Commission of the European Communities

Telecommunications

Directorate-General XIII

Telecommunications
Information industries
and Innovation

The debate on a Europe-wide telecommunications market

The Green Paper

Worldwide, the "telematics revolution" – brought about by the convergence of telecommunications and computer technology – has generated a growing need for a fundamental change of attitude within the telecommunications administrations, which are usually state-operated monopolies.

In Europe, this takes on even greater significance since it must coincide with the completion of the Community's internal market, scheduled for 1992.

It is apparent that this ambitious goal cannot be achieved unless the Member States enter into close cooperation and agree to a common set of rules. Failure to do so would be to risk the continued and further fragmentation of the European market. In particular, a broad consensus is urgently needed with respect to the orientation, scope and time scale of the necessary measures.

The Green Paper on Telecommunications submitted by the European Commission in June 1987 aims at bringing about this consensus. After an initial policy discussion in October, the Commission will issue a number of more formal proposals by the end of the year.

The information technology revolution

The convergence of telecommunications and computer technology is transforming the industrial and socio-economic fabric of Europe at an accelerating pace.

The telematics revolution is the result of spectacular developments in three areas :

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

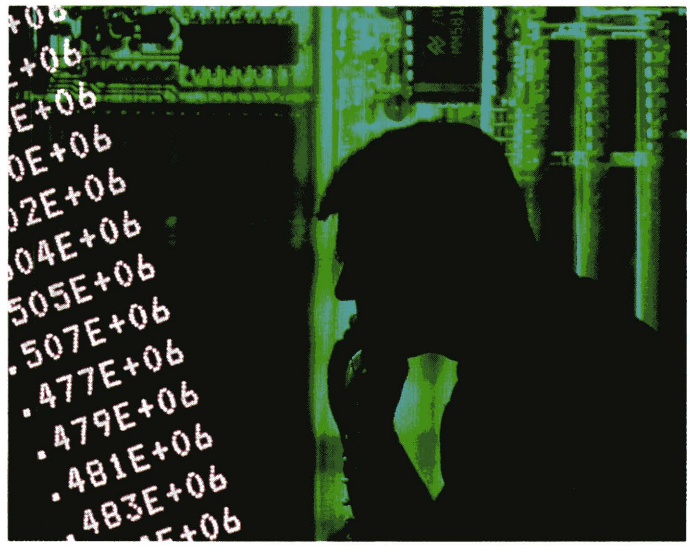
As a result, telecommunications, computing and television can no longer be considered as separate phenomena and must be treated as an ever more tightly integrated unity.

The challenges

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

Among Europe's big industrial companies, for example, the demand for data communications capacity is growing at the rate of 20-40% per year. Experts predict that over the next 20 years the total public and private investment in telecommunications within the Community will be between ECU 500-1000 billion.

World revenues from telecommunications services in 1985 reached some ECU 300 billion of which public and private expenditures within the Community were approximately ECU 62.5 billion. In 1986, the world market for telecommunications equipment was close to ECU 90 billion, of which the market within the Community represented some 17.5 billion.



Confronted by this world challenge – on which the competitiveness and prosperity of the European Community will ultimately depend – the Community must take action on two key fronts: the scale of the market and its future organization.

The scale of the market

No single Community country accounts for more than 6% of the world's telecommunications market, whereas the United States represents 35% and Japan 11%. Yet, taken as a whole, the Community has a 20% world market share.

It is evident that the Community needs more competitive market structures. It is equally obvious that the potential of a truly European market has been far from fully exploited. For example, during the first half of the 1980s, average per capita expenditure on telecommunications equipment within the Community was only

ECU 32 compared with ECU 46 in Japan and ECU 80 in the United States.

Clearly, the new technological environment resulting from the convergence of computing and telecommunications is blurring borders within the Community in the same way as it is blurring traditional boundaries between different information technology products and services.

Modifying the national monopolies

Telecommunications have taken 140 years – from the invention of the telegraph in 1847 – to develop from a single service into the dozen or so services we know in the 1980s. In an environment based mainly on the traditional telecommunications tools – telephone, telegraph, telex – Europe could perhaps continue to tolerate the continuing domination of national monopolies. But the growth in services and applications in Europe between now and the year 2000 is likely to be explosive, with the accelerating telematics revolution continually breaking new ground.

Ideological discussions aside, if this new world challenge is to be met, Europe cannot leave it to the existing national monopolies to organize everything: regulations, supplies, operation, pricing. The current structure simply cannot satisfy the legitimate expectations of European consumers and industry. State-regulated and operated telecommunications authorities must work hand in hand with the computing sector, which operates in a highly competitive commercial environment.

Current regulatory change

The United States and Japan have re-regulated the telecommunications sector to improve their performance and competitiveness. Europe, with its different history, culture and economic and technological characteristics, must also find the most appropriate means of adapting its telecommunications structure.

Intense debates currently underway within the Community countries herald radical changes in the regulations governing the telecommunications sector and the status of network operators – both public and private. Some countries have already substantially modified their telecommunications structures while others are still in discussion... At the same time, a reconfiguration of industrial alliances at the European and international levels is also taking place.

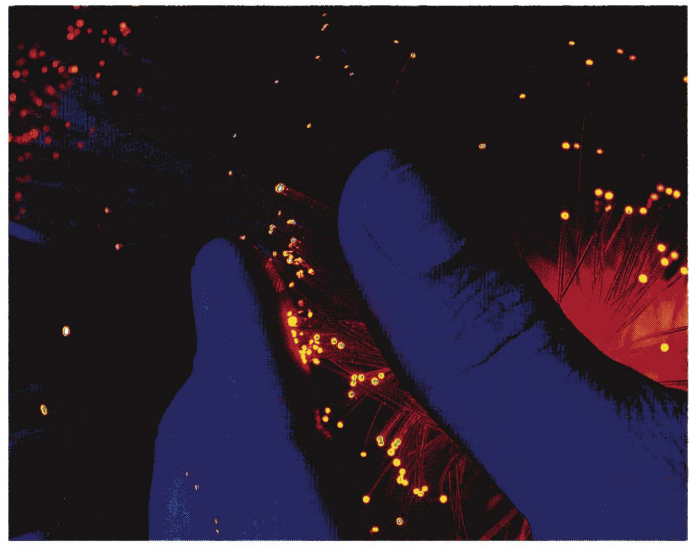
In the light of these complex factors, the European Commission proposes an orderly progressive transition towards a competitive telecommunications market within the Community.

A primary objective is to give European manufacturers a continental base. Moreover, users must be allowed to develop or have access at the lowest possible cost to the numerous new services that will be generated by the continuing convergence of telecommunications and computer technology.

Outline of the Green Paper's proposals

is open not only to governments, but also to the European Parliament, the Economic and Social Committee, public and private telecommunications administrations and carriers, the European telecommunications computing and services industries, users and trade unions. The broad lines of the Green Paper's proposals cover :

- Complete phased opening up of the terminal equipment market to competition.
- Substantial opening up of the telecommunications services market, excluding at this stage a number of basic services considered essential to ensure current public service goals and objectives.
- The right for services to operate across Member States' national borders.



- Continued exclusivity or special rights for telecommunications administrations (public and private carriers) to supply and operate the network infrastructure; recognition of their central role in establishing future generations of infrastructures.
- Clear separation of regulatory and operational functions of telecommunications administrations.
- Opening up of the market for satellite ground stations to the extent that the equipment is associated with telecommunications terminals rather than infrastructure.
- Recognition that telecommunications tariffs should be responsive to cost trends.
- Developing a consensus from both sides of industry in order to smooth the transition and to maximize the opportunities presented by the new networks and services to create employment.
- Using telecommunications to accelerate economic development and reduce the isolation of outlying regions of the Community.
- Establishing common European positions within the various international bodies (GATT, ITU, etc.)
- Creation of a European Standards Institute.

This would be a small core of experts brought together from public and private network operators as well as experts seconded from industry. The objective would be to facilitate and accelerate establishment of the universal standards and specifications indispensable to an open and competitive market environment, and to development of European information technology services.

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European telecommunications standards

Technological progress over the last 20 years has led to telecommunications systems and networks that can process and carry large quantities of information of many kinds: voice, text and pictures, business data, signals for remotely controlled appliances and much more.

The demand for services such as mobile communications, visiophones and videoconferencing is growing rapidly in both the business and the residential sectors, requiring an ever-increasing capacity to communicate over greater distances, with a larger number of users, in a greater number of ways, at higher speeds and with minimum costs.

This represents a formidable challenge to the telecommunications network providers and industry. They have attempted to meet it, often with considerable success and benefit to the general public and the business community. However, the pressure, pace and complexity of development and implementation have not always allowed the introduction of harmonized services and terminals which can provide the user with a high-quality, end-to-end, international service or national services which are sufficiently compatible with each other for the same type of equipment to be usable in all European countries.

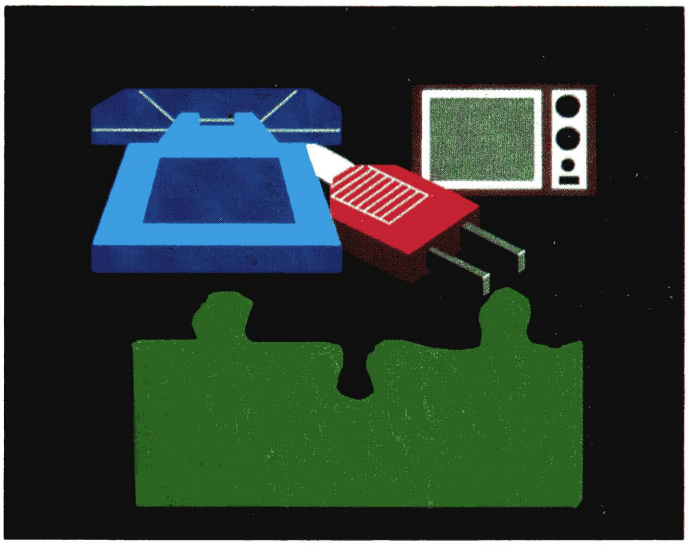
Although most people are aware that telecommunications are developing rapidly, so far this may have meant little more for the average family in Europe than wondering whether or not to buy a cordless phone or an answering machine.

Standards and markets

The complex issue of international technical standardization is one of the principal obstacles to be overcome before the full range of new telecommunications services is generally available. Pieces of equipment such as the telephone, personal computer and television can increasingly be combined into integrated information systems due to the convergence of digital information processing, telecommunications and audio-visual technology. But without standardization, this is as complicated as trying to combine a food-mixer, a cooker and a freezer into a single kitchen "work station".

In a number of cases, national standards or national selections from international standards have been adopted and used in monopoly purchasing and supply situations. National telecommunications industries have therefore tended to focus on the needs of national markets. Besides restricting choice, this tends to limit European telecommunications equipment and services to markets which are increasingly too small to provide an adequate return on investment, particularly in view of the high costs of R and D.

The role of telecommunications in the overall economic development of the Community is increasingly important. This is clearly recognised by US and Japanese interests in the Community



market. The European telecommunications industry must therefore be able to operate in this wider market, by selling standardized equipment on a bigger scale, and thereby move to a position where it is better able to meet competition from the USA and Japan in global markets.

As the infrastructure of new digital networks is developed and advanced new services used by complex customer terminals (often multi-functional) come into operation, it will be essential to achieve a harmonized approach with a high degree of end-to-end communications capability. This can only be achieved if very precise technical standards are developed and widely used. Ideally this should be on a world-wide basis, but this is often difficult to achieve because of technical, economic or political differences in approach to the pro-

pects of successful standardization in Europe should be rather better.

Community moves towards standardization

The Community has approached these issues through a number of advisory and legal measures. These have taken the form of :

- Directives and regulations (legally enforceable) covering the initial stage of the mutual recognition of type approval for telecommunications terminal equipment, the adoption of common standards for direct satellite TV broadcasting, the allocation of frequencies for public pan-European digital mobile communications, and help for the less-advanced Community regions.

- Agreements (such as recommendations) demonstrating the political will of the EC countries to move ahead voluntarily together, to open up access to public telecommunications contracts, to set the scene for the joint development of advanced telecommunications technologies, to use visiophone and videoconference techniques in intergovernmental applications, to promote European standards and the common application of standards, and to coordinate the introduction of ISDN.

The Commission has helped to step up the work of the European organizations CEPT and CEN/CENELEC responsible for telecommunications and information technology standards. CEPT has responded by a major reorganization, including the formation of a high-level Technical Recommendations Applications Committee, and a significant increase in its activities.

Further activities proposed by the Commission involve the joint development of advanced telecommunications technology, trade electronic data interchange systems and the coordinated introduction of public pan-European digital mobile communications.

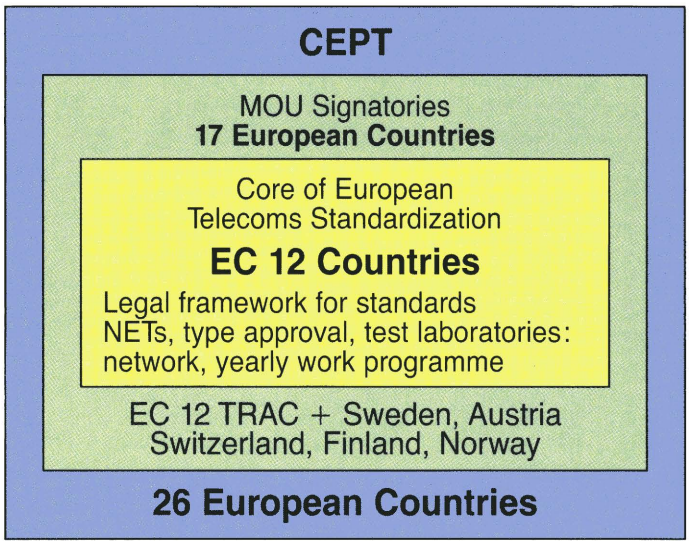
Terminal equipment

The offer of a number of new services in the coming years points to steady growth in the Community terminal market, which is growing at a rate of 6.5% per year (compared to 8.2% in the USA). This market also requires a growing variety of types of terminals, often multi-functional, to satisfy a variety of user needs. For this reason, the terminal market has to evolve towards the unrestricted offer of equipment, nevertheless following common standards to ensure the inter-operability of terminals Community-wide. For teletex terminal equipment, for instance, a NET standard is under preparation within the framework of the European type approval scheme.

