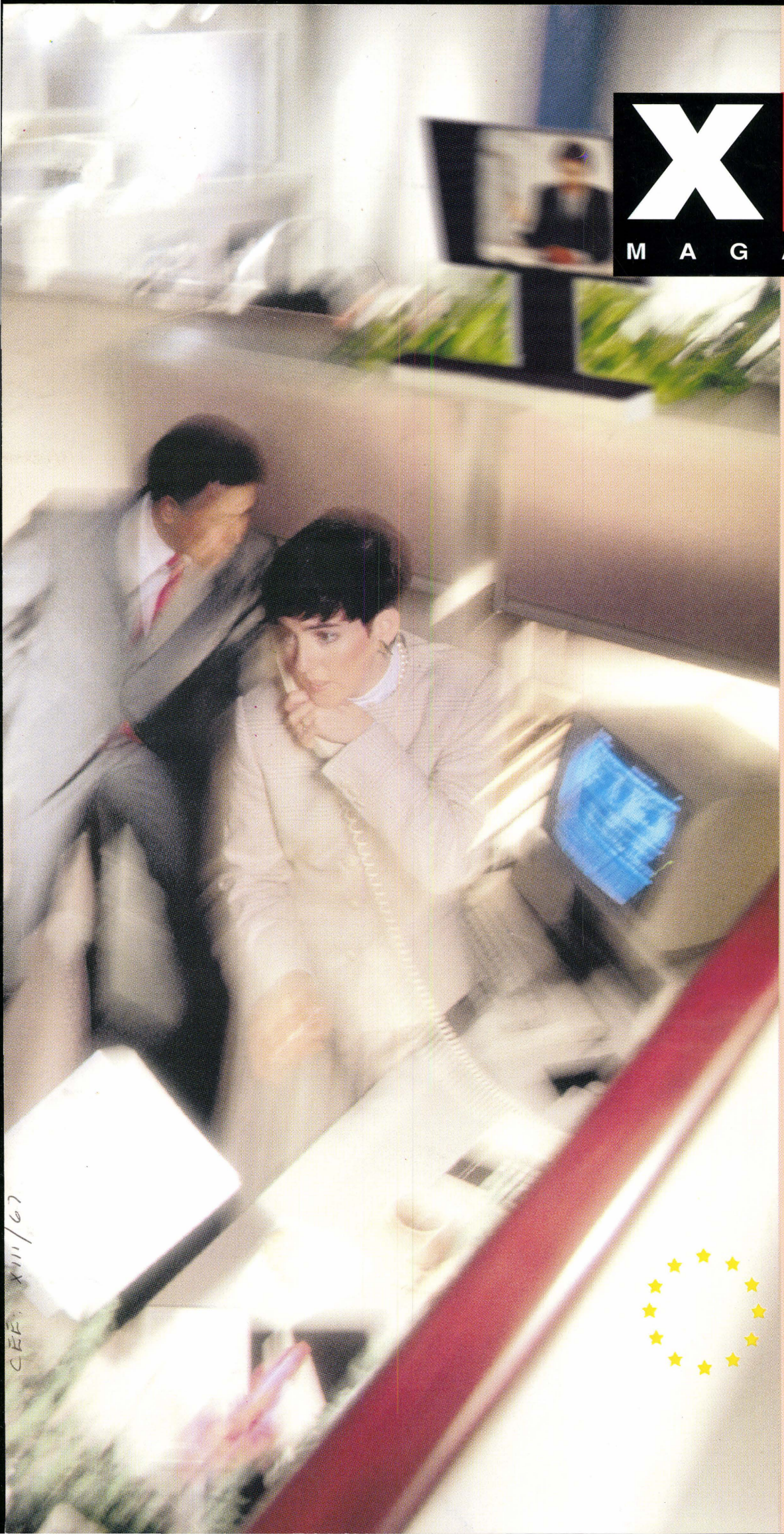

JULY 1991 ISSUE No. 2

XIII MAGAZINE

EUROPEAN COMMUNITY POLICY FOR TELECOMMUNICATIONS, INFORMATION INDUSTRIES AND INNOVATION

RACE: EUROPE'S BROADBAND FUTURE

COMMISSION OF THE EUROPEAN COMMUNITIES
DIRECTORATE-GENERAL XIII.

XIII MAGAZINE

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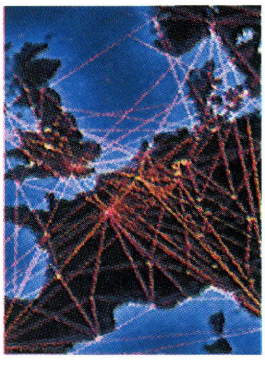

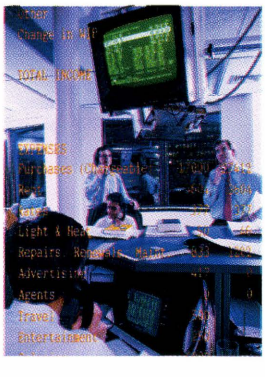

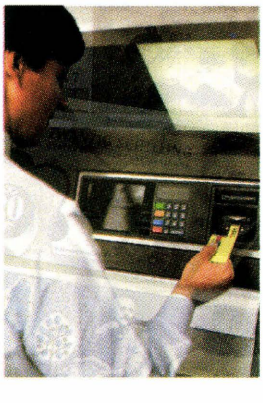

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Commission of the European Communities
Directorate-General XIII
Rue de la Loi 200
B - 1049 Brussels

XIII Magazine is also published in French, Spanish, Italian and German editions.

XIII Magazine is published every three months by the Directorate-General for Telecommunications, Information Industries and Innovation (DG XIII) of the Commission of the European Communities.

ISSN 1017-6950

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Designed by Ludden Taylor Associates

Printed in Belgium by Imprimerie Bietlot.

EDITORIAL

The maintenance and reinforcement in the Community of a competitive electronics, computer and telecommunications industry is of considerable importance for the European economy as a whole.

These industries constitute an infrastructure due to the generic and pervasive nature of the technologies they develop and use, technologies which are found in equipment, software and application systems now used in almost all economic and social activities. The competitiveness of the productive fabric, the creation of new services, the productivity and quality of existing services - in particular public services used in everyday life - are strongly dependent on them.

Their impact on employment is highly significant: directly or indirectly, over six European jobs out of ten already depend on information and communications technology.

These industries are currently in difficulty, particularly in Europe. Drawing on the conceptual framework set out in its communication of November 1990 on *Industrial policy in an open and competitive environment*, on March 26 the Commission adopted a communication entitled *The European electronics and information technology industry: state of play, issues at stake and proposals for action*. This document contains not only an overview of the current and future state of the European electronics and information technology industries, but also puts forward a series of measures which could be implemented by the public authorities to the extent that, in parallel with these measures, the industry itself sets out clear medium- and long-term objectives and gives clear undertakings.

European industry is well placed in IT software and services, advanced manufacturing equipment and telecommunications. It is quite a different story in such key sectors as semiconductors, computers and computer peripheral equipment, which are dominated by the major Japanese and US firms.

Cyclical factors have accounted for some of the difficulties of these industries in Europe (depreciation of the yen and the US dollar against the ecu). But the roots of the problem are structural. They are numerous and interrelated.

Chief among these is the weight of the past: the fragmentation of the Community market, the variety of standards and proprietary systems, failure to take account of the single European market. The inadequate size of each national market has prevented European companies from securing the benefits of economies of scale and external networking effects, and from being the first to launch innovative products on the market.

Secondly, the conditions of competition are unequal between different parts of the world. On a global market where companies must adopt global strategies to survive, these differences become economically decisive. At a time when competition rules are becoming stricter in the Community, in other competing areas measures relating to competition policy are becoming more flexible or remain less strict. This gives rise to a greater or lesser degree of disadvantage for European enterprise. The same applies to financing conditions and the availability of skilled staff, which appear to be less favourable in Europe than in certain competing areas.

The structure of the European productive fabric demonstrates a number of weaknesses: relatively limited vertical integration, insufficient linkage between users and manufacturers, too little cooperation in the development of new products.

The industrial strategy of EC companies has not been sufficiently based on the Community and world dimensions and on long-term perspectives. The successful and growing cooperative ventures in the field of precompetitive research and technological development (R&TD) have not led to equally satisfactory results as regards innovation and production. This has resulted in considerable losses in earnings in terms of market share.

Faced with these structural handicaps, the Commission does not intend to recommend artificial support for enterprises. Measures to be taken to enhance the competitiveness of the European electronics and IT industry depend in the first instance on companies themselves taking the initiative and facing up to their responsibilities, and on their capacity to make the most of the new opportunities presented by the completion of the single European market. Given, in particular, the importance of the electronics and information technology industries for the economy as a whole, it is up to the Community and the Member States to help create an environment which encourages the adjustments which must be carried out by the companies involved.

Five proposals for action have therefore been set out by the Commission, designed to ensure true competition at world level.

Action relating to demand. The proposal is to set up computerized telecommunications links between administrations as soon as possible and to develop a high level of interoperability between their information systems. This action will be accompanied by the launch of projects designed to modernize or create, with the help of computerized telecommunications (telematic systems), large-scale public service infrastructures in such areas as distance learning, transport, public health and the environment. Other projects could cover the gradual introduction of broadband services networks and the development of pan-European high-definition television services.

Action on technology. The Commission considers it necessary to launch a second generation of R&TD, ranging from projects at the precompetitive stage to projects geared more closely to the market. This second generation would be characterized by the concentration of work on a smaller number of better targeted and more ambitious projects, closer cooperation with users, provision of training linked to advanced research and opening up to international cooperation. Such projects could cover software, computer-integrated manufacturing, microelectronics, peripherals, high-performance computing and telecommunications.

Action on training. The Commission believes multidisciplinary training measures should be launched or stepped up. They would be targeted at training staff and at staff engaged in production and management in firms using and supplying telematics products and services. Networks of excellence composed of both academic and industrial research teams, geographically distributed throughout the Community, will continue to be set up.

Action on international relations. In international negotiations the Community is firmly resolved to ensure more equitable conditions of competition and access to third country markets. This will be the case in the Uruguay Round of GATT multilateral negotiations. While meeting its international obligations, the Community may, where necessary, resort to bilateral measures and invoke its customs regulations and its trade policy instruments. The Community is likewise ready to promote international cooperation by setting up the appropriate frameworks of exchange and cooperation or by extending them to EFTA countries, central and eastern European countries, the US and Japan. If necessary, it will take the initiative to launch international cooperation programmes.

Action on the business environment. Other initiatives can also contribute towards a favourable business environment. These would involve improving financing systems, faster standardization and integration of standards into products, closer involvement of the development of electronics and IT in the introduction of structural policies, and intensifying partnerships between the various groups involved, in particular small and medium-sized enterprises (SMEs).

The Council of EC Industry Ministers received the communication with particular interest and invited the Commission to go further into this analysis, to continue the discussions with industry, users and investors, and, on this basis, to submit suggestions on tangible initiatives and measures as soon as possible. The Council has entrusted a group of Member State civil servants with the task of discussing the guidelines contained in this document, on the basis of concrete proposals, with representatives of the Commission.

DG XIII, in close cooperation with the other Commission Directorates-General concerned, in particular DG III and DG I, is now preparing to carry out the follow-up work required. ■

Michel Carpentier,
Director-General DG XIII, Commission of the European Communities

INFORMATION SUPERMARKET

Electronic services across Europe

By Vicente Parajon Collada,

deputy Director-General, DG XIII

INFORMATION IS A KEY FACTOR in the industrial production, distribution and marketing chain. For some service sectors, such as finance, insurance and tourism, it has been described as a basic raw material, much like gas, water or electricity for the manufacturing industry.

A recent Commission proposal (Impact 2) aims to exploit this valuable resource to the full, both as an aid to competitivity and to stimulate the emergence of an EC-wide information market.

The information market

Information comes in two basic forms, printed and electronic. The traditional publishing sector is dominated by newspapers, periodicals and books. The electronic sector includes online databases, compact disc, electronic mail, audiotex and TV-based teletex. Until a few years ago, the market for electronic information was insignificant in economic terms. In 1991, the combined turnover for electronic information products and services in the US and the EC will be an estimated ECU 11 billion (SourceLink Assoc). Market observers forecast an average annual growth rate of 15-20 %, a high score for any sector.

Besides the main operators in this area - large media organizations such as Bertelsmann, Maxwell, McGraw Hill and VNU, global financial services such as Reuters and Dunn & Bradstreet - there are a myriad of smaller, specialized services in both the public and the private sectors. Together, they make available over 4,500 distinct online databases through 650 real-time information services worldwide. The telecommunications carriers also play a fundamental role by providing data network facilities.

Since the early 1980s, the market has evolved away from its origins in science and technology towards specialized professional information services: financial and company data, market research, business-to-business information, news services. It is anticipated that the trend will continue towards general interest markets, leisure, education, training, social and cultural themes in future.

Europe's position

Compared with the United States, there is a considerable gap in market turnover, of the order of 3:1. Database production in Europe is around half the number of databases produced in the US. The EC is ahead of Japan in these respects.

The European information services market is still fragmented by linguistic, regulatory and technical barriers. The main developments take place too often on a national basis. The markets in the UK and France are much higher than in other Member States, accounting for well over half of EC turnover. In France, this is largely due to the booming Teletel videotex service. Five and a half million Minitel terminals generated one hundred million hours of traffic in 1990.

In terms of database production, the UK and Germany head the list for professional databases, not counting videotex (see pie chart).

National policies can vary too. Take the case of chemical information, where some Member States have made bilateral agreements with a transatlantic partner rather than a European one.

Action at Community level

These key indicators reveal several things. Firstly, there are enormous opportunities offered by information technology and telecommunications (IT&T) to develop new information services. Secondly, electronic services have developed in spite of the slow economic climate. The premium on competitivity has surely resulted in a need for improved information services. Thirdly, some of the market's main problems need to be addressed at a European Community level, in the context of the post-1992 single market.

