Esprit
Information Exchange System

# iesnews

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ICL is the information systems subsidiary of the UK-based STC group. As one of Europe's largest Communications and Information Systems Groups, STC's focus is to apply these technologies to the benefit of its customers. Although, as a group, we operate with 35,000 people in 70 countries, most of our operations lie within Europe. The target for future growth and prosperity for the Group, and especially for ICL, is Europe.

Because we see our future as growing primarily in Europe, we have enthusiastically supported, both within the United Kingdom and across the rest of Europe, all efforts to create the Single European Market, to establish international standards and to encourage the international competitiveness of European-owned companies.

## Guest Editorial: ICL and IES

Against this background it is a pleasure, as well as an honour, to be invited to contribute the first Guest Editorial to "IES News" by a representative of the IT Industry.

The guiding light in what we have done and in the way we plan our future is to "provide customer benefit", to assist our customers to improve their operational and managerial effectiveness. Our strategies bring together the capability to offer total business solutions to our customers, a clear focus on industry markets and a product strategy committed to Open Standards. This is backed up by an active partnership program to build collaboration and alliances. It also creates opportunities especially in the area of electronic information exchange systems. I would like to explore each of these three areas (Open standards, collaborations and information exchange systems) more fully in a European context.

ICL has a commitment to full open systems, not just to OSI, although this is a key component. Effective information systems require clear standards throughout all key systems functions. Open wiring is a requirement across Europe and

### LATE NEWS

***International Data Exchange Association (IDEA) Working Group to Study EDI Traffic Patterns in Europe***

*A survey is to be made of likely traffic trends, growth, movements and costs of Electronic Data Interchange (EDI) in a wide range of industry sectors. Emphasis will be on country of origin and destination, type of message and possible barriers encountered. The study will also examine migration patterns and possible replacement by EDI of older services such as facsimile or telex.*

***Network Access Simplified***

*COMCO (the developers of a smart card, devised to avoid travellers having to obtain local NUIs during their stays outside their home country where the NUI is registered), have announced that several major European hotel chains have started to install 1200 Baud modems to further simplify access to E-mail systems and other network facilities.*

### LATE NEWS

***Providing Access to UN Databases***

*The Advisory Committee for the Coordination of (UN) Information Systems (ACCIS) in Geneva has published a guide on how to access the wide range of databases provided by the various UN Organisations. Copies are available from the ACCIS Secretariat.*

***1989 Esprit Week.***

*Please keep the week of November 27 reserved for this event.*

### THIS ISSUE:



Esprit
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and Innovation

# Guest Editorial: ICL and IES

we are in the process of defining a full building wiring approach which recognises the particular technical requirements in Europe and optimises the use of currently installed cable. In the network system both assurance of confidentiality and network management standards are needed to ensure systems remain open. We are actively working in the USA as well as in Europe to put such standards into the public domain. For the end user, our customer, the X-400 Message Handling standards are keys to additional application specific services, while the work of X/OPEN in defining a common applications environment provides for application portability. In each case ICL is developing products compliant with the developing standards. For example, our Departmental systems range has been designed to support up to a hundred or more users with a common applications operating system environment - UNIX, conforming to the X/OPEN recommendations, and we are a founder-member of UNIX International.

Developing standards is one of the prime areas where ICL has worked together with partners including leading edge customers, other European suppliers and the European institutions. ICL sees this process of working with European partners as an essential step for European companies to take as they move out from their national strongholds into the new European home market, and ultimately to compete and win on a global scale. It is indeed encouraging to see these companies meeting and talking together at all levels from technicians to Chief Executives, despite their need to continue fiercely to compete with one another. Competition and collaboration are not mutually exclusive!

Programs like ESPRIT have greatly facilitated this change of attitude. Before that program existed, interaction between the European IT companies was fragmented and very limited in scope.

ESPRIT II projects in which ICL is involved are focussed towards our future product needs including applied research into user needs and applications requirements. This will enable us to build on the results already obtained through ESPRIT I and produce pilots for future products. For the future, we would hope to see DG XIII supporting an even stronger drive towards applications and to continue to provide its welcome leadership to the European information industries.

There are other forms of partnership. We are reinforcing our work in Knowledge Engineering with our investment in ECRC, the European Computer Research Centre in Munich. This is a privately-owned laboratory, set up as a joint venture by ICL, Bull of France and Siemens of Germany, focussing especially on logic based systems. Early software products and tools from this work are already being marketed, and during the next two years we will be enhancing our programs with European universities to develop innovative application demonstrators. Our partnership with Regnecentralen of Denmark is another example of our wish to bring together the best available technical skills to address the growing opportunities presented by the European investment programs.

There is also a growing movement of IT employees among the member states. No longer will it be the norm to dominate the organisation with "home" nationals, particulary in Research and Development areas. Freedom of movement of employees is already a prime benefit of the Community and ICL intends to recruit the best talent available. We have now spread our recruiting net to many of the principl seats of learning outside the United Kingdom. As the barriers to the movement of goods, services and capital within Europe come down, so the opportunity for electronic interchange of information, and increasingly of funds, will grow. This is something we are well aware of as market leaders in the UK in EDI via our International Network Services subsidiary. Here too there are pressures to join forces with customers, other network infrastructures and applications suppliers.

It is user needs that are increasingly driving the moves towards information exchange systems. More and more businesses understand the benefits of IT as a business weapon, and public sector organisations understand how IT can improve levels of service. IT is no longer just a cost-saver, but a driver which enables enterprises to interwork. One obvious area of growth is the interchange of data along the routes of the commercial cycle, between component supplier and producer, and producer and customer. This is especially true in Europe, where the removal of trade barriers and the deregulation of both physical distribution and telecommunications will cause rapid changes in market dynamics. Indeed, it is difficult to envisage how the Community's administrative functions will be able to operate efficiently without extensive EDI facilities.

ICL is anticipating the changes to the European market, both with a redirection of Research and Development and marketing investment

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to build up our current position, and with a policy of investment via our European Strategy Board and the work we are doing directly with the Commission.

Our goal is a European market based on open standards and open procurement but with equal access to opportunities among all the major trading blocs. We do not support discriminatory trade policies either in Europe or in the rest of the world, especially in the area of high technology, upon which the future prosperity of all of us so intimately depends.

And so, to our European friends we say, join us in establishing open, international standards so that together we can bring to our customers the benefits of automated information exchange that will oil the wheels of a united Europe.

ALAN ROUSSELL
Deputy Chairman
European Strategy Board
ICL, LONDON

# Operational Machine Translation System

## Introduction

Although machine translation (MT) is a concept almost as old as computers, it has often been regarded as a discipline unworthy of scientific or academic attention. Only over the past couple of years has it started to receive the type of recognition it deserves, mainly as a result of its proven performance in a handful of successful applications.

How can this rather sudden change be explained? First of all there is the demand factor. Translation requirements are currently growing by an average of about 15% per annum, not only for combinations of European languages but for Japanese, Korean, Arabic and Chinese too. Secondly, there has been an evolution in the type of translations required: in the fifties and sixties literary translations were the order of the day while our increasingly technological society of the seventies and eighties regards technical information as the top priority. And, finally, world politics – and, in particular, European politics – have led to new markets for an increasingly wide variety of goods and services requiring multilingual documentation and communication.

## Existing systems

Most of the systems in current use originated in the United States in the sixties and seventies. They fall into two basic categories: the larger, more complex systems such as Logos, Spanam and Systran which are normally installed on centralised mainframe computers and less sophisticated products which run on personal computers at the user site.

Quality of output depends very much on the language pairs involved, the type of document and, of course, the coverage of technical terminology. It often happens that a given product will provide a reasonable level of quality for one language pair and less satisfactory results in another.

Language coverage in MTsystems is now generally very good. Most operational systems cover French and English in both directions and most also have German and Spanish as either a source or target language. English is undoubtedly the most highly developed source language with a wide range of targets such as Spanish, Dutch, Portuguese, Danish, Swedish, Japanese and Arabic.

## Who uses MT?

Current users of MT fall broadly into two main categories: those who need to scan foreign language texts for information purposes and those who wish to translate material in their own language into various target languages for dissemination.

The pioneer among the information scanners is the United States Air Force who has used the Systran system since 1970 to translate first from Russian and later from French and German into English. The documents cover a wide range of technical sectors and user satisfaction is said to be very high. In Europe, the Nuclear Research Centre in Karlsruhe, F.R.G., has a similar application involving the translation of French-language research papers into English. In both cases, raw machine translation is channelled to

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subject-field experts who are able to cope well with less-than-perfect quality.

The most common application of machine translation for the second group of users is to be found in the translation of maintenance manuals. Most MT systems are being used in this way by large corporations such as Xerox, IBM, Dornier and Siemens. Here, a fairly high level of quality is required which is achieved by a combination of careful source document preparation, a dependable level of technical terminology in the MT system, and human post-editing. The major advantages are speed (products can be released to foreign markets earlier), consistency and cost.

In the public sector too, institutions such as NATO, some of the UN agencies and, of course, the European Commission itself are also making use of MT to translate technical reports, administrative documents and minutes of meetings. Raw MT quality is seldom adequate for user requirements but in some cases rapid post-editing (at a rate of say four pages per hour) provides acceptable results.

In France, machine translation is beginning to be used in significant volumes on the Minitel network where Gachot S.A. provides a number of on-line services using the Systran system.

## What remains to be done?

Machine translation can hardly be regarded as a technology in its own right. For it to be used successfully by the non-expert, much remains to be done to overcome many of the technical problems which often outweigh its advantages.