The Community has a special interest in harmonizing terminal equipment standards and the process of approving the terminals for attachment to public networks. This currently operates on the basis of each country requiring testing for conformance with its appropriate national standard(s) in one of its own testing laboratories. For European manufacturers, this has meant undergoing lengthy and expensive testing and approval procedures in each country before launching a product in the potential Community market.

To help in this evolution towards a free market for terminal equipment, the Community has adopted a directive on mutual recognition of conformance tests for terminals, which allows industry to market its equipment after only one set of tests in an approved laboratory – instead of 12. This new move, coordinated with the EFTA countries, should certainly accelerate the development of a free terminal equipment market.

Memorandum of Understanding (MOU) on European Telecoms Standards - Production and application layers



A European Standards Institute

The Commission has also proposed a more effective standards-making process in the form of a European Standards Institute which would operate on a full-time basis, drawing on a wide range of experience and skills to produce effective and timely standards which could be used for procurement and approval purposes.

TRAC Technical Recommendations Application Committee – an autonomous committee within CEPT, in which each signatory of the Memorandum of Understanding on European Telecommunications Standards shall be represented to constitute the body, which will be responsible for the implementation of the MOU. TRAC decides on the acceptance of technical recommendations such as NETs.

NETs "Normes Européennes de Télécommunications – technical recommendations which are given mandatory force, according to the legal procedures established in Directive 86/361/EEC.

Packet-switched networks across Europe

In the late 1970s a new type of public telecommunications network started developing in Europe: packet-switched public data networks (PSPDNs).

Using a much improved store-and-forward technology with short call set-up and transit delays (dozens or a few hundred milliseconds), allowing quasi real-time interaction, PSPDNs are good enough for most telematic and teleprocessing services and applications.

Several new characteristics distinguished these networks: among them, a large number of access modes and facilities to tailor the service to the customers' needs; tariffing mainly on volume of data actually transmitted; and independence from distance. This made them particularly suited to provide a wide range of transactional data services and applications, including on-line database access and retrieval, at moderate costs.

The interconnection of, and ready access to, different data bases and computer centres throughout Europe can clearly play an important role as a catalyst in overall economic and scientific activities. The Commission therefore decided to sponsor the development and implementation of EURONET, a true trans-European packet-switched network with switching or access nodes in each country and a single European network management centre, providing a universal and homogeneous packet-switched service between the different European subscriber institutions and organizations.

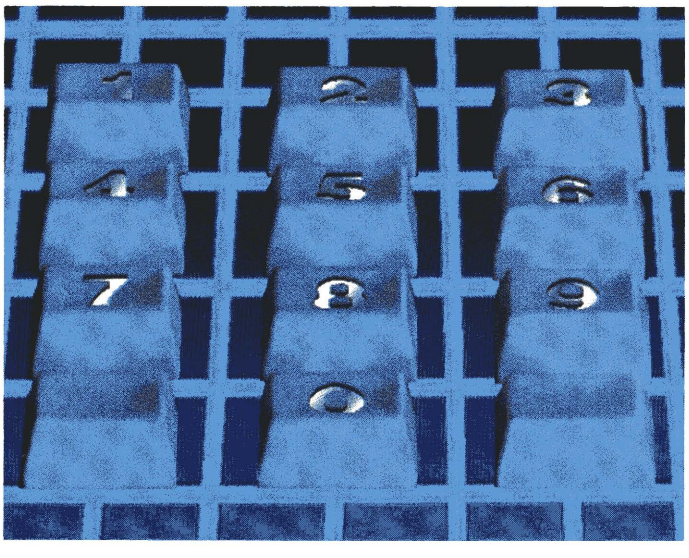
EURONET had a considerable success at the time, when no PSPDN and corresponding international lines existed to link up all the European Community countries.

By 1984 most countries had already implemented their national PSPDNs and were offering commercial packet-switched services. International and intercontinental services between national networks were provided through several interconnections, either direct or via transit networks. As previously agreed, EURONET was then gradually dissolved and its customers connected to the national PSPDNs.

However, the development of these national PSPDNs followed different time schedules, commercial policies and priorities, leading to different implementations and to some difficulties in the provision of truly harmonized, good quality, international packet-switched services.

Careful analysis of the situation and consultations with users led the Commission to draw up a first diagnosis of packet networks in Europe and take this to the Senior Officials Group for Telecommunications (SOG-T) for discussion. This move was followed by a proposal to the CEPT, backed by the SOG-T, for the creation of an Ad-hoc Group on Packet Networks.

Since then there has been a wide-ranging mobiliza-



tion of consensus and acceleration of work across the Community to provide advanced packet-switched networking for Europe. The main steps in this trans-European action have so far been as follows:

September/December 1985
First diagnosis of X.25 packet networks situation in Europe.

April 1986
Commission proposal to SOG-T for the creation of an Ad-hoc Group on Packet Networks.

May/June 1986
Coordination meeting between chairmen of CEPT committees CAC and CCH, held in Brussels, decides to set up a Joint Project Team on International Packet Switched Services according to the Commission proposal and previous SOG-T

discussions:
A draft mandate produced.

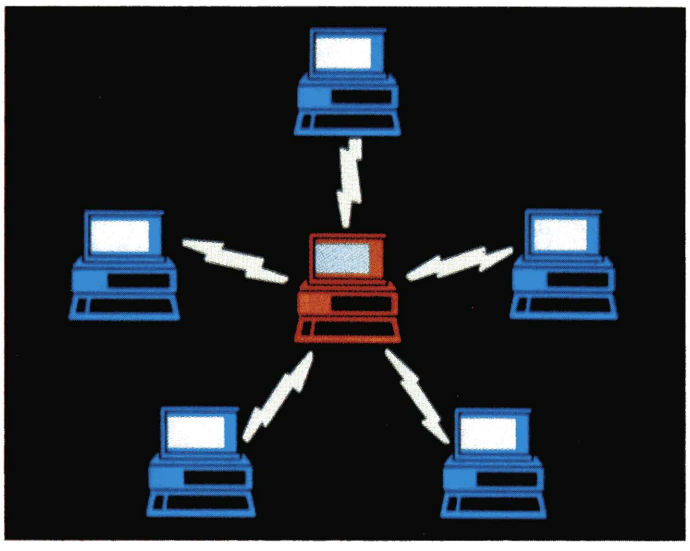
September 1986
First meeting of the CEPT CAC/CCH Joint Project Team in Munich with Commission participation – decides on priorites, identifies difficulties to be overcome, produces two draft recommendations and a questionnaire to administrations on implementation plans for PSDNs in Europe.

March 1987
Second meeting of the Joint Project Team held in Munich, with Commission representatives.

June 1987
Third meeting of the Joint Project Team held in Düsseldorf, again with a Commission representative.
At the second and third meetings, the work already initiated on the main targeted areas (see following table) had made rapid progress and new areas were identified, major results regarding access to packet-switched services, quality and availability at European level being available from the CEPT/Commission meeting in September.

Joint Project Team initial target area

1) Establishment of operational test DTEs in all European networks (throughput and delay measurements).
2) Detailed international traffic and performance (QOS) statistics.
3) Availability of technical specifications by CEPT defining QOS parameters related to X.25 international traffic :
   - throughput and delays
   - others (e.g. availability of virtual circuits).
4) Diagnostic messages and harmonization of codes according to CCITT 84, on a European level, at the user interface :
   - X.25/X.75 interface.
   - X.28 interface.
5) Upgrading of all international links in Europe to 64 Kbps.
6) General implementation of restoration principles (for interconnection of networks and rerouting).
7) Coordinated implementation of multilink dynamic procedures covering international links.



8) Coordinated implementation of X.25 84 version according to CEPT recommendations at European level :
   - T/TD 08-01 (OSI packet-mode terminals)
   - T/TD 08-02 (interworking of PSPDNs)
   - T/TD 08-03.
9) Agreement upon and implementation of international reverse charging, or European NUI. Manual on European log-on procedures.
10) Availability and implementation of a CEPT X.32 functional standard (for Europe-wide internetworking).
11) Introduction of new OSI packet mode DTEs available from European industry (complying to T/31) from 1987 on.
12) Market development and additional customer support plan, for promotion of pan-European public packet-switched service.
13) Identification of strategies for future introduction of packet bearer services in ISDN, and coordination of PSPDN-ISDN interworking approaches for the integration scenarios.
14) Coordination of network development plans with regard to the next generation of packet switches (line speeds up to 2Mbps) available by 1988/90 from European manufacturers.

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ISDN standardization

The upgrading of telephone networks and the general introduction of digital switching and transmission systems are not only improving existing services but laying the foundations for a wide range of new integrated services.

This is the promise of ISDN – Integrated Services Digital Network. With cooperation across the Community, the transition from analogue to digital networks can be successfully engineered to provide access to ISDN for subscribers in most parts of Europe in the early 1990s.

Digitization is already bringing major benefits to telephone operating companies, industry and users. The services offered by ISDN represent an even greater step forward:

- For the operating companies, there are the prospects of increased revenue from new services and a growing use of the network, coupled with reduced costs associated with pair gain in the local network, improved operations and maintenance efficiency, the merging of voice and non-voice services and the gradual disappearance of dedicated networks.
- For the industry, there is the promise of increased market volume for new equipment associated with an infrastructural development in the network for the provision of a new service, the increasing use of which should in turn stimulate the replacement market for non-enhanceable equipment.
- For the users, there is the prospect of a fast, flexible and reliable system that can be tailored to meet the full range of telecommunications needs, from the corporate user to the small business and the home.

Broad acceptance of the ISDN service by the telecommunications user will be achieved only if the costs are comparable with those of services over existing dedicated networks. The key to reducing the cost of the new service is international standardization.

With standardization, the equipment market base will expand to realise the economies of scale necessary for the industry to recover the substantial development costs associated with advanced microchip (VLSI) technology and applications software. Standardization will reduce the operating companies' need to implement expensive interworking solutions. And standardization will allow the creation of a harmonized network environment where service usage can grow faster, thus providing larger revenues earlier for the operating companies, which in turn should enable them to reduce charges.

Community action on ISDN standardization

Community action on ISDN standardization is focused on the need to produce standards as early as possible in the evolutionary stages of ISDN, in order to neutralize the development of non-standard solutions in individual Member States. To achieve this, the Council of Ministers has issued a Recommendation to Member States on "the coordinated introduction of the integrated services digital network (ISDN) in the European Community". It is hoped that with the cooperation of the Conference of European Postal and Telecommunication Administrations (CEPT) and European industry, the targets for the introduction of ISDN (phase 1) in Europe from 1988-1993 can be met. The principle proposals of the Recommendation can be summarized as follows :

General points

ISDN (subscriber access at 144 Kbit/s and 2 Mbit/s) should be considered as a natural evolution of the telephone network, i.e. it should be used

by both professional and residential subscribers and the existing structure of the current telephone network should not be fundamentally changed by this evolution. The first decisions must take this into account.

Nevertheless, the speed of market penetration will depend on numerous economic, social and cultural factors and, of course, on the impact of the network itself, i.e. the dissemination or actual penetration of the new services at any point in time.
It is clear that the professional sector has significantly greater expectations and requirements for the services than the residential sector.

The professional sector will be penetrated through the supply of multiservice PABXs and of ISDN accesses. In this sector, it is of major importance that the terminals connected to ISDN basic access and behind the PABXs should be compatible, which necessitates the use of a common standard for both public and private networks.

A significant demand from the residential sector will only develop following a sustained policy of anticipated supply, launched over a long enough period to attain a critical mass of new service penetration, thus creating in effect a "snowball" reaction.

This policy should be supported by marketing and tariffing activities to help stimulate demand.

Defining the public/private network interface

A standard physical interface between ISDN terminals and the public network is recommended.

This should be at the CCITT S or T reference point and should be in accordance with CCITT and CEPT recommendations.

In the case of basic access (i.e. 144 Kbit/s), the physical interfaces at the S and T reference points must be identical. This terminal interface should also be offered by PABX manufacturers so that common design of terminals can be achieved.

The above implies that, for basic access at least, the public network termination and interface function (NTI) is provided by the public network operator.

During a transitional phase of several years PABX multiservices will clearly use different standards; but, as soon as possible, these PABXs ought to be able to offer, in addition to these standards, the S interface.

Terminal connection

A standard has been agreed for a "universal telecoms plug and socket" which can be used for a range of telecommunications services (telephone, teletex, facsimile, data transmission, Minitel and soon visiophone). For ISDN the plug and socket will be used to connect individual terminals (up to eight) to a passive bus connected to the network termination.

ISDN services

The ISDN services and the options available for their definition are so numerous that any attempt to define ISDN standards containig a complete and definitive set of services would result in an unacceptable delay in the production of standards. It is therefore necessary to set priorities for certain services consistent with a first phase implementation of ISDN. These services and their priorities are summarized in the following table.

Some services to be supported by a second phase ISDN are also indicated in the table.

Numbering, addressing and signalling

The introduction of common channel signalling between network nodes to achieve fast call set-up and "within call" signalling is a critical part of ISDN implementation. Therefore the further development of CCITT Signalling System N°7 is essential and certain important parts of it require further work.

