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# Esprit Information Exchange System

## iesnews

Issue No 14, February 1988

### LATE NEWS

#### Progress in DFN

Further details of the German EARN migration to DFN (see IES News, No. 9, pg. 8) have been announced: the installation of the gateway at GMD Birlinghoven is complete allowing EARN partners to communicate freely with OSI conformable partners. In addition, the gateway also ensures smooth transition between international networks operating at 64 Kbits to national ones at 9.6 Kbits. Currently, 5000 million bytes pass through the Birlinghoven installation per month, corresponding to a 200 m high stack of typed A4 sheets.

#### Document Transfer Tests

The British Library Document Supply Centre, Boston Spa, reports commencement of tests for facsimile transmission of documents by broad-based telecommunication channels (both land lines and satellites) to remote users in the U.K. and abroad. Results suggest that electronic transfer may be an economic alternative to post within the next year or two. Currently, the Centre handles 13.000 document requests (average 12 pages) per day.

At a press conference, held in Brussels on 24 February 1988, Vice-President Karl-Heinz Narjes of the CEC presented follow-up actions to the Green Paper on Telecommunications (See IES News, No. 10, pg. 1).

1988 will be a key year in preparing for the advanced, cost-effective telecommunications infrastructure of the 1992 Single European Market.

## EUROPEAN TELECOMMUNICATIONS: PREPARING FOR 1992

After launching the first series of trans-European projects under the Community's 1.1 billion ECUs RACE program in January, the Commission has now taken a major initiative in opening up the European telecommunications market to wider competition.

The Commission's newly-published proposals are the operational conclusions of a wide-ranging public debate launched by the Green Paper on the common market in telecoms equipment and services, put forward by the Commission in June 1987. The basic idea and aim of the Green Paper is the establishment of a competitive Community-wide telecommunications market by 1992.

The Green Paper has been widely welcomed. This positive response has allowed the rapid preparation of a first series of follow-up actions, including a strict time schedule with the following main points:

- \* the complete opening of terminal equipment markets by 31 December 1990: a proposal on this subject will be submitted before end-March 1988;
- \* progressive opening of the market for telecommunications services from 1989 onwards;
- \* full mutual recognition of type approvals: a draft directive will be submitted before the end of 1988;
- \* full opening of the receiving antenna market (Receive Only Satellite antennas - ROS) before 31 December 1989, except where they are connected to public networks;

LIBRARY

### LATE NEWS

#### Network Viruses

A report in the International Herald Tribune notes that a host computer, programs on which have been deliberately degraded, could affect programs and operation of other computers on the same network. More information on this strange aspect is being sought and will be noted in a future issue.

#### EuroKom Migration Successful

Those of us who have been involved in hardware or software migration will know what tremendous efforts were involved by all at EuroKom in accomplishing simultaneous software and hardware migration. The last message sent on "old" EuroKom is reproduced below:

(34143) 88-01-29 John Conroy EuroKom

Receiver: Dennis Jennings UCD

Receiver: Manos Castrinakis CEC-DGXIII

Subject: The Last Non-Picture Show

This will be the last text sent on the DEC-20, purely by chance of course.

It is appropriate to wish the old lady well; she has served ESPRIT and UCD more reliably, for longer, and to a larger community, than any of us envisaged.

All of us will enjoy using the new, improved facilities.

## EUROPEAN TELECOMMUNICATIONS: PREPARING FOR 1992

- \* the setting up of a European Telecommunications Standards Institute: agreement with the European Conference of Postal and Telecommunications Administrations (CEPT) has been reached; CEPT has already taken the basic decision to establish such an institute by April 1988;
- \* progressive implementation of post-oriented telecommunication tariffs;
- \* application of VAT to telecommunications (the 18th VAT directive is currently under discussion by the Council);
- \* full application of EC competition rules to the sector; the Commission intends to draw up corresponding guidelines;
- \* ensuring independence of procurement decisions of telecommunications administrations and the opening of public procurement.

On certain other issues discussions will continue over the weeks and months to come. These include

- \* a coherent European position regarding the future regulation and development of satellite communications in the Community;
- \* a concept for the promotion of Europe-wide services, by a market-led approach and definition of common tariff principles;
- \* defining a European position on the major international questions in telecommunications;
- \* developing the social dialogue and taking full account of social concerns.

## Background information

The convergence of telecommunications and computer technology is transforming the industrial and socio-economic fabric of Europe. This telematics revolution is the result of spectacular developments in three areas:

- \* Micro-electronics ("chips")
- \* Digitisation of telecommunications (application of "computer language" to functions such as switching and transmission)
- \* New transmission technologies (optical fibres, satellites...)

Worldwide, the market created by these developments already exceeds 500 billion ECUs. By the year 2000, up to 7% of the Community's GDP may derive from telecommunications, compared with just over 2% today. And by the end of the century, up to 60% of all jobs will be dependent to a greater or lesser extent on telecommunications through information technology integration.

Total public and private investment in telecommunications within the Community is estimated at 500-1000 billion ECUs over the next 20 years. Clearly, the new technological environment resulting from the conver-

gence of computing and telecommunications is blurring borders within the Community in the same way as it is blurring traditional boundaries between different information technology products and services.

This challenge to the future competitiveness and prosperity of Europe calls for Community action on two main fronts: the scale of the market and its future organisation.

No single Community country accounts for more than 6% of the world's telecommunications market, whereas the United States represents 35% and Japan 11%. Yet, taken as a whole, the Community has a 20% world market share. The potential of the single market offers great opportunities for the European telecommunications sector and it is evident that the Community needs more competitive market structures.

The regulations for the future markets in telecommunications equipment and services therefore need to be re-defined. The Commission's Green Paper is designed to ensure that this redefinition takes place in a rapid, orderly and effective way, to make the most of the new economic opportunities offered by advanced telecommunications throughout the Community.

## WANTED

Professional organisations or experienced people in the development of computer documentation are being sought.

The selected party shall be engaged to assist in the creation and production of an user manual for a documentary retrieval language associated with a database management system. The end product shall be written in English but needs to be sufficiently simple for non-native English speakers to use.

If you are interested, please send brief outline of experience and background, by 15 April 1988, to:

IES News  
"Documentation"  
European Institute for Information Management  
13, rue de Bragance  
L-1255 Luxembourg

# EUROPEAN ACADEMIC RESEARCH NETWORK: The migration of EARN to use ISO protocols, summary of the proposed strategy and tactics\*

## 1. Summary

EARN is determined to migrate to use ISO protocols as soon as possible.

It is vital that during this migration there is no significant loss of service to the users.

Until recently there have not been the products available to start a migration. There is now a number of developments which suggests that the first stages of a migration could now be undertaken. The completion of the process will take several years.

The EARN Board of Directors set up a working party to define the migration path and is just concluding its work. This paper is a summary of their report. The full report is now under discussion.

## 2. Why migrate?

There are three reasons for EARN wishing to use ISO protocols:

- EARN had to obtain permission from the various national regulatory authorities in order to operate. This was because it infringed the PTT monopolies in some countries. CEPT, the European advisory body for such matters, agreed to recommend EARN should be permitted as long as they migrated to ISO protocols by the end of 1987.
- EARN uses the fairly primitive IBM NJE protocols which provide a store and forward network for file transfer and mail. The use of ISO protocols would provide a broader range of services. ISO protocols are expected to be available

under most systems whereas NJE is restricted to the more popular ones.

- All the west European countries (and many others) are expected to base their academic networking on ISO protocols. EARN must cooperate and interwork with these networks.

## 3. The state of protocols

The CCITT X-25 protocol is widely available but only in its 1980 version. The 1984 version is required for the support of ISO protocols. The PTTs planned dates for the 1984 version are not yet clear. Various private switch suppliers now provide it.

The X-400 mail protocol is available in a number of experimental or pilot versions. The use of this protocol is likely to expand rapidly as the PTTs provide services based on it in the near future.

FTAM (the ISO file transfer protocol) is only now becoming stable and implementations are not expected for some time.

VTP (virtual terminal protocol) and JTP (job transfer protocol) are both unstable and implementations are not expected for a long time.

## 4. The parts of EARN

EARN can be regarded as two parts - the national parts and the international ones.

The migration of EARN within a country must be undertaken in close cooperation with other national act-

ivities and will therefore not be directed centrally.

The migration of the international parts will be directed by the EARN Board. All the international EARN nodes are IBM ones. This is the principal subject of this paper.

It is essential that the international and national migrations are carefully coordinated.

## 5. The first stage, strategy

The only ISO protocol that can currently be adopted is X-25.

The strategy is to operate the IBM NJE protocol over X-25. This can be achieved using IBM products. The users will not need to be aware of the change since the strategy will not alter the serviced provides or the interface to the user.

The use of NJE over X-25 demands the use of X-25 permanent virtual circuits. These cannot be provided internationally by the PTTs and therefore EARN will have to provide an interim private X-25 network. This has the secondary advantage that X-25 (1984) can be used which is not currently available from the PTTs and this is needed to support the higher level ISO protocols.

## 6. The first stage, tactics

A survey has shown that private switches which provide permanent virtual circuits and X-25 (1984) are available.

The number of switches and their location depend on the cost of

\* Reprinted by courtesy of "Computer Networks and ISDN Systems" (Elsevier).

# EUROPEAN ACADEMIC RESEARCH NETWORK: The migration of EARN to use ISO protocols, summary of the proposed strategy and tactics

switches and the cost of lines. An incomplete study suggests that initially there should be two switches – one serving the north of Europe and one the south. There will need to be some relocation of lines but this is expected to be done over a fairly long period of a year.

It is intended to use the X-121 address scheme. This defines the first four digits of an address. Eight digits will remain for use within a country which will be allocated according to national needs although it is suggested that four digits define a site and four are for use within a site. A two-digit subaddress will not be policed by the network.

Initially only a few sites with good networking expertise will be connected. The rest of the international sites will be migrated at a later date and in some cases when lines are relocated.