In order to grasp these opportunities, the Commission embarked in 1988 on the first phase of a programme to stim-

ulate the market. Known as Impact (Information market policy actions), the first phase ran for two years with a budget of ECU 36 million.

The strategic objectives of the second phase over the next five years are twofold: the improvement of the European climate for the growth of information services and the emergence of advanced Community-wide information products and services.

To translate these objectives into action, four main measures are foreseen by the Impact 2 programme.

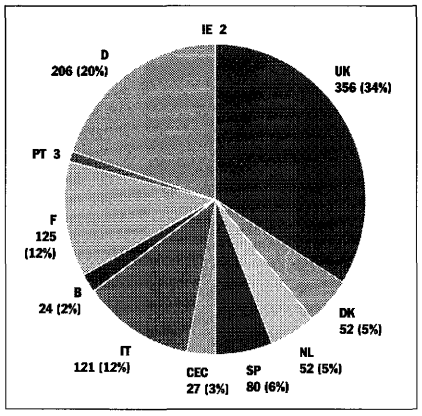
An Information Market Observatory has been set up to improve understanding of this complex, fast-growing sector. The IMO is a cooperative network of experts, coordinated by the Commission. It estimates the shape and size of the world market, identifies the main trends and brings out strengths and weaknesses. Its regular industrial reports include production and distribution indicators, technology trends, market segmentation and analyses. The latest IMO report confirms the increased interest of businesses in using electronic information, explores recent technology trends like audiotex, and estimates expenditure on databases.

A legal advisory board, composed of top lawyers, has been set up to assist the EC to prepare proposals for overcoming legal problems at Community level. Electronic information services have highlighted several difficult issues: can confidentiality of online searches be guaranteed? Who is responsible for the accuracy of information in databases? How are intellectual property rights managed? The legal advisory board provides a unique focal point to monitor and analyse legal problems which arise in different Member States.

There is also the related question of data privacy protection. Today, the simplest personal or business transaction leaves an electronic trace - payment of bills, health records, administrative records and so on. There is growing concern that existing national and international legislation does not cover satisfactorily the individual's rights to protection of nominative data, especially where electronic systems are concerned. The Commission has therefore proposed a package of initiatives which aim to achieve a high level of protection for individuals across the Community, without creating barriers for economic activities such as direct marketing.

A third action is aimed at increasing the accessibility and user-friendliness of information services. They are often too arcane or complex and not designed for the professional end user who is in a hurry. Part of the answer is to build in simpler interfaces and access methods. But it is also necessary to cater properly for the human factor, by providing multilingual guides to the information market, education and training. The EC's ECHO information service makes a significant contribution to both aspects, especially by hosting experiments like MAX for voice access to databases, online references and training files, seminars, exhibitions, etc.

EC database production



Source: Information Market Observatory

Finally, the emergence of advanced information services in strategically important market sectors will be vital for stimulating future growth. The Commission has already co-funded a number of pilot and demonstration projects in areas like patents, information on standards, tourism, road transport, intelligent interfaces and image banks: 20 cooperative transnational projects have been launched, involving over 100 European organizations with an overall investment of ECU 70 million.

One of the projects involves national and international standards bodies in providing their respective documents in a harmonized electronic format. Another one is developing a multimedia information atlas with maps, statistics, text and photographs of selected Mediterranean regions. A third project aims to interconnect different transport information services, in order to help increase the efficiency of road transport operations. In each case there are one or more information providers, an innovative product or service, and a target group of users.

Such projects provide a dynamic platform for promoting the use of standards, innovative technology combinations, multilingual interfaces, expert systems and optical storage media. They also give the industry the opportunity to tackle the financial, economic, legal and operational aspects of providing and using international electronic information services.

Future shared-cost projects will represent one of the Impact programme's main instruments to boost strategic information initiatives. The Commission limits its role to that of a catalyst, providing only a percentage of the costs, but bringing parties together in transborder cooperation for common ventures.

Future perspectives

The political and economic orientations will be determined by the opening of the single market in the Community. Increased information exchange is an integral part of this process.

The effects of the changes in east and central Europe and the evolution of relations between the three main global trading blocks in the world will also create an impact.

Within the information industry, there will be a rush of available technology for the gathering, storing, processing and transmission of information. It will be up to information market operators to take these opportunities on board. The evolution of public data networks towards ISDN and broadband is a case in point. In this respect, DG XIII's telecommunications policy actions and research and development into advanced communications (Race programme) all stimulate and support the information market initiatives.

These developments will surely promote the growth of the information market and the increased strategic role of applications-orientated EC programmes, such as Impact. ■

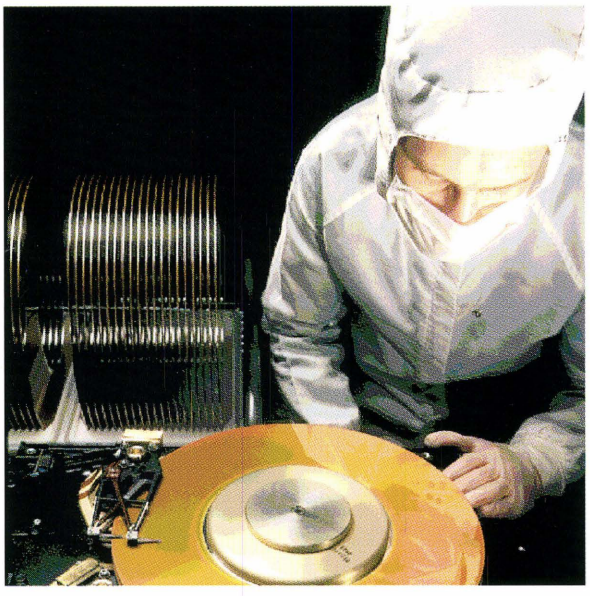
If time is money,

so is

information...

COMMUNICATIONS TECHNOLOGY

Designing Europe's broadband future



By RACE programme director Roland Hüber

SINCE THE MID-1980s the RACE programme (*Research and development in advanced communications technology in Europe*) has become a synonym for European efforts to develop and implement integrated broadband communications (IBC) in Europe.

Why is the European Community, and more specifically the Commission, involved in these matters at all? IBC is, after all, a technologist's term. It is not even yet a fully defined technology; it is rather a generic concept which covers still unclear choices between different possible technical solutions for an integrated digital telecommunications system. Many companies, official bodies and working parties are involved in the exploration and definition of this concept, in Europe and elsewhere. But while the Commission has no single policy on technology, it has always stood in favour of network innovation and harmonization of standards among Member States.

The basic justification for EC action is the need to promote the development of Europe's infrastructure. But there is a long-term commitment to a strategic goal. This goal is the single European market, with the free movement of goods, services and people throughout the Community. Free and open communication access, provided by telecommunications infrastructure, is an essential adjunct to this. A key contributor to this aim is the Race programme, which gives support to a wide variety of telecommunications projects and provides a permanent forum for the exchange of research findings.

Current efforts need to be seen in a historical perspective. Up to the end of the 1970s, the public switched telephone networks in many European countries tended to be under-financed and frequently had many other objectives than that of serving the telecommunications needs of the customer in a cost-effective way. They were generally monopolies, with the elimination of competition frequently implying the elimination of innovation.

Since then, technological innovation, deregulation and market expansion have transformed this picture in most European countries. Meanwhile, dramatic changes have also been taking place in the United States, in Japan and elsewhere. The substantial benefits which would flow to the European consumer from efficient and cost-effective telecommunications depends on the right decisions on technology and policy being taken now.

Turning to practical matters, it is well to summarize briefly at this point how the Race programme actually works. Based on initial Community funding of some 550 million ecus, the programme has allowed for the launching of around 90 research projects, proposed by network operators, industrial telecommunications companies, service providers or users. It should be noted in parenthesis that participants from EFTA countries are also involved.

Thus a typical Race project is run by a multinational consortium of four or five participants. They are researching into a specific area which they pro-

posed and the EC accepted as being a significant contribution to the overall development of broadband communications in Europe, and the value of the work is proved by the most realistic test of all - they had to put their own money into it, matching the Community's funding.

Following an 18 month "definition phase" in 1985-86, the programme has been running since 1987 and the overall strategic goal originally set for Race at that time, namely the introduction of integrated broadband communications (IBC), taking into account the evolving ISDN and national introduction strategies, progressing to Community-wide services by 1995, is still valid.

This requires some definition. The term "integrated" points to the integrity of the whole network, and the proper interworking of all its constituent parts, such as existing voice telephony, narrowband ISDN, mobile services and emerging broadband video services. "Broadband" designates the total mix of services to be considered, from the upper end of narrowband ISDN to high speed facilities required for uncompressed video. And "communications" implies not only basic switching and transmission but also those higher level functions and features which make services efficient, user-friendly and economically viable.

The central role this defined objective plays in the strategic management of the programme cannot be overemphasised. Proposed projects which do not adequately contribute to the objective, however valuable and interesting they might otherwise be, are rejected ipso facto. Every project once approved is audited annually by teams of external auditors, and those which started out well but which have subsequently deviated from the objective are either redirected back onto the right track or, if this is impossible, have their funding stopped.

Since the objective of Race was first defined, a much clearer appreciation of its implications has emerged, particularly:

- the heavy drain on cash resources necessary to finance the construction of the new infrastructure,
- the natural reluctance among telecommunications operators to make big investments before a clear demand for new services has developed,
- the impact of actual or possible deregulation affecting the investment risks as seen by established operators,
- the differences in national market conditions, leading to a phasing in the timing of introduction throughout Europe, based on the local situation.

This is taking place against a background of important changes in the economic structure of the industry as a whole:

- the increasing capital intensity of network operation,
- rapidly decreasing transmission costs, with the introduction of high-capacity fibre links,
- the change in telecommunications equipment markets, away from switching and towards transmission, network management and customer premises equipment.

A very important consideration is that many of the pioneer users of broadband will be found among larger companies. It is among the major corporations that one finds the telecommunications expertise and financial resources necessary to exploit an innovative technology. But by definition such large companies operate on at least a European, and often a world-wide, scale. Therefore, strictly national initiatives and policies towards broadband communications will not be good enough.

All these factors mean that there is a clear need for a robust multinational implementation strategy which will evolve with the market well into the next century, based on a strategy developed jointly and agreed between network operators, industry and users. The major milestones of such a strategy are expected to be as follows .

In the first phase, roughly from now to 1993, one can expect the introduction of early applications, mostly in the business and professional field, and of advanced communications experiments to test emerging new services, based on existing networks and possibly also on early versions of broadband-ISDN equipment, for example metropolitan area networks (MANs) and the first asynchronous transfer mode (ATM) prototypes. At this point also the major investment and procurement decisions will be made. This requires the completion of the related major standards at this time.

This will subsequently progress to the linking up of all the capitals of the Community, and some neighbouring countries, based on existing or presently planned optical trunk networks, supporting all kinds of voice, data and image traffic. This may be either in a separated or an integrated mode.

Thus, by 1995 the initial IBC implementation and completion of customer access for businesses in major centres of economic activity throughout the Community can be expected. At this point also, field trials to test a representative range of broadband services, including residential customers, with two-way video and possibly digital HDTV using commercially available broadband equipment, could be foreseen.

It is the middle of this decade which will be the critical period. By 1996-97,

the offer to business locations in towns of more than half a million inhabitants of a range of basic broadband services, allowing fast inter-LAN data transmission, desktop video conferencing and sophisticated CAD-CAM facilities, is likely to become reality. At the same time, widespread fibre-to-the-home deployment carrying a full range of services to the residential customer is due to start.

Depending on local conditions, existing and planned broadband islands will progressively link up via long-distance optical fibre networks, offering increasingly universal access to services. In the long term, a 50 % penetration of Community-wide broadband access availability is targeted for the years 2005-2010.

This scenario demands broadly-based collaboration in three areas :

- network strategies and planning for IBC implementation,
- development of the necessary technologies for IBC,
- functional integration, including the carrying out of application pilot projects.

The structure of the Race programme has been designed to cover work in these three areas.

The application pilots are real-world tests of prototype communications applications which, when fully developed, will require the use of or will benefit from the introduction of IBC. That is, they have a potential or direct need for high bit-rate transmission, large data volumes or complex multimedia interaction which only the advent of IBC would make economic. These pilots are being run in manufacturing industry, finance, transportation, healthcare, media and publishing and other key industry sectors.

All of the individual application pilots share the same general objectives. These are :

- to confirm the results of initial analyses of market segmentations and needs,
- to advance the understanding of the characteristics of user needs by gathering real-world experience,
- to provide feedback on applications and thus on service and system specifications,
- to provide an input to the industry sector's standardization process,
- to pave the way for the widespread adoption of the pioneering applications, by the users .

It is a very important strategic goal to try to reduce uncertainty for manufacturers and network operators in equipment and service design, and to improve business and industry's understanding of IBC's potential. This is because the cost of developing and offering integrated broadband communications in Europe is evidently considerable. Telecommunication administrations will be reluctant to make this investment unless a clear user demand can be shown. But the majority of users will not be aware of what can be done with broadband services until they are offered and can be tried in action. Accordingly, there is a certain danger of a vicious circle, where lack of supply leads to lack of demand which in turn seems to justify the lack of supply.

The role of Race and especially the application pilots is to help break out of this vicious circle. By showing that there is a demand, and by realizing it in an actual functioning application, the programme hopes to promote a virtuous circle where increasing demand will produce economies of scale which in turn produce lower prices, which reinforce demand, and so on.

The Community's current framework programme for research and technological development finishes this year. A new programme, the third framework programme, was approved in April 1990, covering the years 1990-1994. Specific programmes within this third framework programme are currently going through the necessary approval procedures, and they include one which is devoted to advanced communications technologies.

The Commission's proposal for this specific programme identifies eight areas of future action :

- IBC research and development.
- Intelligence in networks/flexible communications resource management.
- Mobile and personal communications.
- Image and data communications.
- Integrated services technologies.
- Information security technologies.
- Advanced communications experiments.
- Test infrastructures and interworking (horizontal R&D area supporting the other priority areas).