For example, the achievement of full specifications for the ISDN user part (ISUP), the signalling connection control part (SCCP) and the transaction capabilities (TACP) is recommended in order to reach a common standard, with a wide field of application, at the earliest opportunity.

As an interim solution, it is recommended that, starting from 1988 and when CCITT N°7 is introduced, international digital exchanges (linked by digital circuits or possibly also by analogue circuits) should be interconnected by means of the enhanced telephone user part (TUP+) for both PSTN and ISDN services.

Interworking with the existing public telephone network also needs to be achieved, including some means for identifying different teleservices and terminals.

Tariff considerations

The determination of tariff levels and structure for the ISDN is fundamental for its rapid take-up.

In the longer term, following an inevitable period of

high investment costs, the level of investment per basic access should be comparable with that of the current telephone network, with an investment structure related to the type of transmission and digital switching – which may be different from that of today.

Future studies on ISDN tariffs should take account of the following proposals:

- In accordance with current trends, tariffs for all services, including telephony, should be less dependent on distance that at present (always bearing in mind the problems of transit costs through other countries).

- In the transitional phase from the analogue network to the ISDN, corresponding to the period 1988 to 1993, special account should be taken of the relationship between, on the one hand, the tariff threshold applicable to ISDN services and ISDN basic access and, on the other, tariffs applicable to telephony.

- Tariffs for teleservices which use the same bearer capabilities should be independent of the teleservice. On the contrary, all value added by the network should be charged independently of the utilisation of the bearer capabilities.

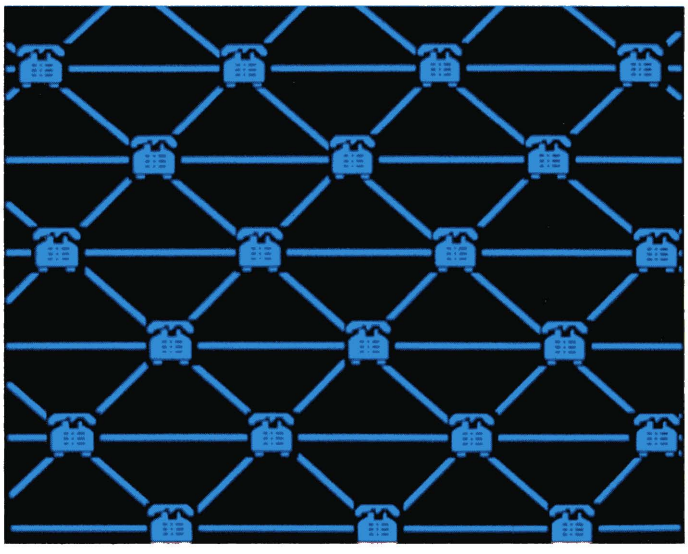
- An agreement should be obtained on the ratio between the monthly rental for the primary rate access (2,048 Kbit/s) and that for the basic access (144 Kbit/s). A ratio of the order of 10 might be discussed.

Interworking between national ISDN trials

It is proposed that operating companies implementing national trials of ISDN before the full implementation of the present recommendations should endeavour to interconnect these services, where provided, in order to increase early experience of ISDN in Europe.

Level of penetration

The objective should be set for an adequate



geographic coverage and rate of penetration at national level for each country. The operating companies should plan to provide by 1993 ISDN accesses for a number equivalent to 5% of 1983 subscriber main lines. This figure depends, among other things, on the capability of the industry to offer cost-effective ISDN solutions for the infrastructure and the terminal equipment.
The territorial coverage should be sufficient to permit 80% of customers to have the option of ISDN access.

Further ISDN standardization issues

The major ISDN standardization issues yet to be addressed are those relating to the integration problems, especially with regard to the definition of interface standards between the ISDN and digital cellular mobile networks and the ISDN and broadband services.

It is hoped that, from the results of standardization work currently in progress within CEPT in the fields of broadband communications and digital cellular mobile radio, clearer pictures of these services will emerge. These, together with early experience of ISDN field trials, should allow the problems of integration with ISDN to be addressed.

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A blueprint for an advanced telecommunications network

The "Transnational Broadband Backbone"

The European Commission is committed to the development of advanced telecommunications services and networks by the implementation of infrastructure projects of common interest. One such project, designed to harmonize the traditionally nationally-oriented network planning in the Community, concerns the joint European development of the transnational part of the future telecommunications network: a Europe-wide broadband infrastructure that "integrates or, if necessary, overlays existing networks" to provide the full range of modern communication services to all Member States and ensure a high level of international competitiveness for the Community. Such a broadband infrastructure, a "Transnational Broadband Backbone", could become Europe's high-tech link into the telecommunications of the year 2000.

The Transnational Broadband Backbone (TBB) study

The feasibility of creating such a TBB infrastructure became the declared intention of a series of studies conducted throughout the EC. This task was given, in 1985, to a multinational team of experts operating under the auspices of the European Telecommunications Consulting Organization (ETCO), which is a federation of consultancies associated with the PTTs of France, Germany, Italy, the Netherlands and the United Kingdom. The ETCO team had additional support from CTT (Portugal), Luxconsult (Luxembourg), Mansa Consulting (Denmark), OTE (Greece), RTT (Belgium), Telecom Eireann (Ireland) and Telefonica (Spain), as well as from the PTTs of the Community countries and those of Switzerland, Norway and Sweden.

The team gathered data concerning the PTTs involved and their network plans in the area of pilot projects and new telecommunications media and their applications. They evaluated the technological developments and worked out the anticipated volume in international digital telecoms traffic in the years to come.

Comparing the present situation with the possible and the probable developments, a concept emerged that would provide the conditions for the introduction of advanced telecoms services throughout Europe as soon as possible : TBB.

The TBB concept

In general, the concept suggests a joint approach by all PTTs in providing the transnational broadband support lines based on existing and planned capacities for traditional services, which would be extended to carry the new broadband services. Aiming a little higher, at minimal extra cost, could bring major benefits faster to Europe.

The following points in particular were made by the study:

- It is feasible to provide, by 1988, a Community-wide digital transmission infrastructure, able to carry the traffic of all foreseeable narrowband services, including first applications of 2 Mbit/s, by 1988.

- This infrastructure will to a large extent be covered by bilateral links already planned between Member States, including their neighbouring countries, and by the national trunk lines being installed.
- By connecting this infrastructure with the international gateways in the national networks it should be possible to commence digital telephony, including the expected ISDN traffic, by 1990.
- This infrastructure will, however, only provide for a small number of broadband services within the Community. Reasons are the lack of precise demand forecasts and the absence of a suitable introduction strategy.

- In order to allow the Community-wide introduction of future broadband services and thus a transition to Integrated Broadband Communications (IBC), expansion of existing plans is recommended. This could be done by marginal, additional expenditures.
- A step-by-step approach with check points in 1988, 1990 and 1993 seems appropriate.
- The financial requirements differ from country to country. They are, however, marginal compared with the investments already budgeted.

The suggested budget extension would amount to ECU 224 million. This additional expenditure would make a broadband backbone a reality even before 1990. This network could have the capacity for handling the entire anticipated narrowband and broadband traffic generated by large-scale business users, teleports and the locally emerging broadband "islands".

In their study, the experts recommended further that the international infrastructure should be based on monomode glass-fibre systems with the added flexibility of satellite links. This would correspond with the overall trend in the network planning.

Flexibility

Due to the varying standards of the telecommunications infrastructures in the Member States, resources and therefore priorities differ greatly.

Moreover, technical consensus still has to be reached on key elements such as video codecs of transmission and switching principles, while the international standardization bodies have only started to tackle the problems.

The situation is further complicated by the fact that ideas about the service to be offered are extremely diverse and vague. Uncertainties about the precise definition of the future broadband services abound and prevent the detailed, clear definition of an EC-wide broadband backbone.

The ETCO team took this into consideration and recommended a highly flexible approach.

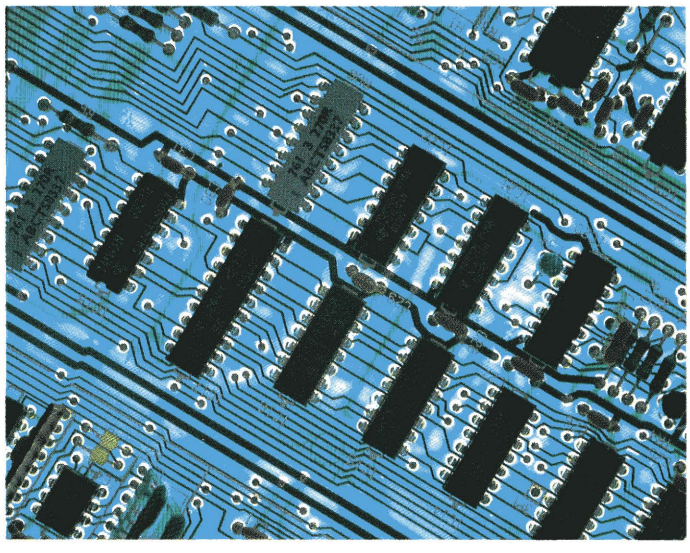
Concerning services, ETCO suggests the following :

- to define and offer - parallel to the ongoing introduction of videoconference services - a number of bearer services with bit rates of 2 Mbits / s and 140 Mbit / s. This supply-oriented approach would bridge the transition period until 1995, when, with the support of the RACE programme, a demand-oriented and harmonized set of integrated broadband communication services would be introduced.

The Commission has pushed the TBB idea ahead by having the results of the ETCO study further evaluated, with continuous market research to establish a solid data base. The broadband backbone study has been forwarded to the "Group for analysis and forecasting" (GAP). The GAP experts have considered the proposals, in the context of other tasks given to them by the Senior Officials Group for Telecommunications (SOG-T), and have drafted a common strategy.

Market research and data

The TBB study highlighted the fact that there are no concrete forecasts for demand in advanced – in particular broadband – services, either from the PTTs or from the relevant groups of the CEPT. Supported by SOG-T, the Commission has therefore initiated a European telecommunications data base and associated market research on demand and traffic development in broadband services for business use.



Because it is not possible to use either the extrapolation of past trends or direct consultation of companies which have no experience in these types of services, a new methodology has been chosen (see fig. 1).

The results of this study were scheduled for the second half of 1987.

The GAP proposal

The GAP has ploughed through surveys and concepts stemming from the national PTTs, the telecommunications and consumer electronics industry, Eutelsat, Telespazio, consultancies and the RACE programme.

In view of the preparatory work and the definition phase of the RACE programme, the experts have unanimously agreed that integrated broadband communication for Community-wide services can be realised by 1995.

It will be necessary, however, to develop new applications in close consideration of the actual user requirements; demands must be identified, the market for the respective services needs to be created and developed – and the necessary infrastructure must be made available on time.

The availability of such a broadband infrastructure is of major importance to Europe's telecommunications future. For instance, services can be integrated in the existing digitized telephone networks,

but not broadband services. The market will therefore not be prepared for the new services without an available and dependable broadband infrastructure.

The final GAP proposal is based on a number of conditions that can be defined as follows:

1. Monomode glass-fibre systems reduce transmission costs considerably. The factor of bit rates will no longer be felt as a constraint.
2. It seems reasonable to use identical codecs or at least identical modules for the consumer electronics and telecommunications services.
3. The selection of the right multiplex principle will influence the local broadband network and the switching technology.
4. The lack of practical experience and detailed knowledge concerning the expected charges hamper a precise definition of services.

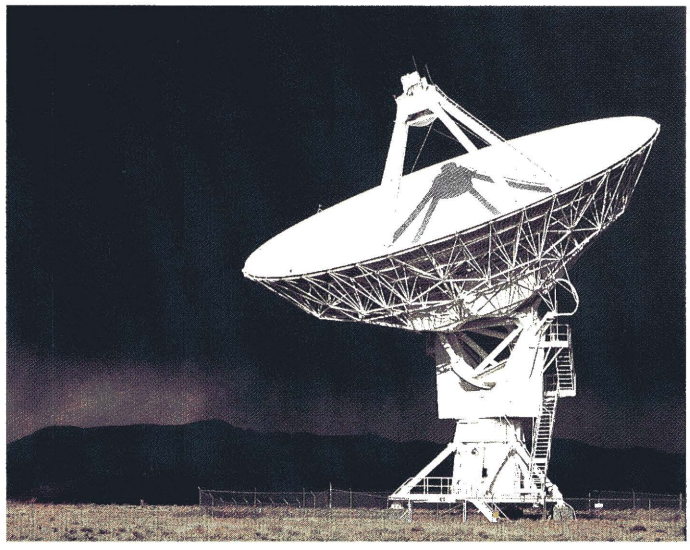
Based on these and a few other preconditions, GAP continued to sift through several introduction strategies. The result of this screening process was the proposal to launch a field trial that would, according to GAP, essentially "be a continuation of the results of the broadband backbone study."

In this field trial, to be carried out Europe-wide between 1991 and 1995, the market for interactive broadband telecommunication for businesses should be evaluated, while the necessary international infrastructure for high transmission capacities should already start to be implemented from 1988 onwards.

Additionally GAP proposes to use this infrastructure for Europe-wide 2 Mbit/s transmissions in 1989. The field trial should also be tied in with the development and progress of the RACE programme and serve therefore as a coordinated experiment, which would not only be a formidable instrument to analyse the market, but would at the same time give manufacturers and telecommunications authorities the opportunity to test line performance, equipment and terminal installations.

Further essential points in the GAP proposal :

- By the end of 1987, the general framework for the field trial should be laid down. Marketing teams and technical committees then need to help define the exact specifications for a network lay-out serving approximately 10,000 subscribers. The definition of Codecs, applicable also for TV sets and video recorders, should be completed by 1988.



- The costs for a country of 20 million telephone subscribers are in the range of ECU 100 million (lines only, no terminals or personnel included) estimated over a period of five years. The risk factor amounts to ECU 60 million. GAP therefore suggests examining the possibility of Community funding.

