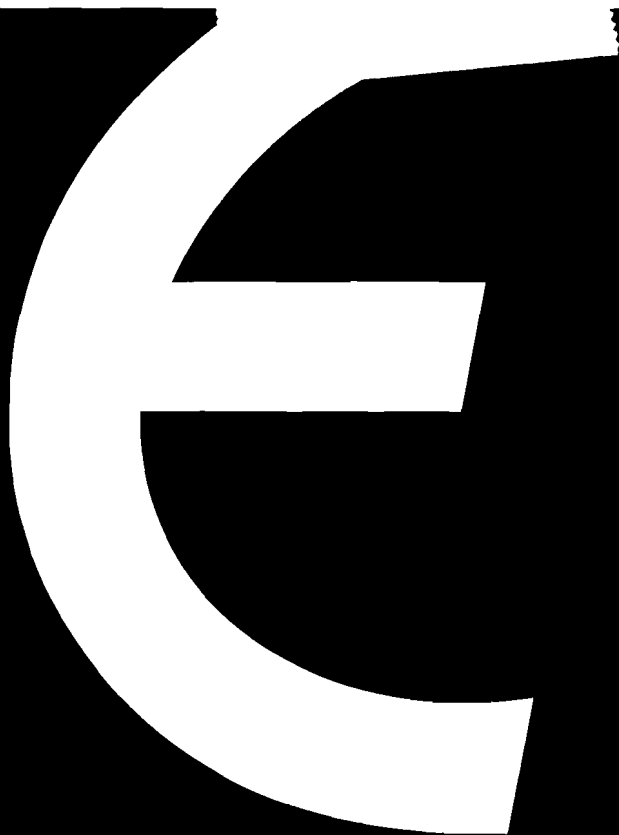


Telecommunications and Europe's future



European File

Commission of the European Communities
Directorate-General for Information,
Communication and Culture
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New telecommunications technology is shaping the face of Europe as it will appear in the year 2000. It not only makes our daily lives easier: it is helping to determine Europe's economic future. The sector is rapidly expanding and undergoing profound technical and structural changes.

A twofold revolution

Two innovations are central to the future of telecommunications:

- **Digitization.** The basic first-generation services (conventional telephone and telex) are out of date. The transmission of data – of the human voice over the telephone, for example – is increasingly being done in digital form, converted into bits, the basic elements of a binary data processing language.
- **The taming of light.** A second revolution is imminent: that of optoelectronics. Because of its speed and short wavelength, light can transmit large amounts of information relatively cheaply. Copper wire, which carried first a modulated electric current (conventional telephone) and later discontinuous electronic pulses (digital telephone), is now to be succeeded by optical fibre cable. This is made of a material similar to glass and carries pulses of light, produced by lasers. All the evidence is that optical fibre and the satellite are the transmission media of the future.