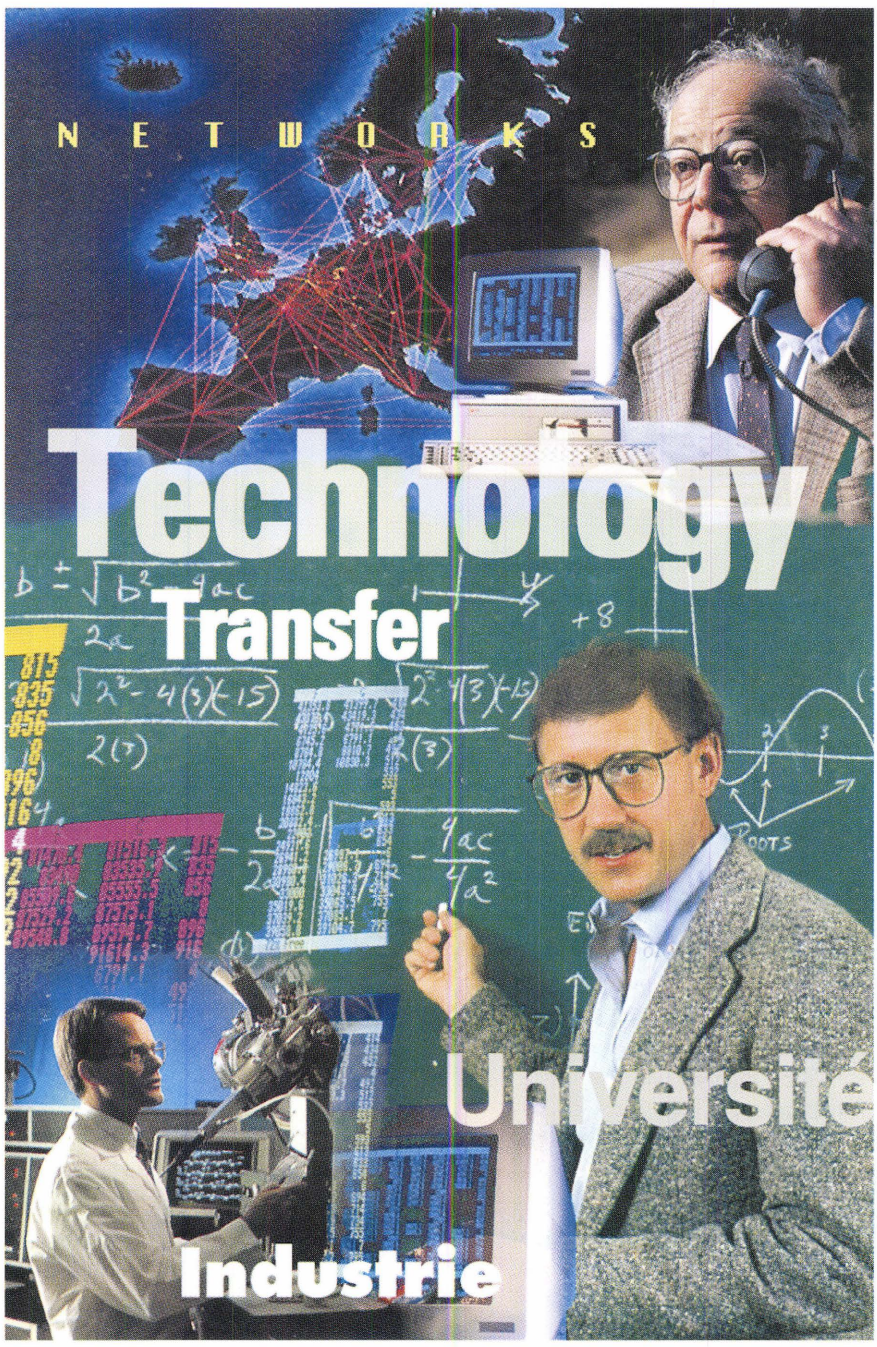
ECU 484 million has been earmarked as the Community contribution to carrying out future projects in these areas.

At the strategic level, the emphasis of future action is likely to shift from the previous phase of "exploring options" to a more concrete phase of "preparing for implementation". It may also become necessary to fine-tune the role of public involvement as implementation approaches and competitive and market forces gain importance.

To summarize, Race is not technology in a vacuum. It is a planned programme of research and development, managed in a businesslike way, with the objective of producing the right technology at the right time at the right price for well-specified applications. The overriding goal is in the end to provide the user with a greater variety of telecommunications services, of a better quality and at a lower cost, giving Europe the full internal and external benefit of a strong telecommunications sector. ■

ESPRIT BASIC RESEARCH

NETWORKS OF EXCELLENCE



Esprit Basic Research Actions.
A new concept which encompasses research coordination, human resources, and the synergy of research and technology communities across Europe.
A report by George Metakides

TECHNOLOGICAL INNOVATION is essential for the competitiveness of the IT industry and, because of the pervasive nature of IT itself, for society's overall well-being. At times like the present, when the pressure for industrial innovation is so strong, it is important to ensure our continued ability to innovate is not put to risk.

The IT fundamental research community is the source of tomorrow's ideas as well as the breeding ground for tomorrow's industrial researchers. This community in Europe is very highly regarded all over the world and has achieved its recognition over a long period of consistently hard and imaginative work.

Basic research: a reservoir

Esprit Basic Research has been specifically created in order to ensure that the reservoir of new knowledge and skills which are essential to tomorrow's innovation is replenished. Basic research actions thus concentrate on those interdisciplinary areas which are clearly upstream from pre-competitive research and have a clearly identifiable potential for industrial impact and future breakthroughs.

Significantly, 75% of current participants in basic research actions are newcomers to Esprit and constitute a net gain in the contribution of the fundamental research community to the overall industrial effort. At the same time, technology transfer is essential for the industrial focusing of basic research actions to be relevant and to result in innovative action. The main mechanisms to ensure this have been:

- Direct industrial participation: 26% of basic research actions have industrial partners participating directly and this percentage is rising; as the work of the basic research actions matures, industrial partners associate themselves with the action teams.
- Links with Esprit sectoral activities: reviews are organized in open workshops in which industrial participants in relevant areas are invited and industrial participants in pre-competitive projects are selected as reviewers of basic research actions.

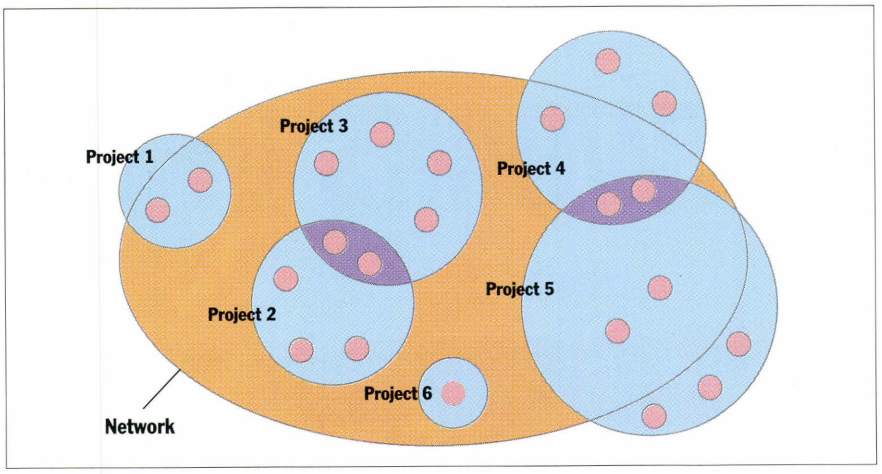


Fig.1 Research activity in a network of excellence

In addition to the above, Esprit Basic Research has adopted the new concept of networks of excellence, which encompasses not only technology transfer but also research coordination, human resources and the cohesion of the research and technology communities across Europe.

Networks of excellence

Researchers need increasingly to specialise but technological problems need more and more system approaches for their solutions. The traditional partition of academic disciplines no longer responds to modern needs in interdisciplinary areas such as robotics, speech and natural language, computer integrated manufacturing, human/computer interfaces, neural networks or even software engineering. An intrinsically interdisciplinary approach is called for to complement and bond the individual disciplines in the pursuit of actual solutions to real technological issues.

A network of excellence is a grouping of research teams with common long-term technological goals. These teams coordinate their research as well as their training policies closely. For their common goals, the research teams that constitute the "nodes" of a network of excellence possess collectively:

- a critical mass of top-level experts
- skills in all disciplines which contribute to the attainment of the goals
- a state-of-the-art infrastructure.

Viewed as a distributed form of a "centre of excellence", such a network contains skills and knowledge that are unlikely to be found in any one place in Europe or abroad.

Typically, members, or nodes, of a network define a strategy necessary for the achievement of its long-term technological goals and devise a frame of reference, in which fit the projects of the different members of the network. As shown above in Fig.1, not all nodes need to cooperate on all projects, nor

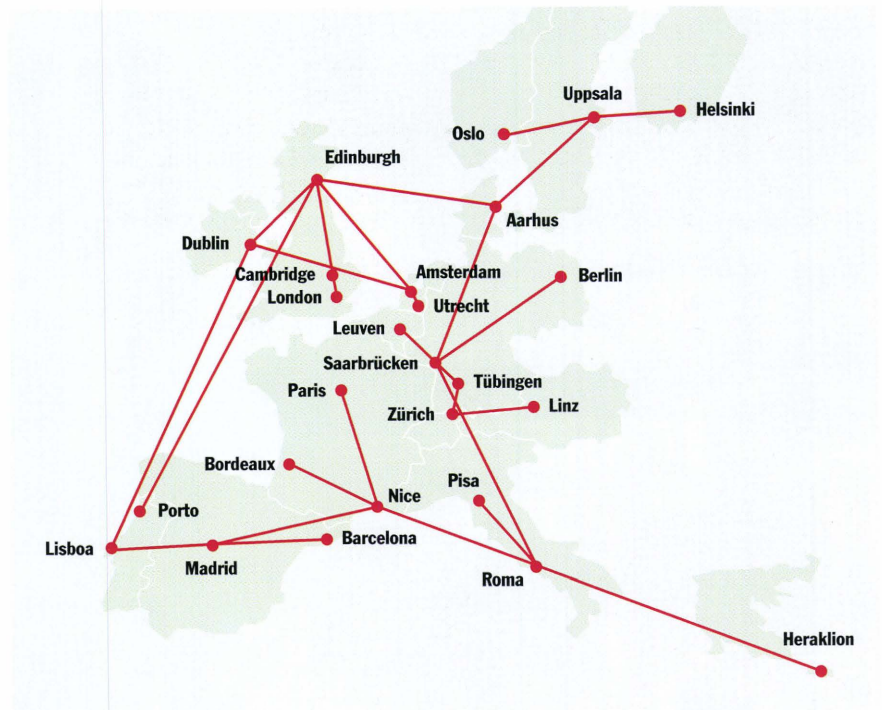


Fig.2 Networks of excellence

are organizations outside the network excluded from such cooperation. Each project solves different problems towards the common goal.

A network is in principle open to all organizations working towards the same goals wherever in Europe they may be situated. The map above in Fig. 2 shows what may be a typical structure of a network in a particular area, with the lines between the nodes indicating an intensity of collaboration, exchanges or communication links. For management purposes a limited number of nodes will carry out the administrative load at any given time.

The close linkage between the nodes of the network means that access to any node gives access to the resources of the whole network, whether these resources are know-how, special skills or material resources such as expensive specialist equipment shared by the nodes. This accessibility of the network from all geographical points has implications for:

- industrial innovation/technology transfer
- human resources
- cohesion.

Whereas any one node may have considerable expertise in one aspect of an industrial problem, the network combines the expertise of all its nodes. Thus, European industry, wherever it may be located, can have access to an entire network by accessing any one of its nodes. The links with industry, which may indeed itself finance research projects within a network, ensure both the short- and the long-term industrial relevance of research.

The collective strength of a network makes it a pole of attraction for young researchers, doctoral or post-doctoral, who may be able to spend part of their time in different nodes of a network which collectively provides the interdisciplinary skills needed and the direct interaction with the network's industrial nodes.

Some researchers trained this way, through research itself, will continue their career within the research community while the majority will find their future in industry; the interdisciplinarity and relevance of the research carried out will encourage the creation of the skills industry needs so badly: the skills of systems engineers, people with a complete view of the area from concept to implementation.

The distributed nature of networks can also help ensure that excellence is not drained away from regions of Europe which have not had the same tradition of technological development as others. These regions can have viable nodes of European networks, even if having large "centres of excellence" would be unrealistic. Moreover, this gives local industry the opportunity to access the most advanced research locally and it gives the local research community access to a global industrial market.

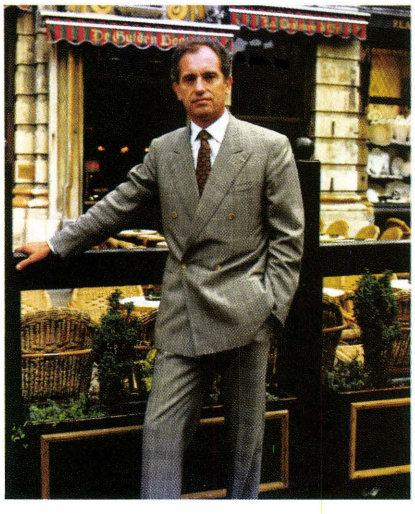
Networks of excellence adopt concrete measures to achieve their objectives. In the field of training, the intention is not only to promote mobility of researchers but also to design curricula and interdisciplinary course material in the area of their expertise. In the field of industrial relations, these networks act as clearing-houses for research results and also promote personnel exchanges with industry so as to ensure continued training and technology transfer through people themselves. In research, they coordinate activities by setting out priorities in order to achieve their goals, forming appropriate consortia and liaising with other networks.

Networks of excellence is a concept that looks at the long term of European research and, if successful, it may have a profound and long-lasting influence on the European research community and its role in industrial innovation and training.