A few sites will need additional software which may also cause a slight delay.

The EARN services will be enhanced by the addition of the X-3, X-28, and X-29 services on some sites. This will not be very useful until the national parts of EARN have migrated to X-25 or gateways are provided to other X-25 networks.

The tactics within a country will be the responsibility of the country. Some countries will want to migrate in step with the international parts of EARN. Others will want to wait. Others may want to provide gateways and relays to existing or proposed national networks.

The use of Coloured Book protocols and DECNET will be allowed for an

interim period to meet the needs of some specific groups of users. This will allow good connectivity between Ireland, the UK, and some other sites who use Coloured Books. DECNET is popular with the astronomy, space physics and high-energy physics communities.

## 7. The second stage, strategy

The first higher level ISO protocol to be promoted will be the X-400 mail protocol.

Some countries are expected to migrate with the international part of EARN. They will be installing switches for this purpose. These switches may be used to enhance the international parts of EARN and require some change to the EARN topology.

## 8. The second stage, tactics

There is a number of X-400 systems now available.

In particular the IBM Heidelberg system will operate on IBMVM systems and so it will be mounted on many of the international nodes. This system has the property that parts of the system can be located remotely over the NJE network thus allowing greater penetration of EARN by X-400 than the extent of the X-25 network would suggest.

Other X-400 systems, such as EAN, are expected to interwork with the Heidelberg one and recent tests are encouraging. These will be of greatest interest within a country.

Some countries are expected to be part of the EARN address space as

they migrate. Others will have different schemes and gateways and relays will be provided to maintain a service. Various promising products are in existence or being produced.

The most important relay will be between X-400 and RSCS mail systems. A suitable product is being produced in Germany.

## 9. The fourth stage, strategy

The use of NJE, DECNET, and Coloured Book protocols will be phased out leaving a pure ISO network. At this stage it will be possible to use the public networks.

The removal of these protocols depends on the provision of FTAM (the ISO file transfer protocols) which should be available in a year or two.

## 10. The fourth stage, tactics

Currently there are no suitable versions of FTAM available and no firm indication of dates. EARN will wait for suitable products and promote them as soon as possible.

The fourth stage will require further study. It is unlikely to be concluded before 1989.

## 11. Time scales

The international switches plus a few connections could be provided by the end of 1987. The complete migration of the international part of EARN to X-25 will take to the middle or end of 1988. NJE services must be provided immediately.

X-400 can be provided on some nodes by early 1988 with all interna-

# EUROPEAN ACADEMIC RESEARCH NETWORK: The migration of EARN to use ISO protocols, summary of the proposed strategy and tactics

tional nodes operating it at the end of 1988.

The use of Coloured Book and DECNET protocols will only be provided where needed. Planning will be on a bilateral basis.

The migration of countries has not yet been studied in detail. There will be gateways and relays to some existing X-25 national networks at the end of 1987. A small number of national networks within the EARN address scheme are expected towards the end of 1988.

Implementations of FTAM are expected in 1988 or 1989.

NJE will be phased out as soon as FTAM is proved to be able to offer a comparable service. Manufacturer plans and times are not available.

## 12. Standards

EARN will follow the emerging functional standards being elaborated by CEN/CENELEC. EARN is also following the activities of RARE. This is important to ensure that EARN can interwork with other academic networks which are all expected to follow the same standards and functional standards.

It must be noted that EARN is a service provider and does not intend to take part in standards activities as a primary activity. In addition, EARN does not intend to develop products but to use those provided by others.

## 13. Conclusions

EARN is moving towards the use of ISO protocols as fast as possible. The main delay is caused by the lack of implementations of protocols

which is not surprising considering the unstable nature of some of them.

EARN is dedicated and will remain dedicated to providing the best possible

service to the European academic and research community.

P. BRYANT  
RUTHERFORD  
APPLETON LAB.  
DIDCOT, U.K.

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# OVIDE – A Videotex Database for the European Parliament

## A. Activities of the European Parliament (EP) and general objectives

Members of the European Parliament (MEPs) have three sources of logistical support in the discharging their responsibilities as elected representatives:

- their personal secretariat,
- the services of the EP's Directories-General (DGs),
- the secretariat of the political group of which they are members.

EP activities generally culminate in votes on motions. To this end, notes, reports, minutes, proposals and amendments are drawn up and distributed.

The EP's activities are organised on the basis of a four-week cycle of committee meetings, political-group meetings and part-sessions (2 + 1 + 1). At committee meetings, MEPs discuss matters which will be on the agenda at part-sessions.

The activities of the EP are concentrated in three cities:

- Luxembourg, where the Secretariat is based (with offices in Brussels and Strassburg),
- Brussels, where committee and political-group meetings take place,
- Strassburg, where part-sessions are held.

Liaison with the Commission and Council is most important.

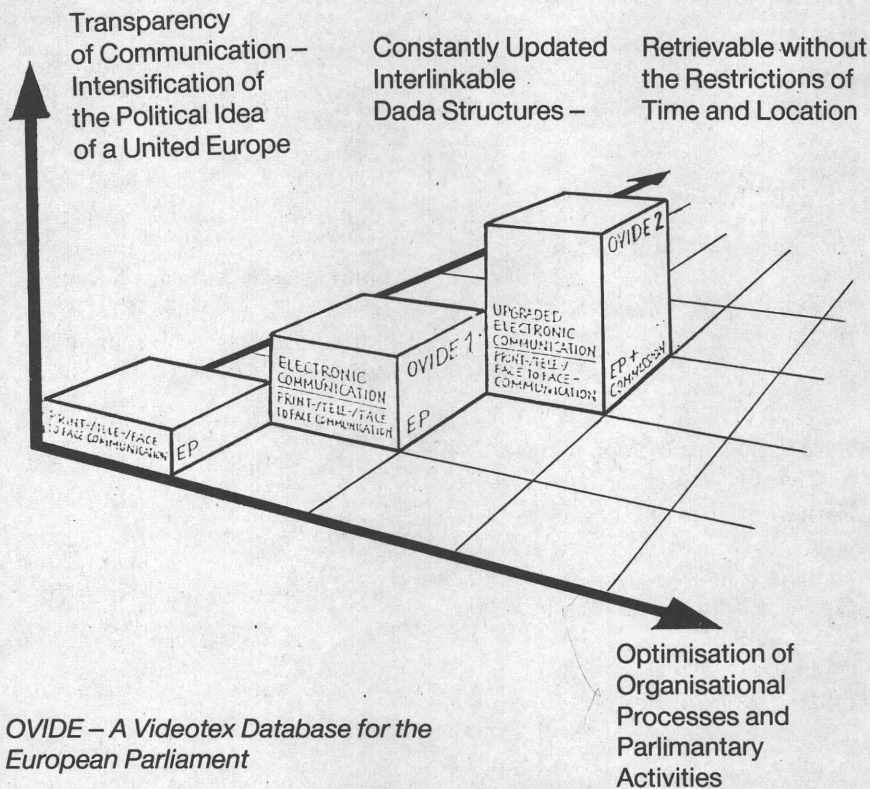
## B. OVIDE - overall objective

The overall objective of OVIDE, as part of the administrative infrastructure referred to, is to provide MEPs with an information and communications tool affording high-speed, round-the-clock access seven days a week – from anywhere in the European Community – to concisely formulated, up-to-date information. OVIDE is designed to be an easy-to-use, efficient facility for communicating with colleagues and staff, also affording public access and eliminating the delays and geographical constraints of their office. MEPs must also be able to access national videotex services from their terminals.

## C. Background – the OVIDE I pilot service

The OVIDE I pilot service was launched at the October 1985 EP part-session, the main theme of which was new technologies, in collaboration with the Commission of the European Communities (INSIS program); on the basis of a restricted target group comprising some 50 MEPs, the members of the Bureau and of the enlarged Bureau and the political-group and parliamentary-committee chairmen, it was designed to assess user acceptance of an electronic information and communications service.

This service is currently operated from the Commission's Computer Centre in Luxembourg on a Siemens-based system configuration comprising a mainframe and communication computers interfacing with local and remote terminals. System access from remote terminals is via various national videotex systems (Télétext, Bildschirmtext and Prestel) or directly via switched telephone lines.



# OVIDE – A Videotex Database for the European Parliament

OVIDE I provides users with various services, e.g. mailbox facility, information on EP part-sessions, up-to-date news agency despatches, and supports videotex terminals offering CEPT presentation profiles 1, 2 and 3 as well as ASCII terminals.

Assessment of the pilot service by the EP demonstrated general user acceptance of the facilities and functions offered. Since the OVIDE I system was not originally designed to function as a videotex server, however, certain shortcomings emerged as regards performance, reliability and user-friendliness. Users have furthermore called for additional information and communications functions, such as document retrieval capability.

Some usage statistics may be of interest. The number of calls made monthly on OVIDE I more than doubled in the year ending July 1987 to exceed 3.500. The most widely used language of the four available (French, German, Italian and English) was the French version, with virtually all of the messages sent during July 1987 being in French. Other interesting details are the use made of Eurostat data and of the practical help services such as air and railway timetables.

## **D. Objective: an operational OVIDE II service**

OVIDE II is to be based on the conclusions reached in the light of the OVIDE I pilot service; its principal objective is to simplify the dissemination of information to MEPs and facilitate communications among MEPs and between MEPs and their staff, the system being accessible

from any of the 12 Member States of the European Community. Furthermore, access is to be provided for private users; information on the EP's activities will be available to them. System access will be both from local terminals installed on EP premises and from remote terminals in the 12 Member States; both MEPs and the public will be able to gain remote access to the system.

## **E. OVIDE II system structure recommend unanimously by the 12 PTTs of the European Community**

In the light of an assessment of videotex in the European Community and the resulting problem of laying down appropriate parameters on the basis of which OVIDE II should be developed, the Commission of the European Communities raised this issue at the round-table discussion between the 12 PTT telecom directors on 3 May 1985.