Since May 1987, the PTTs and a number of telecommunications companies have had the GAP proposal under examination. The Commission is scheduled to decide on further measures, based on their reactions, and submit an endorsed strategy to the Council in the second half of 1987.

This strategy will aim at using the mobilizing effect of common infrastructure projects for the development of advanced high-tech telecommunication services. It will contribute to the rapid introduction of Integrated Broadband Communications for the benefit of telecoms manufacturers, network carriers, service providers and – most of all – the future users of these services.

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Research and development in Advanced Communications technologies in Europe

The RACE Programme

Future economic and public services growth in the Community will depend very heavily on the development of advanced telecommunications. For this reason, the EC has instigated a pre-competitive research programme involving the trans-border cooperation of national telecommunications authorities, industry and universities. Research and development in Advanced Communications technologies in Europe, better known as RACE, has been underway since 1985.

RACE deals with the technologies required for the establishment of integrated broadband networks and services by the 1990s. Its main objectives are :

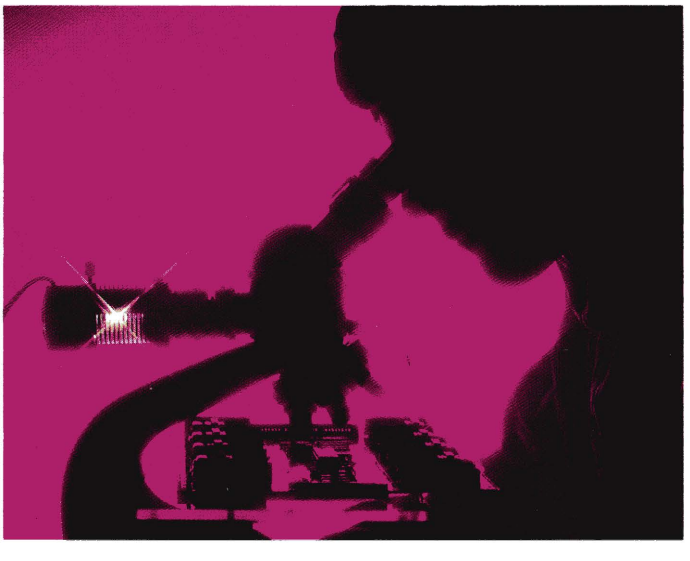
- to promote the European Community's telecommunications industry, so as to ensure that it maintains a strong position at European and world levels in a context of rapid technological change;
- to enable European network operators to confront the technological and service challenges with which they will be faced;
- to offer opportunities to service providers to improve cost performance and introduce new or enhanced telecommunication and information services which will both earn revenue in their own right and give indispensable support to other productive sectors of the Community;
- to make available to end users, at minimum cost and with minimum delay, the telecommunication services which will sustain the competitiveness of the European economy over the next decades and contribute to maintaining and creating employment in the Community;
- to contribute to the formation of a Community internal market for telecommunications equipment and services, as the basis for sustained strength on world markets;
- to contribute to regional development within the Community by supporting the development of common functional specifications for equipment and services permitting the less prosperous regions to benefit fully from the introduction of advanced telecommunications in the Community.

The RACE definition phase

The definition phase (July 1985 to December 1986) covered the initial work needed to improve the definition of the functional requirements of integrated broadband communications, together with exploratory research and development in key areas of agreed urgency.

The definition phase comprised two parts :

1. Development of an Integrated Broadband Communications (IBC) reference model, covering the network itself, the kinds of terminal equipment attached to the network and applications / services provided by their interworking and economic trends assessments.
2. Long lead-time R&D relating to the technology involved. Certain topics had been identified as being crucial to the development of IBC, but due to the existence of a number of technology options, research had to be done at this stage to identify the paths to be taken for the full-scale R&D effort. These include : broadband switching and coding, micro and opto-electronics and software requirements.



The main phase

RACE is a strategic, market-responsive research and development programme producing tangible results and is closely related to ESPRIT, the information technology programme. The Community contribution for the current main phase of RACE is set at ECU 550 million, matched by an equal contribution from the industrial participants in the programme.

By 1992, the main phase will have proposed a foundation for a set of standards for a European IBC

network. These will then become the framework for subsequent competitive product development.

The RACE main phase has been divided into three segments :

- Systems — IBC reference model
System analysis and specification
Development tools and standards
- Technology — Supporting technologies
Communications software
Terminals and related technologies
Subsystems and techniques
- Integration — Testing of interconnection and interworking.

For carrying out the work under these three segments, the EC Commission issued a public call for proposals in July 1987. In response to this call 97 proposals were submitted, of which 45 were selected for funding. Each project has an average of 9-10 partners.

The total funding requirement for these projects represents ECU 362 million, 50% (ECU 181 million) financed out of the Community budget. The overall budget of the RACE programme is ECU 1.1 billion, 50% financed by the EC and 50% by participating partners.

A second call for proposals is planned for the summer of 1988.

The economic benefits

By coordinating research activity on Integrated Broadband Communications (IBC), RACE is ensuring that scarce resources are not wasted through needless duplication. In establishing a common framework for IBC from its inception, RACE will realize a level of network cohesiveness that has never before been possible. Cost savings will therefore be achieved through a virtual elimination of the elaborate interface equipment that would otherwise be necessary. The integration of many different services into IBC should lift production volumes and so help ensure that economies of scale are realized by Europe's manufacturers.

For the consumer, Integrated Broadband Communications means greater flexibility in the choice of equipment and the quality and selection of services. Broadband is associated with high speed and high quality; the services offered range from compact-disc sound right up to the proposed high-definition television. For commerce and industry, IBC will offer easier and quicker communications. Videoconferencing, CAD, mobile communications, electronic mail — RACE seeks to provide all such services via similar digital communications networks for the whole of Europe, using an infrastructure of optical fibres, satellite links and broadband switching nodes.

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Satellite communications

Since the first geosynchronous communications satellite "Early Bird" relayed across the Atlantic 300 voice circuits, or one television channel, between four European countries and the United States, commercial satellite communications have gained a quarter of a century of experience.

The peaceful use of space – for telecommunications, earth resources exploration, navigational aids, weather information, scientific research and experiments – has developed rapidly. Already 110 countries are members of Intelsat, 26 European nations are members of Eutelsat and 48 countries support the Inmarsat global maritime satellite organization.

Hundreds of large Intelsat antennas, thousands of medium-size earth stations and hundreds of thousands of small, low-cost satellite receiving dishes are already spread around the world, relaying different services beamed down by 40 or more commercial satellites.

Satellite launch schedules were retarded by a series of failures in 1986, including the tragic explosion of the manned Space Shuttle. However, as soon as the impasse is over, it is virtually certain that international demand for new satellite communications services will further crowd the geostationary as well as low-altitude orbits.

EC policy and actions in the development of space communications

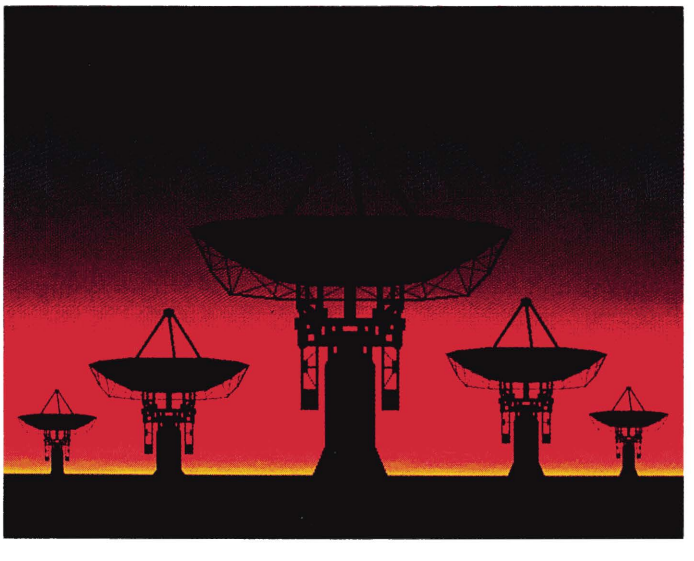
The space communications industry now involves a number of countries around the globe. Thanks to many national and regional efforts in creating individual and European space policies, Europe now holds a leading position in satellite launching, space technologies and research.

The EC Commission, and in particular DG XIII, is keenly aware of the rapid evolution of satellite communications and other space applications, and the leading role European countries and industry can play in future developments.

Satellite telecommunications

The Commission has a mandate from the Member States to develop a coherent policy for telecommunications in Europe. It is thus necessary for the Commission to ensure that future satellite techniques in Europe integrate with and complement the overall European telecommunications network. Further detailed coordination is necessary by the Commission wit h other components of the developing European satellite communications infrastructure.

This implies close coordination with the European Space Agency (ESA), as the organization developing European space technology, and Eutelsat, as the operator of European regional satellite systems. The Commission therefore ensures close ESA and Eutelsat involvement in the RACE initiative as well as such technology programmes as ESPRIT and BRITE.



For the medium to long term, discussions are underway between the Commission and ESA, which is currently clarifying its new 10-year programme for development of future satellite communications technology.

Audiovisual

The availability of new forms of distribution of audiovisual information by satellite – e.g. television, videoconferencing and corporate communications – has already had, and will continue to have, a major impact on the introduction of such systems in the Community, particularly in light of the new single European market in the field. The enduring effect of new technology must therefore be given due consideration in the development of a Community policy on audiovisual information.

Transport and communications infrastructure

There are a number of areas of Community transport, by land, sea or air, where space techniques can be cost-effectively exploited. Typical uses would be communications to, and position fixing of, mobiles; providing data links; and implementation of search and rescue facilities (exploitation of systems such as SARSAT, ARGOS, PRODAT and LOCSTAR).

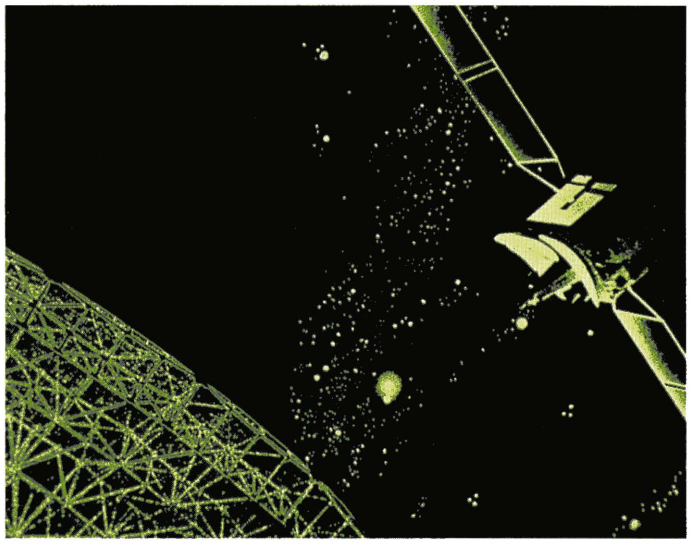
Aid to developing countries

As part of the implementation of its policy to aid Third World development, the Commission participates in the financing of studies, technical assistance and infrastructure construction in the field of satellite communications, such as :

- feasibility study for an African telecommunication satellite;
- feasibility of a satellite system for the Andean Pact countries;
- various infrastructure components (ground stations, switching installations) in the Pacific countries.

Education and training

With the Commission's development of the COMETT and DELTA programmes, progress is already being made towards making better use of new information technologies in education. It can be shown that training in the Community can be improved through the combined application of information, telecommunications and audiovisual technologies.



A possible use for distributing educational information via new generation communications satellites has been identified, and is worthy of further study and analysis. In the near-term, this could lead to a test-bench experiment in conjunction with the ESA Olympus test satellite, which in turn would provide guidelines for a subsequent service proposal.

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New television technology

From DBS to HDTV

Television technology now being developed will provide a far greater choice of programmes, with the highest sound and picture quality, across Europe in the 1990s. If TV is a window on the world, the view will be much wider and clearer than ever before – and the implications, from cultural to commercial, are far-reaching.

Satellite broadcasting

High-powered Direct Broadcast Satellites (DBS) will soon be broadcasting to many European viewers. By 1990 there will be at least five of them in orbit : TDF1 (France), TV-SAT (Federal Republic of Germany), Olympus (European Broadcasting Union / Italy), BSB (United Kingdom) and Tele-X (Scandinavia). Each will carry up to four TV channels receivable in most of western and central Europe, and over an even broader area if larger receiving dishes are used.

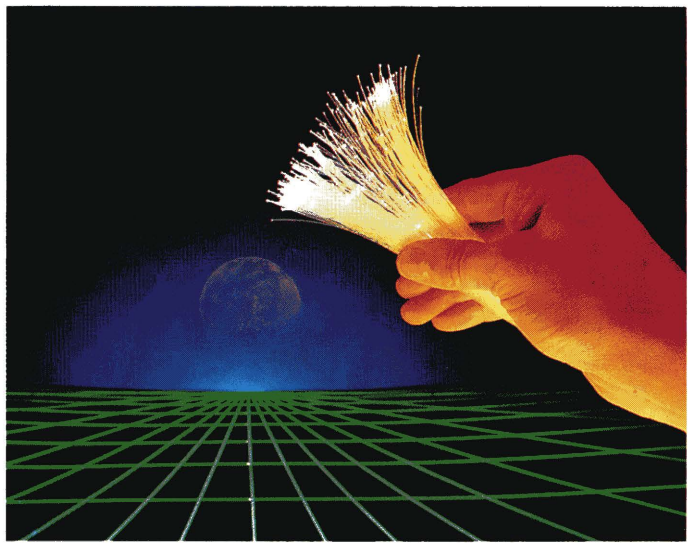
DBS will use a new TV transmission system : developed by the European Broadcasting Union (EBU), the family of MAC-packet standards improves picture quality and brings TV sound into the hi-fi league, with up to eight channels of compact disc quality digital sound; so multi-lingual broadcasting becomes a real possibility and spare channels can also be used for teletext. Anyone who plugs a low-cost converter into their existing TV set will be able to received MAC DBS broadcasts via a 35 cm rooftop dish, because the system was designed to build on consumers' existing investments in video.