On the one hand, there is the problem of document preparation. The non-expert user sitting at his PC or Minitel terminal knows nothing of the workings of the translation software. He is unaware of the fact that a spelling error, missing punctuation or non-standard formatting will lead to translation errors.

Here progress can be made at two levels. On the one hand, spelling correction technology can be integrated in the automatic interface to the MT system while on the other, a degree of online screen editing can be introduced to draw the user's attention to syntactic and even semantic problems in his draft. This type of technology is developing quickly but improvements in user-friendliness are called for.

In addition, as companies with large multinational requirements become more aware of the cost of translation activities, it is probable that they will pay more attention than in the past to document drafting. The so-called editors now on the market are designed to discipline authors and their secretaries in the use of vocabulary and syntax in order to reduce to a minimum the possible ambiguities in a source text. This approach makes not only for better comprehension in the source language itself but for quicker and more reliable translations. Above all, source texts drafted along these lines are ideal for machine translation. Several companies have already adopted this strategy, particularly in connection with maintenance manuals and its acceptance is likely to increase in the future.

## Current trends

Manufacturers of machine translation systems have generally had more problems than might have been expected in the past year. The main reason appears to have been that expectations – and therefore investments – exceeded the immediate market potential of some of the market leaders.

Logos was forced to dramatically reduce its linguistic development effort after failing to conclude major contracts in Canada while Weidner closed shop in North America and Europe; the parent company, Bravice, continues to operate in Japan. Even Alps – which is more in the area of machine-assisted translation – has now decided to concentrate on translation services in general rather than on sales of its software.

By contrast, Smart continues to prosper in North America particularly in the translation of technical maintenance manuals and job descriptions. Greek has recently been added as a target language.

The low-priced MS-DOS software developed by Linguistic Products of Texas is also beginning to make inroads into the MT market. Some 100 packages for language pairs including English, French, Spanish and Danish, were marketed in 1988. Swedish is to be added this year.

Systran has been used more extensively by NATO, Xerox, the US Air Force and on the Gachot Minitel network. The European Commission has brought the system on-line for internal users and sees major applications of the software for the translation of patent literature.

Last but not least, the Japanese giants who nearly all have MT deve-

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lopments have continued to make progress on the applications side. Several systems are now operational for English-Japanese and Japanese-English.

## Progress on MT research

Over the past few years there has been a steady increase in the MT research sector. The most notable developments have been in Japan where all the large computer manufacturers are developing systems for English-Japanese and Japanese-English and to some extent for other language combinations. The most successful to date appears to be Fujitsu with its Atlas systems.

In Europe, the major research project continues to be EUROTRA co-financed by the European Community and its Member States. It is hoped that pilot systems for all the European languages will become operational by the end of 1990. EUROTRA differs from other MT systems in departing from an exclusively dictionary-based approach by adopting linguistic analysis, synthesis and transfer using a single analysis procedure for each language for direct translation after synthesis into all the other Community languages.

Other projects in Europe include DLT (Distributed Language Processing) in the Netherlands and METAL, orginally from Texas but now supported by Siemens in Germany.

In the United States, IBM has once again become involved in MT developments and is designing systems from English into Spanish, Hebrew and Finnish, mainly for the translation of its own technical documentation.

By and large, though, MT research results have been rather disappointing. Some large projects such as Calliope in France have been terminated. The Japanese systems have proved more difficult to develop than originally anticipated and Eurotra has suffered from difficulty in coordinating developments in the various countries concerned.

The result has been that more traditional approaches to MT have been generally more successful than innovative strategies.

## The future

Over the next ten years, machine translation is likely to become the norm rather than the exception. Technical documentation, which is already by far the largest source material for translation, will be systematically submitted to MT processing as the drafting of source material improves.

It is unlikely that any real revolutionary approaches to MT processing will arise in the near future. Existing systems will continue to improve with experience and new developments will fall back increasingly on well-established processes as the difficulties of programming new linguistic strategies are encountered in practice.

The main users will be multinational corporations and international organisations: publishers, who are increasingly supporting on-line information and translation services, will also become dependent on machine translation.

Systems will become more user friendly as improved peripherals are introduced whether on stand-alone systems running on PCs or to improve access to larger systems via telecommunications.

Input technology will also have a major impact on MT use as optical character reading improves and voice technology develops.

Finally, it is reasonable to suppose that by the end of the century it will be possible to carry out machine interpretation between various languages as voice analysis techniques are developed for automatic dictation. International telephone calls will no longer require each party to know the other's language. Conversations will be translated simultaneously and automatically.

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N.B. It is our intention to publish articles describing some of the MT systems mentioned (e.g. METAL, EUROTRA, etc) in future issues of "IES News".

# The TEDIS Program a Progress Report-April 1989

TEDIS is the Community program for *Trade Electronic Data Interchange Systems* which has as its aim the coordination and promotion of EDI within Europe. The program was launched in January 1988 with a budget of 5.3 MECU over two years.

This paper briefly reviews the main achievements and activities of the TEDIS program to date. It will also describe some of the main problems that are perceived as barriers to implementing EDI and make some suggestions as to how to overcome them.

## Coordination

One of the main tasks within the TEDIS program is to coordinate existing EDI activities. This embraces the national organisations concerned with the facilitation and simplification of trade procedures, and those European industry sector specific associations which have a particular interest in EDI. TEDIS already gives its full support to ODETTE in the automotive industry, CEFIC for the chemical industry, EDIFICE in the electronics and computer industry, EAN for the retail and wholesale trades and RINET in the insurance and reinsurance sector. In the transport industry no such all embracing trade association or EDI interest group existed. Consequently a TEDIS transport group, has been established to improve coordination in this vital sector.

All these associations have committed themselves to the use of EDIFACT, and are involved in its standardisation and message development work. The cross-fertilization of experience from implementation or trials of EDI in all these industries is a powerful stimulus to common practice.

The role of TEDIS is to provide logistic support for these associations, and encourage the exchange of information and experience between them. While different industries may have somewhat different requirements they face common problems in implementing EDI. The different industries are, in effect vertical markets, but the problems can be identified as horizontal: they are the same in all the sectors. Once these problems have been identified TEDIS seeks ways of resolving them within a European context.

The interest shown by Standardisation or Trade Facilitation bodies in various Member States has been very encouraging. Some have even established specific EDI Fora to concentrate resources on EDI activities. It is clear that potential users and suppliers of EDI software or systems need such local contacts who can explain what EDI is, can provide copies of the relevant standards, and who can coordinate national contributions to the UN/EDIFACT work. TEDIS supports the activities of these bodies and will encourage such initiatives wherever possible.

## Standards

One of the major obstacles to the development of EDI within Europe was the absence of a single standard. The Americans had one standard, the U.K. another; different industry sectors developed their own variants; as a result there was no way that people could expand their network of EDI partners beyond their original sphere of interest.

## UN/EDIFACT

During the last year the TEDIS program has supported the work of the EDIFACT Board for Western Europe. The Board is to be accorded Associate Body status with CEN, as the recognised authority for EDI standards within Europe.

The Commission provides, through the TEDIS program, staff and resources for the EDIFACT Board Secretariat, and a technical support team for the message design groups. In addition the expense of directing and controlling the work is defrayed by the program.

It has been very encouraging to see the widespread support for and commitment to UN/EDIFACT from the major user groups and the IT industry. The progress of the UN/EDIFACT work has been remarkable. UN/ECE/WP.4 and the Joint Rapporteurs' teams have defined the UN/EDIFACT Syntax and Data Element Directory, Syntax Implementation and Message Design Guidelines. The syntax is now approved as an ISO standard ISO 9735 and the Trade Data Element Directory as ISO 7372. These international standards have also been adopted by CEN as European Standards EN 29735 and EN 27372 respectively.

Work on specific messages has also been impressive. There are now some 20 messages either agreed, under trial or in an advanced state of development.

## CEBIS

It is a well established fact that whenever a group of experts meets to develop electronic messages they will produce as much paper as possible. In order to bring to the development process some of the benefits of modern technology the *Commis-*

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*sion EDIFACT Board Information System* (CEBIS) has been established. CEBIS contains all the data elements, segments and messages agreed at previous United Nations meetings. In addition it will contain any new or modified versions of these which may be created in the continuing development process between those meetings. It is currently used by the UN/EDIFACT Message development groups to help the design of new messsages. It makes it much easier to see what effect particular modifications to one message by one group would have on all the other messages or the work of the other groups.

The agreed part of this database will soon be made more widely available. A copy of the data will be made available on the ECHO database server which will be accessible via the public data network.

## Telecommunications

EDI does not demand entirely new telecommunications networks, but rather places new demands on existing networks. Consequently in this area the TEDIS program adds its weight to existing Community initiatives in the field of Open Network Provision (ONP) and ensures that the needs of the EDI community are met within the framework of a European Telecommunications Policy.

The potential volume of EDI traffic is unknown; but it is already clear that users do not think the existing data networks are providing the level of service they require. Some of these perceived inadequacies may relate to the different manner in which optional X-25 facilities have been implemented, others to the throughput capacity of international X-75 gateways, others again may actually be related to problems in the users's software. Variations in tariff levels and variations in the way they are calculated are also a major concern, both for data networks and leased lines.

Over and above these basic networks issues there is a need for standard implementations at the higher levels, to provide, for example, an integrated X-400 message handling service throughout Europe. TEDIS has been active here in encouraging the work of the CCITT in developing a specific MHS protocol for EDI. In the interim a European guideline for the use of current X-400 systems and services for EDI messages has been agreed at a series of meetings organised by TEDIS.