It was decided to set up an ad hoc committee to examine the problem of installing a Community-wide server for MEPs.

After a number of working sessions, this committee unanimously recommended to the EP, on 27 February 1986, a conceptual model for the OVIDE II system structure.

The technical specifications of the OVIDE II system are based on this.

## **F. OVIDE II system configuration**

The OVIDE II service is to be based

on an "open" system architecture in a reliable configuration with high-convenience man-machine interfaces and high performance levels, the objective being to minimise response times. Figure 1 is an overview of the projected OVIDE II configuration.

## **G. OVIDE II system: principal characteristics**

- Multistandard videotex and SC II terminals supported;
- Access to OVIDE II via both in-house terminals and national videotex systems in the European Community on the basis of protocols specified by national PTTs and with the option of videotex interworking (CEPT TE-1 draft);
- Multilingual information management (in four languages) covering videotex page content, user prompts and system messages;
- High-convenience user interface: a *single* interface to the various applications;
- Access control with hierarchical authorisation for protected information areas;
- Reliability (round-the-clock service seven days a week);
- High performance levels, e.g. average response time of 2 seconds;
- Initial configuration to be small;
- Initial configuration to be upgraded by adding functions and data sources.

## **H. OVIDE II functions and information content**

The following remodelled functions and facilities have been recommended in the light of the experience gained in the operation of the pilot

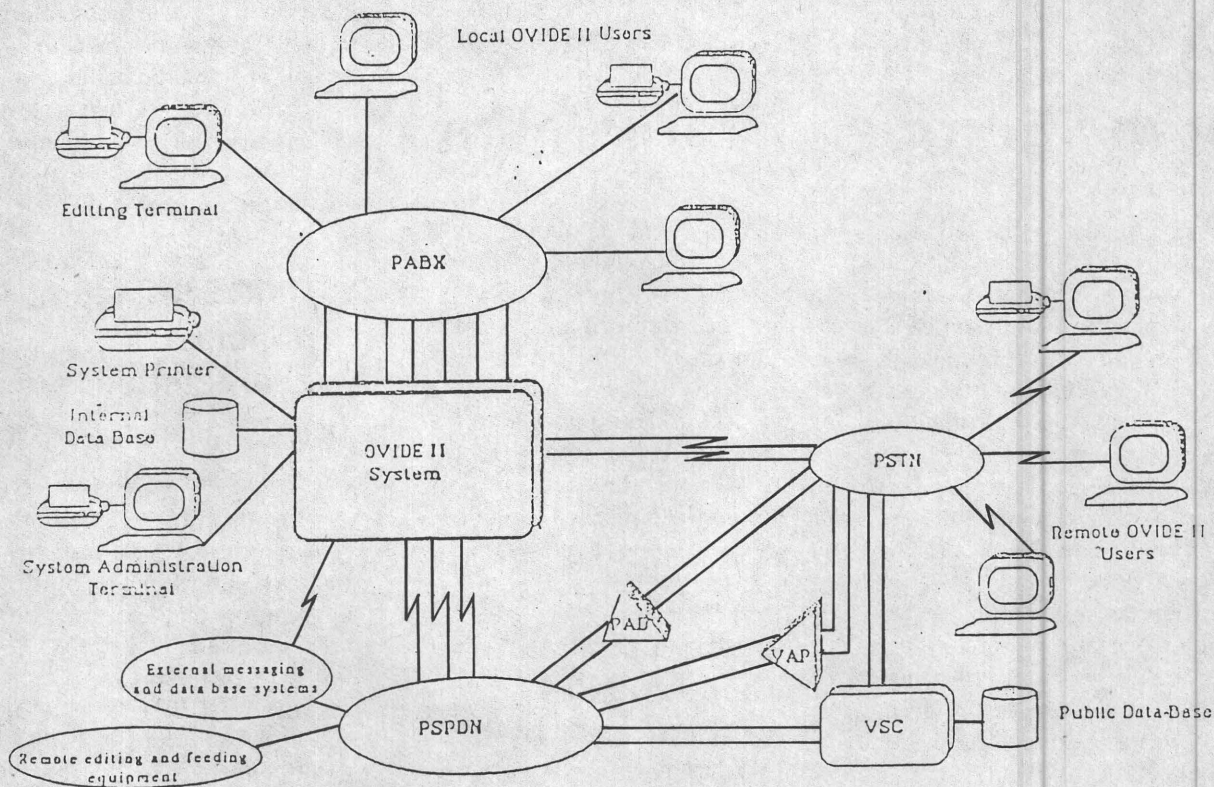


Figure 1: OVIDE II system configuration overview

service for almost two years, surveys among MEPs, assistants, political-group staff and the EP Secretariat, and, not least, user expectations, the objective being to establish an electronic information and communications service which will gradually become an integral component of the EP's infrastructure.

#### 1. Personalised message service

- Personalised tools

#### 2. General in-house communications services

- Pinboard function
- OVIDE-supported teleconferencing
- Parliamentary telessessions
- Parliamentary teleservices

#### 3. Public relations in the Community

- The 1989 elections and the Community public
- Public forums
- Opinion-polling
- Subject-specific closed group session

- Games and competitions

#### 4. Practical information for MEPs (for use in-house)

- Logistical environment
- Professional environment

#### 5. Practical information for external use

- Information for the public
- Information for the media

#### 6. Media

- EP information generated by the Directorate-General for Information and Public Relations
- News agency despatches
- News agency bulletins
- Press review

#### 7. Database gateways

- Document retrieval

### I. OVIDE II users

The following will be OVIDE II users:

- MEPs using their own terminals in their countries of origin;

- MEPs' assistants (MEPs to share their terminals with their assistants);
- EP officials, political-group staff and officials of other Community institutions using terminals installed in Luxembourg, Brussels or Strassburg; these terminals are also for use by MEPs and their assistants;
- Members of the OVIDE system management team;
- Groups interested in the Community's activities, e.g. the media and national political parties (OVIDE II subscribers);
- All users of national videotex services in the European Community are potential OVIDE II users.

Based on information provided by the

OVIDE Management Team  
European Parliament  
L-2929 LUXEMBOURG



# COSINE NEWS

Cooperation for  
Open systems  
Interconnection Networking  
in Europe.

COSINE News intends to cover  
viewpoints of all parties with  
interest in COSINE.

## COSINE Policy Group to Compare National Plans

It was agreed at the last CPG meeting in Zoetermeer that national implementation plans should be developed for each participating country. These plans should specify how each country will participate in COSINE.

The CPG is now in the process of investigating and comparing the national plans currently being developed and a discussion of the early versions took place in Brussels on February 12. It is anticipated that a common position on the plans will be submitted for consideration at the CPG meeting in Pisa on 9th and 10th March 1988.

The CPG aims to assess from the first versions of the national plans how far the participating countries have committed themselves to COSINE. Each country has been asked to indicate how they foresee the community which will be included in COSINE, in particular in relation to academia, research institutions and industry, and to give some forecast of the rate of growth of this community.

The CPG also aims to establish the level of commitment of individual countries to the COSINE Specification. It will therefore investigate whether there will be a public procurement policy and whether the level of government funding will be dependent on the use of the Specification, or whether this will be compulsory only for infrastructure equipment within a specific class of activity, such as for example all Eureka projects. The CPG will also collect information on any national initiatives which run in parallel with COSINE.

### Provision of Carrier Services

The positions countries take on the provision of carrier services will be of particular importance in these first versions of the national plans. The basic COSINE position is that publicly available packet switched data networks should be used as

far as possible. This position has been made more precise so as to incorporate the increased choice of network services which will become available as a result of liberalisation in the area of telecommunications. In November 1987 in Zoetermeer the CPG adopted a new model proposed by the chairman of RARE, Professor Peter F. Linnington. The model has so far received general approval and its main elements are as follows:

- no geographical, regional or sectoral barriers are to be imposed by the available carrier service;
- all subnetworks should provide access to and from the X-25 subnetwork operated by the PTTs and PTOs;
- single point of access and single billing should be available for services provided by the subnetwork service provider to the facilities manager.

The national plans to use operational network bearer services will help the CPG to identify the actions which will be taken to encourage migration from EARN and EUNET protocols to OSI. The plans will also contain information on future political and organisational arrangements which may be planned to allow end users to cover their operational costs, such as for example contracts with PTTs in relation to network usage.

The final versions of the national plans are expected to be available in time for the Eureka COSINE Workshop in October of this year.



# RARE Report Analyses Tariffs and Availability of Public Data Networks

The RARE report "Tariffs and Availability of PPSDNs in Europe", prepared as part of the COSINE Specification Phase, identifies various "barrier factors" in data communications. In parallel with the study done by RARE, a special CEPT Project Team has pinpointed difficulties which are hindering the implementation of a harmonised European packet switched network. An article on page 18 of this issue describes the findings of the CEPT Project Team. Several of the areas selected by CEPT as in need of improvement address the problems identified by RARE.

The RARE report cites the following as the main problems with packet switched networks:

- National call charges differ widely across Europe, by as much as a factor of 6 to 8 taking into account charges for connect time and volume;
- International call charges differ across Europe, depending on the country of origin, by as much as a factor of 2 to 5;
- Charges for intra-European traffic are much higher than domestic charges for equivalent traffic;
- Some countries charge for failed calls while others do not;
- In some countries VAT is not added to data communications charges while it is in others, and at rates ranging from 8 to 25%;
- National facilities for X-25 packet switched traffic differ widely from country to country. International traffic depends greatly on the number and bandwidth of the international connections, or on the facilities of the transit country;
- Different X-25 interfaces are required for identical end-systems in different countries;

- Performance statements issued by different national PTT administrations are difficult to interpret.

## Tarification Varies from Country to Country

On average, intra-European data transfer is almost five times more expensive than national communications. "Such difficulties tend to maintain the fragmented nature of the European market" RARE reports in its analysis. Tarification of public packet switching data networks (PPSDNs) varies from country to country, and performance causes serious problems. As a result some European research communities are at a substantial disadvantage.