High Definition Television

First generation MAC DBS broadcasts will add a new dimension with digital sound; the next generation promises an equivalent quantum leap in picture quality : a wide-screen, cinema-style viewing experience. This is high definition television (HDTV), when wall-mounted flat screens and projection TVs will ultimately replace today's televisions, which are still based on the 50-year-old concept of a glass vacuum tube in a box. The range of consumer equipment will include more advanced versions of products already available, such as VCRs and camcorders, and the studio version of the technology will provide such good quality that cinema films may well be shot in HDTV, with the added benefit that electronic effects currently available on video systems will be easily and cheaply available to the cinema industry.

MAC standards : the evolutionary approach to HDTV

The Community is rich in the creative and information skills required to provide the best television in the world. Yet failure to evolve a concerted European approach towards technological and regulatory issues could hand these new opportunities over to be exploited world-wide by the European TV industry's overseas competitors. One of the key issues is technical standardization.



Up to now, different technical standards have been used for broadcasting in different Community countries – SECAM in France and Greece, various versions of PAL elsewhere – so that viewers cannot receive cross-frontier broadcasts without dual standard TV sets or, if they are on a cable network, conversion equipment. A dozen different sets are therefore needed to pick up all the TV channels in Europe, limiting the viewer's choice and pushing up manufacturers' costs in a highly competitive world market. Now, a Commission initiative has led to the acceptance by European governments (in November 1986) of the MAC family of DBS TV transmission standards for the future.

This consensus means that the European television market should overcome the differences that have so damaged the competitive prospects of

European manufacturers in the pre-satellite generation of TV. While individual European TV-makers might have appeared to enjoy protection on their national markets due to incompatible standards, the Japanese have been developing TV manufacturing into a global industry with much higher economies of scale. The heavy revenues generated have financed Japanese development of new products, contributing significantly to the Far Eastern dominance of the European and American consumer electronics markets; these resources have also funded Japanese research into other areas of information technology, such as computers and memory chips.

The Japan Broadcasting Corporation has been developing an alternative 1125-line 60 MHz HDTV production system since the late 1960s. The system uses 27 MHz of bandwidth, equivalent to five ordinary TV channels, so it is not practical to broadcast it in that form because if would take up too much radio spectrum. Over the last five years, NHK has developed the MUSE transmission system which fits the standard 8.1 MHz DBS channel. It uses similar techniques to MAC, with a widescreen picture and digital sound.

The essential feature of the Japanese HDTV/ MUSE package is its incompatibility with all existing television systems. NHK decided to break with the past totally. By contrast, the European MAC approach has been based on compatibility with existing systems, permitting a low-cost evolution through improved television to HDTV. Community manufacturers and broadcasters chose this route because it shows greater respect for consumers' existing equipment investment, allowing the costumer to choose when he wants to upgrade, rather than using obsolescence to dictate this decision.

The Commission has played a key role in coordinating an international response to the Japanese HDTV proposal. In the race to introduce HDTV, it is perhaps a case of "more haste, less speed" – for a start, far more of the world runs on electricity at 50 Hz than on the 60 Hz proposed for the Japanese system. An "HDTV Forum" has been set up by the Commission's Directorate-General XIII which meets regularly to exchange views and coordinate all the different interests involved : those of broadcasters, manufacturers, the film industry, etc.

Now, in the framework of European cooperation, European TV companies are developing the high-quality HDTV system the world needs to evolve towards a new generation of television. European HDTV is designed to meet international requirements, not those of a particular region; and European consumer electronics companies are producing the answer to those requirements, after committing some ECU 200 million in R and D over three years.

The deadline for an international decision on HDTV is 1990. Through Community cooperation, that deadline will be met.

"Television without Frontiers"

Technological development has tended to move faster than the national and international regulation of broadcasting. In 1977, frequency allocations had already been sliced up among states for high-power satellite broadcasting to the home; but the whole broadcasting environment has recently been transformed by competition, with the arrival

of commercial broadcasting stations in several European countries and by the alternative to high-power DBS offered by medium-power satellites such as SES Astra. In the Community, the Commission's Green Paper "Television without Frontiers" has promoted a wide-ranging debate on the regulatory issues attached to all forms of cross-border broadcasting : it has been followed up by a draft directive (COM86 146 final / 2) with legislative proposals covering many topics, including advertising and European programme production.

The future of European television is therefore increasingly being decided at Community level. Satellites, after all, do not recognize national boundaries. And the Commission's initiatives in regulation and standardization – decided in close consultation with broadcasters, manufacturers, researchers and national authorities – are designed to ensure coordinated, Community-wide acceptance of the changes that DBS will bring, fast enough to allow the European television industry to meet new competitive challenges on an international scale. The aim is to benefit the viewer, by providing more choice and cheaper equipment, and to ensure the future of a consumer electronics industry of major importance to the Community.

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Special Telecommunications Action for Regional development

The STAR Programme

STAR is a five-year programme (1987-91) aimed at making use of advanced telecommunications services to promote the economic development of the less favoured regions of the European Community. The Community is contributing ECU 780 million to the programme with a matching contribution from the Member States.

The problem is urgent

Economically disavantaged regions already lag dangerously behind in their levels of telecommunications equipment and services – and the gap is widening. Moreover, many high-growth sectors of the economy are becoming increasingly dependent on advanced telecommunications services. It is therefore imperative to provide the less favoured regions of the Community with a modern, functional telecommunications infrastructure as rapidly as possible.

Where is STAR ?

The STAR programme is active in seven Member States : France, Greece, Ireland, Italy, Spain, Portugal and the United Kingdom. For some countries, only certain designated regions are eligible for assistance, e.g. the Mezzogiorno in Italy; Corsica and the overseas Departments in France; Northern Ireland in the United Kingdom.

What is STAR doing ?

The programme follows two fundamental lines of action :

1. Helping set up the kind of telecommunication infrastructure necessary to provide advanced services to business users in the less favoured regions.
2. Supporting measures designed to stimulate demand and encourage use of the telecommunications infrastructure in the less favoured regions.

STAR therefore plays a role at all critical junctures : from the initial capital investment... through the establishment of telecommunications services... to facilitating use of these services as a catalyst for economic development.

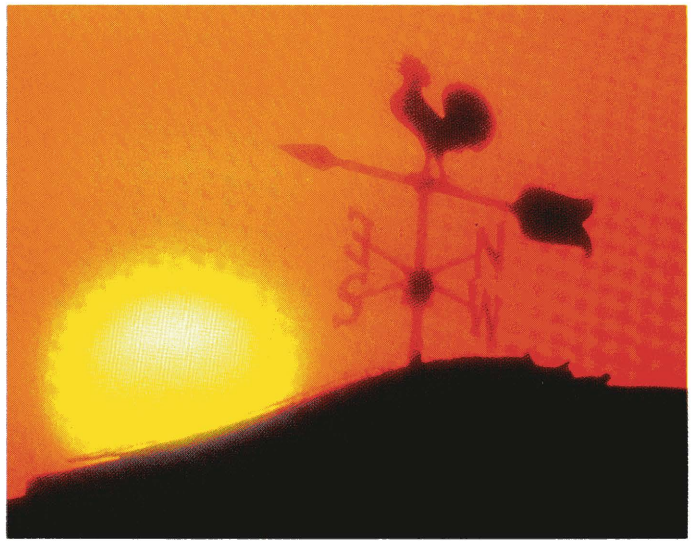
Who benefits from STAR ?

Because the objective is economic growth, STAR is specifically conceived for business users – with special emphasis on small and medium-size enterprises (SMEs). The Community recognises the key role of the SMEs in the economic fabric of Europe, and it recognises that enterprises of this dimension have particular needs which must be identified and catered for.

What actions is STAR funding ?

Three major areas of physical infrastructure come within the scope of the STAR programme :

1. Establishment of major telecommunications links between the less favoured regions and the new advanced networks which are being set up across the Community.



2. Acceleration of digitization to ensure earlier availability of ISDN (Integrated Services Digital Network), and thus minimize the time lag which usually occurs between the introduction of such services in central areas and outlying regions.
3. Establishment of interim "overlay networks" in advance of ISDN to give a quicker response to needs and requirements which are already evident.

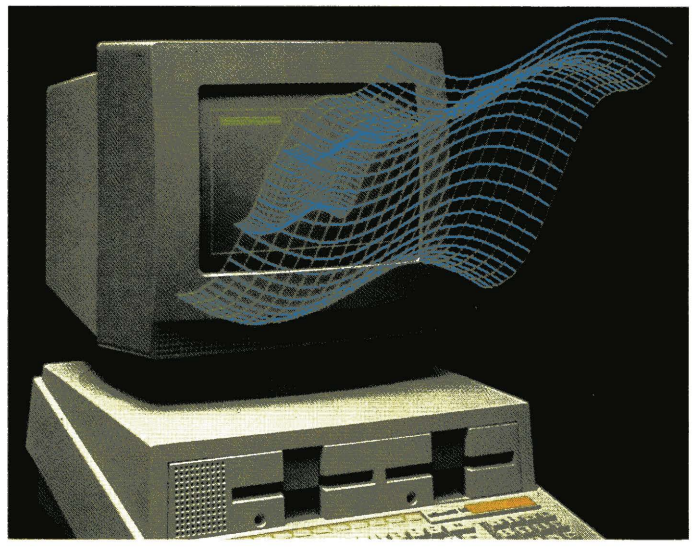
Besides investments in infrastructure, STAR funding also aims at promoting the supply and encouraging the use of advanced telecommunications services in the regions as rapidly as possible. Seven broad categories of activities are now being implemented.

- Preparing local or regional programmes for

telecommunication use.

- Designing and implementing publicity and information campaigns.
- Demonstrating the benefits of using advanced services.
- Encouraging SMEs to use advanced services.
- Establishing telecommunications services.
- Implementing "distance networking" projects, i.e. working on a terminal at a remote site connected by telecoms to other colleagues.
- Providing specialized regional information services.

STAR is an exciting new programme which offers a genuine opportunity to reduce the disparities in telecommunications facilities and services within Europe. By bringing networks closer together, STAR will help to bring people closer together, to the economic and social benefit of the entire Community.



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Pan-European Mobile Communications

Cars with telephones could become as familiar as cars with radios on the Community's roads in the next 10 years.

At present, public mobile communications are limited to telephony, with a relatively small but rapidly growing number of users; as more sophisticated portable and hand-held terminals are developed, data communications and other services will be introduced, making communications on the move essential for a broad range of business and private users.

Unlike car radios, car phones can only be used within the range of national or local networks. The incompatibility of frequencies used and the different types of systems implemented or planned make it impossible to operate pan-European mobile communications services across frontiers. This reduces the utility of mobile services for users and prevents European equipment manufacturers and service providers from making full use of the potential Community market.

Now the imminent changeover to a second generation of mobile communications technology presents a unique chance for the introduction of a pan-European system in the Community.

The new system will be based on digital rather than the current analogue technology, allowing low-cost solutions to technical problems and compatibility with the Integrated Services Digital Network (ISDN) now being developed in the framework of European cooperation established by the Community.

The European Conference of Postal and Telecommunications Administrations (CEPT) has made a vigorous start on using the transition to second-generation technology, expected at the end of this decade, as a chance to develop a common European system of digital cellular mobile communications. A special working group – the Groupe Spécial Mobile (GSM) – has been set up by the CEPT for this purpose.

The telecommunications administrations have already agreed, within CEPT, to reserve the frequencies 905-915 MHz/950-960 MHz for the initial introduction of the future pan-European mobile communication services. (In the short and medium term, the upper 1 MHz of each of the two bands will be used for cordless telephones by the following countries : Belgium, Denmark, Italy, Federal Republic of Germany and the Netherlands). In the long term, the full 2 × 25 MHz (890-915 and 935-960 MHz) bands should be available for the future pan-European system.

But time is short. Outside these reserved frequency bands, saturation of available frequencies for current systems will be reached in several Member States, particularly in large cities, by 1990/91. Pressure will therefore increase to release the bandwidths reserved for the future pan-European system for use by current national or regional systems.

This would jeopardize any real prospect for the introduction of pan-European mobile communications. The saturation problems expected in the next few years make 1991 the latest date for the availability of a pan-European second generation system. Industry must therefore be ready to provide the technical equipment for such a system by 1991.

The European Community has moved fast to achieve the consensus and set up the timetable required to meet this deadline.

The Council of Ministers first approved the main objectives of a Community telecommunications policy in December 1984. One of the major objectives is accelerating the development of advanced telecommunications services and networks throughout the Community.

Following up these objectives, the Senior Officials Group for Telecommunications (SOG-T) set up a Group for Analysis and Forecasting which looked into the question of pan-European mobile communications. The Commission was able to report good progress on the coordinated introduction of such mobile communications in June 1986, in line with a Council Recommendation of November 1984 which confirmed the need for the introduction of services "on the basis of a common harmonized approach" from 1985 onwards.

For its part, the European Parliament has requested that the current incompatibility of services be resolved and that work be carried out towards Community-wide mobile communications.

And in December 1986, the Community heads of state and government (European Council) asked the Commission and Council of Ministers to make a special effort to secure agreement on standards and the commitment of operators necessary to enable Europe to compete in the development and marketing of digital cellular radio in the 1990s.

Consultations with the telecommunications administrations, the CEPT, the telecommunications industry and users have now achieved broad consensus. With the European Council objective in mind, the Commission prepared a Recommendation and Directive for the Council of Ministers which was adopted in June 1987.