It is also important that the particular needs of the small and medium sized enterprise are recognised. Data Communication is too often seen as something only of interest to large corporate businesses. This cannot continue if the real benefits of EDI are to be realised at a Community level.

## Security

EDI users need to be sure that a message - an order or an invoice for example - has really come from the business or the organisation it claims to come from, and that no one has tampered with it. Some guarantee of delivery would be required - in the form of the electronic equivalent of the registered letter and the signed document. TEDIS has been considering the user requirements for security and authentification of EDI messages, and the way in which this can be achieved.

A report of a major study in this area has recently been presented to the Senior Officials Group Information Technology Standardisation (SOGITS). We are waiting for their reaction before further defining relevant activities within the TEDIS program.

## Legal Aspects

The legal status of EDI messages, their contractual validity and value as evidence will be a crucial factor in encouraging the use of the technology in both the commercial and public sectors. The use of traditional paper documents and handwritten signatures is hallowed by the law of many Member States. The same level of acceptance is not necessarily accorded to electronic messages.

A detailed study on the different aspects of legal significance for EDI in all the Member States is being undertaken at the moment. The report may suggest areas where the Commission needs to make recommendations or proposals for a harmonisation of the different legal and judicial systems within the Community.

The need for a model interchange agreement has also been identified. What is the use of an international data interchange standard if before each and every interchange the parties have to agree afresh all the terms and conditions which shall apply? A model interchange agreement would provide a framework within which specific agreements could be formulated. Coordination with the various industry sector interest groups which are already using EDI provides a fund of practical experience for such a model.

Coordination between the various user groups and with UNCITRAL and initiatives such as the UNCID rules developed by the Internation-

# The TEDIS Program a Progress Report-April 1989

al Chamber of Commerce will ensure that these recommendations facilitate EDI at the international as well as European level.

## Awareness and Promotion Activities.

TEDIS has been very active in promoting greater awareness of EDI, its advantages and benefits. One of the most active promotional activities is the setting up of pilot projects to show how the use of EDI can benefit small and medium sized enterprises. In addition TEDIS has supported conferences and exhibitions focussed on EDI. There is a steady request for information relating to the program, and a range of publications and promotional media have been and will continue to be produced to meet this demand.

## Pilot Projects

In October 1988 a call was published in the Official Journal inviting proposals for projects amongst small and medium sized enterprises involving the use of UN/EDIFACT and OSI standards. The responses demonstrate that an impressive range of industries and communities throughout Europe are interested in EDI, and would like to become more actively involved. Unfortunately the current TEDIS budget is not large enough to fund all these projects, but we hope to find some means to encourage those projects which we cannot directly finance.

## Conferences and Exhibitions

The Commission regularly participates in relevant conferences and exhibitions. Recently the TEDIS program has supported a demonstration of EDI at CeBIT '89 in Hannover. The aim of this demonstration was to show OSI standards such as X-400 or FTAM being used to transmit UN/EDIFACT messages between different vendors', equipment and software. Twenty-seven participants - members of the Eurosinet or OSITOP groups - including most of the major computer manufacturers took part in the demonstration.

TEDIS will continue to support and encourage European conferences and exhibitions which help to raise the level of awareness of EDI both amongst suppliers of systems and services and amongst potential users.

## Publications

In addition to the current range of information material, more publications are planned; some basic fact-sheets about EDI, covering the different aspects mentioned above; some more comprehensive guidelines in these areas; and some introductory material for those encountering EDI for the first time. A video is being produced to present the program to conference or exhibition visitors. Further material will be developed in conjunction with the users and the appropriate UN/EDIFACT group.

## Awareness Survey

A call for proposals relating to a survey of the current level of use, implementation and general awareness was published in early September last year. A contract has been awarded, and the work is now in progress. About 1,000 interviews will be carried out, which will give us a clearer picture of what is, or is not happening in Europe in terms of EDI. This report should be available within the next few months.

R. WAKELING
CEC DG XIII D5
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# JUPITER - a Project for Information Transfer, Education and Research

In the last issue of "IES News" we reported on the growing use by libraries of OSI services, with special emphasis on developments in the U.K. and The Netherlands. Since then, details have been released of the JUPITER project, funded by the (U.K.) University Grants Committee and sponsored by the JANET User Group for Libraries (JUGL). The Project which is undertaken by Glasgow University Library has as its aim to increase the knowledge and use of the JANET network among academic libraries. One of the activities will be to familiarise users with JANET gateways to other library services available on other networks. Further research and development will include the use of JANET for file transfer of catalogue records, access to Open Public Access Catalogues outside the U.K., stream-lining of interlibrary loan operations and document delivery.

Further information can be obtained from:

John MacCOLL
Project Officer
Project Jupiter
Glasgow University Library
Hillhead Street
UK-Glasgow G12 8QQ

# The PARLAKOM Pilot Test

## The Bundestag (German Parliament) opts for Open System

The pilot phase of the network provision for deputies, committees and administration of the Bundestag has now been completed successfully and some results and recommendations for future expansion have been released. Following a preliminary study by Gesellschaft für Mathematik und Datenverarbeitung and ADV/ORGA of the requirements, feasibility, aims and financial, personnel and administrative consequences of the provision of an integrated comprehensive communication and office system, the Bundestag recommended commencement of the pilot phase in early 1986.

An early far reaching decision taken was the adoption of product neutrality, i.e. products of several suppliers were to be involved in the project. This admittedly led to some difficulties, which however were solved by insistence on all products to meet open systems specifications. The equipment for the initial trials, which involved 51 participants among the deputies, came from Siemens, Nixdorf and Wang. Interconnected workstations and integrated offices were installed in the Bundestag and in constituency offices. Additionally, open access terminals for online enquiries were provided on some floors of the Bundestag building.

Interconnection of the various parts of the system was by a separate ISDN installation with gateways to the outside world.

A considerable effort was expended in providing training and guidance in the use of a technology which was alien to many of the test participants together with on-the-spot presence of technicians to assist in case of system problems, real or imagined. Both these steps, costly certainly, paid handsome dividends in the readiness to adopt the new methods of receiving and passing information and data, handling correspondence, committee minutes, etc. More than half the participants used the equipment provided for more than 5 hours a week, with some users logging more than 5 hours daily. User feedback was attended to as quickly as possible and adverse comments reported appeared to be largely trivial – size of letters on screen, brightness, and other ergonomic aspects.

One of the problems encountered was the interchange of formatted texts between the various products used in the test. Initially it was found impossible to achieve this even for two different products of the same supplier, but much progress has been made in this direction and partial solutions found. However, text interchange via the public Teletex system is feasible and the structure of the text is preserved in transmittal. Special security precautions were introduced to ensure complete privacy of such exchanges.

An important aim of the Parlakom trial was to enhance information provision to deputies from both in-house and external databases and the open access terminals were largely installed for this purpose. The proximity of the terminals to the points at which information was required proved to be particulary attractive for all users, with some deputies requesting facilities for database access from their constituencies.

The main emphasis was on legal and financial (economic) information. The problems of user training for this part of the trials have not as yet been fully resolved.

Because of the potentially sensitive nature of some of the data and documents handled and transmitted, considerable efforts were expended to ensure the highest degree of security and privacy possible.

Overall the results so far have led to an extension of the project: the aim is to equip at least 50 deputies and their Bundestag and constituency offices with workstations and communication facilities each year. Significant technical problems remain to be overcome, considering that in Bonn alone there are some 70 separate sites which have to be brought into the network. At the expansion rate proposed, full computerisation of all offices would not be complete until 1997 at the earliest, which means at least two Bundestag elections will fall in this period, with the problems arising from new deputies who will have to be trained as users. Acceleration to 100 new users a year would require a substantial increase in budget or a reduction in facilities to be provided.

It will be interesting to watch development and growth of Parlakom and any effects it may have on user behaviour. The work at the European Parliament on Ovide will obviously also benefit from the experience gained, and vice versa.

Based on information received from Gesellschaft für Mathematik u. Datenverarbeitung, F.R.G.

# EuroKom News

## Esprit I Success

We are currently in the rollover period between ESPRIT I and ESPRIT II, with the new ESPRIT II users just beginning to come through in substantial numbers (new user registrations have been on the upswing since ESPRIT Week last November, with 120 registrations in January alone).

This is a good time, therefore, to look back at ESPRIT I, and evaluate our performance in providing a service to that community. We are greatly encouraged at EuroKom to find that our market penetration was far beyond our expectations, and, when compared with the larger and more established commercial vendors in this business, our penetration, **our market,** is better after five years than some of our commercial competitors have achieved after twenty years in **their** markets.

There were 477 organisations participating in ESPRIT I. During the period of the program, we provided a service to 331 of these, that is just about **69%.**

This must be seen as a tremendous achievement, firstly for the IES group, who started the whole thing just five short years ago, and secondly for the EuroKom team, who have, in this same short time, grown from a couple of people supporting a ten-year-old DEC-20 to an established services company, doing business in 22 countries, with 25 staff members, two powerful mainframe computers representing a total investment of the order of 1 MECU, and user numbers now rapidly approaching 2,000.

Since the original estimates, when we commenced providing a service, were that our penetration would be small, of the order of some hundreds of users, we can be pardoned now for a few words of congratulation, to the IES people and ourselves; we provided a service to almost 2,000 users (at peak) during ESPRIT I, and, based on recent registration activity, it looks like we will be doing even better for ESPRIT II.

## The Brussels Office

Below is an illustration of our new Local Support Office at Rue Guimard in Brussels, which was opened by Dr. Sean McCarthy, the Irish Minister for Science and Technology, in March. From this ground floor office, we will be providing training, demonstrations, and support for our users at the CEC and other Brussels-based organisations, and the office will also act as a spearhead for our support and marketing activity throughout mainland Europe.