The report highlights how differences in tarification affect two of the facilities typically accessed during national communications sessions: dialog access and file transfer. Both dialog access and file transfer are cheapest in Iceland, Ireland and the U.K., and most expensive in Spain, Austria and Germany. The difference between the cheapest and most expensive countries for dialog access is a factor of 5 to 6 and for file transfer a factor of 8.

But the main area of concern is international data communications. The report compares the costs in different countries of dialog access and file transfer during intra-European sessions and finds that users in Finland, Italy and Spain have to pay more than twice as much as those in Luxembourg, Germany and Ireland for the same facility. For transatlantic traffic dialog access and file transfer are cheapest in Norway, Iceland and Luxembourg and most expensive in Switzerland and Italy. The report also notes that an appropriate bandwidth may at times be unavailable, as a result of which session durations for file transfer may be as much as 9 times longer

than necessary, with an accordingly high connection time charge. The report concludes that the international call charges may result in an "unnecessary price barrier" for data communications which put a "high burden on the research community of the COSINE countries".

Discounts on off-peak domestic traffic may benefit many users, but international traffic sees less of such benefit from existing tariffs.

Most countries offer discounts for bulky amounts of data or long session durations and most offer reduced tariffs during evenings and weekends. However, here again there are national differences, and major discrepancies in the applications and amounts of discounts will make the institution of internationally available discounts a very complex process.

As well as tarification, the actual throughput of a PPSDN will affect costs in terms of standstill time during periods of network congestion, and net time during sessions.

## Plea for Volume Based Tarification

From the point of view of the COSINE user the realisation of a harmonised communication facility for the European research community is a complex issue which will require considerable adaptations to existing tariffs. As a first step RARE recommends a tariff policy which takes greater account of the volume of information transmitted than of the time needed to send it. Better tariff policies will serve to build up a large market and are therefore in the long-term interest of the telecom administrations.

Communications services based on a reasonable and internationally harmonised tarification can stimulate the development

of international user groups and significantly improve the productivity of engineers and scientists, enabling them to exchange experimental and production data, results, computer-aided designs, ideas and references to other information sources.

### Throughput Performance

Many users of data communications networks have experienced throughput problems. In its report, RARE has mapped out the data communication infrastructures of the COSINE countries, showing which of them have direct connections. Researchers in countries which numerous and fast connections obviously have the best chances of collaborating via PPSDNs with their European colleagues. The U.K., France and Germany have the highest number of direct international connections and circuits to other countries, and are used frequently for transit traffic. RARE will carry out a detailed examination of the performance of the European PTTs under another part of the COSINE Specification Phase workplan.

### Towards a Common Market for Telecommunications Services and Equipment

The GREEN PAPER\*) on the future development of the telecommunications sector in the Community addresses many of the problems raised in the RARE report in the context of a Community-wide telecommunications policy.

A number of proposed positions in the Green Paper is directly related to the issues raised in the RARE report:

- Free (unrestricted) provision of terminal equipment
- Free (unrestricted) provision of all services in the non-reserved area
- Clear definition by Community Directive



of general requirements imposed by Telecommunication Administrations on providers of competitive services for use of the network, including definitions regarding network infrastructure provision.

This must include clear interconnect and access obligations by TA's for transfrontier service providers.

Details should be prepared in the context of OPEN NETWORK PROVISION, and should include tariff principles, usage conditions and agreed technical interfaces

- Separation of regulatory and operational activities of Telecommunication Administrations. This should provide for an independent body supervising the relationships between network operators and users.

The Green Paper was intended to initiate a debate and attract a broad spectrum of opinion. In the meantime, the Commission has received a wide range of comments from TA's, the telecommunications and data processing industry and from user organisations (including RARE).

On this basis a program of action has been formulated which sets out a number measures to be taken.\*\*)

With regard to OPEN NETWORK PROVISION, there has been strong support for the definition of Europe-wide harmonised network provision. The work program specifies the open provision of leased lines as a first priority to be undertaken in 1988, followed by the analysis of conditions for open access to Public Data Networks.

This last action, to be carried out in cooperation with the project team of CEPT and the user communities involved, should open the perspective of removing many of the barriers identified in the RARE report.

## Suppliers Call for Global Synchronisation of Standardisation

Standardisation activities and procurement policies need to be synchronised and harmonised globally. That was the main message of Brian G. Millis, head of standards and architecture in ICL, to the EUREKA COSINE Workshop held in November. He emphasized that in the framework of COSINE, suppliers look forward to serving professional as well as what he called brilliant users. Meanwhile, also other representatives of suppliers are clearly recognising the market pull effect that COSINE aims to create.

Mr. Millis made clear that what the industry needed was a consistent use of open standards. This will benefit the users in the sense that commodity products will be-

come available and can replace ad hoc solutions. "The academic sector needs to synchronise its requirements for standards. We really need coordination of government procurement policies." He pointed out three roles for COSINE: to enable individual experts to participate in technical work; to function as an evolutionary integrator project; and to create a volume market pull effect. In terms of volume, COSINE represents tens of thousands of workstations and thousands of servers.

### Standardisation needs acceleration now

Functional standardisation has a good history in Europe, said Mr. Millis. But accele-

\*) Ref. COM (87) 290 FINAL: Towards a Dynamic European Economy - Green Paper on the Development of the Common Market for Telecommunications services and equipment

\*\*) Ref. COM (88): Implementing the Green Paper on the development of the Common Market for Telecommunications Services and Equipment



ration and coherence are now needed, he told the Workshop. He advocated more efficient use of experts in the field, through a fast work project approach, elimination of duplication and provision of European input to a global set of standards. Suppliers, users and standard makers should be brought together in an open forum such as EWOS (European Workshop on Open Standards). EWOS is getting support from suppliers in SPAG and ECMA; from users in COSINE and RARE, EMUG, OSITOP and

the CEC; and from standardisation bodies such as CEN, CENELEC and CEPT. COSINE will be represented. "EWOS intends to accelerate the functional standardisation process. We hope that a lot of technical work for creating standards will be brought into EWOS. We need to get the whole machinery going at once: the pro-

cess needs to be synchronised in as many circles as possible." Once technical work is done, the output or ED's (EWOS Documents), will be turned into functional standards through the voting system in CEN/CENELEC. This body will remain the official European standardisation body. The new forum for information technology standards intends to coordinate with the other major regional workshops based on NBS in the United States and POSI in Japan.

The following articles on networking in individual countries are based on country reports gathered from the CPG meeting in Zoetemeer, Nov. 5-7, 1987

## Networking Developments and Policies in Sweden

In Sweden network development is undertaken in a practical way with an emphasis on pilot projects and testing facilities. Currently the organisational structure of migration towards OSI is being revised. It is expected that from the COSINE Specification Phase, relevant specifications for all the services planned can be obtained. The Swedish government has launched a three-year national R&D program in the field of information technology: Swedish Telecom (ST) is the initiator and a major sponsor of the program. The main effort, called IT:4, is directed at the area of industrial development with annual government funding of 165 MSEK, provided that private industry contributes the same amount. An important aim is to create close cooperation between industry, the public sector and academia.

The IT:4 program puts emphasis on projects having obvious benefits for society and on those promoting Swedish participations in European projects. Development of open systems for data communications according to the OSI Reference Model meets both requirements and is therefore part of the program. International cooperation for the move to OSI is realised by participation in COSINE, RARE and the Nordic Universities Networking (NORDUNET), as well in the work performed by international standardisation bodies such as ITU/CCITT, ISO, IEC, CEN/CENELEC/CEPT and ECMA.

The strategy for OSI development defines three different, complementary areas of cooperative projects:

- Development projects for prototype realisation of key modules in open systems, e.g. the development of portable software for OSI protocols on layers 3-5, and the realisation and demonstration of text conversion programs based on ODA/ODIF for different word processing systems. Availability of protocol testing facilities and technical support for using them are essential for the success of this area. TeleTest, part of the Swedish Telecom Group, will soon introduce test services. The test system includes new technology jointly developed by SICS (Swedish Institute of Computer Science), ST, TeleLOGIC, NCC (UK) and COS (USA).
- Technologies which are of primary importance for the realisation and use of OSI communications. In addition to testing, other prerequisites for the acceptance of open systems networking are cost-effective techniques, standards and products for computer and communication security. Studies, implementation and field trials concerning security will be conducted in large- and small-scale (LAN) OSI systems.
- Pilot systems serving as experimental environments which in an early stage may offer data communication services

between participating parties, e.g. for file transfer. MAP prototype environments will be established for experimental purposes, for demonstration and training. In Kista near Stockholm, a LAN will be created which will support ISO 8802/3, 4 and 5, i.e. CSMA/CD, Token bus and Token ring, and will also be connected to OSI networks via Datapak. Among the projects are data security in local environment, MAP and TOP prototypes. Open systems are promoted as the communication infrastructure in applications- and user-oriented demonstration programs.

### Pilot project: OSINET-S

From the COSINE perspective probably the most important pilot project is the creation of a logical network for R&D, OSINET-S, consisting of a number of nodes accessible via the public X-25 packet switched network Datapak. During 1988 the installation of at least ten nodes is foreseen, to run experiments and to evaluate file transfer protocols and message handling facilities. Further projects include evaluation of security mechanisms and a directory service. The network nodes must connect directly to testing centres. OSINET-S members are primarily participants in R&D projects of the IT-program and represent the three important sectors within the R&D community, industry, the public sector and academia. The infrastructure and the expe-

periences gained with OSINET-S will contribute to the preparation and implementation of COSINE in Sweden. This is illustrated by the fact that funds from IT:4 have been allocated explicitly in support of Swedish contributions to the COSINE Specification Phase.