Exploratory one-year phases of three such networks have been launched in the areas of language and speech, distributed computer systems architectures and computational logic so as to study their different structures and characteristics. The experience gained in the setting up of these networks will give valuable input to the specifications needed for the next call for proposals. ■

George Metakides *heads the DG XIII division responsible in the Esprit programme for basic research and scientific relations.*

Encouraging the creation of "the skills industry needs so badly - the skills of system engineers, people with a complete view of the area from concept to implementation"



SWISS PARTICIPATION IN EC R&D PROGRAMMES

Interview with Benedict de Tscharner, Swiss ambassador to the European Community

THE COMPLETION OF the single European market is scheduled to be accompanied on 1 January 1992 by the creation of the European Economic Area (EEA) bringing together 19 European countries - the 12 EC Member States plus the six member countries of the European Free Trade Association (EFTA) and Liechtenstein. Negotiations on the treaty to create the EEA are moving ahead fast. At the heart of talks is the application by the EFTA countries of the so-called four freedoms - the freedom of movement for capital, services, goods and people which constitute the cornerstone of the EC. Other facets of EC policy are also being negotiated, in particular participation by the EFTA countries in the Community's R&D framework programme.

Switzerland is a unique case within EFTA, in part owing to the priority it has accorded so far to national matters over supranational issues, unlike Sweden and its neighbour to the east, Austria. It is also unique in its high degree of economic development, marked by the total assumption of risk by Swiss firms; that is regarded as an anachronism even among the EFTA countries. Switzerland's ambassador to the Community, Benedict de Tscharner, confirms his government's interest in taking full part in EC industrial R&D programmes, particularly Esprit, and gives his impressions of the current state of EEA negotiations.

Switzerland, along with the five other EFTA member countries, is participating in a number of actions under the Community's R&D programmes. However, it is still an "à la carte" participation.

Five years ago, Switzerland signed a scientific and technical agreement with the Community which expanded the scope of our cooperation. It now takes many forms: for example, a programme between the Swiss and EC authorities, limited participation in projects or, in some cases, simple concerted action. An agreement to take part in a project is signed directly by Swiss firms, or, if need be, research institutes. The Swiss government does not intervene financially nor in management.

Do Swiss firms usually participate in the big programmes, such as Esprit, Race and Brite-Euram, through this second type of project-by-project arrangement ?

Yes. We participate in a series of programmes governed by agreements between the EC and Switzerland. But they are perhaps not the most important, and Esprit and Race do not figure among them. In fact, not one of them is a programme handled by DG XIII, although sometimes our participation is still involved. Race, for example, is an R&D programme, but the aim is to develop broadband European networks not built by the Community on its own but put together by all European countries via cooperation by CEPT. So, we will be beneficiaries but will also contribute to its execution.

Looking at it globally, we believe that once a certain level of participation is reached in a project, a dialogue on guidelines and the programme's direction should take place. That is why we have always openly expressed our interest in taking part in programmes and in political and scientific dialogue. But our aspirations go further - we, I mean all the EFTA countries, should be able to participate in all the framework programme's scientific and technical activities.

Coming back to the industrial programmes such as Esprit and Race, how do you explain the EC's position of limiting the participation of Swiss firms in projects ?

It's not my job to interpret the Community's point of view. But it is clear, and we have experience of this, that during the EC's ongoing advancement there are fragile experimental phases during which participation of outside countries could raise more

problems than at a later stage, when a programme gets into its stride and goals have been confirmed. That's one thing. But there are other aspects that leave us a little bewildered. We thought that broader participation in a programme would also have an impact on solidarity and that once Switzerland did more than participate in only a few projects of particular interest to Swiss firms, and began contributing to the general costs of a programme, we would see some solidarity and full programme support. But we observed that, in internal Community debates, there are countries that are perhaps less scientifically advanced who balk at broadening participation. It's something we still do not understand, unless it can be attributed to institutional issues. Maybe those countries fear that industrially and scientifically advanced countries might have too much influence on the political and intellectual debate. I don't want to be judgmental, but there is no doubt some touchiness there, although I don't think it would really call into question the ideas I've put forward.

Which of the current programmes most interest Switzerland ?
Esprit, Brite-Euram and Race would be at the top of the list. Let's not forget that in a given project, the Swiss participating company is not as well-positioned as an EC company. A Swiss company participates at its own risk and must pay its own way. Only our public institutions participating in these programmes are eligible for state backing. In the EC, on the contrary, public subsidies are available to everyone. But, despite this handicap, our participation is quite up to the mark.

How big are the Swiss companies that participate in these programmes ?
That depends. Big companies are involved in Brite-Euram, since this programme mainly concerns the machine sector. It is more or less the same for the Race programme. But, if you take the Esprit programme, the participation of small and medium-sized Swiss firms is the norm. You have to realize that Switzerland's industrial structure is built on SMEs. Of course, we have big firms, but they are not the best yardstick of industrial reality.
And one field where Switzerland is particularly strong, chemicals, is not given a great deal of attention by EC R&D programmes. However, this attitude is starting to change in the light of the importance the EC has been attaching lately to biotechnology and medical research.

You mentioned the desire expressed by all the EFTA countries to participate fully in the framework programme. This petition is currently being studied in negotiations on the future treaty for the European Economic Area (EEA) that, if all goes well, is expected to take effect on 1 January 1993. How are negotiations going ?
Talks on our participation in the framework programme are being held in the context of horizontal policies, or the so-called support policies. I can assure you that we do not consider them second-rate. It's also a symbolic matter. If we fail to build alongside the four freedoms a procedure of basic improved cooperation, then the European Economic Area will look pretty skimpy. The aim is to eliminate barriers, of course, but if we manage to include cooperation of a new calibre, then the EEA will take on much more meaning. We are at a stage in the negotiations where we cannot yet foresee the quality of this future cooperation. I would even say that we are a little worried because we thought this full cooperation would have been much easier to achieve. And the inclusion of this issue in EEA talks could well delay their success. The EEA will not get off the ground before 1 January 1993. That is causing us to waste time and it looks likely that scientific cooperation officials in the Commission will have to pass the book-keeping test along with all the other EC institutions. There is a risk that an element of quality will be lost.

Would it have been better to hold negotiations on the framework programme outside the EEA talks ?
I leave that opinion to you.

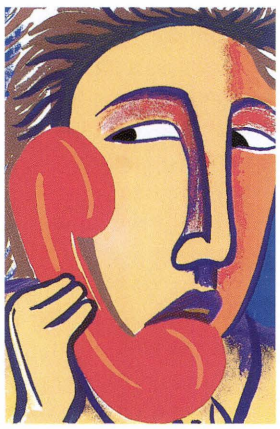
In conclusion, perhaps we could touch on the global negotiations now under way. What are the real chances of success of the future EEA, now that Austria and Sweden have clearly expressed their desire to join the Community?
Well, I think all the EFTA countries want a good agreement that can work. My Austrian and Swedish colleagues would confirm that for a very simple reason: even if they have the ambition to join the European Community, neither the date for membership negotiations nor the date for the next membership have been set. No one can say for how long the EEA will be the basis for good relations. That makes a good agreement all the easier for the EFTA countries. As for Switzerland, the same issue has come up. Our government recently stated that the matter of EC membership is still open. So that door is still ajar, even if, unlike Austria and Sweden, we have not, at this stage of the game, made up our minds. Of course, things are moving and a new force is afoot. The terms are also changing. What do security and neutrality mean in Europe today? All these components call for an open mind and continuous adaption. ■

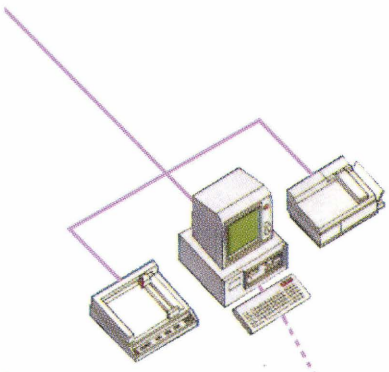
Interview by **Marie-Martine Buckens**
journalist

EC technology programmes: "All the EFTA countries should be able to participate"

THE OTHER EUROPE
POLAND

Close cooperation is developing between Poland and the EC





"BOTH SIDES ARE NOW embarking on a period of training", said A.Ksiezny, director of international affairs at Poland's PTT ministry, when questioned about relations between his country and the EC in the sphere of telecommunications and information technology. Poland is banking on the Community to help it catch up in the telecommunications sector, which will be a major underpinning of Poland's changeover to a market economy. Poland is seeking support from two major sources. First, the Phare economic assistance programme and, in the longer haul, the EC-Poland association agreement, which is currently under negotiation. Poland is taking as its model the European Commission's green paper on the development of telecommunications.

Among the telecommunications sectors in the east European countries, Poland's is the most dilapidated. But Polish authorities were also the quickest to understand the nature and importance of the challenge before them. The components required for rapid progress are nearly all in place, in part thanks to EC support. Today only 3.1 million Poles, or 8% of the population, have a telephone. That means there are only 7 phones for every 100 inhabitants, which is less than Romania, where 17 out of 100 have a phone. The Community's average is 37 per 100. Some 2.3 million Poles are on the telephone waiting-list and the average wait is a staggering 13 years. Poland's facsimile system, which is linked to the telephone network, is also in critical shape. On the other hand, the telex system and the information technology industry are in better shape. Poland has four radio stations and two television channels. The Polish government

has already gone a long way to enacting the necessary institutional and regulatory reforms as well as creating the environment that would attract ample investment and generate revenue in the telecommunications sector.

At the start of 1991, a new law was passed in Poland that split the telecommunications sector in two: the postal service, which for the time being will remain in the public sector, and telecommunications, which will be privatized along the lines of the UK model. Two state agencies were also created to regulate telecommunications and to assign and manage radio frequencies. In addition, Poland is currently developing an investment and modernization strategy for the telecommunications sector. The Polish communications ministry intends to invest nearly 13 billion ecus in the network over the next 10 years and plans to install 2 million lines by 1995. That will bring the number of telephones in Poland to 13 per 100. The development of Poland's telecommunications sector will be the key to cultivating closer ties between Poland's economy and the EC and must therefore not be conducted in isolation. Poland is modelling its strategy on the EC's telecoms green paper and has been admitted to the European Conference of Postal and Telecommunications Administrations (CEPT). It hopes to become a member of more specialized bodies such as the European Telecommunications Standards Institute (ETSI) and CEN/CENELEC. Similar efforts are being deployed in the radio broadcasting sector.

Poland is not so far behind, and will have an easier time catching up, in the information technology industry. The number of microcomputers used by professionals is estimated at 100,000 and it is assumed that Poland is about two years behind the West in this sector. There are about 2,000 minicomputers in Poland, suggesting that it is 15 to 20 years behind the most advanced European countries, but Poland is at least 25 years behind in the large computer systems. However, the situation in computing is not as bad as in the telecommunications sector. Moreover, Polish companies could decide to go straight for the accelerated introduction of microcomputing, rather than investing in mainframes on which the cost of the same operation can be up to 100 times higher. This would allow Polish enterprises to skip a generation of data-processing and fast-forward to today's micros. But they will nonetheless have to plan their development carefully. Purchases are still conducted in a disorderly fashion. Software, the weak link in Poland's information technology chain, is another area that will have to be given priority attention. There are currently only 100 Polish companies specializing in this vital area. IBM is negotiating a lucrative contract with the Polish government for the supply of hardware and software to the tune of $8 million, in exchange for services such as demonstrations and training centres.

In assessing Poland's situation and its aspirations, it becomes clear that it will need help to carry out its far-reaching modernization plan. The EC has already pledged its support, either under its Phare programme or through the five-year EC-Poland bilateral trade and cooperation pact signed in 1989. There is also a third source of cooperation that was set up specifically for Poland in the farming sector. The free food aid supplied by the Member States led to the allocation of counterpart funds equivalent to 60 million ecus, which will be used to revitalize the farming sector and rural zones. Polish authorities realized that improving the telecommunications network would advance considerably efforts in the farm sector and they put these funds to work on a broad project concerning rural telecommunications, with help from the Phare programme. The sum of 6 million ecus has so far been devoted to the programme.

This year cooperation will move into a higher gear. The Member States have put together their strategy for telecommunications aid to the east European countries. They intend to help them adopt new laws modelled on EC laws. The two new Polish companies - the PTT and the privatized telecommunications firm - will be able to apply to the EC for assistance in a number of areas. These would include the setting up of strategic planning offices, managing telecommunications and devising plans for commercial operations, participation in EC standards, the application of international standards and, lastly, planning and modernizing their telecommunications networks.

Once these broad outlines have been defined, the Member States will then be able to spell out the support arrangements on offer to their east and central European partners. They are already taking part in the Tempus university exchange programme and are deriving benefit from the EC's training schemes. Polish authorities would also like to participate in research projects under the Cost programme. In support of its ambitions, Poland has a number of strong points, such as a market of some 40 million relatively prosperous consumers, a qualified and inexpensive pool of manpower and experience in certain front-line technologies. Contrary to what is happening in Hungary, European industrialists are in a strong market position and several companies, such as CIT Alcatel, SESA-Alcatel, Siemens and Kabsch have already signed agreements to set up joint ventures with Polish businesses.

But, say the Poles, South Korea is already contending for a place in the sun and both Japan and the United States are showing more aggressive interest than the Europeans. EC industrialists - and their Polish counterparts - will have to adapt to their new partners and help them integrate, develop and benefit from a market with an estimated value of $20 billion. ■

Stéphan Sberro
journalist

JESSI

MICROELECTRONICS, THE STRATEGIC RESOURCE

By Pasquale Pistorio,

CEO of SGS-Thomson Microelectronics Group

WORTH 750 BILLION ECUS, providing some eight million jobs world-wide today. A 2000 billion ecu market by the turn of the decade. Already Japan's biggest industry. These facts alone make the electronics industry one of the most important on the world industrial scene.

Yet these statistics pale into insignificance against the strategic importance of the electronics industry with regard to the health and success of almost all other industrial sectors, and even nations. It is no exaggeration to say that an advanced industrial society cannot exist without controlled access to an advanced electronics industry.