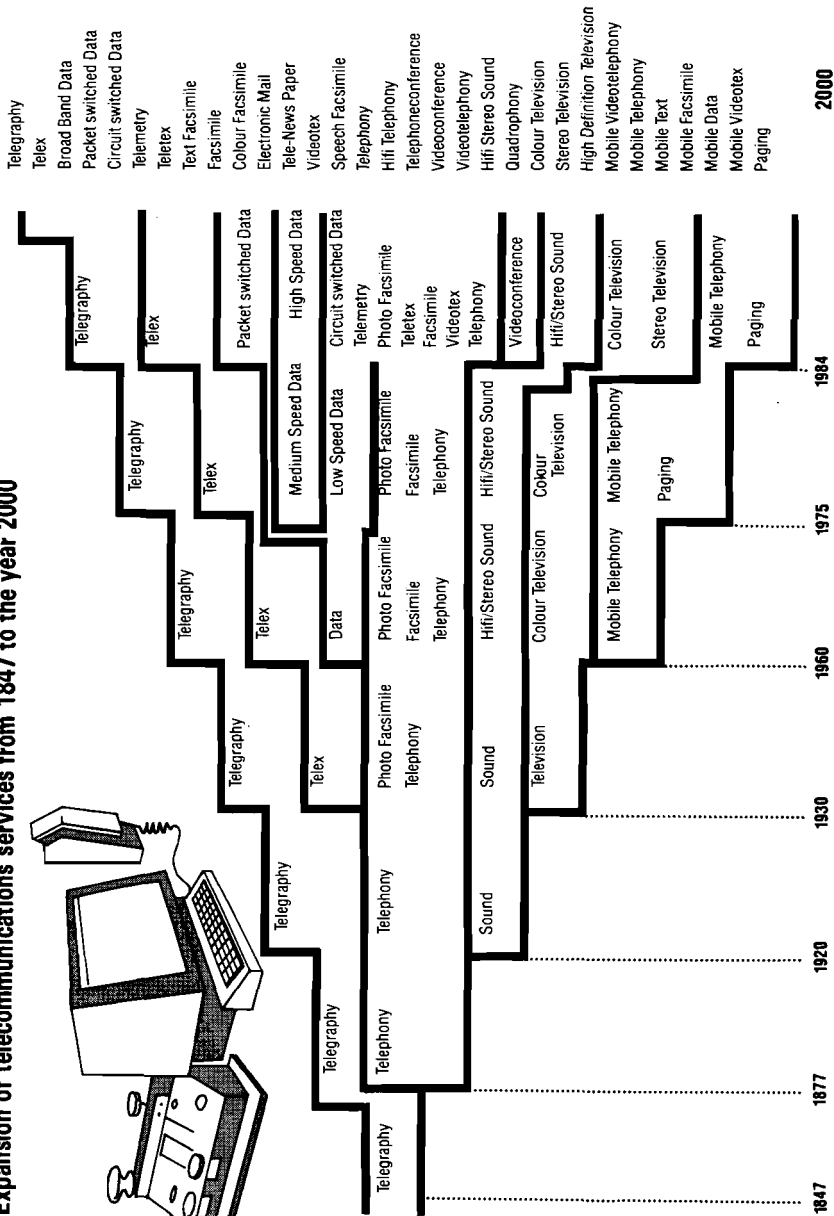
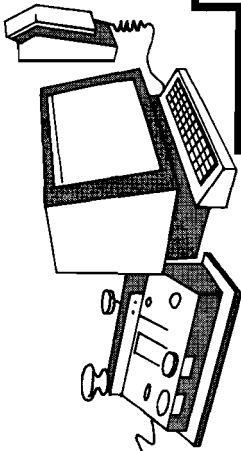
Progress in such technology makes it possible to improve existing services and gradually to institute new ones: facsimile (transmission of photocopies by telephone line), electronic mail (transmission of messages by telephone line, satellite or cable), videotex (telephone transmission of data received on a television screen), videophone (telephone with picture), remote printing and publishing, mass high-speed transmission of data and documents etc.

The development that is going on need not lead to a cumbersome multiplication of networks: there is a growing effort to develop integrated services digital networks (ISDN), which will use a limited number of terminals (mainly the telephone and television screen, which in combination offer multiple possibilities), with the same transmission lines carrying sound, picture and computerized data, all in bit form.

Sooner or later the creation of a high-bitrate, or broadband, network will make it possible to avoid overloading the system, will improve the quality and range of services, and will multiply the possibilities for dialogue or interaction with suppliers of services. Optical cable will carry both the traditional and the new telecommunications services – interpersonal videocommunication, combining voice, picture and text, will no doubt be the order of the day – as well as numerous television programmes in which the user can participate (choosing, for example, the language in which to hear a serial).¹

¹ The problems of television will not be discussed further in this text. See our No 14/86 'Television and the audio-visual sector: towards a European policy'.

Expansion of telecommunications services from 1847 to the year 2000



Source: Consortium British Teleconsult/Consetel/Detecon/Mepostal/Sofrecom et al.

These technological innovations are already the subject of various local experiments. They will increase business productivity and bring about major changes in our daily lives: electronic mail and facsimile could replace the traditional letter post, clothes will be ordered and holidays booked from catalogues on a television screen, there will be increased possibilities for working from home on a keyboard linked up to one's company headquarters.

The economic consequences will be equally considerable. The contribution of telecommunications to Gross Domestic Product in the European Community is expected to grow from 2% to 7% between now and the year 2000. Also the multiplier effect of the investment foreseen will be substantial: it is estimated that one million invested in telecommunications infrastructure brings about a total increase in activity of one-and-a-half million; the ratio is as good as that of the building industry.

However, technological change inevitably means important changes in the market. Unless Europe reacts to the new situation, the changes could be to its disadvantage.

- The Community has some important experience to its credit. The Europeans have for a long time been leaders in telecommunications development. The Community is still the world's leading exporter of traditional equipment, with a positive trade balance of about 2 000 million ECU per year.¹ A dozen European firms supply most of the Community's requirements and dominate the world market, exporting 30% of their production.