### Role of Swedish Telecom

Swedish Telecom is, like many European PTT's, a supplier of telecom services in a gradually deregulated environment but it also assumes responsibilities for R&D on a national scale in the field of telecommunications. In addition to the actions already mentioned ST is supporting open systems by means of:

- the setup and operation of OSI prototype and test laboratories,
- development and operation of an internal X-400 standard exchange for electronic messaging;
- a policy concerning the use of X-400 in all future message handling systems and services;
- heavy investments during 1988 to enhance the public packet switched network Datapak. Its capacity, quality of service and conformance with actual standards and with other public networks will be updated.

Two other agencies promoting open systems are Swedish Defense and the Swedish Agency for Administrative Development. A well defined procurement policy is one means of moving to OSI. The Swedish Agency for Administrative Development has declared that OSI products should be purchased for public purposes where they are available. This will also have a substantial impact on the private market.

### Current situation

Academic networking is fragmented into at least three environments, each of which relies on a different technology. Interworking is arranged through gateways, in some cases via a third country. The Swedish University Network SUNET is the largest, operating on a backbone of X-25 Datapak.



The majority of users of this umbrella network has access to a DEC-net through X-25 with 170 nodes and six area routers (one for each university region). The other major networks are EARN, which operates at 14 nodes in Sweden, whereas UNIX-based systems are widespread within the academic and research community. Most of these systems share USENET. For SUNET, some provisions for migration plans and projects for migration to OSI are laid down in their contract with DIGITAL: this incorporates a set of options implying free delivery of OSI products once these are available (before July 1st 1988). As far as EARN is concerned, the common plans on a national level will be implemented. A condition for a common strategy is the creation of coordinated services regarding operation, management and development, which will be in force by spring 1988.

Sweden has realised that a superior organisation for strategic planning of integra-

tion of different networks is invaluable. Therefore, a new framework and organisation for all academic networking in Sweden is being created and will come into effect before summer 1988. The new organisation aims for an improved coordination of planning, funding and maintenance of networks, together with a closer interaction with the user groups concerned. In this way the means and resources to adopt and implement the migration framework offered by COSINE will be enhanced.

R&D cooperation between industry and academic institutions is traditionally strong in Sweden. An increasing number of industrial R&D groups is involved in national and international collaborative projects, such as IT:4 and EUREKA. These groups identify the demand for an open data communication infrastructure. What remains is to offer the necessary information and organisation in order to get them involved with COSINE.

Dr. György Enderez, TELEVERKET

## French Research Networks Moving Towards OSI

The developers of research networks in France are taking the existing and burgeoning OSI standards as a yardstick. Activities are being carried out to implement the developing OSI standards in the two research networks REUNIR and ARISTOTE. Message handling systems following the X-400 recommendations, file transfer implementations and high throughput PTT facilities in the framework of ISDN are given priority in current development work. Participation in European projects such as COSINE and RARE gives the necessary international dimension to the efforts of providing better and forward looking networking services to the French research community.

The French Research Network is compos-

ed of two different networks that offer the same applications: REUNIR and ARISTOTE. REUNIR (REseau des Universités et de la Recherche) is an academic and research network. The name was officially given in February 1986 to a network which has been developing for many years, within the universities and the National Scientific Research Centre (CNRS).

The basic objective of REUNIR is to manage the basic communication network between computer centres and laboratories. But at the same time, REUNIR is geared towards expansion. It wants to extend the basic network to other interested research organisations, as well as to establish connections with foreign academic and research networks.

## Effective Testing Requires International Approach

Against this background, the current activities of REUNIR are of two kinds. In the first place, it is taking immediate action to improve the communication between users of REUNIR, with an ever growing openness towards international networking. This is achieved through specific projects coordinated by the REUNIR Technical Team. Secondly, REUNIR is engaged in middle and long term planning for effective application of communication standards. In practical terms, this requires close monitoring of the evolution of the OSI standards and their implementation by manufacturers. To be effective, such tests have to be done at an international level, and REUNIR intends to participate fully in the activities of the European organisations and projects such as RARE and COSINE.

An immediate action sometimes requires the use of non-standard communication protocols which are directly available. But in such cases the cost of future migration towards ISO standards is an important factor of choice. User needs must be carefully screened to separate the urgent ones from those which can wait for coming standards. And when new standards become stabilised, current projects should be used as an incentive to the manufacturers to implement them on their systems.

The current scope of activities for REUNIR extends to:

- message handling systems;
- file transfer;
- interconnection of main computing centres;
- direct access to computational and documentation services.

## Common Applications for Network Users

ARISTOTE also aims at expanding the reach of researchers by defining an environment to establish a network that interconnects large research centres. The CEA (Commissariat à l'Energie Atomique), CNES (Centre National d'Etudes Spaciales), INRIA (Institut National



de Recherche en Informatique et Automatique), EDF (Electricité de France), CNET (Centre National d'Etudes des Telecommunications) and various other research centers such as LAAS, CCVR and Ecole des Mines de St. Etienne will all benefit from the efforts carried out within ARISTOTE.

At present, the activities of ARISTOTE are to define and to implement common applications for the different interconnected research centres. The OSI protocols are taken as a basis for the architecture of this network under construction. The technical team is mainly working on the following subjects:

- Message Handling System X-400. Such a service has been developed and several gateways have been implemented;
- Directory. A common end-users' directory is being established
- ISDN and high throughput PTT facilities. For graphics and images, the future networks should provide a high throughput. Such studies are being specified and tested in the current network;
- Real time. Many industrial networks need real time applications. A group is studying this approach;
- File transfer and access methods, virtual terminal and graphics are new groups beginning their work.

## OSI Fundamental for New TELECOM Projects in Finland

Finland has about 2.500 academic network users, but the potential user group amounts to 30.000. In addition to the academic community there are both private and commercial users. Electronic mail, file transfer, computer access and conferencing are all available.

The body with overall responsibility for the administration and legislation of networking in Finland is the Finnish Ministry of Communication. The Finnish University and Research Network (FUNET) - authorised by the Ministry of Education - coordinates academic networking activities, and the Joint Working Party for Data Communications coordinates networking standardisation and the use of standards.

## New TELECOM Law: Free Competition

The Nordic countries coordinate their efforts in the area of data communications for public networks, in particular under the Nordic Public Data Network Project (NPDN). The NPDN network has about 50.000 subscribers and considerable ef-

fort has been put into both network security and reliability, as well as maintenance and network management functions.

There are more than 50 nodes throughout Finland. The academic wide area networking infrastructure is based on X-25 and leased lines. Public telecommunications services are considered too expensive to be the only services available to academic users, therefore there is a mixture of private and public services. The legal framework is already there: Finland has a new telecom law with a clear commitment to supporting free competition.

Most local and metropolitan area networking on university campuses uses Ethernet LAN and corresponding bridge technology. The higher level protocols used in Finland are: DECNET, TCP/IP, XNS, RSCS/JNS and X-400. The protocols are used in the national DECNET, in EARN, UUCP and Internet. There are in the region of 100 active DECNET nodes, 10 EARN nodes, 40 UUCP nodes (of which 20 are for academic use), and 30 Internet nodes in Finland.

## Lans Vital in Infrastructure

FUNET plans to move to OSI gradually as quality OSI products become available. Meanwhile, the use of manufacturer independent protocols such as TCP/IP is encouraged, allowing a smooth migration to OSI protocols. Through FUNET, Finland is working on a recommendation for OSI conformance in the procurement of computers and network products. FUNET has no funds specifically allocated for OSI migration, but it is expected that in the future an increasing proportion of the available funds will be used for OSI products and gateways.

The optimistic outlook for FUNET foresees most of the mail and file transfer traffic being based on OSI protocols by the end of 1989. Because of the importance of local area networks Finland is also investi-



gating OSI solutions for LANs. The OSI strategy includes the use of private X-25 networks whenever public alternatives are not competitive. International cooperation for moving to OSI is underway within NORDUNET and RARE, and has already begun in the framework of the RARE MHS pilot service. In addition, there have been informal discussions on utilisation of the OSI - TCP/IP gateway products being developed within the Internet community. Users' communications needs vary, according to the type of connection, from local to wide area traffic. Therefore the view of Finnish network users is that local area networks must be seen as vital elements in the networking infrastructure.

rich, as well as both polytechnic schools in Lausanne and Zürich. Together, they represent a potential user population of about 87,000. In the second phase, some more technical schools and industries will be connected. However, no particular developments will be made to fulfill specific requirements of particular user groups, notably the industrial users.

The initial investments will be covered by public funds. The allocated amount will come to about 9 MECU for the period from 1987 to 1991. But the first services that become available in 1988 will generate exploitation income to be paid by the users. However, due to the strategic importance of computer network links for scientific activities, a governmental subsidy will be granted. The exploitation expenses are estimated at about 2,6 MECU until 1991. After this date, the yearly exploitation cost is estimated at 1 MECU.

## Realistic Approach for OSI Introduction in R&D Networking in Switzerland

The necessity to link together members of the scientific community as well as to share the main information research resources has been identified as being of the highest importance for research activities in Switzerland. The pilot network CHUNET for message handling, using software from the University of British Columbia, has shown a high interest in such an infrastructure, together with the feasibility of an efficient network linking various research centres. Moreover, the international network EARN has also been extensively used by these scientists. The success of these experiences encouraged the development of an advanced system. This project, named "SWITCH" (SWISS Telecommunication system for Higher education and research), officially starts in 1988.

The framework for SWITCH can be summarised as follows. SWITCH will provide telecommunications services, which means that it is not a research project. The

network will use public communications infrastructure wherever it is possible. The software will be based on the OSI-model of ISO and will be as close as possible to existing standards or recommendations - especially those resulting from the COSINE Specification Phase.

### Pragmatic Solutions

However, it must be clearly stated that at the end of the initial phase of the SWITCH project, about 1991, the network has to be operational and fulfill its major objectives. Therefore a pragmatic approach is necessary: practical solutions will take the technical evolution in this domain into account. This means that advantage will be taken of synergies between the evolution of EARN and SWITCH.