A classic example of the importance of this is the automotive industry, where it is only by using electronics to the full that manufacturers can produce cars that compete in today's demanding markets.

Computer-aided design techniques, for example, are heavily used in the automotive industry, right from the original concept stage through to pre-prototype electronic modelling. The cars themselves are built on automated lines using the most sophisticated computer integrated manufacturing techniques. And when they go out to dealers, computerized stock controls keep tags on all the cars right up to the moment they are sold.

This, of course, does not take into account the sophisticated electronics built into the car in order for it to meet today's new consumption and pollution regulations.

In short, without electronics the automotive industry would have ground to a halt.

And this applies equally to other key industries such as chemicals, aeronautics and the medical sector, not to mention new electronic sectors like HDTV and ISDN which in themselves will be tremendous economy drivers.

If it is true that no advanced industrial society can exist without controlled access to an advanced electronics industry, it is equally true that no advanced electronics industry can exist without controlled access to an advanced microelectronics industry. It is not by chance that 10 out of the world's top 10 electronics manufacturers have their own semiconductor companies!

These ideas have found ever-increasing support, not just within industry itself but also in the way governments are viewing the strategic importance of the microelectronics industry as a precondition for the health and success of the electronics industry.

Japan has demonstrated its belief in the strategic importance of microelectronics in its usual pragmatic way. The intervention of the Ministry for International Trade and Industry (MITI) led to the coordination of resources and efforts in the Japanese microelectronics sector, leading to the dominant position the Japanese microelectronics and electronics industry holds today.

It is interesting to note also how the Japanese have completely closed the circle: the advances made in microelectronics are used to produce new advanced electronic systems which are in turn used to produce even better and cheaper microelectronic devices. It is a vicious spiral which could quite easily screw the western world right into the ground.

America, too, has woken up to the importance of microelectronics, as is evidenced in the words of J.K. Galbraith, who said in essence in a report to the US Congress that the semiconductor industry is an essential element in the transformation of industrial life in any country... losing leadership in this sector would mean losing international competitiveness in the most advanced technological sectors, which have been at the base of the USA's economic supremacy since World War II.

And what is true for the USA is even more so for Europe, which started from a worse position - with its numer-

ous national programmes and fragmented markets with varying standards. However, Europe is handling the situation fast and rationally through a series of Community-wide programmes which are having wide-reaching effects.

The earliest of the programmes (Esprit 1 and 2), which were essentially pre-competitive in nature, brought together many different aspects of industry and academia from many different European countries. And it must be added that given the insular and fragmented nature of European industry in the past, this was an achievement of quite significant proportions. More pragmatically, the final goal of Esprit 2 was the establishment of Application Specific Integrated Circuit (ASIC) capability within the European Community.

Although leading to many positive results, the Esprit programme, it should be remembered, has largely been focused on a limited number of strategic research areas. Esprit has established the necessary climate for successful European cooperation, evidenced, for example, by project 2039 (advanced PROM building blocks), in which SGS-Thompson participates.

The translation of such technological research and development into volume production - an area where Europe has been very weak in the past - has been accomplished with products like SGS-Thomson's 4Mbit Eprom, developed as Eureka project EU102, which has helped give the Franco-Italian company a position of leadership in the non-volatile memory sector, where SGS-Thomson currently holds the number three position in the world.

More recently the most ambitious and comprehensive programme so far, not just in Europe but maybe in the world at large, has been launched under the auspices of Eureka with a substantial participation of the Community through Esprit. This is the Joint European Submicron Silicon (JESSI) programme, which brings together practically all members of the European electronics and microelectronics industry - including equipment and material suppliers along with independent and state research institutes.

The success of Jessi will be measured in the market place: it will bring the European microelectronics industry to a point, by 1996, where it can cover at least 45% of the European electronics industry's needs. This will give more equilibrium to the global balance of microelectronics trade and most importantly, it will give Europe's electronics industry a level of controlled access to advanced microelectronics.

However, it should be noted that all Jessi will achieve - even if every one of its objectives is met - is to keep Europe in the microelectronics race.

Up to now technological progress has been a hard but steady climb. Now we are reaching the mountain peaks and the going will get tough. Every piece of new ground won is going to require even greater costs and even more co-ordination.

The competition have already set up their base camps and are all ready to make their coordinated attacks on the mountain top. Europe too has to build on Jessi.

The costs foreseen for the industrialization and mass production of devices coming from future technologies will no longer be measured in hundreds of millions of dollars but in billions. And we can't even afford to ask the question: can we afford it? ■

Since May 1987 Pasquale Pistorio has been President and Chief Executive Officer of SGS-Thomson Microelectronics, the semiconductor group created by joining forces between SGS and Thomson Semiconductors

JESSI

The JESSI (Joint European Submicron Silicon) strategic programme was launched in 1986 under the Eureka intergovernmental initiative involving 19 European countries and the Commission.

Jessi aims to make European industry capable of mass-producing future generations of intelligent chips. Its ultimate objective is the production by 1996 of dynamic memories with a capacity of 64 megabits (64 million individual information elements) on a single chip and 16 Mbit static memory chips. The intermediate objective is to develop dynamic memory chips with a capacity of 16 Mbits and static memories of 4 Mbit capacity by 1992.

After a preparatory phase which ended in February 1989, the programme itself will develop over eight years (1989-96) along four axes :
- technology : development of advanced technologies, both for memory chips and for the manufacturing sciences;
- equipment and materials : R&D in semiconductor production equipment and processing materials;
- application : computer-aided design (CAD) development tools and complex key integrated microelectric systems;
- basic research : long-term action designed to support the industrial objectives of the Jessi programme.

The total budget for the programme is estimated at around ECU 3.5 billion.

"An advanced industrial society cannot exist without controlled access to an advanced electronics industry"

The next world challenge in IT

HIGH-PERFORMANCE COMPUTING

Interview with Professor Carlo Rubbia, Director-General of CERN, on the EC working group report on high-performance computing

BY THE END OF this century, high-performance computers will be vital for any society which considers itself to be at the cutting edge of technological progress.

A working group set up by the European Commission, comprising some of the most eminent scientists on the European scene, recently unveiled the findings of its survey on Europe's supercomputer sector.

It draws one striking conclusion: at present, in spite of some promising R&D results, European industry still has no supercomputer product offering. It goes on to add that, in such a vital and sensitive sector, the Community can ill afford to be totally dependent on imports from abroad. Professor Carlo Rubbia, chairman of the working group, outlines the reasons which led the group to recommend to the Commission a massive research and development programme as a matter of great urgency and top priority if Europe is not to be cast adrift in the supercomputer stakes.

Why this report and what are the principal conclusions it draws ?

I believe that at the origin of this report is the observation that European suppliers are completely absent from the supercomputing arena. We have been asked to evaluate the present situation in the light of this puzzling fact and to express our opinion. Our conclusions are that this situation is unacceptable and must be changed. The vital importance of high-performance computing for the future development of our society and, ultimately, for the quality of everyday life is such that Europe cannot depend totally on foreign supply. This would not be accepted in other fields such as the steel or car industries, which are no more vital than high-performance computing industries.

Is Europe lagging behind the United States and Japan and if so, is this backwardness irreparable ? You have referred in particular to Europe's dependence in hardware and software. Can this dependence be reduced simultaneously in both cases?

We believe that we cannot talk of a technological gap between Europe and United States or Japan, in spite of the fact that this sometimes seems to be a sort of acquired notion. In particular the leading position of European research is well established in the field of advanced parallel systems. What is really missing is the technology transfer mechanism which allows the results of the research to reach the market and contribute to building a solid market image.

This technology transfer cannot originate solely from the research sector and government must intervene to foster the development of a European supercomputer industry, as is the case in the US and Japan. Today the software and hardware markets are dominated by US and Japanese products and it will take a considerable amount of time for Europe to become a recognized partner and an important player. The market image for European products must be rebuilt, particularly in Europe, where users are most of the time unaware of what Europe has to offer, and this is a long process which requires political commitment and continuity of action.

To answer the second part of your question, we believe that an investment in software can bring us more immediate results, but in the long run also the production of all the components of a computer environment must be mastered in Europe. This is an unavoidable requisite to acquire and maintain a pre-eminent position amongst the world leaders in information technology. The examples of the US and Japan are illuminating in this respect. It is therefore important to invest both in hardware and in software now, while recognizing that the timescale for the return on the investment can be different.

What action should the Community take in this domain and what concrete form could this take ?

The Community can have a decisive role in the development of a European supercomputer industry and a European supercomputing culture. One of the main problems encountered by European computer industries is that they cannot be limited to a national market and the division of the European market in national markets can be a serious hindrance, particularly for a start-up company trying to penetrate a market completely dominated by American and, increasingly, Japanese suppliers. In this area the action of the Community can be instrumental in helping to create a continental market open to European industries. A supercomputing initiative is continental in its nature, its scope and its ambitions, and here the EC can play a unique role in promoting and supervising such an initiative. A very important element in the development of a European supercomputing culture, and in the organization of the knowledgeable and influential community of European supercomputer users, is the availability of reliable and efficient network connections. In a related area the EC has already been very active in the coordination of national telecoms, and this must continue as fast as possible.

Several projects connected to supercomputing are already taking shape within the Esprit programme. Can the actions you propose be integrated in this same programme, or does the nature of these actions require a different programme ?

The undeniable success of the Esprit programme is one of the elements which justifies our optimism for the successful development of a European supercomputer industry. It must, however, be noted that our committee has been more oriented towards markets and users, while Esprit is more a pre-competitive research programme. In this sense the two aspects are complementary. I think that now Europe has been shown to possess remarkable technological potentialities in information technology, it is time to assemble the users, make them aware of these results and give them the possibility to access them in the form of marketed

products. In this sense our action is complementary to but different from the Esprit initiative, and thus calls for a completely new initiative. Moreover, while the scope of Esprit extends to the whole of the information technology domain, our committee has advocated a specific initiative in the field of high-performance computing for its unique and strategic importance for Europe.

What is the time scale of this action ? What investments do you estimate will be required and what budgets do the United States and Japan allocate to this domain ?

We are suggesting a plan over at least 10 years, but this is only a first phase. The importance of the subject and the timeframes involved in an action which has the ambition to have long-term industrial, market and technological results will require continuity in that action well beyond the initial 10 years of our plan; but we believe that 10 years is the strict minimum to obtain some durable effects on the European position amongst the world leaders in high performance computing. As we have said in the report, we think that the resources invested should gradually build up to a total annual investment of Ecu 1000 million by around 1995. This sum is expected to come from different sources (governments, EC, telecoms and so on) and by 1995 the European supercomputing community should have the maturity to profit fully from such an investment. On the other hand, it is extremely difficult to evaluate the exact magnitude of the similar investments in Japan or in the US, because the data are either not available or difficult to interpret. The sum we are proposing seems well in line with that invested in the US and in Japan exclusively for high-performance computing.

If Europe were to pull out due to lack of adequate financial means, what would the consequences ?

We believe that Europe has the economic capability to create and develop a world-class high-performance computer industrial infrastructure. It is more a matter of priorities in the investments. We have clearly indicated this in our report as an absolute priority for Europe. The cost of leading this initiative to a successful conclusion may seem high. However, the cost of not having such a initiative will certainly be higher. If the present situation continues, the absence of a European supercomputer industry and the general weakness of the European information technology industry will be a limiting factor for the industrial and economical growth of Europe beyond its control. We do not believe that Europe should allow such an eventuality to occur, whatever the cost may be. Not only is the market for high-performance computing machines, admittedly limited, at stake, but also the competitiveness of all European industry and the control of the home market in the face of aggressive competition from the US and Japan. Without evoking unlikely scenarios of embargos on high technology products, we want to stress that a small delay in the acquisition and the effective use of the latest technology in computers, for industrial sectors like the automotive and aeronautic industry or the chemical and pharmaceutical industry, can make all the difference between success and failure.

What is the importance of high-performance computing in everyday life ?

The impact of high-performance computing on everyday life is already much deeper than we think. Scientific research would simply be impossible without high-performance machines. But the supercomputers have long since come out of the scientific laboratories to become invaluable tools for the design of products and industrial procedures.