The Recommendation and the Directive aim:

- to make full use of the technological opportunity provided by the definition of the second-generation common mobile system in Europe;
- to create a European-wide mobile communications system;
- and to end the unacceptable incompatibility of systems, thus eliminating the breakdown of mobile communications at frontiers.

The Recommendation and Directive are designed to promote a dynamic infrastructure for the Community's economy, through an orderly and rapid transition from the current incompatible systems to pan-European cellular digital mobile communications.

The Council Recommendation – on the coordinated introduction of pan-European cellular digital mobile communication in the European Community – aims to direct and accelerate the efforts of the Member States, telecommunications administrations and industry to find a common solution, within an acceptable time schedule, in order to initiate the transition from the current incompatible systems to true pan-European public mobile communications.

The Council Directive on the frequency bands to be made available for the coordinated introduction of pan-European mobile communications in the Community has the primary objective of ensuring the timely availability of sufficient frequency resources for the future pan-European mobile communications services.
It is recognized that the 1991 starting date for the pan-European system calls for adherence to a tight time schedule, as set out in detail in the Recommendation.

The Commission intends to raise Community-wide awareness in both the business and the private sectors by sponsoring information on the development of services and standards. Given the tight schedule for the full specification of services and standards, the Commission proposes to support the work of the telecommunications administrations within the CEPT, in the framework of its agreement with this organization.

With regard to the specifications for terminals – mobile, portable or hand-held – the Commission will give high priority to this issue in the framework of the implementation of the Directive on the first phase of the establishment of mutual recognition of type approval for telecommunications terminal equipment and the related elaboration of NETs (Normes Européennes de Télécommunications) for this type of equipment, in order to permit international roaming and to promote the European market for terminals.

The Commission will further see to the strict application in this area of Council Directive 83/189/EEC, laying down a procedure for the provision of information in the field of technical standards and regulations and of Council Decision 87/95/EEC on standardization in the field of information technology and telecommunications.

Finally, the Commission will investigate together with the national administrations and the customs authorities any other measures necessary for ensuring the free circulation and unrestricted use of mobile stations within the Community; the Commission will propose appropriate measures as required.

In 1992, the biggest single market in the world – the European Community – is scheduled to become a reality. The new pan-European mobile communications system and services will put business and private users in contact on the move throughout the Community.

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Videoconferencing

Committee meetings take up an increasing amount of time and expense for business and administration world-wide. Besides the direct cost of travel and hotel accommodation, loss of time, reduced efficiency and fatigue are additional overheads.

Although some face-to-face meetings will always be necessary or preferred, the development of electronic systems, combining technical and infrastructural facilities for holding conferences or working meetings without requiring participants to spend so much time away from their usual working places, could improve the situation considerably. This is where videoconferencing has a particularly promising future.

Establishing videoconferencing facilities across European frontiers, and beyond, requires consensus on technical and regulatory issues. The Community not only provides the impetus and the framework for agreement but is itself a leading client for international videoconferencing facilities, since progress in Community affairs – indeed, the management of the Community as a whole – depends largely on committee meetings. Brussels and Luxembourg host numerous meetings involving European and national officials every day, while other specialists in Community affairs are travelling between the 12 Member States.

As a potential leading-edge user itself, the Community has therefore taken a number of steps to promote videoconferencing facilities, pioneering the application of this new technology across frontiers to open up new services and market opportunities.

Community videoconferencing

The possibility of such an improvement in the physical organization of Community meetings was identified in 1982 in the framework of the INSIS programme. It appeared that the rapid development of videoconference technology, plus the early availability of a broadband telecommunication infrastructure, could provide the best means for the purpose.

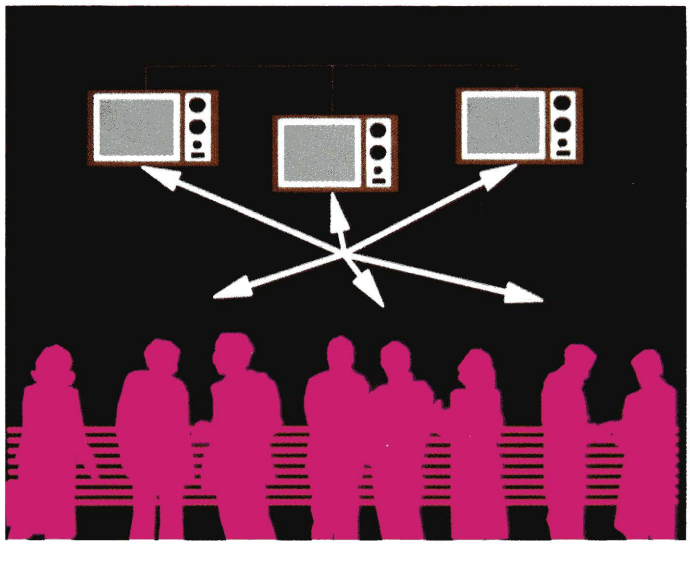
A study was therefore initiated to investigate the creation of a pilot videoconference service between the Community institutions in Brussels and Luxembourg. Officials of Community institutions and Members of the European Parliament were chosen as the main potential users.

The Commission took full advantage of the work being done in other frameworks, in particular by the European Videoconference Experiment (EVE) undertaken by the European Conference of Postal and Telecommunications Administrations (CEPT).

The EVE project, focused mainly on technical and telecommunication aspects, has lead to the European Videoconference Service (EVS) project, oriented more towards the commercial and marketing aspects of this new service in Europe.

Intergovernmental videocommunications

In the meantime, rapid technological development



and progress in the industrial production of videoconferencing equipment allowed a second initiative: in February 1984 the EC research and technology ministers asked the Commission to study the possibility of setting up a videocommunication system that would link the capitals of the Member States and the three locations of the Community institutions, putting videocommunications at the service of political decision-making in Europe.

Aimed at improving communications, facilitating the preparation of meetings or negotiations and reducing travelling, this initiative is also expected to play a significant role in the development of a future broadband telecommunications network across Europe. As a catalyst in the creation of a trans-Community broadband network, the project

could be a key element in Community telecommunications policy.
This trans-Community network of videoconference services is operated mostly via the Eutelsat SMS satellite system. Multi-point videoconference technology will become available in the near future and will then be implemented on the network, if needed by the users, over the following few months.

Several considerations which are specific to the Community, in particular the need to work in different languages, will have to be studied in depth. The possibility of simultaneous interpretation, compatible with videoconferencing, will be examined.

Given that many users will be high-level policy-makers dealing with sensitive matters, a high degree of confidentiality will be required. This is presently being studied. A common encryption system has to be defined in the framework of this project, which is expected to pave the way towards videoconference services open to a larger user population and adapted to broader geographical coverage.

Visiophones

Visiophone communication, i.e. communication between individuals sitting in front of a terminal comprising a screen and a camera in their own office, rather than in specially equipped studios, will be included in the project. Although videoconference studios have become a commercial product in the Community, common specifications for visiophony still need to be worked out.

To do its job under this initiative, the Commission has set up a technical working group bringing together representatives of PTTs and other organizations concerned. This group agreed to carry out a feasibility study of the proposed system and their report, covering its technical and economic aspects, is now available (COM(85) 265 final) from the Commission.

The PTTs are also organizing demonstrations of cross-border videoconference services to demonstrate and raise awareness of their feasibility

among potential users. Videoconferencing was used each week for working meetings and press conferences by United Kingdom representatives during the UK presidency of the Council of Ministers in the second half of 1986; the success of this first demonstration led the PTTs to plan more ambitious operations which could become the forerunners of a permanent service.

In 1985 the Community set up two studios, in the European Parliament in Luxembourg and in the Commission's Berlaymont building in Brussels, as a short term follow-up of the INSIS videoconference activities, with the PTTs in Belgian and Luxembourg providing the necessary terrestrial link (2Mbits) to connect the studios. EC officials are being encouraged to use these studios whenever possible for their meetings, not only between Brussels and Luxembourg but also between Brussels and studios in the capitals of the Member States. The Permanent Representations (EC embassies) of the Member States are also invited to use the Brussels studios.

This pioneering use of new telecommunications technology today could rapidly become commonplace tomorrow, not only for European decision-making but for business meetings across the Community.

Videotex in Europe

Videotex stands as a rather peculiar case within the framework of telematics and telecommunications services. Originally conceived as a data transmission and retrieval service using home television sets, it is now taking on aspects of a genuine telematic service.

No unified approach was possible at the time of early system development. Consequently, continuing evolution, influenced by differences in separate and contrasting national approaches, has led to today's situation where the single label "videotex" covers a wide range of private and public services with generally incompatible standards for information transmission and presentation.

World standardization activities for videotex are carried out mainly by CCITT. In Europe, videotex standardization is carried out by CEPT in its TE1 "Terminal Equipment" Group. CEPT orients its activities in a number of directions: definition of a European presentation standard; definition of common interworking procedures between videotex centres and data bases; definition of new informatics applications for videotex services.

Presentation standards

CCITT and CEPT are considering three basic data presentation techniques: character presentation, geometric presentation, photographic presentation.

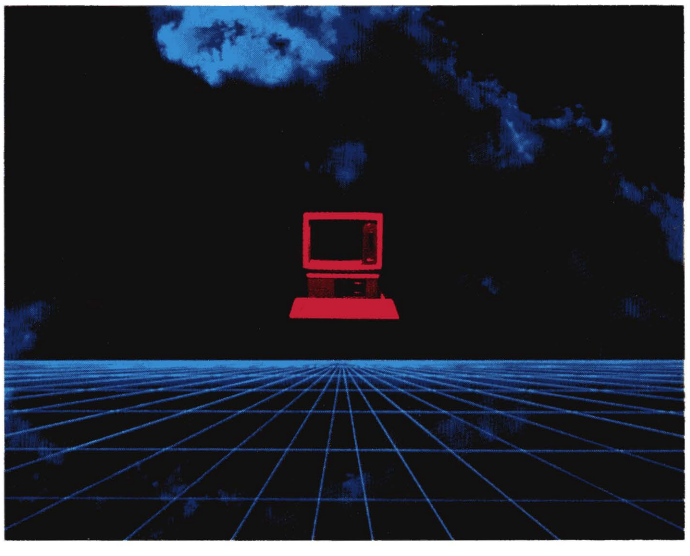
Videotex presentation standards are globally arranged in the appendices of the CCITT Rec. T.101. Such appendices contain three standard families or "Data Syntaxes" which correspond to the presentation elements of the Japanese system CAPTAIN (Data Syntax I), European videotex services (Data Syntax II, also defined in CEPT cod. T/CD-06.01), and North American systems NAPLPS (Data Syntax III).

Data Syntax II in turn comprises four different "profiles" respectively corresponding *de facto* to the German (Bildschirmtext, Profile 1), French (Télétel, Profile 2), UK (Prestel, Profile 3) and Swedish (Prestel Plus, Profile 4) national presentation standards.

NAPLPS and CAPTAIN largely exploit geometric presentation, for which they are almost completely compatible. In contrast, European profiles now allow character presentation only. Such profiles are formally considered as subsets of Data Syntax II; however, although sharing some sets of characters, they are quite incompatible with each other. Interconnection between any two European systems therefore requires a dedicated gateway.

While CAPTAIN and NAPLPS are quite stable and operate satisfactorily, Data Syntax II therefore looks more like a general framework of presentation features for European videotex services than it does a consolidated reference point.

If the current situation in European presentation standards is less than satisfactory, likely trends in



videotex development present interesting elements. The really important items deal with the reference model for graphic videotex terminals and the standard to be adopted for geometric presentation.

These aspects are closely related, since possible agreement on a single European graphic (geometric) presentation standard justifies the effort of defining a common model for a videotex terminal exploiting such a standard. The benefits of this achievement for European industry are evident.

Concerning the first aspect, two different approaches, supported by Germany and France respectively, are now under discussion within the TE1 Working Group of CEPT.

The first is based on the character terminal struc-

ture defined in the Data Syntax II and fully complies with Profile 1, including character and DRCS presentation. The second calls for a modification of such a structure to achieve different and simpler profile management and also claims to take all terminal profiles into account.

Concerning the most suitable choice for the geometric presentation standard, two possible solutions are now under study : the so-called GDS (Graphical Data Syntax for a Multiple Workstation Interface) and CGM (Computer Graphics Metafile for the Storage and Transfer of Picture Description Information). Both of these options have to be evaluated taking into account the opportunity of ensuring compatibility with GKS (Graphical Kernel Subset), which is a widely accepted ISO standard containing a general description of geometric functions for computer graphics.

ECMA currently is strongly in favour of adopting the current version of CGM as ISO standard for text and office systems in the framework of the Office Document Architecture (ODA). On the other hand, CEPT supports GDS as international standard for videotex in order to allow full compatibility with the already-defined GKS.

This situation risks frustrating all the compatibility efforts and guidelines pursued up to now in the field of geometric presentation. Indeed, it is clear that if CEPT and ECMA choices are different, the compability between videotex and computer graphics will no longer be ensured.

Interworking and applications

Two basic network arrangements are recognized by CEPT and CCITT for videotex services.

The first relies on the use of national videotex centres which interface videotex terminals at any communication level and operate information retrieval on the user's behalf. This arrangement is followed in Japan and in most European countries. The second solution provides for use of simple access facilities to the data network, allowing terminals to be connected directly to the data base and to retrieve information. This arrangement is mainly followed in the USA, France, and to some degree in Austria, Spain, Ireland, and New Zealand.