In the first phase, the users will be the eight cantonal universities of Basel, Fribourg, Genève, Neuchatel, St-Gall, Vaud and Zü-

### Swiss Policy promotes OSI-model

The SWITCH foundation has a Council with representatives from the federal and the cantonal authorities as well as from the users. The Council is responsible for the global strategy and for the exploitation and the development of the network. It will be assisted by a Scientific Committee for all technical questions. Executive tasks will

#### The following SWITCH services are foreseen:

- \* SWITCHmail
- \* SWITCHfile
- \* SWITCHjob
- \* SWITCHterminal
- \* SWITCHinfo

In addition to the user oriented services, the SWITCHlan concept foresees a countrywide 'logical Ethernet' by using MAC-level bridges to connect LANs in different universities. This service at the ISO network layer is regarded as an interim measure to allow the access to the two supercomputer centres with the presently available protocols (TCP/IP).

be delegated to the Executive Committee, which will also control the operational activities. A Technical Staff of 5 to 6 will be employed.

To conclude, the Swiss policy promotes the standardisation of communications in Europe through the OSI-model of ISO. With the SWITCH project, the objectives of which are close to those of COSINE, Switzerland is making a strong effort in this direction. Meanwhile, it is believed that a pragmatic approach necessitates harmo-



nisation of new developments with those in existing facilities such as EARN, which have more far reaching influence.

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## COSINE Proposal for Enhanced Cooperation Between Industry and University

COSINE presented itself to the newly established European Institute of Technology (EIT) at its inaugurating conference celebrated in Rome on December 9th. In his address to the conference, the chairman of COSINE Dr. Peter A.J. Tindemans declared that EIT is the kind of venture for which COSINE plans to provide a computer communications infrastructure. COSINE and EIT also stem from the same political commitment to strengthen Europe's industrial and technological infrastructure. Computer communications are invaluable for the cooperation of people and organisations throughout Europe. From the middle of 1988 onwards COSINE aims to organise the actual migration of network services to services of increased functionality and interconnectivity.

The EIT acknowledged in Rome that researcher-level interactions are the heart of productive collaboration between industry and universities: "What is missing, however, are networks that achieve regular and effective interactions among university and industry scientists across Europe. Such networks will be created as part of the EIT initiative." As an initiative of some

leading European industrialists, cooperating with the OECD, the EIT intends to facilitate co-operation in precompetitive research and foster closer co-operation among industrial and academic researchers. The EIT should enhance industrial innovation in Europe by enabling industry to take full advantage of the educational and research programs of European universities by organising a network of outstanding research centres. Emphasis will be on areas of particular importance to European industry, including information technology, materials technology and biotechnology. The new organisation is committed to enhance the contributions of the educational and research system to industrial innovation, as industry is forced to accelerate product development, production and distribution cycles. Although a private sector initiative, the EIT will have close relationships with public programs such as ESPRIT, RACE and COMETT.



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# Conformance Testing Service - Phase II

The second phase of the CTS program is now underway: more than 20 contracts, out of 62 proposals received, are under negotiation and at least half of them are close to being signed. Some 10 MECUs have been committed already and more will be allocated this year for the contracts which still remain to be negotiated.

"CTS-II" is the continuation of the CTS (Conformance Testing Service) Program launched two years ago by the "Standards & Type Approval" Department of DG XIII with the aim of establishing in Europe a set of laboratories able to verify that IT and Telecom equipment conforms to standards (ISO, CCITT, NETs, ENVs, EN).

The CTS initiative is framed within the CEC policy for standardisation and is a complement to the production of Functional Standards: in fact, Functional Standards aim at facilitating and harmonising the implementation of international standards in real products and the CTS provides the means to verify that such products, claiming conformance to standards, really do conform.

Key features of the CTS program are the independence of the laboratories with respect to specific manufacturer influence, the competence they have acquired in definition of harmonised tests suites and procedures, and the mutual recognition of the results they emit.

Independence and competence of the laboratories will give cost effectiveness and European breadth to the new Conformance Testing Service.

The ultimate objective of the CTS is to give customers confidence in standards: confidence they need in

order to invest in standards conformance multivendor solutions.

The initial phase of CTS was especially dedicated to OSI, with some exceptions being Languages (COBOL, PASCAL, FORTRAN), Graphic Kernel System and Software Quality Assurance, and has already covered the establishment of harmonised Conformance Testing Services for:

- Terminals to be connected to Packet and Circuit Switched Networks
- Teletex
- Message Handling Systems
- File Transfer and Management (FTAM)
- Local Area Networks (layers 1-4) for CMSA/CD technology.

All the projects launched in the first phase are still in progress and the setting up to the different services is scheduled progressively during the course of this year, starting this spring for Network and TTX and terminating with the FTAM, whose the timescale of which has suffered from the instability of the relevant ISO standards.

In the meantime, the extension of the CTS program was launched last summer with a Call for Proposals which, as has been mentioned, has received more than 60 responses and whose contractual negotiations are progressing rapidly.

Although a detailed report will be available only at the end of February, it is already possible to say that, with Phase II, the CTS program is likely to embrace all the Member States and to extend the technical scope much beyond the existing one summarised above. In particular, subject to successful finalisation of contracts, extensions are

foreseen in the areas of Network Services, OSI applications, Operating Systems, Languages, Graphic Interfaces, Buses, Local Area Networks.

With the recent extension, the CTS program has matured and evolved from a CEC innovative initiative toward a concerted European effort whose coordination requires a wider mechanism than the existing TCCB (the Coordination Body set up for ensuring the overall coordination of all the projects belonging to the CTS program). In the meantime, the Memorandum IT-03 is progressing toward the setting up of the necessary elements for mutual recognition of IT Certificates in both EC and EFTA countries, thus ensuring a greater commonality. Therefore, the TCCB will shortly come to the conclusion of its mandate and the coordination task will be shifted to an appropriate European entity taking part in the implementation of the M-IT-03.

More detailed information on the CTS program is available from the Standardisation Service of DG XIII - E/4 J-37 4/27, 200, rue de la Loi, B-1049 Brussels. The proceedings of the first Conference of the CTS Program (CTS Technical Days 1st and 2nd October 1987) published by IOS can be ordered from IOS-International Services B.V., Van Die-menstraat 94, N-1013 CN Amsterdam, The Netherlands, at the price of 40 ECUs. (See also IES News, No. 2, pg. 18 et seq.).

# Major Target Areas of Cept for Enhancement of the European Packet-Switched Data Networks

## Overview of Results achieved within Major Target Areas

The proliferation of the national CEPT packet-switched networks followed different timetables and different commercial priorities thereby delaying the implementation of a fully harmonised and up-to-date European packet-switched data network. Following a proposal from the Commission to CEPT, a special ad-hoc group on packet-switched services was established to create consensus among the CEPT Administrations for an early implementation of an advanced packet-switched network in Europe. In order to accelerate the work further a special CEPT Project Team was created in May/June 1986 to deal with the remaining, mainly commercial, difficulties preventing an implementation of a harmonised European packet-switched network.

The main results add network support for the latest version of the X-25 communications standard of CCITT. This allows users to take advantages of a range of new fea-

tures on the packet-switched data network. The results also include two new CEPT Recommendations: one facilitating an easier use of portable computer terminals across Europe and another providing standardised description of dial-up procedures for terminals with an X-28 interface.

## 1. X-25 Services

### Packet-Switched Services according to CCITT Recommendations X-25 (1984)

This lists the user facilities and additional features which should be implemented for X-25 (1984) across Europe. CEPT has on basis of this Recommendation elaborated an extensive work program for the implementation of X-25 Services.

The work program indicates three key areas where PTT Administrations urgently have to undertake necessary actions in order to enable data terminal equipments to operate full OSI Connection-mode Network Services:

- transit delay selection and indication

- CCITT-specified terminal facilities
- fast select

### Other commercial important facilities

For the majority of the other facilities which are to be supported commercially in Europe, CEPT has requested that PTT Administrations facilitate the provision of Closed User Groups (CUGs), international permanent virtual circuits (PVC) and call redirection features to conform wholly to the relevant CCITT (1984) standards. The technical enhancements necessary to overcome this deficiency in the availability of CUGs and call redirection to full 1984 specification in European networks are in progress (see Table 1).

### Diagnostic Codes

CEPT has given special attention to the harmonisation of diagnostic messages. A relevant CEPT Recommendation states that PTT Administrations should implement call progress signals according to X-75 (1984) as early as possible. It has been confirmed that this is being followed by CEPT Administrations who are specifying full conformance with current CCITT Recommendations for all new equipment. Preparations for enhancement of existing equipments to align with the 1984 CEPT Recommendation on diagnostic codes are continuing (see Table 1).

## 2. Improved Possibilities to Conduct International Traffic

### Implementation of X-75 Multilink Procedure

A CEPT Recommendation requires that X-75 multilink procedure

OEPT

1988

SERVICES AND FACILITIES ON PUBLIC PACKET SWITCHED DATA NETWORKS IN EUROPE

Packet-Switched Public Services	Country																EU	
	A	B	CH	D	DK	E	F	GB	GR	I	IRL	IS	L	N	NL	P		S
X.25 (1984)	88	88	88 <sup>u</sup>	88	A	88	89	88	88 <sup>u</sup>	NP	88	A	A	88	88	88	88	A
International Permanent Virtual Circuit	-	A	A	A	A	A	A	A	88 <sup>u</sup>	A	-	NP	-	NP	A	-	A	A
Closed User Group	-	A	A	A	A	A	-	A	88 <sup>u</sup>	A	-	NP	A	A	A	A	A	A
Alternative Routing	A	A	A	A	A	A	A	A	88 <sup>u</sup>	A	A	A	-	A	88	A	A	A
X.75 Multilink Procedure	NP	A	A	A	NP	A	89	88	88 <sup>u</sup>	88	89	NP	-	89	88	NP	NP	A
X.75/X.25 Diagnostic Codes	88	A	A	A	A	88	A	A	88 <sup>u</sup>	A	88	A	-	88	A	88	88	A
Test Terminal Equipment	A	A	NP	A	88 <sup>u</sup>	88	A	A	89	88	A	NP	-	88 <sup>u</sup>	88	88	A	A

Legend: A: Available 1987  
88: Available by April 1988  
88<sup>u</sup>: Under consideration for 1988

89: Under consideration for 1989  
NP: Not planned

# Major Target Areas of Cept for Enhancement of the European Packet-Switched Data Networks

res be implemented in Europe as early as possible. This will enhance service security and reduce significantly the probability of premature call clearing within the network, enabling more advanced applications, such as computer-aided design, to make use of packet-switched data services.