Our understanding of the basic laws of nature, together with the ability of a supercomputer to perform billions of operations per second, allows us to reproduce and simulate reality to a very high degree of precision. Thanks to supercomputers, experiments which would be costly, dangerous or time-consuming can be performed, and the finest details can be reproduced and analysed, without the constraints and the limits of real experiments. Many more dimensions of reality can be explored in this way and in greater detail than with the classical experimental methods. A supercomputer can build and test new prototypes in its virtual reality to find the best one to produce. Even better, it can directly find the best product or the best solution to a given problem. This is affecting everybody every day. Cheaper goods, safer cars, better drugs, better environmental control and better organization of services are all effects of the intelligent and inventive use of high-performance computing machines. But the utilisation of high-performance machines is only at the beginning. Problems like accurate weather forecasting, predictions of the long-term climatic trends, drug design, nuclear fusion and many others are effectively limited by the speed of today's computers. All these and other disciplines could make use today of a thousandfold increase in the performance of the fastest machines, and this must be seen as a top priority objective to be reached by the year 2000. This is also why it is important to start an initiative in Europe, because we have the potential to provide an original, inventive and constructive contribution to the achievement of these goals. ■

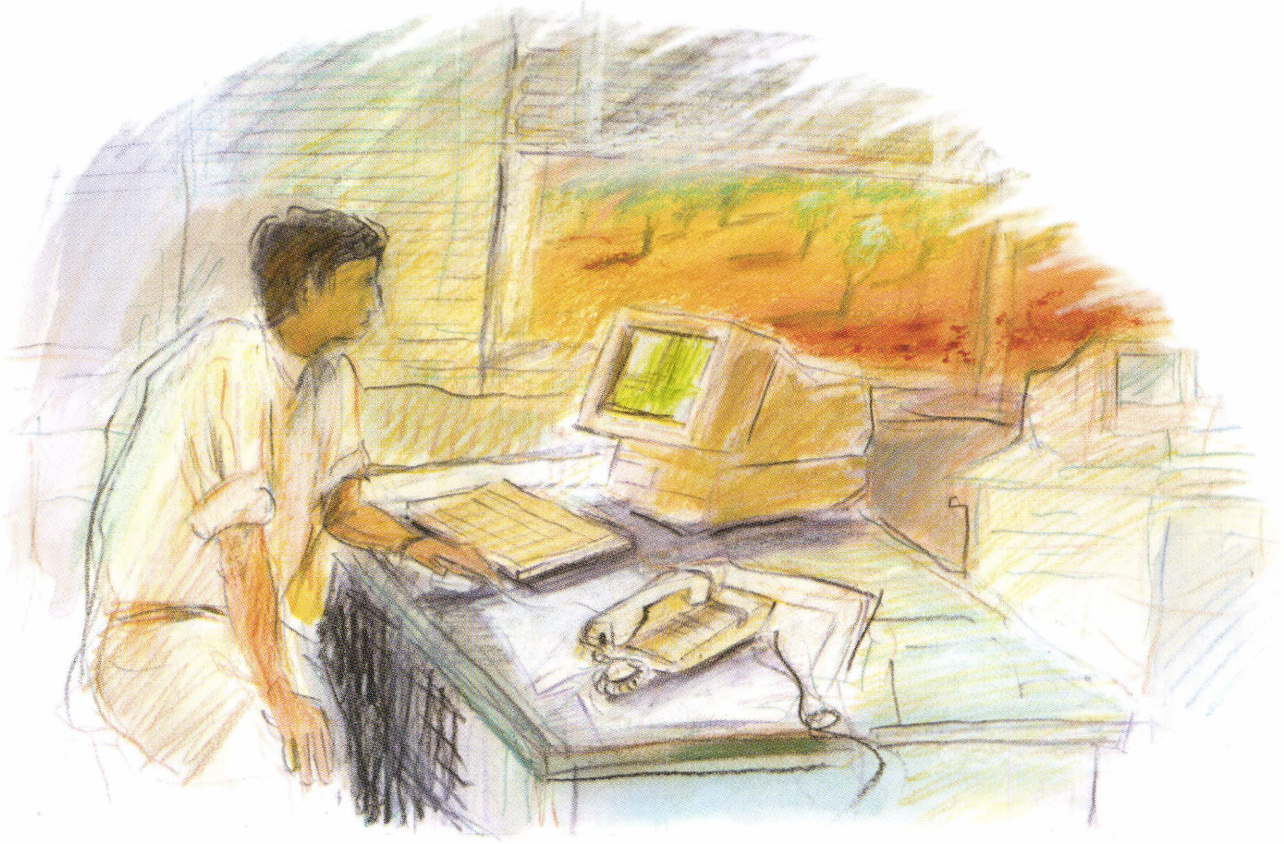
Interview by **Anne Eckstein**
journalist

Carlo Rubbia has been Director-General of CERN, the European laboratory for particle physics, since 1 January 1989. Professor Rubbia has worked as a senior physicist at CERN since 1961. He has been awarded numerous prizes, including the Nobel Prize for physics in 1984.

"The Community can have a decisive role in the development of a European super-computer industry and a European supercomputing culture"

Low-tech regions, high-tech communications

An overview of progress four years after the launch of the STAR programme, by Olivier Pascal



ADVANCED TELECOMMUNICATIONS systems are currently at the fore of regional economic development. Thanks in part to the Star *(Special telecommunications action for regional development)* programme (1), launched by the Commission in 1986, the less prosperous regions in the EC have embarked on a scheme that has already helped them catch up in this sphere. Four years down the road, at a time when the Telematique programme has been set in motion and when future actions are on the way to striking a real balance among the 12 Member States in the strategic sector of telecommunications, it is time for an overview of progress so far.

One of DG XIII's tasks is to implement Community telecommunications policy, which has aimed from the start to "reduce the disparities in development among the various regions" of the EC. Launched in October 1986, Star devotes most of its total budget of 1,580 million ecus to the installation of advanced telecommunications infrastructures in the least-favoured regions of the EC. These infrastructures are designed to carry advanced services that are vital to the competitiveness of businesses in these regions. Star consequently employs a significant share of its funds to promoting these services.

Star's major contributions have been to ensure advance investment by telecommunications operators in the peripheral regions of the EC, to launch a major awareness campaign targeted at local SMEs to promote greater use of advanced telecommunications services and, thirdly, to initiate sectoral applications.

The programme's achievements were first of all to prompt and anticipate offers by telecommunications operators for the networks. As a result, the digitization of telephone networks throughout the Community has been accelerated. This amounts to, on average, an increase of 5% to 10% of national digitization investment planned for this period, but this figure is much higher if one adds regional budgets. Examples are found in all the Member States of the introduction of large inter-regional or international digital transmission arteries via fibre optics or satellite. Mobile cellular radio communication systems have been installed in Ireland, Portugal and Corsica, and data transmission networks, such as packet networks, videotext access systems and X.400-type message systems, have been set up in Ireland, Portugal and Italy.

Star has, moreover, fostered the organization of effective programmes for the dissemination of information and the demonstration of advanced telecommunications services for regional SMEs. Such programmes have been set up in Spain, Portugal, Italy and Ireland.

Star has also generated demand in a number of both sectoral and technical areas that should be bolstered. Some

examples of these are the databases accessible via videotext, office automation services ranging from the use of a fax to local PC networks, computerized data exchange systems of the EDI type and various kinds of computerized work performed outside the traditional office environment. The sectors of application are just as varied and range from tourism to distribution and include made-up articles, textiles and subcontracting of car components.
The creation of numerous telecommunication service centres under this programme that are adapted to the features of each region is another achievement of the Star programme.
Star is now beginning its final year. More than 1 billion ecus have already been committed to some 300 projects, 80% of which deal with infrastructures.

Telematique - providing a boost to services

On January 25, the Commission approved a new EC programme called Telematique for the development of data transmission services in the EC's slow-developing regions.
This initiative is designed to extend the project begun by Star in the services sector to SMEs that either furnish or use services. It is also aimed at expanding the scope of participants to include those who wish to apply exploratory research conducted on advanced data transmission systems to sectors such as transport, health, education and data bases. Of course, beneficiaries must be located in the regions in question, and can include public sector bodies. Particular attention may be accorded to applications that involve more than one EC region.
Whereas infrastructure investment was the priority area for Star, under Telematique it will be restricted to equipment giving access to existing networks.
Telematique has been allotted a budget under the ERDF amounting to 200 million ecus for the 1991-1993 period, with which the European Investment Bank (EIB) may be associated.
From 8 February 1991, when the initiative was published in the EC's Official Journal, the Member States will have six months to submit their operational programmes to the Commission for approval.
Both Star and Telematique play up the role of advanced telecommunications systems in the harmonized development of the EC's regions. But they are also designed to remedy the uneven development of resources available to the regions, particularly in the telecommunications sector. Other actions, at the initiative of the Member States or the Commission, will have to be set in motion to bridge the gaps in this area, which is fundamental for the building of the single European market.

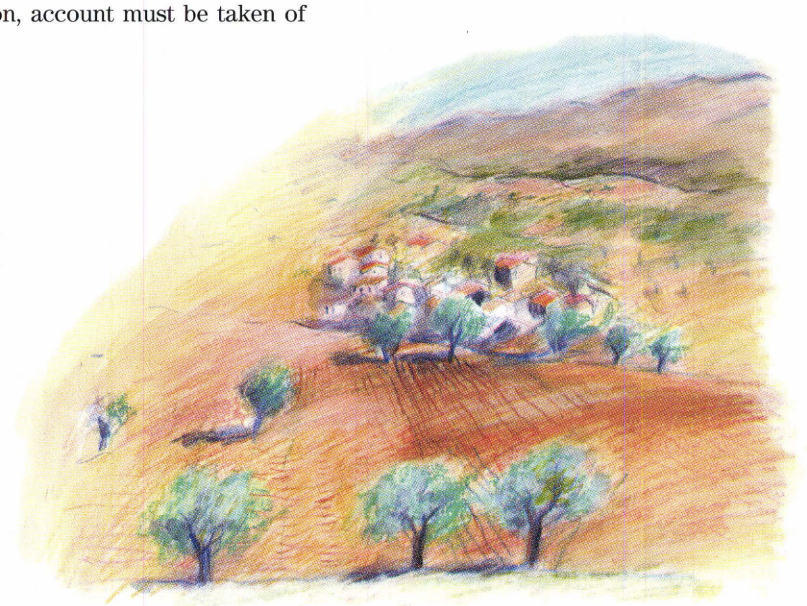
Beyond Star

The aim of Telematique is to foster demand, particularly in the field of data communication, that would result from actions under Star. A further aim is to encourage the peripheral regions to take part in applications that will be used by the advanced data communication systems generated by EC research programmes. It is likely that we will have to continue our assistance in order to improve Community cohesion in the following areas:
- infrastructures and networks, through accelerated introduction of European ISDN and pan-European mobile digital networks;
- services and applications, through the creation of a trans-European data communication system including, for example, electronic mail and videotex services;
- particular attention should also be paid to satellite communications and new business services using the VSAT (very small aperture terminal) antennae.

It is already clear that before a regional telecommunications policy can be introduced, the Member States will first of all have to be persuaded that this sector is vital for the development process and should be given preference over, or better still should work in cooperation with, other highly important sectors. However, not just any telecommunications policy will do. One that will ensure standardization throughout the EC so as to guarantee a consistent EC market is needed. In this connection, account must be taken of the new regulatory climate that is now prevailing and in particular the directives on an open telecommunications network and on opening services to greater competition. Lastly, such a policy would call for extensive investment in information campaigns and training in the field of new telecommunications services.
The sizeable resources available from the structural funds could provide the means to implement such a policy. ■

Olivier Pascal *is in charge of regional telecommunications at DG XIII*

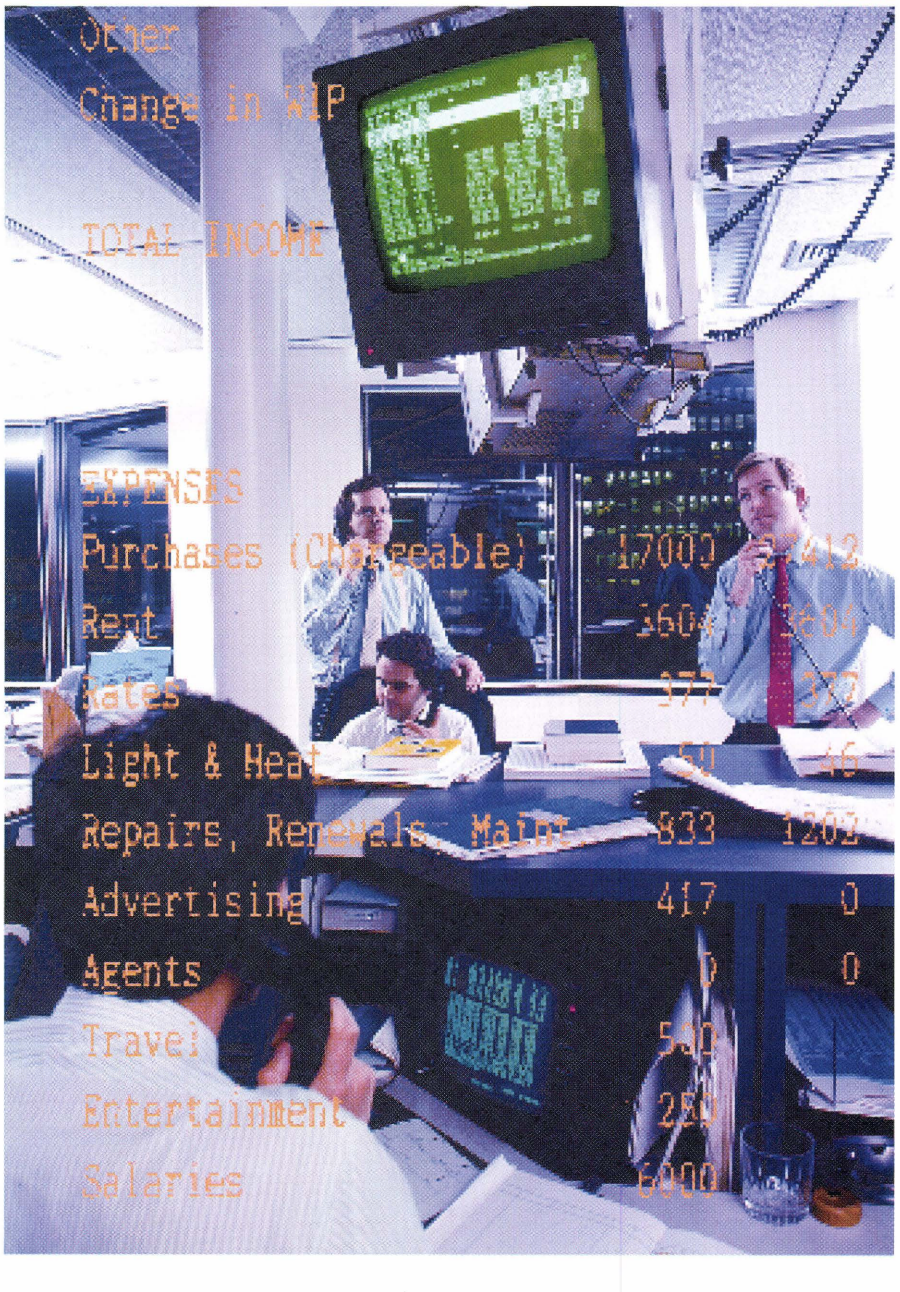
(1) Star is a Community programme co-funded in liaison with the ERDF (European regional development fund) and national, public and private investment. ERDF funding, part of the Community's 'structural funds', goes to particular regions under precisely defined conditions.
The regions are classified according to five 'objectives': Star projects are carried out almost entirely in areas classified under objective 1: regions where development is "lagging behind."



