of project : Experimental application in high speed
   data transmission.

3. Legal basis : Article 235 of the Treaty
   Resolution of the Council dated 15th July, 1974

4. Objective of the Action : The project comprises experiments in computer
   to computer Communications using computer
   networks and satellite link for develop-
   ment of advanced techniques in high speed
   transmission

5. Total cost of Action and annual payments foreseen

   5.0 Total cost :   920 ,000 a.u.

   5.1 Time table for payments :

	1976	1977	1978	1979	1980
	500,000	230,000	80,000	80,000	30,000

6. Financing : Provisions to be made in   future budgets.

FINANCIAL SUMMARY FORM
_____

1. Budgetary post concerned : Article 321

2. Title of project : A set of exploratory studies.

3. Legal basis : - Article 235 of the Treaty
                  - Resolution of the Council dated 15th July 1974.

4. Objective of the Action : A set of technical studies and surveys
                             required to complete the development of
                             actions in a medium term programme.

5. Total cost of Action and annual payments foreseen

    5.0 Total cost : 500,000 a.u.

    5.1. Time-table for payments : $\underline{\qquad 1976 \qquad}$
                                       500,000 u.a.

6. Financing : Provisions to be made in   future budgets.