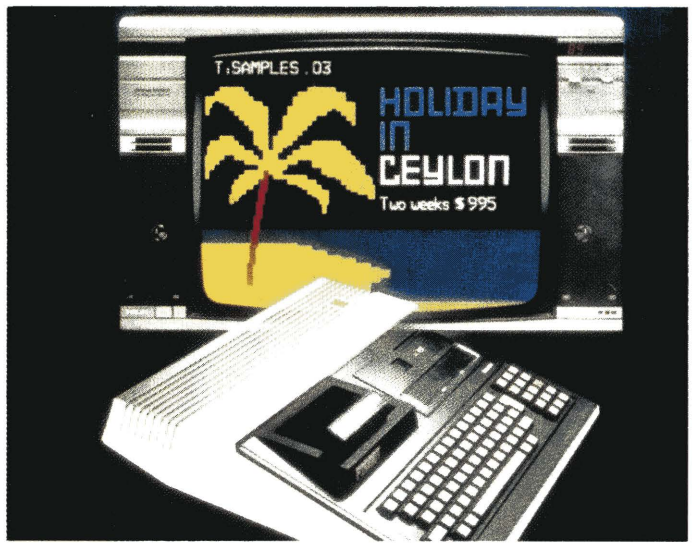
The approaches of CCITT and CEPT for international interworking differ from each other quite substantially.

CCITT is pursuing direct international interworking with the final aim of making the presently indispensable gateways unnecessary for interconnection of national systems. Results achieved to date are quite poor; in particular, no agreement has yet been achieved on the key point of common handling of presentation attributes.

The CEPT approach relies on the use of gateways to handle data exchange according to the so-called "Videotex Interworking" (VI) architecture. Such an approach in principle seems more effective and pragmatic. Indeed, the VI architecture represents the first attempt to define a layer 7 framework for the videotex service to get in line with the OSI model.

Nevertheless, the situation is still far from ideal. The VI architecture presents three main drawbacks:

- It is not yet either completed or agreed, and cannot yet be used to drive industrial implementations.
- Due to the difficulties in agreement, gateways to handle it are likely only in the medium term.
- It does not completely solve the problem of interfacing national presentation syntaxes. In fact, in its present form either it could imply in each country the conversion between local and CEPT Profile 1 syntaxes or it could require the definition of a subset of presentation elements common to all national standards to be used for international operations.



A major joint effort by CEPT and the Community is therefore necessary to reach a compromise agreement to allow early implementation of a significant set of VI. Failure could have very serious consequences for the entire policy of telecommunications development and service in Europe.

Terminals

Suitable videotex terminals can be essentially classified according to the following families :

- Television-based devices with videotex adapter, modem and keyboard; price range ECU 450 to ECU 1150.
- Specialized terminals developed for videotex, including :

Low-performance devices such as the French Minitel; price about ECU 115.

Mid-range devices with colour display and some basic features; price from ECU 680 for Profile 3 to ECU 1150 for Profile 1 terminals.

High-performance devices with editing facilities and possible compatibility with several presentation standards; price from ECU 1700 to ECU 2250.

- Business terminals with microcomputer-based

full editing facilities and videotex capability; price ECU 2250 to ECU 5700.

- Adapters for personal or microcomputer; price ECU 115 to ECU 1150.

Two opposing trends in technology development can be identified :

1° Large-scale production of low-cost videotex dedicated terminals capable of handling only the simplest character presentation.

Multiservice terminals capable of handling sophisticated applications (text processing, telesoftware, etc.) and presentation techniques (geometric, graphical, etc.) and also encompassing features of the CEPT A4 videotex terminal reference model.

Regarding the terminal market, the European scenario is dominated by the enormous number (more than 3,000,000) of Minitel terminals already installed. Their replacement by Profile 1 (A4 reference model) terminals is highly unlikely, even in the medium term, because of the French PTT's goal of achieving many millions of installations.

Given the foregoing considerations :

- The convergence of all European videotex services towards the full CEPT (Profile 1) presentation standard can be realistically forecast only in the long term.
- It cannot be excluded that the full CEPT character presentation will be superceded by more advanced and powerful standards (e.g. geometric) as soon as possible.
- While the videotex reference model Profile 3 (Prestel) is likely to be gradually replaced with Profile 1 (Bildschirmtext) in certain countries, it is difficult to predict the same scenario for Profile 2 (Télétel), because of the already major investments, number of installed terminals, and significant service penetration.

It seems reasonable to suppose that the videotex terminal market is unlikely to be influenced by television-based devices, and that it will for a long time be split between two families of products :

- Simple and inexpensive specialized terminals such as Minitels.
- More complex, multi-application (even multistandard) business or business-like terminals encompassing features of the CEPT A4 videotex terminal reference model exploiting presentation features of videotex Profile 1.

This second alternative would also account for new service capabilities incorporated into videotex "telesoftware" specifications and seems justified by the implementation complexity of terminals complying with Profile 1, which can provide additional service and presentation capabilities virtually without cost.

The choice between the above alternatives for national services depends on economic and industrial factors. At present, there are contrasting

trends in the different European countries.

Conclusions

The spread of videotex in Europe has been hampered by the different standards adopted by national services and the generally poor quality of information retrieval procedures, and overall service, provided to users. Other significant factors include the present incompatibility and technology gap between videotex and data terminals, and the PTTs' policies regarding terminals and services.

Yet some remarkable new elements are appearing in Europe, e.g. the attempt to develop a single geometric / graphical standard, the attempt to develop telesoftware applications, and new videotex terminal models. Another significant point is the move towards definition of more advanced data access procedures based on natural language. Research in this direction is currently underway and PTTs are taking the implications into account within the framework of possible videotex enhancements.

In conclusion, there is now a good opportunity to get out of the trap of the never-ending quarrel about national standards and to avoid old errors. Unfortunately, some of the worst aspects of the current situation seem to perpetuate themselves. Differences between France, Germany, the UK and other countries about the definition of VI and telesoftware will certainly delay approval of new recommendations and can hold back the development of videotex in Europe. There is some risk that this situation will facilitate penetration of the NAPLPS standard, at least at the customer level.

Every effort must therefore be made at Community level to achieve a quick and reasonable compromise on the settlement of the high-level videotex standards still under definition. Europe has lost enough time. Strong action, possibly supported at the political level, could overcome economic, industrial and market difficulties, as well as harmonize national interests, in order to salvage as much as possible before it is too late.

The Inter-Institutional Integrated Services Information System

INSIS

High-speed information services are vital for international competitiveness in the modern economy.

The European Community is promoting the development of such services, pioneering the introduction of leading edge technology applications to serve certain groups of users.

Community institutions and Member State administrations themselves form one such group of users.

The needs of the administrations

The European institutions and Member State administrations can greatly benefit from the use of new technologies to rationalize their administrative information exchange across Europe.

The Community needs better communications for many reasons, not the least of which is the geographical dispersion of its institutions. In Brussels alone, there are over 20 Community sites.

Community institutions are in daily contact with Member State administrations, separated by considerable distances. Such daily communication involves the mailing of a huge amount of documentation.

The "paper mountain" is aggravated by the nine Community languages and the vast print runs of some Community documents. Information technology can reduce the amount of documentation and save time and money.

Information technology will not be limited to the transmission of documents; it can also be applied to document preparation, filing, retrieval and archiving – rationalizing administrative procedures.

Community work generally requires ready accessibility to information which is necessary for the decision-making process. Access to information can be enhanced by using information technology for creating and drawing on data bases.

Videocommunication can dispense with much travel time. This is central to the Community environment, where national representative committees are fundamental to much of the work.

The INSIS programme and priorities

INSIS aims to improve communication between the Member States and Community institutions by promoting the coordinated and harmonized exploitation of new techniques combining data and text processing and the use of telecommunications systems. It was formally launched by a decision of the EC Council of Ministers in December 1982. A User Advisory Committee (UAC), composed of Member State and Community institution representatives, was set up to determine needs and prepare proposals for integrated information systems.

INSIS is a user-driven programme. User needs shape its technical standardization and service aspects.

The UAC has defined the following priorities :

- Electronic transmission of written texts (documents) and electronic messaging to reduce delivery delays between Member State administrations and Community institutions.
- Facilities to give easier and more coherent access to information of interest to the Community, most of which is held in a variety of computer data bases.
- Establishment of videoconferencing facilities to reduce travel costs and save time.
- Horizontal integration of informatics services to facilitate access to services and facilities for non-computer professionals.

Given these priorities, INSIS is following two main lines of action :

a) horizontal programmes, aimed at preparing the technical and industrial environment and at

promoting political consensus;

b) pilot projects, aimed at creating experimental systems to assess the technical problems and the impact on working procedures of introducing new technology into administrative environments.

Three general support actions are receiving particular emphasis :

- promotion of European standards, for which INSIS provides a structure for Member State administrations to coordinate their views and convey them to the standardization bodies;
- promotion of early product development, meeting user requirements and conforming to Community norms based on international standards allowing the successful construction of INSIS systems in a multi-vendor environment;
- stimulation of the development of coherent, Community-wide public communications services by the European PTTs to facilitate the interconnection of private systems of the Member State administrations and Community institutions.

Pilot systems are installed to satisfy a specific user community and to provide a test bed

- to evaluate user acceptability and reactions;
- to demonstrate technical feasibility;
- to test different technical options;
- to provide factual data for the assessment of the cost/benefit aspects of an eventual operational system.

Three projects are at present in an advanced stage of development :

a) INSEM (Inter-Institutional Electronic Mail System), which is designed to facilitate the exchange of documents between Member State administrations and Community institutions.

b) Videoconferencing, which provides studio facilities in Brussels and Luxembourg for videoconferences.

c) OVIDE (Organisation de Videotexte pour les Députés Européens), which is designed to provide high-speed access to up-to-date information for members and officials of the European Parliament.

INSEM

The INSEM project aims to define and implement an electronic architecture interlinking the Community's institutions and supporting electronic document and message transmission, which is to be progressively interconnected with similar services in the Member State administrations.

Electronic mail is defined as "a service enabling documents to be routed in electronic form from a sender to one or more recipients and delivered to the latter in accordance with the conditions specified by the sender." The new techniques are intended to provide a service which is functionally equivalent to those currently offered by the postal and internal mail services, but at the speed of electronic transmission.

The INSEM project is about the routing of documents rather than simple messages.

An idea of the scale of the problem can be gained from a look at the Commission's information distribution and processing resources.

- The Brussels PABX is one of the largest in Europe with 12000 extensions and nearly 900 outside lines.
- The telex exchange, which is fully automated, handles 2000 to 3000 messages a day.
- For data processing, the Commission has four large mainframes, 20 medium-range computers, around 1500 terminals, 800 word processors and

100 facsimile terminals, as well as a growing number of microcomputers.

In a view of the size and the heterogeneity of the target populations to be served by INSEM and in view of the multivendor policy pursued by the Community institution, adherence to common standards is essential.

The MHS (message handling system) model has emerged as the most suitable message transmission standard. It covers the conceptual model, the communications services and protocols and the format and coding of the envelope for routing messages.

MHS only indirectly defines the format of the transmitted messages, but the application of standards to the format of transmitted documents is also needed, since:

- within each domain, many documents are transmitted in order to be edited by their recipient(s) who may be using word-processing equipment different from that used by the sender;
- between domains it must be possible to transmit documents that can be printed by their recipient(s) without loss of presentation attributes, even though the printing equipment used by the recipient(s) may be different from that available to the sender.

The ISO has now come up with ODA (Office Document Architecture). A kernel of this standard is now sufficiently stable and is ideal for the reproduction

of text prepared on standard word processors. Making use of contributions from the INSEM project team collaborating with similar national projects, the standardization bodies have come up with workable norms based on the ODA kernel.

The project is in its first phase, during which it is transmitting messages based on teletex protocols until commercial products embody the standards mentioned. In the medium term, teletex will also be included in INSEM as a medium for exchanging documents with national administrations as and when the PTTs make it publicly available.

INSEM's second phase will witness the implementation of functions inherent in the MHS standard and adoption of the functional norms implicit in the ODA standard.

The videoconference project

The INSIS videoconferencing pilot project is in an advanced state of development. It deals with the provision of videoconferencing facilities in the Commission's Berlaymont building in Brussels and in the European Parliament's Schuman building in Luxembourg.

A vast amount of meetings occur every day in the Community which involve extensive international travel. This is an expensive and time-consuming business. The simple objective is to facilitate meetings using advanced communication techniques.

The technical problems of point-to-point videoconferencing have been resolved and at its present stage the INSIS pilot project is primarily concerned with evaluating consumer response to and acceptability of the current facilities.

For the present, standards constrain the European Videoconference Experiment (EVE), allowing only two studios to be linked. It is, however, anticipated that upcoming technology will facilitate the simultaneous linking of up to five studios. Most Community capitals have such studios, making it possible to convene multi-Member State committee communication.

OVIDE

The specialist information needs of Members of the European Parliament (MEPs) and the difficulty of servicing these by conventional means singled MEPs out as the target user group for the OVIDE experiment, which follows the "better access to Community information" ethos of INSIS.

The European politicians require the entire range of Community information. In addition, they also need a great deal of dynamic practical data detailing meeting times and agendas. Moreover, their

geographical dispersal presents a major logistical problem.

Initially, OVIDE is attempting to provide the day-to-day information such as meeting calendars in the major languages. The aims of the initial pilot system were to determine the MEPs' needs and to assess the acceptability and use of OVIDE by them as well as to study the problems involved with a data base of high-turnover information.

OVIDE's second phase, which will be implemented in 1988, seeks to extend the data base to all MEPs, including access from their constituencies. It is expected that both OVIDE and the national videotex service will be accessible from the same terminals.

OVIDE has presented many administrative and technical obstacles which has meant calling on the active cooperation of the national PTTs. They have met frequently under the Commission's auspices to agree on a common approach for OVIDE's second phase.

Improving access to Community information

The success of OVIDE has demonstrated once again the importance of facilitating access to information of Community interest and the important role which can be played by information technologies. For these reasons other important projects have been started in this area, taking into account the needs of a wider user community.