ELECTRONIC TRADING

SAVING TIME, MONEY AND TREES

Robert Wakeling reports on the Tedis programme



THE RAPID AND reliable transfer of information and data will be a precondition for the free circulation of goods and services in the single European market. Electronic Data Interchange (EDI) is one of the most effective means of ensuring this. This is why the Commission has recently proposed to the Council a second phase of the TEDIS (Trade Electronic Data Interchange Systems) programme.

Why EDI?

For centuries, commercial transactions have been based on paper documents, from calls for tender through orders to delivery schedules, invoices and final payment. The cycles of commercial culture have for years been determined by the slow exchange of information resulting from the need to transport physical documents. Today these documents are usually prepared by computers but are still printed out, put in an envelope and posted. The use of electronic information technology within an enterprise stops as soon as a document passes out of the door.

EDI means the direct electronic interchange of commercial or administrative forms between the computers of different organizations. It not only allows major savings of time and administrative cost, but forges new links between the different enterprises.

For trade within the Community, administrative costs account for anything from 3.5% to 15% of the value of the goods. Even a 1% reduction of costs by using EDI would clearly allow economies of billions of ecus.

In terms of the benefits from closer cooperation between enterprises in the Community, and between enterprises and administrations, there may be much more to be gained. Closer cooperation at this level will facilitate current efforts in restructuring certain industry sectors and will reinforce Community policies.

Commission action

The Community has been promoting the coordination of EDI systems through the Tedis programme. Building on the achievements of the first phase (launched in 1988 with a budget of ECU 5.3 million over two years), the current proposal* submitted to the Council envisages a budget of ECU 31.5 million over three years.

Tedis has already helped to raise the level of awareness of EDI throughout the Member States. Within the first phase of Tedis there was close cooperation with and support from five industry EDI communities, in the automotive, chemical, insurance, retail distribution and transport sectors. This number of EDI communities within particular sectors has already grown to 15, and is still expanding rapidly.

A number of projects aimed specifically at the small and medium-sized enterprises (SMEs) have indicated what should be done to ensure that they can also benefit from the use of this new way of doing business.

The experience of the first phase has thus identified a range of issues which need to be examined and resolved, and a number of specific tasks to be completed.

What needs to be done now?

In the second phase of Tedis three main objectives have been identified:

- the integration of EDI implementations and activity in the Member States across different sectors;
- the examination of the economic and social repercussions of EDI and its impact on the management of public and private companies;
- increasing the awareness of potential users, particularly small businesses, and potential hardware, software or service providers.

The integration of various initiatives in different industry sectors and in different Member States will involve continued work on the standardization of messages, the interconnection of value added data or network services, the establishment of secure EDI facilities and the creation of an appropriate legal environment. Coordination will continue to be assured at an international level through the appropriate bodies such as the United Nations or the International Standards Organization.

Hand in hand with the creation of this technical and legal infrastructure throughout the Community must go an increase in understanding how the organization of industry can be improved as a result. The process of change must be managed, and the benefits realised in a fair and equitable manner.

Raising the level of awareness of EDI is a continuing task. In the first phase, the need for national awareness centres in order to provide information and support at a local level and in the appropriate language to potential users in each Member State was clearly identified. In the second phase, the work of these centres will be linked and coordinated through the Tedis programme.

Wider implications

The programme will continue to contribute to the realization of a wider European economic area. Agreements for participation with the EFTA countries have already been negotiated in the first phase of Tedis. These will continue to apply within the second phase. In addition there will be a need to establish interfaces with the EDI systems of the Mediterranean, central and eastern European countries. In these latter, the opening up of modern market economies will place a new emphasis on EDI to complement new trading practices.

As firms reorganize on a European scale to take full advantage of the single market of the future, Tedis has a dual role. Firstly, it is essential that EDI standards and services exist at a European rather than a purely national level. Secondly, it must make sure that the fragmentation into national markets is not replaced by a rigid electronic demarcation between different sectors of the economy. The EDI infrastructure must be both European and also integrated across all sectors.

This infrastructure will be as important in the future European economy as the road and rail networks are today. The removal of physical and fiscal barriers is necessary, but is not enough on its own to ensure the successful functioning of the single European market. It is also necessary to have in place the material conditions of a single market by interconnecting the Community's information and administrative systems. Businesses and individuals must be able to rely on an integrated EDI infrastructure to support the provision of services in such areas as health care, transport and banking across borders as well as within each Member State. Tedis will make an important contribution to the effective integration of these trans-European networks. ■

Robert Wakeling *is responsible within the Tedis programme for raising the level of public awareness of EDI (Electronic Data Interchange), its benefits and consequences within the Community.*

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GETTING THE MESSAGE

Pan-European ISDN

THE SUCCESS OF THE single European market depends on removing barriers to trade, travel and communication - not just physical and fiscal barriers, but also the long legacy of technical obstacles. This is particularly important in telecommunications, where networks have been developed with national needs in mind. Trade depends on the easy, swift and accurate communication of orders, invoices, dispatch notes, payment transfers and thousands of other snippets of information. Overcoming the limitations of Europe's telecommunications networks is vital to business efficiency.

The Commission therefore places considerable emphasis on the idea of the integrated services digital network (ISDN) where all forms of telecommunications, voice, data and image, travel in the same digital form along the same cables. Now 26 public telecommunications operators (PTOs) from 20 countries in Europe are in the process of introducing ISDN into their national networks and have agreed to introduce a common international ISDN service by 1992/93.

Overcoming the limitations of Europe's telecommunications networks is vital to business efficiency

"ISDN has the potential to develop as the backbone of the new nervous system which the 1993 market so urgently needs," in the view of Commission vice-president Filippo Pandolfi. "It will now be decisive to proceed rapidly with the development of pan-European services in order to put the new services at the full service of the European citizen."

The first steps towards achieving the target were met late in 1990, when commercial links were opened between the ISDN services of France, Belgium, Germany, Denmark and the UK. The networks from Italy, Spain and the Scandinavian countries will be linked this year. The links are not limited to Europe - access was made possible last year to both the US and Japan and this year will be extended as well to Hong Kong, Singapore and Australia.

Standardization for the pan-European ISDN is well advanced. Most of the standards are stable - more importantly, no delay with the introduction of the pan-European ISDN will occur because of a delay in standardization. This means giving operators the proper basis for implementing compatible ISDN infrastructures, thus avoiding costly interworking scenarios otherwise needed. It also means encouraging the development of applications and hardware, and of raising user awareness of ISDN - its benefits and its pitfalls.

The importance of applications being developed is clear in France and in Germany where ISDN is well advanced. Numeris, as the French national ISDN service is known, has been available nationwide since the end of last year.

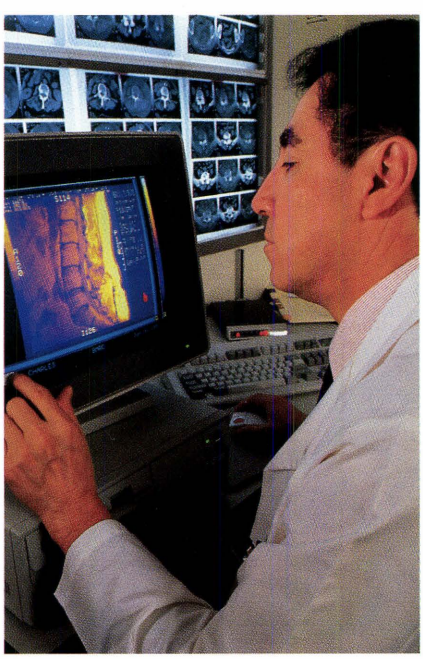
As part of the programme for supporting the introduction of ISDN, France and Germany have set up a system for the development and implementation of user defined applications. These have often been designed with small and medium-sized user companies in mind. The ease of use of ISDN, and in particular its multi-media capabilities, makes it well suited to offering advanced telematics services to organizations that do not have substantial in-house computing skills.

Estate agents, for example, can access multi-media databanks that show clients not just printed details of property, but also photographs of the house or flat from inside and outside. Travel agents can also use photographic databases to let their customers see what is on offer. Medical consultants and surgeons can look simultaneously at medical records and at images such as x-rays or scans. Doctors can receive information about pharmaceuticals via Numeris - not just text but diagrams and graphics thanks to ISDN's multi-media abilities. Of course, it not just small companies who can benefit from ISDN applications. Philips, for example, has developed a support system for electronic engineers, in conjunction with a small software company, Sadre, from Paris, under the 'partenaire' scheme. The engineers can access an expert system for advice on diagnosing faults in equipment and image databases for circuit diagrams to help in fixing the problem.

When links were established between the French and German ISDN services last November, five applications were made available as well to offer users concrete reasons for using the new service. The two key applications are an equipment maintenance service and a building surveillance system. The German machine tool company, Index Werke, provides details of its products via ISDN to its French subsidiary for on-site maintenance support. The building surveillance system uses the multi-channel capability to allow remote observation of buildings and the checking of alarms without wasteful visits. Development of such international applications and services is vital to attracting large numbers of users to ISDN. To help the process, France Telecom and the Deutsche Bundespost Telekom have given the job of supporting application development to Eucom, their joint subsidiary. Eucom will set up branches in France and Germany and other European countries specifically to speed up the development of ISDN applications.

The Commission, for its part, is helping with the development of standards and ensuring that the user's voice is heard. It expects that the Council of Ministers will adopt in January next year a recommendation on ISDN technical interfaces and tariff principles as part of the Open Network Provision (ONP) strategy to develop an open telecommunications environment. It is also encouraging equipment suppliers to agree standards for user terminals and will order 2000 ISDN terminals for its own use to help speed that process. The first meeting of the Commission-sponsored ISDN User Forum took place last year - the first step in a process that will collect user views on service developments and tariffing questions as well as provide users with adequate information on how and when to use ISDN. ■

Paul Gannon
journalist



Medical consultants and surgeons can look simultaneously at medical records and at images such as x-rays or scans

Does the gas company know you're left-handed ?

Frans de Bruïne,
Director, DG XIII Information Industry and Market directorate, on personal data protection and information security

BY PROPOSING TO COUNCIL a number of initiatives concerning personal data protection and information security, the Commission has taken a major step towards the creation of a single market and a citizen's Europe.

Already in the late '70s, when the first national data laws appeared in Europe, it became clear that protection was not exclusively a human rights issue but one which could have important repercussions for the computer and information services industry and, in particular, the transborder flow of data in general. Relevant concerns were thus included in both international instruments that were issued at the time, the Council of Europe Convention 108 and the OECD privacy guidelines, as well as in the Commission's 1981 recommendation which urged Member States to ratify the convention.

Today, 10 years later, the relationship between data protection and the Community objectives of economic, monetary and political union is clear. Information is essential for society at large. Europe's trade and industry, science, technology and public administration, including customs, health, social security and police authorities, all increasingly require information and, in particular, personal data. Such data may range from simple names and addresses to data concerning financial, medical or family questions. They need to be protected from possible abuses, especially in view of the cross reference and transfer possibilities offered by the new technologies.

At present only seven Member States have personal data legislations - which, in certain cases, diverge considerably. This situation not only threatens individual rights but also could jeopardize important Community developments by constituting barriers to the free flow of information.

The Commission has therefore proposed to the Council a set of initiatives concerning personal data protection and information security. These initiatives have four complementary objectives:

- to ensure that there are no barriers to information flows within the Community on data protection grounds;
- to establish a high level of personal data protection throughout the Community;
- to prevent abuse of Community citizens' personal data by third countries;
- to help in the provision of effective and practical security when information is processed electronically.

The core of the proposed initiatives consists of a directive providing a general framework for the protection of individuals in relation to the processing of personal data. It covers all automated and structured manual files, in both the public and private sectors, provided the personal data concerned fall within the scope of Community law.

Conditions for processing and communication of personal data are established. It is most important that the individual who is the data subject knows of the existence and possible communication of files concerning him, in order to be able to exercise his rights and protect his privacy. These rights are essentially the same as those included in

the Council of Europe Convention 108 and national legislations following that convention, notably the right of access, rectification, regular information and judical remedy. Personal data have to be collected and processed fairly and lawfully; stored for specified explicit and lawful purposes and used in ways compatible with those purposes; adequate, relevant and not excessive in relation to the purposes for which they are stored; accurate and, if necessary, kept up to date; and kept in a form which permits identification of the data subjects for no longer than is necessary for the purpose for which the data are stored.

Particular attention is given to special categories of sensitive data revealing ethnic or racial origin, political opinions, religious or philosophical beliefs, trade union membership or concerning health or sexual life.

Member States are asked to encourage professional associations to draw up European codes of conduct in respect of their specific sectors on the basis of the principles set forth in the directive.

Security, liability and sanctions in case of non-compliance with the directive are covered by specific provisions.

The question of transfer of Community personal data files to third countries is of crucial importance. The Commission seeks to guarantee that there are no abuses of the data concerned in countries with inadequate or no protection. Certain negotiation and derogation possibilities are proposed in order to remedy the problems concerned and to take account of specific cases, where flexibility is required.

The various rights and obligations established by the directive will need independent supervisory authorities at national level to ensure that the relevant procedures to be established by national laws in application of the directive are observed.

Representatives of these authorities will constitute a working party meeting regularly to contribute to the uniform application of the national rules adopted pursuant to the directive, give an opinion on the level of protection in the Community and in third countries and advise the Commission on any additional measures to be taken to safeguard the protection of privacy. The Commission will be assisted by an advisory committee composed of Member States representatives.

The draft general directive gives a framework for data protection. Sectoral initiatives, taking into account specific requirements, may also be necessary. Professional codes of practice at European level will be encouraged. It is likely, however, that some sectors will require legally binding instruments, i.e. directives. Such is the case of digital telecommunications (e.g. ISDN). This is a sector of enormous potential but also substantial data protection risks, as has been emphasized by the Council, the European Parliament and data commissioners from various Member States.