The office is now fully staffed and equipped, and any EuroKom enquiries can now be directed to either of the following locations:

**EuroKom Brussels**
Rue Guimard 15
Tel.: +32 2 513 1915
Fax.: +32 2 513 2853
E-Mail eurokom_brussels@eurokom.ie

**EuroKom Dublin**
Belfield, Dublin 4
Tel.: +353 1 697890
Fax.: +353 1 838605
E-Mail eurokom_dublin@eurokom.ie

Our primary objective for 1989 is to further develop our support capability throughout Europe, to cater for the expected large increase in our user numbers over the next couple of years. We are in the final stages of arrangements for three further Local Support Offices, for the U.K., Central Europe and Northern Europe, which we hope to be able to announce in the next issue of the Newsletter.

In the meantime, we look forward to welcoming our many users, both from Brussels and Europe generally, to our Rue Guimard offices. Specific user-support events and training schedules, based at Rue Guimard, will be anounced in direct mail-shots to relevant users soon.

## News in Brief:

Several major developments are in progress, which will be touched on briefly here, and will be discussed in more detail in future issues of the Newsletter.

## Eurocontact:

The PC version of EUROCONTACT is currently being installed at the National Contact Points in each Member country. All will have been

# EuroKom News

completed before the next issue, and we will take the opportunity then to set out some details of the role of these National Contact Points, and the new, distributed EUROCONTACT service.

## X-400 Gateway:

The pilot phase of this service is now drawing to a close, and the next stage of this activity is currently being discussed with IES. The gateway was successfully demonstrated at Esprit Week, and X-400 mail was exchanged between the central EuroKom host and:

- A number of X-400 Personal Computers at the Palais de Congres,
- Several sites abroad, and, interestingly,
- The ROSE consortium, who also had a demonstration stand at the Palais.

During the pilot phase, we have been establishing connections with various identified sites, including a CEC site, some research establishments, and some commercial concerns. A summary of our experience during the Pilot Phase may be available for the next issue.

## And Finally.....

If readers have any queries in relation to any of the above material, or would like further information (or, hopefully, a EuroKom User Agreement?), we'll be happy to receive a note or a call at either of the above addresses.

# Human Factors in Information Technology

## What is HUFIT?

ESPRIT project 385 is the focal point for human factors in the Office Systems program.

The key objective is...

- to provide the European IT industry with a vital means of developing world class products.

These will be products, which...

- are closely matched to the tasks, needs and characteristics of users
- are made feasible and more economically viable by the use of user-centred design and development tools
- have effective, usable and flexible user interfaces.

The project has 3 main areas of interest:

## Area A - from conception to use - an integrated human factors contribution to product design and development

This part of the project aims to ensure that by providing appropriate human factors inputs during the product design process, usable IT products will be designed by the European IT industry.

The critical steps in design that require human factors input have been identified and tools have been developed which deliver the human factors to designers in ways they can readily use to enable them to design usable IT products.

Project outcomes:

**The HUFIT Toolset** - Human factors tools and techniques have been and continue to be developed for use by designers throughout all the stages of product design.

It currently comprises sets of human factors tools which address particular issues in user-centred product design. The Toolset has been designed for use primarily by designers who have little or no previous experience of human factors issues.

The Toolset consists of:

- **QED** - Quick Ergonomic Design, a set of primers on key human factors issues in IT product design and an introduction to other tools in the Toolset.
- **The User Requirements Toolset** encourages full and effective consideration of users and tasks during product planning, in the development of user requirement specifications.
- **The Specification and Design Toolset** comprises a Functionality Matrix for early assessment of the technical specification and

# Human Factors in Information Technology

detailed guidance on user-computer interface design.

- **The Human Factors Evaluation Toolset** assists companies in carrying out effective usability evaluations of products at various stages of the product life cycle.
- **The Documentation Toolset** provides accessible advice for technical authors when producing user manuals.
- **A Methodology for the Identification of User and Task Characteristics** aids human factors practitioners in the detailed analysis of those characteristics for the development of IT products.
- **CUSI** - Computer User Satisfaction Inventory is a tool to rate the perceived usability of a software product or prototype.
- **IT Support Tool for Managerial Tasks** assists developers of managerial planning-support products.

**INTUIT** - a demonstrator design support system to deliver human factors methods and guidance in an appropriate on-line form.

This is a software development tool which uses knowledge engineering techniques and encapsulates expert human factors knowledge to assist a design team. It provides a CASE tool that promotes good human factors practice and delivers contextually relevant design guidance. It is a tool for user-centred design in the construction of usable application software and in particular in the building of user interfaces. Both the display formats and dialogue management components of interface design can be produced with computer assistance from the system.

**INTUIT** is intended to provide on-line support for the development process to allow human factors expertise to be applied to the development process directly. It is intended to operate proactively using human factors expertise to generate usable systems.

**The CHF Information Service** - the collation and classification of computer human factors knowledge and the provision of an on-line literature search facility.

A unique bibliographic information service dealing specifically with the diverse field of Computer Human Factors (CHF) is being developed by HUSAT. Previously no single commercially available abstracting or indexing service existed dealing solely with the subject area of CHF. Potential users of the service will include human factors experts, designers, information providers and other interested specialists such as engineers and systems analysts. The service provides on-line access to a database of bibliographic references with abstracts, conference reviews, book reviews, bibliographic citations to books, reports, standards, conference papers, conference proceedings and non-book materials and journals.

A Thesaurus and Classification of Computer Human Factors have been developed which are available on the interface to aid users during the construction and refinement of searches. The CHF Information Service will provide on-line access to a unique and constantly updated source of CHF literature via an easy to use interface.

## Area B - Integrated human computer interfaces - theoretical and empirical investigations towards integrated user interfaces

The primary purpose of this part of the project is to provide theoretical and empirical knowledge about basic interaction modes, i.e. direct graphic manipulation, natural and formal languages, etc., for application in products with integrated human-computer interfaces.

Project outcomes:

**MAITRE** is a development environment for integrated multi-media interfaces with a series of application prototypes bringing together the project results on different techni-

## Seminars 1989

| | | |
|---|---|---|
| Interface Design | Stuttgart | 17-18 April |
| User Centred Design | Loughborough | 23-26 May |
| Rapid Prototyping | Stuttgart | 15-16 June |
| User and Task Analysis for Designers | Loughborough | 26-27 June |
| The Design of Integrated Interfaces | Stuttgart | September |

# Human Factors in Information Technology

ques of information presentation and user-system interaction.

**DIAMANT** is a dialogue management tool for the development of integrated graphical interfaces. DIAMANT adopts object oriented principles to provide a flexible and efficient environment for building interactive prototypes and applications.

**GLOT** is a Glossary of Terms of IT and Office Systems in three languages (English, German and French) now being put on-line.

## Area C - Information transfer

This part of the project aims to raise the level of awareness, knowledge and practice of human factors in the European IT industry.

This is achieved by:

- Ensuring the development of practical human factors tools for designers in IT supplier industries.
- A Seminar program to support the human factors tools in operation - at both design team and managerial levels.
- The provision of human factors consultancy to assist companies to tailor the tools precisely to their product life cycle, or to set-up and operate Human Factors Laboratories.
- The development and dissemination of publicity and marketing material at conferences and exhibitions, and through academic and industrial publications.

The program of Workshops and Seminars has been designed to heighten awareness of important human factors issues in design and to provide practical training in the application of the human factors tools in product design.

## Workshops 1989

The HUFIT Team can provide in-house human factors workshops of one-half to two-days duration in chosen aspects of the HUFIT Toolset. These workshops will, where possible, be tailored to the specific requirements of the company requesting the workshop and will be targeted appropriately for Designers or Managers.

For further details please contact the Seminar and Workshop Organiser:

Mrs Jackie Baseley
ESPRIT-HUFIT Seminar Organiser
HUSAT Research Centre
The Elms
Elms Grove
LOUGHBOROUGH
Leicestershire LE11 1RG
UK

Tel.: 0509/61 10 88
Fax: 0509/23 46 51

## The HUFIT Consortium

Two academic centres of excellence are responsible for the organisation of the project:

**The Fraunhofer Institut für Arbeitswirtschaft und Organisation (Prime Contractors) IAO, Stuttgart, FRG.**

**The HUSAT Research Centre, Loughborough, UK.**

The industrial partners representing premier companies in the IT office systems area:

**Bull, Massy, France**
**ICL, Bracknell, UK**
**Olivetti, Ivrea, Italy**
**Philips, Eindhoven**
**The Netherlands**
**Siemens, Erlangen, FRG**

Also represented in the project as subcontractors are:

University College Cork, Eire
University of Munster, Germany
University of Minho, Portugal
The Piraeus School of Business Studies, Greece

Dr MARGARET GALER
Technical Director Area A
HUFIT Project
HUSAT Research Centre
Loughborough
UK

For further information, please contact the Project Officer at the following adress:

Mr. Didier Bouis
CEC DG XIII A-I
Tel.: + 32-2-23 60 283

# Public Conferences on EuroKom

EuroKom (the electronic mail, file transfer and teleconferencing service established by the Commission of the European Communities) has many public conferences comprising notices and comments. One of those conferences (European Institution IT News), acts as a bulletin board for short notices and news items about Information Technology & Telecommunications (IT&T) arising from the activities of the various European Institutions e.g. The Commission, The Council of Ministers, and the European Parliament, etc.