The main benefit of the X-75 multilink procedures on internetwork routes is that failures of a single link, whether caused by line, terminal or switch problems, can be recovered without clearing calls. In 1988, 7 CEPT Administrations will be able to provide this feature (see Table 1).

## **CEPT Action for Service Restoration in the Absence of Multilink**

CEPT has given special consideration to the implementation of call restoration on all European international links and has evaluated the many options available which can provide some level of service restoration in the absence of multilink. These options include:

- standby circuit
- operation of multiple links in parallel
- automatic alternative routing.

Options like **standby circuits** and **multiple parallel links** are already provided for European internetwork connections, especially those with the highest traffic volumes.

Automatic alternative routing which does not provide the same high level of call resilience and security as multilink, nevertheless allows immediate recovery of service in the event of a link failure. Existing calls on the failed link will be cleared, but new attempts will be

routed over another link(s), thereby bypassing the failure. Some service degradation may be apparent due to the increased loading of operational links.

By the last quarter of 1987 almost all CEPT Administrations running packet-switched data network supported automatic alternative routing.

## **3. Improved Methods for Measurement of Data Traffic**

CEPT has given special attention to the establishment of improved facilities for regular monitoring of network quality of service. During the work of the CEPT Project Team the following observations were made on the current situation:

- On a domestic level, each CEPT Administration already monitors its network performance, and further improvements to these activities are undertaken constantly.
- Standard conditions for measurement of throughput and delay on international calls across Europe were determined by a CEPT Group on Packet Network Interworking in December 1985 and now are part of a new CEPT Recommendation. It is expected that measurements will be made according to these conditions and yield results which can be used to assess the effects of equipment, protocol parameter and routing enhancements within networks.
- A number of CEPT Administration has already test terminal equipment (DTEs) available and others have definitive plans for 1988 (see Table 1). Further actions will be taken in respect of virtual

call availability and other parameters.

- CEPT considers the exchange of network performance information between Administrations to be of greatest value when an exceptional or anomalous result has been obtained.

## **4. Increased Transmission Speed between Different CEPT Countries**

### **Implementation of 64 Kbit/s Internetwork Lines**

CEPT considers that X-75 links between European packet networks should in principle be operated at a standard speed of 64 Kbit/s in the earliest possible timeframe.

There are several benefits of operation at 64 Kbit/s, in addition to the obviously greater capacity. Transit delay is reduced by the shorter packet-emission time and the consequently reduced link-queuing delays, which help to maximise user-perceived performance in terms of faster screen-filling and file transfer. This is particularly true for users with X-25 access at 9.6 Kbit/s or higher, whose terminal equipment is able to make full use of their access link on an individual virtual call.

It has been observed that changes in traffic volumes and characteristics are to some extent directly attributable to service improvements. Any higher unit costs associated with the use of 64 Kbit/s links can easily be offset by generating new traffic.

In consequence, CEPT administrations are aware of, and fully endorse, the overall desirability of moving to 64 Kbit/s terrestrial internetwork links. Indeed, by end of 1987, 6 European Administrations already operated X-75 links at this speed and a further 5 have firm plans in various stages of progress to intro-

# Major Target Areas of Cept for Enhancement of the European Packet-Switched Data Networks

duce such links during 1988.

The major reasons for non-use of 64 Kbit/s have so far been low traffic volumes and lack of digital circuits. However, taking into consideration the overall topography of network interconnections across Europe and steadily increasing traffic levels, CEPT Administrations have during 1987 put much effort into reducing further the number of 9.6 Kbit/s X-75 links by abandoning 9.6 Kbit/s direct routes in favour of transit routes over 64 Kbit/s links. However, universal use of digital circuits at 64 Kbit/s will not be entirely available across Europe by mid-1988.

## **CEPT Plans for Internetwork Links at Speeds above 64 Kbit/s**

The need for the next generation of packet-switching equipment to handle international X-75 links at speeds higher than 64 Kbit/s is under discussion. At present the next higher internationally standardised speed is 2048 Kbit/s.

Some CEPT Administrations anticipate a possible need for 2048 Kbit/s in 2 to 3 years time from 1988 onwards based on the following reasons:

- increased traffic between PSPDNs and the absence of standardised speeds between 64 Kbit/s and 2048 Kbit/s
- the increased number of X-25 data terminal equipment with a speed of 48 Kbit/s and possibly 64 Kbit/s requesting international data service with acceptable quality of service
- the requirement to interwork with the future ISDN service and to have the widest possible integration of services.

## **CEPT Proposal**

Taking into consideration that X-75 does not currently support 2048 Kbit/s and some technical problems may have to be resolved before its introduction, CEPT will start collaboration on this topic and initiate internal studies and discussions with telecommunication manufacturers.

## **5. X-32 Services**

CEPT considers the need for data services provided by the X-32 terminal interface to be increasing across Europe, but because of different service requirements, a wide range of features can be envisaged. CEPT recognises that harmonisation is urgently required for the X-32 service.

The utilisation of the X-32 terminal interface is related to a great range of users:

- Personal computers for end-to-end mail and FTAM applications
- EDP centers for back-up to direct X-25 connections
- Teletex terminals
- X-25 equipment with low traffic.

### **Advantages of X-32 Capabilities**

The X-32 Recommendation allows a data transmission user to combine the advantages both of telephone access and packet mode transmission.

In particular the advantages of telephone access are:

- reduced cost for low traffic terminals
- easy mobility of terminals.

The advantages of packet mode transmission are:

- better error protected transmission than X-28
- high speed range 2.4 to 9.6 Kbit/s
- dial-out capability
- multiple logical channels
- access to OSI end systems and Value Added Service for end-to-end communication (Message Handling System, Directory System, Databases)
- access by gateway functions (provided by packet mode DTEs connected to public packet networks) to LAN or other OSI networks.

## **Harmonisation of X-32 in European Packet-Switched Networks**

It is expected that a number of CEPT Administrations will provide X-32 services in the first part of 1988 on a commercial or an experimental basis.

A preliminary agreement has been reached between CEPT Administrations so that a basic type of harmonised international service can be offered using the NUIT method for call identification for charging purposes while awaiting suitable arrangements for X-32.

## **6. X-28 Services**

The X-28 terminal interface provides the user interface for asynchronous terminals connected to packet-switching networks. It defines the asynchronous Packet Assembly/Disassembly (PAD) interface for public data networks.

In addition to providing operating parameters, the X-28 terminal interface accepts commands from the user for communicating with the network. These commands enable the user to establish a connection to a specific terminal, to request information on the status of the connection, to modify selected parameters and to test the proper functioning of the terminal. The terminal interface

# Major Target Areas of Cept for Enhancement of the European Packet-Switched Data Networks

also displays messages to the user regarding errors and changes in connection status.

## Easy Provision of NUI (Network User Identification) in CEPT Countries for Users of X-28 Portable Terminals

There is an urgent need today for business people and other travellers to gain access to public data-communication services in different countries, and it is a complicated process for the customer to get the necessary user identifications as each CEPT Administration has to be approached individually. It is also a problem for many CEPT Administrations to provide this service to visitors if they are not allowed to send bills to addresses outside their own country.

CEPT considers it important for the Administrations to satisfy the requirements of the customers and takes the view that problems could easily be solved if a user could get the necessary NUI for different countries from his Home Administration.

To obtain this, some guidelines are necessary and it is the purpose of the new CEPT Recommendation to have as simple guidelines as possible to avoid too complicated procedures between Administrations.

CEPT considers it important that this service is available to as many customers as possible, and therefore two alternatives have been drawn up:

- a. provision of visitor's NUI via Home Administration
- b. direct provision of visitor's NUI by use of credit cards.

The detailed guidelines and the above-mentioned alternatives are

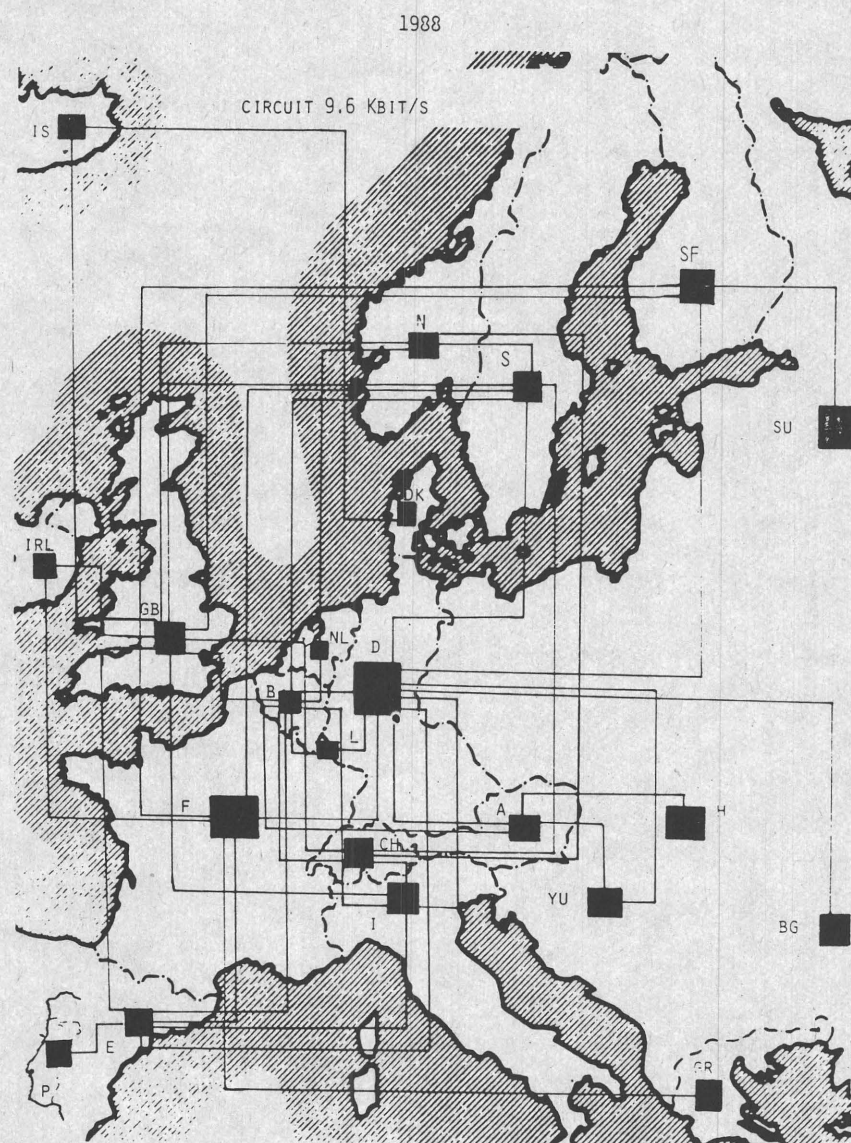
contained in a new CEPT Recommendation on the provision of visitor's NUI for public-data communication services.