The ISDN directive drafted by the Commission concerns essentially the application of digital technology to public telephone, videotex and teleshopping services. Data protection provisions relate to two categories of personal data: those collected and processed by the telecommunications organizations in order to be able to efficiently provide the services concerned; and those related to the identification of incoming or outgoing calls made possible by digital technology. This draft directive aims at achieving an adequate level of data protection in two directions:

- minimizing the risk of abuse by limiting the data processed by the telecoms organizations to the minimum required for ensuring adequate operation, service quality and subscriber facilities;
- and ensuring the personal data protection rights of both the called and the calling party, given the identification possibilities offered by digital technology.

Thus specific provisions are included for issues particular to such services as itemized call billing, calling line identification, call forwarding, unsolicited messages and consumer profiles made possible by teleshopping facilities.

Attention is also being given to the danger of diverging technical standards that might be introduced to meet data protection requirements.

Three further data protection initiatives are proposed by the Commission.

Access to the Council of Europe convention will facilitate and institutionalize contacts between the Community and third country parties to the convention, especially for the cases of transfers of personal data between such countries and the Community.

Member States are invited to extend the application of the general directive provisions to the personal data not coming within the scope of the Community laws in order to establish full protection, as is already applied in the seven Member States which have introduced national legislations.

Last but not least, the increasing number of programmes and projects undertaken by the Community institutions and involving personal data processing make it essential that the same principles are also applied with regard to these institutions. The Commission has declared that it will apply the general directive principles to personal data files processed by its services.

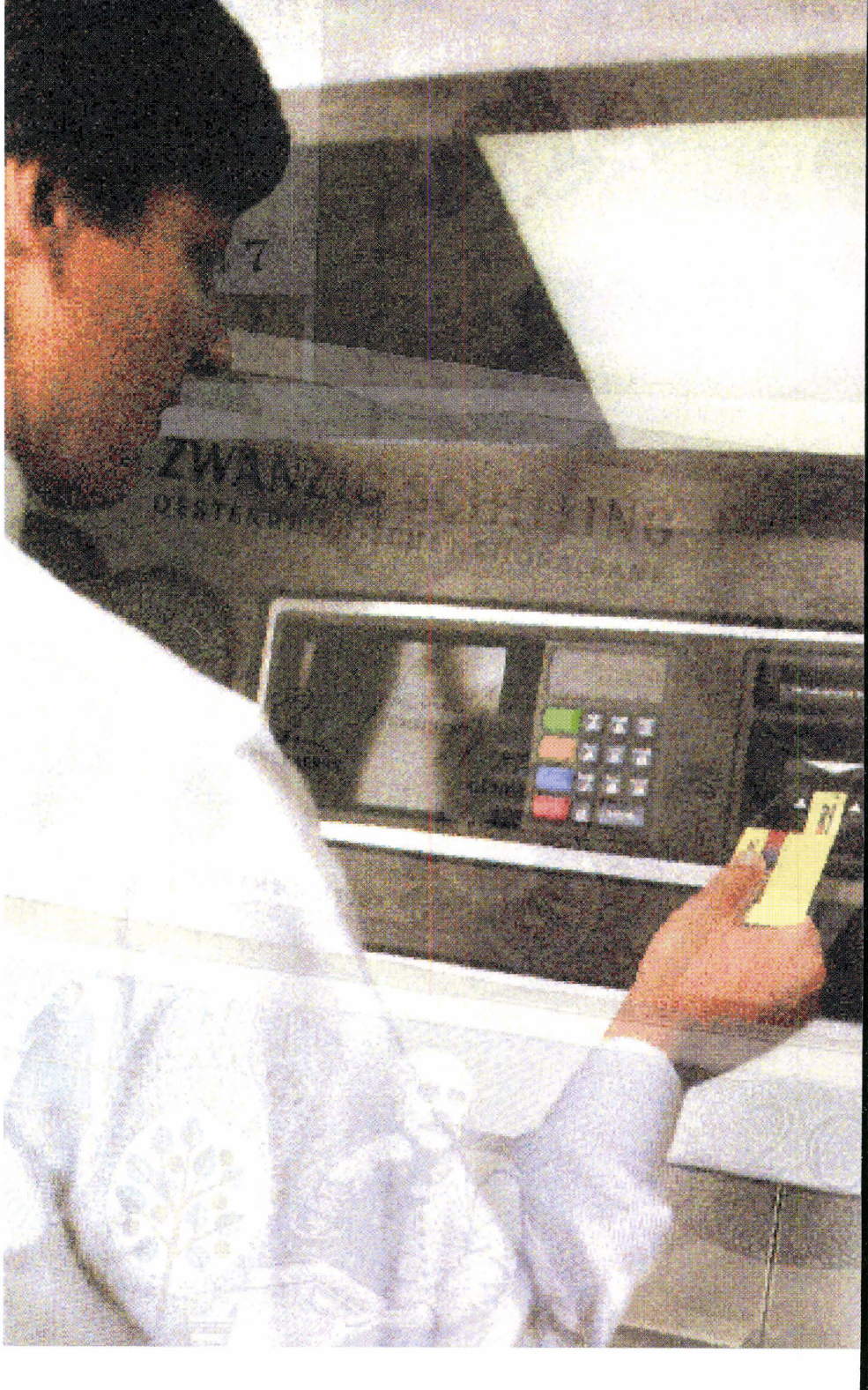
In addition to the five data protection initiatives mentioned above, the Commission has proposed to the Council a decision in the field of information systems security. Given the vulnerability of modern societies depending on electronically processed and transferred information, the protection of information through security measures has become a central policy question and a major concern worldwide. The key issue is to provide effective and practical security for information held in an electronic form to the general user, administrations and the business community without compromising the information interests of the public at large.

The Commission's proposals are at present being discussed by the European Parliament and the Council in the context of the cooperation procedure necessary before adoption. ■

Standardization in information technology

PIECING TOGETHER THE BITS

Without standards, the EC would be doomed to remain a technological Tower of Babel



At first glance, standardization in information technology might appear to be reserved for specialists. Information technology nonetheless is present in nearly all sectors of human activity and most of us make use of it, sometimes without even realizing it. Most of us have used a bank card to withdraw money from a cash point, for instance - just one example of how advanced technology has entered everyday life. And it is irritating not to be able to use the same bank card while on holiday in another country. One of the tasks of standardization is precisely to remedy that shortfall.

Not so long ago, most computerized systems operated in a closed environment. For lack of open standards and perhaps for business reasons, manufacturers tended to close their systems by introducing non-compatible technology. Such outmoded ideas no longer make sense given the growing impact of information technologies and the increasingly dominant place they hold in the economy. An application such as an electronic message service requires an open approach. Information must be sent to the right address, regardless of who the receiver is or the equipment used to send the message.

So it is not enough simply to have the right advanced technology. The technology must be programmed in order to have the greatest economic impact possible. In medicine, a problem arises in transposing electrocardiogram signals. If the systems used by two different hospitals are not compatible, then the same examination has to be conducted twice, which doubles the cost.

While such an occurrence is harmful on the national level, it is doubly so on the EC level. Europe will soon be bringing down its internal borders and will have to adopt a universal technical language, otherwise true technological integration will remain a mirage. So it comes as no surprise that standardization is one of the Community's overriding priorities in the information technologies sector. Without standards, the EC would be doomed to remain a technological Tower of Babel.

The Community has not been planning this project all on its own. The aim is to introduce harmonized worldwide standards that would ensure the necessary interoperability of systems, thereby allowing them to communicate with one another. Another objective of the EC's information technology policy is to do away with a number of barriers to trade, e.g. the disparate standards to which manufacturers have to conform.

The Commission is not a standards organization and therefore does not devise standards. That task is entrusted to European standardization bodies that bring together the national standards organizations located in each Member State and in the member countries of the European Free Trade Association (EFTA).

Since 1985, the goals of harmonization and the basic requirements involved have been set out in a number of instruments, including EC directives, while the technical means used to attain these goals are defined by the standards themselves. This allocation of tasks helps to spell out clearly the framework in which information is provided and published. Standards bodies, and through them the interested parties such as manufacturers and users, have the job of coming up with the commercially and technically viable means to reach the aims defined in EC legislation.

There are three EC standards bodies : The European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunications Standards Institute (ETSI). This three-pronged structure reflects that operating on a worldwide level, which brings together the ISO, the IEC and the CCIT/CCIR. However, it quickly became apparent that given the growing number of areas to be covered, the approach of these three European bodies had to be coordinated. This task was given to the Information Technology Steering Tripartite Committee (ITSTC), which assigns work on the basis of areas of traditional competence and helps to settle problems through very simple arbitration procedures.

One fundamental problem in the area of standardization is the need to reconcile the interests of users with those of manufacturers. Moreover, we often start with a simple problem and quickly end up entangled in a many-sided predicament. To take the example of automatic payment cards, standardization begins straightforwardly enough with the problem of the size of the card, the use of a magnetic strip or a microprocessor, then enters a web of difficulties involving such issues as security and transaction guarantees. Each component in the chain is linked to the previous one. In computerized banking, agreement must be reached on how to conduct electronic transactions. Consequently, the bankers must first get together and agree, before the stage is reached in which standards are drawn up. In this connection, meetings in the form of workshops are very useful because they allow all the interested parties to discuss openly a proposed standard and reach a preliminary understanding. Once this stage is covered, the results are transmitted to the standards body, which sets in motion the formal adoption procedure and guarantees harmonization by means of statutory rules that are applicable to EC standards.

All national governments in the Community are tackling the transition between information transmission and electronic data systems. That change will be all the easier if it is founded on commonly-agreed technology. There is, of course, an obvious economic opportunity for the companies who will be manufacturing the equipment, but the advantages for the man in the street will be at least as numerous.

The ability of different systems and networks to communicate is a prerequisite for the setting up of a truly unified Europe. ■

Patrick Baragiola
journalist

HDTV

Coming shortly to a screen near you?

The producer's point of view

If television today is a little window on the world, the advent of high-definition television (HDTV) will provide a picture window : a much larger screen, near perfect picture quality and sound which can literally surround the viewer. However, this window still has to be opened. What kind of strategy will have to be adopted to create the conditions which will ensure the success of European HDTV?

XIII Magazine spoke to two specialists who are involved in the sector on a day-to-day basis: Brendan J. Slamin, head of the HDTV department at the British Broadcasting Corporation (BBC), and Jacques Barsac, a French producer and author of numerous articles on HDTV.

16,000 hours of fiction per year

From a technological point of view, the battle is almost won: research carried out under the Eureka initiative, with the active participation of the European Commission (DG XIII), has resulted in the development of a European high-definition production standard (1,250 lines, 50 full pictures per second) and a broadcasting standard, HD-MAC, which will enable HDTV programmes to be transmitted via cable, hertzian wave or satellite. Companies have manufactured the equipment (cameras, television sets, stationary and mobile studios, etc.) which will be marketed as from 1995.

However, equipment is only one side of the equation. Its corollary is the programme material, and Europe has a tough row to hoe on this score. European television stations currently broadcast some 16,000 hours of fictional programmes annually. Such a gargantuan appetite makes enormous demands on production capacity. The Commission advised the professionals concerned to set up a European Economic Interest Grouping (EEIG), Vision 1250, which would make HDTV equipment available free of charge to its members - industrialists, television stations, independent producers and telecommunications operators - to enable them to produce programmes in the European HDTV standard.

The BBC, which produced the first experimental programme in HDTV in Europe at the end of 1988, recently made a high-definition recording of Mahler's eighth symphony, performed before a live audience by the London Philharmonic Orchestra conducted by Klaus Tennstedt, with a choir of 360. The equipment supplied by Vision 1250 included five of the seven cameras used and one of the three mobile recording units. Brendan J. Slamin was in no doubt that it would have been impossible to mobilize such an array of equipment without the assistance of Vision 1250. One of the BBC television stations will be broadcasting the recording, using a converter which transforms HDTV into the PAL standard, while maintaining a very high quality of sound and picture.

Jacques Barsac, the French producer of the European HDTV fictional film *1250 Qui dit mieux?*, believes that software (programmes) and hardware (technology) strategies should go hand in hand. However, the various links in the chain from hardware to software, comprising satellite operators, television stations, industrial circles, producers, etc., are far from having identical economic interests. As a way of involving the various parties in the HDTV battle he has put forward a major initiative: setting up from scratch a state-run pan-European television station, drawing on all the countries involved, and broadcasting in the European HDTV standard. This superstructure would have a common programme content, to be broadcast in several languages, on the one hand; and a number of specific programmes, designed for different regional audiences, on the other.

Exploiting "peripheral" markets

While waiting for HDTV, a number of experts believe that an effort should be made to exploit "peripheral" sectors, such as promoting the use of high-definition equipment in sectors which do not require a broadcasting standard, thereby enabling industrialists to recoup some of their investment in HDTV over a reasonably short period.

Micro-computing is a sector in which high definition can provide the kind of picture clarity which would immensely enhance the work of a range of enterprises, research centres and laboratories. Likewise, high definition could end the blind robot era in the computer-aided design (CAD) sector and pave the way for a host of new industrial applications. High-definition imaging has important repercussions for the medical, electronic photography, photocomposition and printing sectors. So high-definition technology means much more than TV. To confine it to television would be like using a computer merely as a typewriter or calculating machine.

Experts agree that Europe should pursue a twin-track strategy, comprising high-definition television and high-definition video. A major advantage of high definition is that it enables pictures to be projected onto a screen frame of three metres minimum, in which the actors can be seen life-size (a cinema in the home?). The video market offers manufacturers the chance to recoup their investment in HDTV via a high-definition video disc market and sales to the cinema industry.

Producers see the advent of HDTV as affording many opportunities. Its perfect picture quality and "surround" sound place it in a class of its own. The wider frame enables producers to compose large dimension pictures, a critical advantage for the cinema and for sports coverage. It combines the advantages of television (live information) with those of the cinema (quality) and, in so doing, opens up vast new opportunities for producers. ■

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Broadcasting in Europe takes 16,000 hours of TV fiction annually. The success of HDTV also depends on the programme material.