INSIS is following two paths : on one side it is developing a technical infrastructure to improve user interface to computerized data-bases; on the other side it is developing specific information services for particular groups of users. Among these information services, two are particularly important : CRONOS for the diffusion of statistical information and ECDIN for information on the environment.

Automating European data and documentation exchange

The CADDIA Programme

Complex and costly paperwork constitutes a serious obstacle to the free flow of national and international trade. Much of this paperwork is administrative – and here the EC Commission has pioneered an action plan, launched in 1985, aimed at replacing paper documentation with more efficient and cost-effective electronic data interchange.

Implementation of the plan is under the control of the Steering Committee of the CADDIA programme (Cooperation in Automation of Data and Documentation for Imports / exports and the management and financial control of the Agricultural markets).

The plan defines three fundamental objectives :

1. Automation, by the Member States and the Commission, of the data interchange and processing required for management of the Customs Union, the Community's commercial measures, management and financial control of agricultural markets, and procedures for collection and dissemination of statistical data on Community trade.
2. Coordination of similar actions by national administrations to ensure technical compatibility in the establishment of the necessary telematic infrastructure.
3. Aligning Community developments with those currently underway in the industrial and commercial sectors of world trade – in particular, those developments in the UN / ECE concerned with setting standards for paperless trading. These are the Trade Data Elements Directory (TDED), the universal syntax for Electronic Data Interchange For Administration, Commerce and Transport (EDIFACT), and UN Standard electronic transaction Messages (UNSMs).

The CADDIA Steering Committee (representatives of the Commission and Member States) prepares, coordinates and monitors the long-term development plan. This both respects and integrates with national systems and plans throughout the Community.

The Commission departments involved most directly in CADDIA are :

The Statistical Office (SOEC),
The Directorate-General for Agriculture - DG VI,
The Directorate-General for the Customs Union and Indirect Taxation - DG XXI.
The Directorate-General for Telecommunications, Information Industries and Innovation – DG XIII – is coordinating the CADDIA long-term development programme and implementing the actions required for the development and maintenance of the TDED, EDIFACT and UN transaction message standards.

Customs sector : The Coordinated Development Project

The purpose of the CD (Coordinated Development) project is to revise and harmonize customs procedures with third countries and to implement their coordinated computerization, by means of links between customs systems and other administrative and commercial systems.

A decision of the 1985 European Summit to eliminate all border formalities between Member States by 1992 reinforces the need to generate new data flows on trade statistics necessary both within the Community's internal market and between the Community and other countries.

Major actions currently underway concern computer systems for third country imports / exports, management of the new Customs Integrated Tariff (TARIC) with its interface for dissemination to Member States, and systems for computer-to computer trade data interchange (EDIFACT).

EDIFACT is designed to ensure rapid and economical data flow between the commercial and administrative sectors of the Community and to facilitate trade with third countries.

These systems are being progressively introduced through pilot projects, several of which are already operational.

Agriculture

The CADDIA programme has enabled the Directorate-General for Agriculture to develop its computerized data-processing systems for management of agricultural markets and the European Agricultural Guidance and Guarantee Fund (EAGGF).

- Market management

AMIS (Agricultural Management Information System) processes communications on market prices, import/export licenses, stock levels and production balances, and calculates monetary compensatory amounts, import levies, export refunds and production aids.

- EAGGF

AGREX is an accounting system for expenditures under the guarantee and guidance sections of EAGGF. To reduce costs and time-lags, AGREX procedures for the management and use of funds are currently being revised with the aim of setting up an electronic funds transfer system.

CADDIA has also developed the IT infrastructure tools needed to interconnect these systems with market organizations in Member States.

IDES is an interactive system for entry of AMIS data by Member States while FIS, which allows interactive consultation of data bases, is used to produce reports for Member States.

Projects are now being carried out on an operational basis using public telecommunications data networks to transfer the data.

Statistics

SOEC's information systems have been improved to allow Member States to receive and transmit information about external trade and other sectors such as agriculture via public telecommunications networks. Moreover, data bases containing external trade statistics have been interfaced with

access and data processing facilities in order to speed up and simplify data base consultations.

The EUROFARM project provides data base information on the structure of agricultural holdings in Europe; ultimately it will have direct network links with some Member States.

Pilot projects for external trade data using public networks have been launched, and SOEC is also studying the feasibility of using the EDIFACT international data exchange standards in order to reduce costs and increase performance with respect to large statistical files.

SOEC and DG XXI (customs and indirect taxation) are jointly looking into the fundamental changes in data-gathering systems that will be required for implementation of the internal market in 1992.

Transport

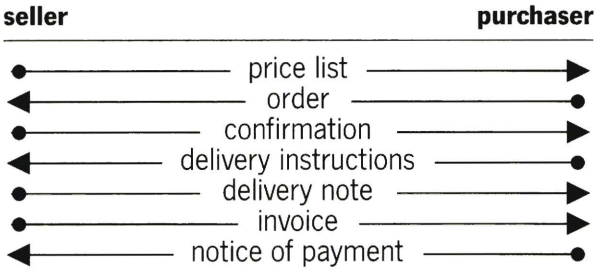
The transport sector is also closely associated with CADDIA because of the converging interests of the CD project trade interface and the European research project on computerization of data interchange for the transport of goods (COST 306).

The transport sector also has specific requirements in the field of mobile communications which can now be satisfied as a result of the decision by EC ministers to establish a common European standard for the new generation of mobile telephone systems.

Trade Electronic Data Interchange Systems

TEDIS

For centuries paper documents have formed the basis of commercial transactions. From invitations to tender to final payments, numerous documents are exchanged between trading partners. The following diagram illustrates some of the stages of a simple transaction:



Today, in most cases, these commercial documents are processed electronically then put in envelopes and sent by post ! Prepared at the speed of light, they are dispatched over one million times more slowly.

In addition to the slowness of delivery by post, this way of doing business has other major disadvantages such as the re-encoding of data, transcription errors, data duplication, lost time, delays in processing data and low productivity. Together these mean increased costs.

In international trade, the costs related to paperwork are estimated to be between 3.5 % and 15 % of the value of the merchandise. On a volume of world trade of about ECU 2.1 trillion, the financial repercussions of any reduction in paperwork are therefore enormous. Example : a large company sends out 2,900,000 invoices per year. The cost of processing an invoice manually is estimated at ECU 9.60. If electronic processing of the invoicing reduces the costs of the paperwork by 25 %, this represents an estimated annual gain of ECU 7 million.

Electronic data interchange (EDI) looks like THE solution to the problem of the paper mountain.

Electronic data interchange, or the electronic transfer of commercial and administrative data, involves the exchange of information and messages between trading partners or public administrations via electronic means of communication.

EDI is carried out either from computer to computer, through the exchange of magnetic supports (tapes, diskettes), or via switched telephone networks or leased lines.

These new possibilities for the transfer of commercial documents have considerable advantages : increased efficiency, reduced costs, improved competitivity.

However, in order to be as effective as possible, these new techniques must process information electronically in an integrated fashion using international standards.

The recommendations issued by the United Nations Economic Committee for Europe with regard to international trade procedures should therefore be respected.

This new approach to international trade is based on:

1) the electronic processing of commercial documents
2) the use of international standards
3) the integrated processing of commercial messages

The advantages are obvious : reduction in manual processing, less time wasted due to repeated data entry, reduction – even elimination – of duplication of data, reduction of the risk of error, permanent

availability (24 hours a day, 7 days a week), independence of time zones, up-to-date information and lower costs.

Comparison of transmission times and costs in Europe of a commercial document, depending on the method employed :

Letter	1 to 2 days	ECU 0.3
Telex	5 min 30 sec	ECU 0.6
Computer to computer	13 seconds	
	switched	ECU 0.13
	automatic	ECU 0.01

To avoid progressing from a paper mountain to an electronic Tower of Babel, it is imperative that international standards are used. Optimal connections between all trading partners can only be achieved if everyone respects ISO standards, the European standards of the CEN and the recommendations of the United Nations with regard to international trade procedures.

Uniform treatment is also essential to avoid the formation of closed electronic networks and assure the possibility of communication between the various sectoral networks now in the development stage. All industries (automobile manufacturers, the chemical industries, electronic, etc ...) must be able to exchange trade messages with freighters, suppliers, wholesalers, forwarding agents, distributors, customs, etc., not forgetting the insurance companies and the banks.

The transfer of trade messages must be effected without technical or procedural problems of any sort whatsoever along the entire length of the chain of trading partners.

The Commission of the European Communities has therefore drawn up a Community action plan related to the electronic transfer of trade data.

The objectives of this plan, – TEDIS – Trade Electronic Data Interchange Systems, are

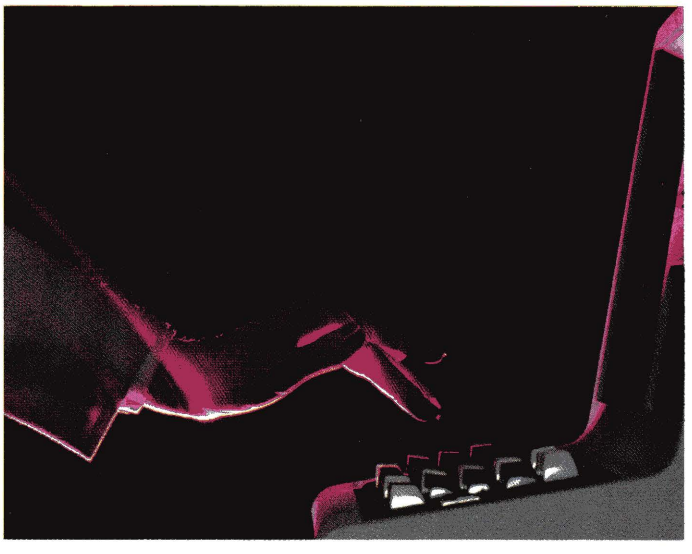
- To avoid a proliferation of closed trade EDI systems and the widespread incompatibility which this entails.
- To promote the creation and the establishment of trade EDI systems which meet the needs of the users, in particular small and medium-sized enterprises (SMEs).
- To increase the awareness of the European telematic equipment and services industry to meet users' requirements in this area.
- To support the common use of international and European standards, where these exist, and in particular the recommendations of the UNECE with regard to international trade procedures.

To attain these objectives, it is necessary:

Firstly, to make use of the experience gained from previous or current activities. This applies in particular to existing policies in the field of telecommunications and standardization, which need to take into account the specific requirements for electronic transfer of commercial data.

Secondly, to introduce close cooperation with the manufacturing industry and the consumer industries or services. This cooperation could take the form of specific sectoral projects to which the Commission could give its support, especially to assure the promotion of aspects of general or common interest.

Thirdly, to assure constant interaction between the horizontal actions – actions concerning common interests such as standardization, tariffs, multilingualism, confidentiality, security, etc. necessary for the development of EDI - and the vertical actions which make up the pilot projects.



Horizontal and vertical actions

Horizontal actions are necessary for the development of the electronic transfer of commercial data. As for vertical actions - the sectoral projects - during the course of their development they come up against horizontal problems which usually have aspects common to several vertical actions.

Each of the intersections between horizontal areas and vertical applications represents a specific problem which must be dealt with both in the general (horizontal) framework and in the specific (vertical) context. Coordination during the development of vertical applications is therefore absolutely essential.

In order to assure the promotion and implementation of solutions which are as closely harmonized as possible, it will be important to provide assistance for the coherent development of vertical applications. It will also be necessary to ensure that they benefit from the experience gained in other projects.

Coordination actions

The main coordination actions consist principally in :

- Promoting the transfer of information between sectoral projects. It is therefore useful and productive to give logistic support (conference rooms, interpretation services) to European sectoral groups to facilitate the preparation and the launching of electronic transfer systems for commercial data.

• Encouraging mutual exchanges of information between working parties set up within the various sectoral projects : telecommunications, electronic commercial messages, legal aspects, security, confidentiality. This dialogue between sectoral projects should allow the sharing of information between working parties concentrating on the same field.

• Taking into account the specific requirements of EDI in the preparation of policies –

a) with regard to telecommunications:
   - the need for international functional standards
   - availability of products which conform to existing international standards
   - the reduction of tarif problems in promoting the intensive use of EDI
   - harmonization of the networks/services proposed by the European postal services (communication by packet switched networks, international lines operating at 64 Kbits/s)
   - adaptation of the telecom services to meet the requirements of users (for example, increasing transmission capacity in view of the processing of the traffic generated by OSI applications)
   - near-term availability of packet-switched networks operating at 2Mbits/s; etc.

b) with regard to standardization:
   - the need for a directory of trade data elements, as complete as possible and kept up to date
   - the need for universal exchange syntax, for a standard structure for exchange, for messages and for segments
   - the need for standardized messages.

The trade data elements directory is the subject of an international standard ISO 7372.

EDIFACT (Electronic Data Interchange For Administration, Commerce and Transport) meets the second requirement and is now an international standard - ISO 9735.

The development of standard messages is the object of a international procedure within the United Nations Economic Commission for Europe.

The Commission (DG XIII/D/4) is closely associated with the standards work which will be a matter of some importance within TEDIS.

Legal aspects and the requirements related to security are also addressed within TEDIS.

Awareness actions

The TEDIS programme aims in addition to :

• increase the awareness of potential users by providing general information.

• inform European equipment suppliers and software producers of the opportunities implicit in

the development of EDI systems and of the progress made so far in this area.

• provide specific assistance to SMEs so that they can participate actively in TDI.

As part of TEDIS, it will also be useful to study the appropriateness of promoting the successful development of software specially intended for this type of transfer.

Conclusions

The Commission is convinced of the present and future importance of EDI in the creation of the internal Community market and in the improvement of its commercial competitivity.

TEDIS will contribute to the development of the electronic transfer of trade data by coordination and awareness-raising activities.

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