In conjunction with this Recommendation CEPT has felt it necessary for a visitor not only to have a NUI for use in different countries

from his Home Administration, but also to know the log-on procedures for X-28 terminals to the different CEPT-networks. Consequently, CEPT has made a Recommendation which gives guidelines as to what such log-on procedures should contain. A booklet should be available from local PTT Administrations during 1988.

Based upon information supplied by

The Commercial Action Committee of CEPT  
Copenhagen



# Research into Networks & Distributed Applications European Teleinformatics Conference Euteco 88

Vienna, 20 - 22 April 1988

This Conference has been organised by the COST11ter action of the CEC. On the first day there will be an opening session and four plenary sessions, during which the following papers will be presented: -

## OPENING SESSION:

Welcome address

- H Putty - Austrian Minister for Science & Research

COST Framework: Targets and History of COST11ter

- H J Helms

ESPRIT: Cooperate to Compete

- J M Cadiou

Telecommunication and the Working Environment

- F Wodja

## PLENARY SESSIONS:

SESSION I: Chair - H Strasser, AL-CATEL AUSTRIA, A

- Synergies between Industry and University in Teleinformatic Research & Education: M Decina

- Institutionalising Human Factors in the Development of Teleinformatic Systems: K Eason

SESSION II: Chair - T Kalin, J Stefan-Institute, YU

- Future Computer and Communication Supported Working Environments: A Kundig

- FDT for Distributed Systems - Status and Perspectives: C Visers

SESSION III: Chair - M Medina, Polytechnic. University of Catalonia, E

- Distributed Operating Systems - Future Directions: S Mullender

- System Integration Issues of Forthcoming OSI Services: Raubold

- OSI-Network, Problems and Future Trends: P Linnington

SESSION IV: Chair - W Jensen, University of Tromsø, N

- An Overview of Issues in Linked Knowledge Base Systems: S Deen

- Basic Research in ESPRIT II: G Metakides

At the end of the first day there will also be a panel discussion on "Research Directions in Teleinformatics".

On the second and third days of the Conference a total of 78 papers will be given during 24 sessions, covering the following topics:

- Cooperative Work / Advanced Messaging (18 papers)

- Human Factors in Distributed Systems (8 papers)

- Security in Distributed Systems (8 papers)

- High Speed WAN Applications (7 papers)

- Architectural Issues in Distributed Systems (4 papers)

- Concepts in Distributed Operating Systems (3 papers)

- FDTs for Distributed Systems (12 papers)

- Distribution Aspects in Data and Knowledge Bases (10 papers)

- Management of Distributed Systems (5 papers)

- Networks / Infrastructure and User Networks (4 papers)

For a complete Conference program please write to:

EUTECO 88

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CEC/DGXIII

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## Regional Governments of the Federal Republic of Germany Show Interest in IES

Last December the IES Services and specifically the EUROCONTACT and IES Data Collection facilities, were presented to a group of representatives of regional governments and German Federal industrial associations.

The meeting was organised by the Brussels Office of the Regional Governments of the Federal Republic of Germany (Beobachter der Länder bei den Europäischen Gemeinschaften), and was kindly hosted by the organisation responsible for data and statistics for North Rhine-Westphalia (Landesamt für Datenverarbeitung und Statistik des Landes NRW) in Düsseldorf.

The interest of the participants was centred on their need to identify effective mechanisms through which they can obtain information on Community activities associated with research and technological programs and initiatives. This information is a prerequisite for them to assist the various organisations in their regions to become better aware of Community related activities and be encouraged to participate.

The presentation, to approximately 25 representatives, was also accompanied by online connections to the EuroKom and ECHO hosts. In the discussion following, a number of interesting points was raised:

- The diminishing cost of the equipment required assists the trend of using electronic media at an increasing level, which is showing itself to be a most effective mechanism for dissemination of information.
- The experience gained by the IES within ESPRIT could be used by other Community programs.
- While the efforts on information dissemination by ESPRIT were recognised, the need for a single point where one could get a clear picture of all Community Research, Development and Technology Program activities was expressed. At present, organisations interested to find information need to have contacts with each of the different Commission services coordinating a cooperative R & D program.
- Access to databases is a good way to pass and compare information but it is by no means the only way. There are other types of information required, which are of short life and can best be handled by news services or through periodical publications.
- It is recognised that national and regional organisations can form a good network of points which can assist Brussels in reaching further into the Community in its effort to inform those who could benefit from the Community research programs.
- The issue of multi-lingual requirements was raised but it was agreed that for practical reasons, the information content was the most vital and the additional problem of translating for specific language audiences could be addressed later.

Within the Commission, work has begun on measures to address the above points. More in later issues.

## ESPRIT Proposers' Day

The second ESPRIT Proposers' Day, relating to the fourth Call for Proposals, was held at the Centre Conference Albert Borschette in Brussels on 2 February. Attendance was higher than expected: a total of about 850.

During the day, delegates had the opportunity to discuss the technical content of the Call for Proposals and obtain information on the administrative procedures for ESPRIT projects. They were also able to find out about the technical content of current ESPRIT projects and special interest groups and, most importantly, to make contact with other potential project participants.

Both online and offline access to the EUROCONTACT database, which contains information on European organisations seeking partners for ESPRIT projects, was available, as was a demonstration of EuroKom.

Throughout the day a number of parallel sessions, chaired by representatives of DGXIII, was held to discuss the following technical areas of ESPRITII:

TOPIC	CHAIRMAN
Microelectronics and Peripheral Technologies	Mr G. Grata
Information Processing Systems	Mr J. Elmore
Computer Integrated Manufacturing	Mrs P. MacConnail
Integrated Information Systems and IT Application Support Systems	Mr J. Roukens
ESPRIT Procedures and Contract	Mr H. Hünke
	Mr A. Anzalone

Within ESPRIT there is presently a number of mechanisms for information flow among the participants of the program and those interested in its progress and results. Such mechanisms include the annual ESPRIT Conference, the various facilities offered by the IES Services such as the electronic mail and conferencing service EuroKom, and various publications and special interest groups such as CIM Europe, etc.

## ESPRIT Forum

So far, "IES News" has focussed on the Information Exchange System, has covered topics from computer networks to standards, and featured a small amount of general news items from the ESPRIT program, and from the autumn of 1987, has included the COSINE News. We would now like to expand "IES News" further and include a separate section called "IES Forum". In this section, program participants can publicise results of their projects, and scientists and engineers can address technical and industrial issues of general interest. In short, it is to be a forum for information exchange. We would therefore like to ask for suitable contributions on topics such as:

- results of projects, their exploitation and impact;
- important technical issues of general interest;
- relationships between ESPRIT activities and national and other international initiatives;
- reports about events of general interest to ESPRIT participants;
- new standards proposals and activities;
- tools and methods for use in collaborative R&D.

Contributions should vary from short announcements to 2-3 page articles, including illustrations. A short profile (and even a photograph) of the authors would be welcomed.

Please send your contribution to:

IES News  
ESPRIT Forum  
European Institute for Information Management  
13, rue de Bragançe  
L-1255 Luxembourg

### FUTURE EVENTS

- CEBIT.*  
Hannover.  
16 - 23 March, 1988.
- Effective Knowledge Engineering.*  
*Learned Information.*  
London.  
22 - 23 March, 1988.
- Computers in Retail.*  
Brighton.  
28 - 31 March, 1988.
- Integration of Voice and Data.*  
Frost & Sullivan.  
London.  
18 - 20 April, 1988.
- SICOB.*  
Paris.  
25 - 30 April, 1988.
- Infobase 88.*  
Frankfurt.  
3 - 5 May, 1988.
- Expert Systems and Production Planning.*  
University of South Carolina.  
Charleston.  
3 - 5 May, 1988.

### FUTURE EVENTS

- Communications 88.*  
Birmingham.  
10 - 13 May, 1988.
- Optical Information Systems,*  
*CIMTech and Meckler, Ltd.*  
London, 13 - 15 May, 1988.
- Eurotelecom 88.*  
Madrid.  
17 - 23 May, 1988.
- Human Factors*  
*in Telecommunications.*  
The Hague.  
24 - 27 May, 1988.
- ADA in Industry.*  
*CEC and ADA-Europe.*  
Munich.  
7 - 9 June, 1988.
- Private Switching Systems*  
*and Networks.*  
I.E.E.  
London.  
21 - 23 June, 1988.
- European Summer School*  
*on Machine Learning.*  
*Paris Sud Universite.*  
Les Arcs.  
18 - 28 July, 1988.