Nevertheless, although the proportion of homes with telephone is still much lower in the Community than in other major developed countries, the prospects for growth in the equipment market are today lower there (6% a year) than in the rest of the world (8%). The Europeans were the first to develop time-switching or digital switching systems, but the Community uses nearly as many different systems as it has member countries. The fragmentation of its market is its principal weakness. It is no accident that it has to import more than 80% of the electronic components needed for the manufacture of new terminals.

- Traditionally the telecommunications market is a public service one, dominated by national suppliers. The situation is however being radically transformed since the United States opted for deregulation, opening their market to all suppliers and spurring the AT&T company to establish itself on other markets. The same trend is to be observed elsewhere. For Europe, the consequences are twofold: it has to deal with an onslaught of external suppliers on its own territory, while at the same time itself seeking new markets abroad.

Modernization of telecommunication systems is indispensable, if European firms are to remain competitive. It can also be one of the prime instruments of new

¹ 1 ECU (European currency unit) = about £0.64, Ir. £ 0.7) or US \$ 0.96 (at exchange rates current on 9 June 1986).

industrial growth. All the more reason for Europe to seize its opportunities and take steps to maintain or regain its position, on its own ground and on a world market that is full of promise. The European Community can play a vital role, by ending the compartmentalization of national markets: in this way it can restore the confidence of industrialists, who hesitate to invest in research because the high cost (up to 20% of annual turnover) can be met only by commercialization on a very large scale. The Community is laying the foundations of the vast market required for the relaunching of the European economy, by harmonizing the various national technical regulations, by 'Europeanizing' public procurement, by proposing coordinated development plans and joint infrastructure projects, by supporting cooperation in research, by gathering the funds needed for modernizing equipment, and by strengthening, through joint action, the position of Member States on the international scene.

Standardization and public procurement: for a true common market

The creation of a true common market in telecommunications requires the opening-up of public procurement policies and a harmonization of the technical rules that govern development of the sector.

- The Community system of prior exchange of information in the field of technical standards and regulations was instituted in 1984. It provides that standardization work undertaken in member countries must be brought to the notice of the European Commission in good time for any new obstacle to trade to be forestalled. A committee of experts examines the situation periodically, makes comparisons and tries to reduce the divergences that can arise between national measures being drafted: the measures can be amended and, if necessary, their adoption can be postponed.
- A Community recommendation adopted in October 1984 provides for consultations between the PTT administrations of Member States before the introduction of any new telecommunications service. The consultation is to take place preferably in the framework of CEPT, the European Conference of Postal and Telecommunications Administrations, a forum within which 26 European administrations coordinate their positions. Since 1985 innovations in this field are subject to a joint harmonized approach, intended to enable compatible services to be offered throughout Europe. From 1986 the administrations must also see to it that digital transmission systems and switching systems which are to be involved in the gradual integration of services take account of standards and specifications accepted at European level. CEPT has the task of establishing common specifications for type approval of terminals, using internationally recommended standards and based on priorities laid down by the European Commission after consultation with national PTT authorities.
- A recent Council of Ministers' directive deals with mutual recognition of results of conformity tests on terminals and a Commission proposal with standard-

ization in the field of information technologies and telecommunications. Where the traditional approach was to establish standards *a posteriori* on the basis of existing situations, this legislation will substitute new procedures, more suited to the rapid development of advanced technology: they demand that technical specifications be made available before the commercial stage. The objectives: to offer a better guarantee of interoperability of telecommunications systems and better prevention of technical barriers to trade; to stimulate, in keeping with the Community's priorities, the harmonized adoption of international standards and the development, by CEPT and various committees, of European standards and specifications to complement the international ones or make up for their absence; to define references for public procurement; gradually to set up a procedure for mutual recognition of conformity tests carried out in Member States' approved laboratories on the basis of Community specifications, so that industrialists no longer lose time and money submitting their products to checks in each member country. With this in mind, the European Commission has already concluded contracts with several testing centres for work on facilities and common procedures for conformity testing. A truly European service is being set up in this field.

The opening-up of public procurement completes the programme. This point is clearly crucial, because of the importance of public procurement in the sector. The Community's Council of Ministers adopted a recommendation in 1984 for the opening up by PTT administrations of their calls for tender to firms from other member countries. During an initial period of two years, this opening is total for new types of terminal for professional use and for the general public. It is partial – a minimum of 10% of the value of annual orders – for traditional terminals and for transmission and switching apparatus; procurement of those items should be gradually liberalized after the two years, until it is completely open.