As part of the IES services, the "Brussels Correspondent" monitors the internal activities of the European Institutions and selected items of interest relating IT & T are announced on EuroKom in order to keep members up to date. The following are recent announcements issued:

## Community IT & T Programs

1. **Brite/Euram. EuroKom Text 56602.**

   Council of Ministers adopt a Community research and technology development with a budget of around 500 MECU over a four year period.

2. **Formenter - A Crisis Management and Catastrophe Prevention Project. EuroKom Text 58140.**

   Using information technology techniques, the project will be designed to operate in complex environments to avoid disasters like Chernobyl, the Challenger launch, the Piper Alpha fire and aircraft crasher.

3. **Call for Proposals for the Setting up of Conformance Testing Services in Information Technology and Telecommunications. EuroKom Text 60386.**

   Centres wishing to participate will be required to offer services equally to all members in the European Community and coordinate their work into a Community-wide mutual recognition scheme. Closing date 10 May 1989.

4. **Sprint (Strategic Program for Innovation and Technology Transfer). EuroKom Text 61894.**

   Council of Ministers approve Sprint program with a budget of 90 MECU.

5. **Value (Dissemination and Utilisation of Results from Scientific and Technological Research). EuroKom Text 64282.**

   Council of Ministers adopt a common position on a new Community research and technology infrastructure program with a budget of 38 MECU for the period 1989-92. Program to be reexamined in a second reading at the European Parliament.

6. **Aim (Advanced Informatics in Medicine in Europe). EuroKom Text 3188.**

   Following the call for proposals (closing date 14 February 1989) a decision on selected projects will be announced soon.

## OTHER ITEMS

7. **Strategy for Advanced European Communications in the 1990's. EuroKom Text 59164.**

   First Strategic Audit report for the development of advanced communications carried out within the RACE program published.

8. **State Aid. EuroKom Text 66112.**

   Commission approves under the treaty establishing the CEC's rules on Aid granted by Member States, F.R.G.'s notification to fund an R & D program on artificial intelligence with a budget of 1.15 MECU.

9. **HDTV (High Definition Television System). EuroKom Text 5476.**

   Commission approves a derogation under Article 92(3)(b) of the CEC treaty in respect of U.K. and F.R.G. participation in the Eureka EU-95 HDTV R & D project.

Any EuroKom user can organise a public conference on a topic of particular interest which can be entertaining, technical or informative and invite other people to become members of and participate in that conference so long as the organiser can keep the discussion going.

Registered users of EuroKom who wish to become members of the European Institution IT News conference can do by issuing the command: **"Member European Institution IT News".** To read the above entries, enter the command: **"Review"** then the specified text number(s) (e.g. **56602, 58140**) Non-registered users who would like further information on how to join EuroKom should contact:

EuroKom
UCD Computer Centre
Belfield
Dublin 4
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Tel.: + 353 1 697890
Fax.: + 353 1 838605
Telex: 91178 UCD EI

COSINE NEWS

Cooperation for Open systems Interconnection Networking in Europe.

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

# The RARE European User Meeting on High Speed Networking

RARE Working Group 6 (WG6) is promoting high speed wide area networking within the research community in Europe. Due to the lack of direct contact with the most important user groups and communities however, the idea of a user meeting was investigated in order to bring together all the important user groups and to gather information about the user's needs. A European User Meeting on High Speed Networking was therefore organised by WG6.

This meeting, sponsored by CEC-DGXIII, was held at CEC Brussels, on 28 February 1989. More than 70 people were present. A large spectrum of user communities was represented and most of them delegated one or several speakers. It was a pleasant surprise to find industry well represented, both as network users and also as network product manufacturers.

The talks showed clearly that the beginnings of high speed wide area networking already exist in the Mbit/s range within several disciplines. The most advanced actors are: the aeronautics R & D with 1 Mbit/s links around and between supercomputers; the High Energy Physics with a 2 Mbit/s network which will soon link large centres to CERN for the transmission of samples of data produced by the LEP, the new CERN accelerator which is just coming into use; the Baden-Württemberg BelWu metropolitan network which uses 140 Mbit/s optic fibres; the national research backbone at 2 Mbit/s; Eurospace, the Distant Learning Program, which is trying to use remote TV and computer operations in an interactive environment; the European Commission's own laboratories at Ispra which are studying techniques to investigate image distribution and computer information systems, based on broadcast rather than point to point.

In other fields, plans are less concrete, but needs are clearly recognised and stated. In many cases, the initial demand comes from user requirements to use supercomputers at a distance, but other needs are mentioned and are likely to grow with practical experience. This is the case in Combustion Analysis, in Astronomy and Space Physics, in Fusion research, etc.

It was interesting to note that academic and industrial groups seem to have comparable needs, apart from the much greater importance given to security in industrial networking. There was a consensus between the participants that three new phases would be needed in European wide bank trunk capacity: 2-10 Mbit/s at once, 34-140 Mbit/s in only a few years, and Gbit/s before the end of the century.

WG6 was much encouraged by this very fruitful meeting to continue its efforts to study and promote high speed wide area networking for the European research community. The CEC, which was well represented at the User Meeting, also encouraged these efforts; at the end of the meeting, the DGXIII representative asked WG6 for a report to summarise the materials and make proposals. WG6 started this work immediately, as an "open" meeting was held the next day. WG6 members were happy to welcome several new participants, who decided at the end of the user meeting that it was worth staying one more day in Brussels: thanks to them, WG6 now benefits from a better representation of several important user groups. WG6 has already circulated a preliminary draft of this report to the user community in order to obtain timely feedback to ensure that the user's needs are correctly represented.

J. Prèvost
RARE Working Group 6

# User's Open Handbook Systems

When "IES NEWS" received and published last April letters pointing out the need for an OSI Products Catalogue and the promise, in response, from the Open Systems Support Team of the Department of Trade and Industry, that such a publication was in preparation, your Editor and many of you possibly felt that this prospect was a long way from fulfilment. How wrong can one be. Last week saw the arrival of a handsome binder "Users' Open Systems Handbook", prepared by Level - 7 Ltd under contract to the Information Engineering Directorate of DTI. The publication as received comes up in all respects to the outlines given a year ago and for clarity of style and presentation exceeds the hopes one may have nurtured for such a book. Obviously, the information presented is designed for and aimed at UK readers and users, but it could well be considered an essential data source for all other European students and users of Open Systems.

In his foreword Keith Bartlett of DTI clearly states the objective and aims of the present volume:

"Communications problems can be reduced if there is effective electronic communication. A common electronic communication structure based on international standards and fully supported products incorporating those standards is now a practical proposition. The standards result from work which started in 1977 on the concept of Open Systems Interconnection - OSI. OSI consists both of a framework and a set of standards for communication and interworking between computer based systems which are widely supported by governments, industry and academia.

Many of the organisations which encourage and support collaborative research programs such as the Department of Trade and Industry in the UK and the Commission of the European Communities, have taken policy decisions favouring the use of OSI within projects. These policies are gaining increasing support because of the advantages of developing a communications culture which is capable of outliving the projects and useful in a wider range of related business and technological activities.

...The Handbook is intended to be a reference manual for project managers in a wide range of scientific collaborative research. It does not require that they themselves become experts in Open Systems, but that they use the expertise accessed through the contact points and other sources within the Handbook."

The first section gives a short, but comprehensive, introduction to OSI, its evolution, the reference model, relevant base and functional standards (and their interrelationship), procurement standards and conformance testing. The next two chapters deal with Prime and Support Functions. The former are defined as functions facilitating information exchange between systems and the latter as those functions enabling a prime function to operate. Four prime functions are dealt with in detail: directory, electronic mail, file transfer and management and structured document interchange. For each of these there is little a user would need in additional data to allow a comprehensive understanding of the purpose and functioning of the various functions - naturally there is no technical detail which would confuse or scare away the normal user-reader. The Handbook is not after all a substitute for a technical manual. A very high level of detail is presented, both in scope and clarity of presentation, - eg - the listing of all operations and their required support for Directories. A further example is the table of Attribute Syntaxes for Directories. Normal Electronic Mail users, who have so far applied E-Mail only to interpersonal message handling or possibly conferencing will be interested in existing and future facilities which form part of the final OSI conformance set of OSI conformant functions including support functions such as Directory Enquiry Services and Fonts, Character Repertoires and Encoding.

Readers will benefit greatly from the section on Where to Get Help. There are details of Trade and User Organisations, UK, European and International, ranging from INTUG to EurOSInet, notes on Conformance and Interoperability Testing Services, lists of OSI products suppliers, and short paragraphs on other useful organisations in this area such as NCC. A bibliography and glossary complete the present Handbook, which is in the form of a looseleaf binder with room for promised updates. The price of the handbook and updates for the next 12 months is £ 99.

Further details from: Level - 7 Ltd
Guildgate House
The Terrace
Wokingham
BERKS RG11 1BR
UK

# News from CEN/CENELEC

## ITSTC, ITAEGM, ITAEGS, ITAEGT...

As is well known, the IT field is replete with more or less obscure abbreviations and acronyms. The CEN/CENELEC work is unfortunately no exception.

As explained in the last issue, ITSTC is the IT STeering Committee, where delegates from CEN, CENELEC and now also ETSI (previously CEPT) take joint decisions in matters related to IT. Some of these matters are found to belong exclusively in the CEN, CENELEC or ETSI area and then the leadership is delegated accordingly. The April meeting of ITSTC was the first to include ETSI participation, although formal agreement on this between CEN/CENELEC and ETSI is still pending.