Infrastructure projects: working together

The second axis of the Community's telecommunications policy is the coordination of development programmes and the carrying out of joint infrastructure projects. Selected according to users' requirements, the projects are intended to stimulate research and industry and to contribute to the creation of the European networks of the future. Among the projects set up by the European Commission are:

- Euronet Diane. This first European information network, created in 1980 by the Community and the national PTT administrations, prepared the way for the interconnection of national networks. It allows users in Member States and neighbouring countries to consult about 600 data banks and data bases by means of a computer and a telephone. The charge for transmission of data is uniform and independent of distance.¹

¹ See *European File*, No 18/82: 'Euronet Diane: towards a common information market'.

- Apollo. The European Commission and the European Space Agency have decided to cooperate in the field of high-volume data transmission by satellite (copies of documents being transmitted in digital form etc.). The project will make it possible to develop experimental equipment and to stimulate the creation of a European market for ground stations and receiving antennae.
- Insis and Caddia. These abbreviations designate programmes which enable the Community's institutions and Member States to pursue their exchanges of information in various forms through an integrated network of services: transmission of written documents, electronic mail, access to statistical data bases, videoconferences, videotex etc. The idea is to set up a market which gives a picture of that of public institutions in the year 1990.

However, it is necessary to go further. New projects are being examined:

- Intergovernmental videocommunications. Videoconference studios already completed or being installed in Community capitals can be used to cut down the frequent journeys that government representatives and experts have to make, and could reduce the cost of their meetings (the cost of a videoconference meeting varies at the moment between 1 000 and 6 000 ECU, depending on whether it is arranged at two days' notice or convened in a few minutes). The system is expected to yield other benefits: validation of European technical standards for videocommunication, an incentive to suppliers of studios and equipment, a spur to national administrations to speed up the development of larger-capacity telecommunications links. In fact it is already possible to organize bilateral conferences using various existing links, either land-based or satellite; the project provides for multilateral conferences from 1987, and for member countries to choose, as of 1988, the kind of link that meets their needs, within a coherent overall system. Experts have envisaged several possible combinations and have drawn up a development timetable based, in the first instance, on the use of satellite links. The European Council of Ministers has recently adopted a resolution favourable to the continuation of the project.
- Cellular mobile telephone: planning and development of a second-generation system have been the subject of technical studies in preparation for a recommendation by the European Commission. The system will have to be digital, in order to facilitate data transmission and allow further development of services; contrary to present equipment, which is not compatible, it will have to permit connections from country to country across the Community. The system will locate the user and sustain his communication over long distances, by means of relay transmitters, each serving a 'cell' of territory of a given area. Such a project could never be realized without a European approach to the problem. The international bodies have already decided to reserve the 900 megahertz band for mobile telephony; the Germans, French and Italians have concluded a research agreement.

- Integrated services digital networks (ISDN). In a first phase of development these networks could accommodate new services using ordinary transmission lines and terminals. Concerted implementation at European level is indispensable. The European Commission has presented a proposal for a recommendation to harmonize the supply of new services, and to clarify and broaden the prospects for the European telecommunications industry. By 1988 users could have access to facsimile, teletex (telephone transmission of texts received on a screen or printer) and standardized interfaces for linking ISDN terminals to the present telephone network. Between 1988 and 1993 the public could avail of facilities for automatic recall of engaged numbers, videotex, telephone conferencing, as well as the transmission of images and computerized data. By the end of 1990, decisions should be taken regarding services such as telemetry, electronic mail, videophony and packet transmission of computerized data (the data are transmitted in groups when the line is free, thus making communication more economical by using slack time). In the longer term, ISDN could evolve towards a broadband (higher-bitrate) network capable of carrying television programmes as well.

- Transnational broadband communication channels. The main axes forming the backbone of a future European optical fibre network need to be established by joint decision. The creation of such a network will make it possible to improve the quality of telephone traffic between European countries and reduce its cost. In a second stage, these channels can be used by a transnational system of integrated broadband services, which will be more efficient than ISDN.