Under ITSTC there are three IT Advisory Expert Groups. ITAEGM deals with Advanced Manufacturing Technologies. It has elaborated a work program (Memorandum M-IT-04) and set up three working groups:

- Architecture (AMT); to prepare "a set of European Standards defining a Manufactured Environment Architecture to provide a framework for standards hardware and software elements of an AMT system and the production of a consistent set of methods for the analysis and representation of industrial enterprises and AMT systems within that architecture".
- Standards Parts Library (LIB); to prepare "a set of European Standards defining a European library of standard components stored in neutral digital form for access by a range of CAD systems".
- Mechanical Standards (MES); to prepare "a work program on required European Standards or extensions to existing mechanical equipment standards to accommodate the requirements of using such equipment in an AMT environment with particular emphasis on the flexible use of ancillary equipment".

ITAEGM will also need to develop a reference model to cover all identified aspects of automated manufacturing.

Additionally, ITAEGM proposes mandates on (1) ergonomic aspects relevant to AMT, and (2) a STandard for the Exchange of Product definition data (STEP).

Membership in ITAEGM is open to up to three experts from each CEN/CENELEC member country. The Chairman is Howard G. Mason, British Aerospace. The group will have met on 18 May 1989.

On to ITAEGS, the ITAEG for the "coordinated planning of Open Systems Functional Standardisation". The main task of ITAEGS is to maintain the ITSTC work program, on OSI functional standardisation, manifested in Memorandum M-IT-02, the fourth yearly issue of which is under preparation and will be published during the second half of 1989. Additionally, the work in ISO/IEC JTC 1 on Technical Report 10000 is now giving rise to the need for ITAEGS to revise Memorandum M-IT-01 – The Concept and Structure of Functional Standards – as well as the basic guidelines for the elaboration of Functional Standards, in order to align the European work with the ISO/IEC work.

Up to three experts from each of CEN, CENELEC, ETSI, and EWOS are nominated by these organisations as members of ITAEGS. Due to its recent restructuring, the position as chairman is currently vacant. The next ITAEGS meeting is on 15 June. An Open Meeting, with discussion of the proposed next issue of M-IT-02, will be held in June (preliminary dates: 10-11).

ITAEGT-T for Private Telecommunication Networks – is the most recent of the ITAEGs. It started as a CENELEC/CEPT group – with ECMA liaison – working on ISPBX standardisation but was later transformed into its current appearance. A work program comprising 18 items has been elaborated, and the first documents are expected to be sent out for vote before this issue of IES News is printed.

The ITAEGT membership consists of up to three experts nominated by CENELEC and CEPT each; additionally three experts nominated by ECMA shall always be invited. The Chairman is Dr P.A. Trudgett, British Telecom. The last meeting of ITAEGT was held on 26 April 1989.

## What is a European standard?

There are three kinds of European standards:

- The European Standard, or EN. It must be given the status of national standard in the member countries, and any conflicting national standards must be withdrawn.
- The European Prestandard, or ENV. It is a prospective standard for provisional application, and conflicting national standards may be kept in force. The ENV must however be announced and kept available by the national member.

# News from CEN/CENELEC

## ITSTC, ITAEGM, ITAEGS, ITAEGT...

- The Harmonization, Document, or HD. It must at least be announced at national level, and any conflicting national standards must be withdrawn. National standards may contain national deviations (on certain conditions).

The ENV solution is intended for use when the situation is not stable enough for an EN but nevertheless some European stability is desired. Its lifetime is restricted to three years, and it must be reviewed by the members after two years. So far, this type of standard has only been used within the ITfield, which is the reason for the common confusion between the concepts of ENV and Functional Standard (an OSI concept). But a Functional Standard may very well be an EN (in fact, the Functional Standard ENVs are intended to become ENs with time), and ENVs could very well be published within other fields of standardization.

### IT testing and certification

In last issue you were told about the European Committee for IT Testing and Certification, ECITC. The OTL group (for OSI Testing Liaison) is in the process of being (re)created under ECITC and has the following tasks:

- Providing technical advice on the requirements for and harmonization of the way that OSI testing support functions are carried out within recognition arrangements accepted by ECITC. Right now this means in particular the harmonization of the overlap between the proposed arrangements for wide area networks (OSTC) and for MAP/TOP (ETCOM). It also means that OTL is working on a vocabulary on this quite new and quite confusing area. In the future OTL will also give advice on – among other things – the specific technical requirements to be used for the accreditation of OSI testing laboratories.
- Keeping under review the testability of OSI functional standards,

| | |
|---|---|
| AMT | Advanced Manufacturing Technologies |
| ASB | Associated Body |
| BSI | British Standards Institute |
| BT | CEN Technical Board |
| CA | CEN Administrative Board |
| CAD | Computer Aided Design |
| CEN | European Committee for Standardisation |
| CENELEC | European Committee for Electrotechnical Standardisation |
| CEPT | Commission Europeen des Postes et Telegraphes |
| CSC | Character Sets and Coding |
| CSMA/CD | Carrier Sends Multiple Access Collision Detection |
| CTS | Conformance Testing Services |
| ECITC | European Committee for Information Technology Testing and Certification |
| ECMA | European Computer Manufacturing Association |
| EDIFACT | Electronic Data Interchange for Administration Commerce and Transport |
| EN | European Standard |
| ENV | European Pre-standard |
| ETCOM | European Testing and Certification for Office and Manufacturing Protocols |
| ETSI | European Telecommunications Standards Institute |
| EWOS | European Workshop for Open Systems |
| HD | Harmonisation Document |
| ISO/IEC | Information Electrotechnical Committee |
| ISBX | International Standards Private Branch Exchange |
| ITAEG | Information Technology Adhoc Expert Group |
| ITAEGT | Information Technology Adhoc Expert Group Private Telecommunication Networks |
| ITAEGM | Information Technology Adhoc Expert Group Advanced Manufacturing Technologies |
| ITAEGS | Information Technology Adhoc Expert Group for OSI Functional Standardisation |
| ITSTC | Information Technology Steering Committee |
| JTC | Joint Technical Committee |
| LIB | Standards Parts Library |
| MAP/TOP | Manufacturing Automatic Protocol/Technical and Office Protocol |
| MES | Mechanical Equipment Standards |
| NPL | National Physical Laboratory |
| OTL | OSI Testing Liaison |
| OSTC | Open Systems Testing and Consortium |
| QSAS | Quality System Assessment Supplements |
| SDIF | SGML Document Interchange Format |
| SGML | Standard Generalised Markup Language |
| STEP | Standards for Exchange of Product Definition Data |

# News from CEN/CENELEC

## ITSTC, ITAEGM, ITAEGS, ITAEGT...

and the status and suitability of the necessary testing standards.

The work will be done in liaison with other relevant groups (e.g. in EWOS and ETSI), and it should be stressed that OTL will not take any substantive decisions on its own but make proposals to ECITC (or, concerning standards, ITSTC). Chairman is Dr Dave Rayner, NPL, UK. The group last met on 27-28 April 1989.

## Standardisation of test specifications

The importance of testing and certification of standards is being stressed more and more. On the Commission side, there are not only the Conformance Testing Services (CTS) initiatives but also a wide-scope mandate to CEN/CENELEC on the standardisation of test specifications for a large part of the European IT standardisation which has been achieved or which is in progress. However, at the moment only the first step of this rather gargantuan work is being taken, namely to formulate a program, taking into account aspects such as the need for test specifications (they are not always needed, or always possible to elaborate), and work already done or in progress (in ISO/IEC or by CTS contractors).

EWOS is also engaged in this work and has formulated a policy statement. The scope and extent of the EWOS engagement is however still under discussion.

## CEN Technical Board

The CEN Technical Board (BT) met on 15-17 March. Among the decisions relevant to the IT field were the following:

- To convene an ad hoc meeting of experts in order to clarify the situation regarding so-called Quality System Assessment Supplements (QSAS – definitions of requirements to be satisfied in an assessment of a quality management system) for the IT field. The group should propose a course of action to the BT. BSI has offered to act as host for the meeting.
- To support the proposal by the EDIFACT Board to become an Associated Body (ASB), meaning that proposals elaborated by that body will enjoy a shortcut into the CEN standards processing machine (if certain conditions are fulfilled). The proposal will now be further discussed by the CEN Administrative Board (CA).
- To send out for formal vote ISO 9069, SGML Document Interchange Format (SDIF), as prEN 29 069.

## CEN workshop on transaction cards

The CEN workshop on transaction cards, announced for April, will be held on 22-23 May 1989. Participation is free of charge; further information from the CEN Central Secretariat.

A report from the workshop will be available to all interested parties.

## Two-year reviews of ENVs

According to the CEN/CENELEC Common Rules, each ENV shall be reviewed after two years, meaning that the members shall decide on whether to transform it into an EN (revised or not), to extend its ENV lifetime (once only; revised or not), or to withdraw it. This procedure has now been applied, for the first time, to ENV 41 101 and 41 102 (CSMA/CD single LAN and multiple LAN, respectively). The result was that they should be transformed into ENs after revision by EWOS.

## Character sets and their coding

The CEN/CENELEC working group CSC (Character Sets and their Coding) met in Athens on 10-12 April 1989 to discuss and vote on ENVs 41 404 (character repertoires for information processing systems interchanging data via Teletex), 41 506 and 41 507 (data stream format for interchange via Teletex and via Videotex, respectively). The group is also working on a technical report describing the problem complex on which it is working and showing the total context and system of its standards.

pr ENV 41 505 (character repertoire and coding for line drawing) is currently being ballotted by correspondence.

In addition, ENVs 41 505, 41 502 (character repertoires and coding for information processing systems, interchanging data via Videotex and Teletex respectively) and 41 503 (European graphic character repertoires and their coding) are subjected to two-year reviews (cf. above).

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# Significance of ITU (International Telecommunications Union) Information Services for CCITT Participants

Readers will certainly be interested in Information Services which are used in other important IT user groups outside the ESPRIT family. It is especially interesting to note the high degree of similarity in conception between these.

## 1. Background

The Plenipotentiary Conference (Nairobi, 1982), in Resolution 67, recognised the importance of extending the use of automation technology in improving production and distribution of publications and documents to all administrations. The scope of Resolution 67 includes not only the preparation of documents and publications, but also their distribution with implicit reference to electronic distribution of information. The General Secretariat and the specialised secretariats have long been aware of the potential value of such distribution for member administrations.

In this context, requirement studies were carried out by experts for a "Document Reference System". The studies indentified that the most urgent requirements were for Electronic Mail and "a system for extending the development and distribution of documents in preparation by the various working groups of the ITU."

These facilities are the first stage of a proposed system which is later also to include reference databases for documents needed on a critical time schedule, and eventually publications. The ITU's Information Exchange Services, briefly described here, are to provide these services.

## 2. Objectives

The overall goal is to provide means for all members to obtain up-to-date ITU-related information quickly and to exchange information rapidly. Present information exchange coverage and channels are limited and, in particular, delay delivery of information to more distant members. Appropriate tools can aid participants in exchanging information and views, and commenting on evolving work in a timely manner. As the pace of standards activities continues to accelerate, the use of electronic communication methods allows effective flow and timely availability of information on CCITT activities.

These services will provide participants in ITU activities and other interested elements of the world telecommunication community with access to an ensemble of computer-based communication tools and data. The information resources made available will be added to in successive phases. They will support a wide variety of user equipment types, and provide a focal point for access to the different services offered.

## 3. The Concept

The ITU Information Exchange Services will be introducing support in the following areas in a gradual way:

1.1. Computer-based communication
1.2. Access to specialised databases of telecommunication information
1.3. Electronic publishing of ITU documents and publications
1.4. Integration with various telematic services such as Telex, Teletex and facsimile.

## 4. Computer-based Communication - Initial Services

In the area of computer-based communications the services will initially include the following:

1. Electronic Mail (including X-400 support in a later phase)
2. Computer-based conferencing (similar to a bulletin board)
3. Videotex formatted information
4. File transfer

## 4.1. Electronic Mail

The electronic mail service permits designated individuals (or functions) from each member to exchange messages both with ITU headquarters and with participants in ITU activities. X-400 mail exchange will be supported and the implementation of systems conforming to the 1988 Recommendations for Message Handling Systems is envisaged. In the prototype phase, message content will be limited to simple text, but the need to exchange complete documents including graphic elements is recognized and will be supported in the future.

## 4.2. Computer-based Conferencing

The computer-based conferencing system will support group communication for specific subject areas such as matters relating to a given Study

# Significance of ITU (International Telecommunications Union) Information Services for CCITT Participants

Group. "Computer-based conferencing system" is a widely used type of computer assisted group communication. In this context the term "conferencing" has no relation to the ITU usage of the term "conference". Computer-based conferencing and bulletin boards are very useful tools which can facilitate group communication around a topic, a document, a question, etc, perhaps in relation to the preparation for a meeting. Typically, each "computer-based conference" would deal with certain numbers of topics, would have a designated moderator and participants could add comments to existing topics. The system controls the participation authorization, organizes the comments around the different topics, interfaces with the electronic mail system, etc.

## 4.3. Videotex

The Videotex service will present information on various areas of ITU activities including official addresses for members, meeting schedules, post vacancies, etc.

## 4.4. File Transfer

File Transfer will provide a means of exchanging documents in specific word processing formats, as well as computer programs made available by groups such as GAS 10, and data files, e.g. for information submitted to the CCITT/CCIR Plan Committees.

Document interchange enhancements will primarily revolve around the ITU document base. Automated filters will eventually permit contributions (e.g. from PC based word processing packages) to be introduced into the document base with a minimum of manual intervention. This will permit contributions to be quickly integrated into the ITU publishing cycle and ultimately allow electronic access through the ITU Information Exchange Services.

The ITU local area network TELnet has introduced new methods for using the existing ITU document base. In particular, there is a trend towards storage of texts (including CCITT texts) on shared network disks (instead of diskettes) with facilities for location, retrieval and authorized updating on an ITU-wide scale. The ITU document base will evolve toward a content architecture based on international standards providing the foundation for document interchange with Members and other contributors.

**File Interchange Format:** The ITU Computer Department has a word processing conversion program that can convert between different PC based word processing packages. Supplying text in one of the following file formats (ranked in order of preference) can assist the ITU.

Samna Word
DCA-RFT
DisplayWrite 2, 3 & 4 (RFT-format)
MS Word
WordPerfect
DisplayWrite 2 & 3 (TXT-format)
MultiMate Advantage II
WordMarc
Wang PC IWP
DEC WPS Plus
Volkswriter
CEOwrite
WordStar
ASCII

## 5. Access to Specialised Databases of Telecommunication Information

The proposed services are the link by which members and other authorised users will be granted access to the specialised databases established by the ITU. In addition to the texts of ITU documents and publications, these information resources include the databases of operational information subject to reciprocal notification, such as the various lists presented in the Service Documents enumerated in Article 26 of the Radio Regulations. Prototype tests are being carried out for providing access and information exchange for the data used by the Plan Committees. Other tests, including access to the Maritime Services databases, have been initiated.

## 6. Electronic Publishing of ITU Documents and Publications

ITU documents frequently include graphic elements and present considerable structural complexity. This implies that storage of documents, if they are to be used as a basis for further processing, must be based on rich document content architecture.

The General Secretariat's policy is that these services, as well as other automated systems at ITU, follow the applicable international standards; e.g., in this area, T-400 series

# Significance of ITU (International Telecommunications Union) Information Services for CCITT Participants

of Recommendations concerning Open Document Architecture (ODA) and Document Transfer and Manipulation (DTAM). ITU is planning to establish a comprehensive "document base" which will be used in the ITU's internal document production system and, on a read-only basis, can be consulted by members via these services.

## 7. Access

The services will be accessible via the packet switched public data network (PSPDN - X-25) and via the public switched telephone network (PSTN). In the area of computer-based communication, where an important objective is to have a very wide coverage, the services plan to support a wide variety of terminal types inlcuding Videotex terminals, Teletype compatible "dumb" terminals (using IA5 coding), personal computers, etc. For access to specialized databases and, in later phases, for the exchange of mixed mode documents, it may be necessary for the user terminal to be a personal computer with appropriate software.

Based on information supplied by ITU, Geneva

# Conformance Testing Services: Wide Area Networks (CTS-WAN)

The CTS-WAN program is part of a major European initiative launched by the Commission to provide harmonised conformance testing services in a wide area network (WAN) environment. (See "IES-News" no. 17, pp. 21-22).

The Organisations involved in this program are:

- British Telecom plc (BT)
- Centre National d'Etudes des Télécommunications (CNET)
- Centro Studi e Laboratori Telecommunicazioni S.p.A (CSELT)
- Statens Telejeneste Tele-laboratoriet (PTT-DK)
- Compania Telefonica Nacional de Espana S.A. (Telefonica)
- Deutsche Bundespost, Fernmeldetechnisches Zentralamt (FTZ)
- The National Computing Centre Limited (NCC)

A CTS-WAN catalogue has been prepared by the project co-ordinators, which identifies the components required for each of the ten CTS-WAN conformance testing services and details the documentation available. Of interest is the fact that over 90 documents are currently in the public domain and have been distributed throughout Europe as well as internationally, including Japan and America.

The catalogue is in two main parts: the first section contains brief abstracts describing each component and the second contains tables of all components, specifying the Intellectual Property Rights owner, availability and price category.

CTS-WAN testing technology components are available in eleven areas:

1. MHS
2. FTAM
3. Teletex
4. X.75 (layer 2)
5. Session
6. Transport
7. Network (X.21)
8. Network (X.21 bis)
9. Network (X.25)
10. ISDN
    Test Specifications
11. General

For each area exept ISDN (where only harmonised test specifications are available) the components are categorised as:

1. Test Specifications
   These documents contain the abstract test specifications and other documentation needed to specify conformance testing services.
2. Operational Documentation
   These documents specify the operational procedures of CTS-WAN test labs to ensure harmonised operation of the test services.
3. Reference Implementation
   These documents comprise procedures used within CTS-WAN to cross-validate test tools.
4. Test Tools
   These components comprise the basic test tools, software

# Conformance Testing Services: Wide Area Networks (CTS-WAN)

and the associated operational documentation of those tools that have been cross-validated within CTS-WAN.

5. Validation Services
   These are services that can be used by implementors of new testing technology to demonstrate the equivalence of a new test tool.

The validation services will be available by mid-1989 following completion of the CTS-WAN project when the Open Systems Testing Consortium (OSTC) has been created. The OSTC aims to maintain the harmonisation achieved for the CTS-WAN test services. One of its functions will be to validate new testing technology to demonstrate that they are CTS-WAN aligned.

For any technical documentation and general enquiries, please contact:

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# Proteas: A progress report

## Finding European partners

Finding European partners was the theme of the latest IETT (Institute of European Trade and Technology) Conference in London earlier this year, attended by over 160 delegates from every sector of trade and technology. It was therefore fitting that, alongside representations of the well established European networks for the promotion of industrial and scientific collaboration across national boundaries such as ESPRIT, SPRINT, TII, TFSMEs and others, mention was made of EUROCONTACT and PROTEAS. These two databases, recently developed by ESPRIT IES for the purpose of finding partners in IT and Telecommunications, were created with quite separate but complementary remits. While EUROCONTACT is intended primarily as a matching service for collaboration between researchers and companies, PROTEAS has been designed to provide a central, pan-European platform to help with information exchange, encouraging exploitation of prototypes and developments arising from European R & D.