Research: developing the technology of the year 2000

The building of integrated broadband communication systems, combining all possible or imaginable services (telephone, telex, teletex, interactive television, mobile videophone . . .) poses a considerable technological problem: the mastering and use of light. Transmission by optical fibre is now possible, but economic and reliable systems must still be developed for transmitting, connecting, amplifying and receiving the light signals transmitted. Laser technology is still open to great improvements. An optical processor must also be developed which can recognize and convert the signals transmitted and received, as well as checking, processing and stocking them and generally regulating their flow. In its memorandum of June 1985, 'Towards a European Technology Community', the European Commission suggested a Community project for the development of such a processor. Other initiatives are already under way:

- Race (Research and development in advanced communications technologies for Europe). This Community research programme was launched in 1985 and is intended to develop the technology base for a future network of integrated broadband telecommunications systems, using optical fibres. Eight sectors of research and development have already been selected: high-speed integrated circuits, high-complexity integrated circuits, integrated optoelectronics, broad-

band switching, passive optical components, components for high-bitrate long-haul links, dedicated communication software, large area flat panel display technology. The programme is planned to last 10 years and the European Commission proposes spending 440 million ECU on it. A first 'definition' phase (July 1985 to December 1986), is intended to prepare the ground by drawing up a reference model for a European network and defining research priorities. Studies to this end are co-financed by the Community (which meets half the costs, 14 million ECU), industrialists and research centres in Member States. Then, between 1987 and 1991, the first operational phase is to include precompetitive work required for the provision of equipment (new terminals etc.) and services for trial and demonstration. Finally, between 1991 and 1996, a second operational phase will cover the development of the technology for perfecting the new equipment and services.

- Esprit (European strategic programme for research and development in information technology). This Community programme of precompetitive research on information technology was launched in February 1984 and covers five fields of activity: among them is advanced microelectronics, which is of particular importance to telecommunications. Some of the research, which is carried out under contracts financed jointly by the Community, industrialists and universities, concerns technology for processing optical signals.
- Eureka. The first workplan put forward by France for the 'European technological renaissance' provided for the 'Eurocom' project, to cover the development of broadband transmission and associated equipment, switching for data processing and office computer communications.

Investment support: priority for less-favoured regions

The Community gives financial support to many investments intended to strengthen telematic links between Member States, to equip and open up regions that are least favoured or geographically removed from the big business centres, and to provide European firms with all the services they need in order to be competitive.

In recent years the Community's financial instruments have devoted some 700 million ECU annually to the development of telecommunications infrastructure. Besides grants from the European Regional Development Fund (ERDF), there have been loans from the European Investment Bank. The loans amounted to some 600 million ECU in 1985 (of which 32 million came under the New Community Instrument) and a total of more than 2 800 million ECU between 1981 and 1985. Most of the aid went to less-developed regions in Greece, Ireland and southern Italy, and enabled them to extend and modernize their networks and equipment. Significant loans have also been given for advanced technology projects: in 1985 the Bank financed satellites for a French telematics network and a satellite ground station in the Abruzzi in Italy.

The spread of new technology need not lead to greater divergences in regional levels of development; on the contrary, it can be used to reduce the disparities. For that reason the European Commission has issued the draft programme STAR, for the co-financing of advanced telecommunications facilities in the least favoured regions. In five years the ERDF would devote some 780 million ECU to the programme.

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To ensure the growth of an advanced industrial sector and the development of new services for all users, to cover the continent with a high-performance network operating at low cost, to open up frontiers and shorten distances between people: a telecommunications policy which pursues those ends makes a decisive contribution to the building of a united Europe ■

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Commission of the European Communities

Information offices (countries fully or partially English speaking*)

Ireland 39 Molesworth Street, Dublin 2 — Tel. 71 22 44

United Kingdom 8 Storey's Gate, London SW1P 3AT — Tel. 222 81 22
— 4 Cathedral Road, Cardiff CF1 9SG — Tel. 371631
— 7 Alva Street, Edinburgh EH2 4PH — Tel. 225 2058
— Windsor House, 9/15 Bedford Street,
Belfast BT2 7EG — Tel. 40708

Australia Capitol Centre, Franklin Street, PO Box 609,
Manuka 2603, Canberra ACT — Tel. (062) 95 50 00

Canada Office Tower, Suite 1110, 350 Sparks Street,
Ottawa Ont. K1R 7S8 — Tel. (613) 238 64 64

USA 2100 M Street, NW, Suite 707,
Washington DC 20037 - USA — Tel. (202) 862-9500
— 245 East 47th Street, 1 Dag Hammarskjöld Plaza,
New York, NY 10017 - USA — Tel. (212) 371-3804

* Offices also exist in other countries including all Member States.