## ESPRIT Week 1988

The original plans for PROTEAS, which stands for PROTotypes European Access System, were first described in Issue 17 of "IES News" with the announcement of the compilation of a pilot database. Longman Cartermill, an electronic publishing company based in Scotland and specialising in scientific and technical information, was put in charge of implementing this project. A small-scale data collection was implemented to reflect a representative sample of the European research community, and this yielded a remarkably balanced demonstration database, with entries from a wide variety of organisations, which was presented at the IES Stand during the ESPRIT Week 1988.

## Pilot database now available

The database, which is continuing to expand as part of a further developmental phase, is now available on user trial to interested parties. It contains entries from most European countries and from a variety of organisations, ranging from large multinational companies to government research establishments, through to specialised R & D firms, SMEs and consultancies.

There are entries from companies such as AEG Aktiengesellschaft, BICC Technologies, Electronique Serge Dassault, IABG, as well as from specialised software houses such as ERDISA in Spain, Generics Software in Ireland, Softek Gesellschaft in Munich. Institutes of higher education, such as Bremen Universität, Cambridge University, etc are also represented. Some, such as the SMART Consortium, have originated within the ESPRIT Program. Others have originated from national programs such as Alvey.

# Proteas: A progress report

Entries span a wide range of developments: 3-dimensional X-ray systems, black and white COD video camera, edge detector for computer vision, vehicle fleet management, are some examples of the prototypes on offer. Each entry comprises a detailed, free-text description of the prototype, followed by relevant parameters such as level of completion, technical limitations, conformance with national and international standards, and information on potential applications and relevant market sectors. Information is also given on patents and copyrights and any limitations arising from existing agreement.

## Significant user interest

The first PROTEAS Newsletter was released in February, with a small targetted circulation consisting mainly of IES enquirers, ESPRIT Week enquiries and statements of interest following the coverage of PROTEAS in European newsletters such as INTERFACE EUROPE. In the short time since the release of this Newsletter, requests have been received for access from France, F.R.G., Sweden, the Netherlands, Portugal, Ireland and the U.K. There have also been requests from consultancy and service companies, and we are exploring ways in which they may act as intermediaries for SMEs.

In addition, PROTEAS has been available since 20 February to all subscribers of Longman Cartermill's main product, B.E.S.T. Great Britain, the national database of public sector scientific researchers. Usage statistics to date show that PROTEAS has already been accessed by many multinational companies as well as small specialist enterprises. This early response to our advertising campaign is encouraging and our primary task now is to ensure that the database grows substantially over the next few months.

## Advertising your developments and prototypes on PROTEAS

With PROTEAS now available online to a small but varied and high quality user base, further entries are invited from R & D teams throughout Europe. Public and private sector organisations, working in either CEC or non-CEC projects within Europe, are eligible to contribute to PROTEAS, including:

- Large and small companies
- Specialised IT and Telecoms companies
- Universities and other public sector research establishments

There is no charge for inclusion and entry forms are available from the compilers of the database.

Channels for coordinated data collection through national and local intermediaries, intra-CEC networks, research establishments, R & D companies, etc. are currently being explored. At this stage we would welcome enquiries form individuals interested in providing local focus points for data collection within their organisation.

## Expansion beyond IT and Telecoms

While data collection is focusing on IT and Telecoms, a primary consideration now is its expansion to cover other sectors of Community Research. The development of a database structure and of entry forms which will accomodate this expansion is being undertaken in parallel with the current implementation of the pilot phase. Entries will be sought from all relevant areas of European R & D, such as Biotechnology, Materials, Energy, etc., by late Spring. Our aim in the short term, however, is to accomodate a wide variety of prototypes within the existing structure, and our experience to date suggests that the PROTEAS entry form is sufficiently flexible at this stage to cover related areas.

## Linking PROTEAS to other CEC activities

There are plans to link PROTEAS with other CEC activities, originally under the umbrella of DG XIII, through the CORDIS (Community R & D Information Services) network, as part of the proposed VALUE Program for the dissemination and valorisation of results which is currently under consideration by the Council. This network of information services, which was briefly described by E. Castrinakis (DG XIII - A) at the IETT Conference earlier this year will bring together a variety of databases on Commission-funded research and related information.

## European Prototypes for European Industry

We have in PROTEAS the makings of a database which, whilst focused on high tech projects of commercial

# Proteas: A progress report

interest, is truly transnational, with entries for every industrial sector, from the SME to the large company. We are now aiming to promote its applications by encouraging companies interested in the developments to get in touch directly with contributors to start negotiations. We intend to keep in close touch with contributors and users, and to continue to tailor the database to their needs. PROTEAS has an important role to play in promoting European partnerships in the commercial exploitation of its R & D. Now that the basic mechanisms are in place, it's over to the contributors and users to set the wheels in motion.

MADELEINE CAMPBELL
PROTEAS Project Manager

N.B. A specimen record can be seen as Text No. 10789 in the EuroKom Conference "IT Press Releases".

TO ACCESS/CONTRIBUTE TO PROTEAS, PLEASE COPY AND COMPLETE THE FORM BELOW

Please send me the following, with no obligation :

| | Number of Copies Required |
|---|---|
| Entry forms for inclusion of prototypes and developements on PROTEAS | < > |
| Application forms for ACCESS to PROTEAS | < > |
| I wish to act as local representative for data collection within my organisation. | YES/NO |

Surname _____ (Dr, Mr, Ms, etc) _____

First name (s) _____

Organisation _____

Department/Unit _____ Position _____

Address _____

City _____ Postal Code _____

Country _____

Telephone _____ Fax _____

Return to :

**Madeleine Campbell,**
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Esprit
Information Exchange System

# IESNEWS

Issue No 21, April 1989

Media such as newspaper, journals and similar print products of which I am an avid reader, have to satisfy their perceived customers, so news about take-over scandals or of filmstar lives are more digestible fare than technological progress which may ultimately provide the means to pay for such reading matter. One must therefore welcome any initiative which will help to make a broader public conscious of what is new and of potential market interest in science and technolgy. PROTEAS, which is described elsewhere in this issue, is one such small step in the right direction if its objectives can be realised. To provide ready access to a data collection describing products or designs which have a commercial exploitation potential to allow parties other than those responsible for the development to know and possibly further the realisation into tangible products available on the open market, is a major undertaking which will require very wide help in acquiring data for inclusion to reach a critical mass and also in making the availability widely known. Information is there to be used, it is not an archive to be admired or considered museal. Like all such actions, it is all of us who have to help - an attitude that it is my neighbour who is involved will not bring the required success.

## Editor's Corner

What is perhaps a sad aspect of the failure of the European media to keep its customers informed of European achievements in science, technology and culture, is that the Megaempires which are emerging in the media sector are in many cases still ruled by European Czars. What is surprising is that where technology is reported, the considerable efforts of the Commission and others to supply pertinent up-to-date information appear to be ignored and little news is forthcoming relating to European initiatives or innovations. This issue in the Guest Editorial offered a platform to one of the major European IT companies, ICL, and the door is open to others to follow suit in subsequent issues of "IES News". We also report on other Commission-backed actions such as TEDIS and CTS. We in the IT sector are aware of these activities and believe it is high time that the general public had this information to make them proud of being European.

### FUTURE EVENTS

*ASSESMENT '89:*
*The Status and Direction of Telecommunications Policy in Europe*
*Johannesson & Associates.*
*Luxembourg, 11-12 May, 1989*

*OPTICAL INFORMATION SYSTEMS 1989.*
*Cimtech and Meckler. London, 15 - 17 May, 1989.*

*BUSINESS COMMUNICATIONS: Telecommunications and Information Management. SEPIC.*
*Paris, 23 - 27 May, 1989.*

*EXPERT SYSTEMS AND THEIR APPLICATIONS.*
*EC2 and ECCAI.*
*Avignon, 29 May - 2 June, 1989.*

*SEDOS - ESTELLE*
*Demonstrator Workshop. Verilog.*
*Brussels, 31 May 1989.*

*LASER 89.*
*Munich University.*
*Munich, 5 - 9 June, 1989.*

*DESIGN OF FAULT-TOLERANT MICROCOMPUTER SYSTEMS.*
*Wisconsin University.*
*Munich, 7 - 9 June, 1989.*

### FUTURE EVENTS

*SUMMER COURSE ON MESSAGE HANDLING AND TELEMATICS.*
*European Electronic Mail Association.*
*Maastricht, 11 - 16 June, 1989.*

*THE UPPER OSI LAYERS.*
*Frost & Sullivan.*
*Munich, 12 - 13 June, 1989.*

*ADA: THE DESIGN CHOICE.*
*ADA-EUROPE.*
*Madrid, 13 - 15 June, 1989.*

*VISUDA 89*
*Visual Computing for Defense, Government and Large Projects.*
*Ministère de la Recherche.*
*Paris, 13 - 16 June, 1989.*

*ELECTRONIC MESSAGING*
*The Marketing Opportunities.*
*Blenheim online.*
*London, 20-21 June, 1989.*

*ELECTRONIC PUBLISHING*
*Blenheim Online.*
*London, 20 - 22 June, 1989.*

*HYPERTEXT 2.*
*Department of Trade and Industry.*
*York, 29 - 30 June, 1989.*

*INMARSAT*
*Mobile Satellite Communication.*
*Blenheim Online.*
*London, 17 - 19 July, 1989.*

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Information Industries