3. Technology

As part of the consolidation policy outlined the previous year, Telefónica has been newly organized to meet the challenges: i.e. promoting technological development in the sector; generation of in-house technology for expanding and modernising services; and in improving technical qualification procesesses, necessary not only as a tool for Telefónica's own requirements, but also as a backup for industrial initiatives.

An immediate consequence of the new work methods established has been the preparation of a technological programme which sets out the requirements over a two-year period, detailing the time schedule and the human resources and funds necessary for their implementation.

The funds employed during the year amount to 3,081 million pesetas (869 million pesetas of investment and 2,212 million pesetas of expenses) which represents 0.9% of revenue from services, an amount that is growing with respect to previous years and is, in consquence, coherent with the technology development policy adopted.

Specific achievements worthy of mention include the following:

Network Structure

Experiments and the first pilot installations of miscellaneous supplementary telephone services have been carried out in the Atocha Exchange (direct line, abbreviated dialling, call waiting, call forwarding, consultation, and 3-way calling) with a video conferencing facility between Madrid and Barcelona.

Of special importance is the SICE (Servicio Integral de Comunicaciones de Empresa or Integral Business Communications Service) which comprises digital communications in the office itself, integrating these functions with those of data transmission (applied to various services) and enabling the formation of private or exclusive trunk or local networks. In reality this is an advance of the RDSI (Red Digital de Servicios Integrados or Integrated Digital Transmission and Switching Service) with application for the business world, which is where highly complex advanced facilities and services are in demand which may well not be required by ordinary or domestic users for many years.

In order to start to establish these services, the first installations of the Ibercom Network Terminal Centres have been carried out, the laborious job of selecting the best system being completed with the end result that the MD110 system to be manufactured by Intelsa was chosen.

Under the heading of Networks, progress continues on studies relating to the RDSI (Integrated Digital Transmission and Switching Service), both for the narrow and wideband types. Specific experiments have been made in this field and strategies have been prepared to introduce compatibility with the Iberpac Network and those to be developed in the future. Work has also started with respect to the RACE, the EEC wideband network.

Mention must be made of the common channel signalling network, a fundamental infrastructure for establishing the future RDSI and preparing strategy for introducing cable television distribution networks.

Finally, under this heading, the expansion of the Iberpac Network has continued by applying the X-25 protocol.

Subscriber equipment

Among developments in 1984 (inhouse, jointly or under contract) are the SATAI 5/10/3, 6/24/7, 2/2/1 and 3/6/2, which complete the whole new range of this type of systems in the TEIDE line. Furthermore, the '0' Dataphone should be mentioned under the heading of Teleprocessing Terminals, together with the Multipurpose Modem and the Ibertex Subscriber equipment.

Where technical qualification has been completed in 1984 with a view to the introduction of Subscriber equipment this mainly concerns the 'Benjamín' handset, a supplementary intecom system, and the call forwarding device with variable destination.

Finally, it is worth mentioning the activity carried out to extend availability of the future digital telephone and a range of equipment which will enrich and renovate the present lines (multi-function telephone, high capacity automatic dialler, hands-free telephone, new dataphones, digital SATAI, audio-conferencing terminals, etc.).

Switching

At the end of the year the first 2,000 subscribers had been connected to the 1240 Digital Exchange in Salamanca-Concejo, as an advanced stage in final commissioning. The necessary work has also been carried out to establish a pilot RDI (Red Digital Integrada or Integrated Digital Network) on the basis of the 1240 system, in the Collado-Villalba Sector.

The AXE system continues to be adapted to the specific requirements and applications of the Spanish network (mobile and transmission exchanges) initiating work on the version of AXE employing more advanced technology, the introduction of which is planned in the next few years.

The intense work on completing and perfecting development of the TESYS system is worth a specific mention. This is in order to ensure fulfilment of international commitments and the requirements of Telefónica itself. In this sense the first "Maximum Configuration" TESYS installation has been commissioned and work on increasing switching speed and expanding complementary management facilities (billing, statistics, etc.) is being completed. Similarly, the old data network equipment is being replaced by TESYS 1.

Furthermore, studies have been initiated on TESYS system evolution strategy, in order to start work on the next technological generation of the system. TESYS models have also been incorporated into the Switch Programming Centre (SPC) in order to guarantee proper high level support for operation and maintenance. maintenance.

Transmission

Special attention continues to be given to the introduction of digital methods, disposing of a complete repertoire of digital systems employing coaxial cable and optical fibres, which will allow this process to be completed. Attention has also been paid to new radio applications, with the advanced state of development of a multi-access rural digital system (MARD) being notable, thus completing the scheme initiated with the MAR system, which has been so well received in the international markets.

Studies and experiments have been started on the transmission of TV programmes and other signals via the EUTELSAT communications satellite.

Advances have been made in systems and equipment availability for the configuration of Ibermic services (high speed digital circuit leasing) and for mobile services.

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External plant

Due to the type of activities included under this heading, work has been highly varied, directed to permanent overhauling and up-dating of complementary elements and materials (splices, junction boxes, civil works, etc.) and to the improvement of maintenance services.

Worthy of mention is the specification and introduction of cables with new characteristics (low attenuation, new fillers, fire-resistant sheath, etc.); the perfectioning of all optical fibre cable laying and measurement engineering, the introduction of an alarm system using the switched network, the overhaul of interior network engineering to enable future compatibility with the RDSI network and cable TV, together with a multitude of projects designed to ensure the technological evolution of local subscriber networks.

Operating aids

The efforts made to facilitate and make operations more efficient are worthy of special mention, applying the opportunities offered by new tecnologies. In this sense, the plan has been designed to establish an integrated control system for the full stock of installed equipment called Operation and Maintenance Structure (EOC-Estructura de Operación y Conservación) together with the Multi-functional Plant Terminal (TPMF-Terminal de Planta Multifuncional) and the Sectorial Control System (SCS-Sistema de Control Sectorial), comprise the basic elements of this Operation and Maintenance Structure, whose implementation is to spread, in the course of the next few years.

Similarly as well as the corresponding job of defining all engineering and strategy, specific experiments have been carried out in 1984 on some related equipment: the VCR (Vigilancia de la Calidad de la Red-Network Quality Monitoring), the PDLA (Probador de Líneas de Abonado - Subscriber Line Tester), the Remote Subscriber Connection and Disconnection Equipment and the CCM (Control de Cabinas por Microprocesador - Microprocessor Control of Telephone Booths).

Applied research

Given the rapid evolution of telecommunications technologies (electronics, information technology, etc.), it is necessary to make a major net research effort in order to remain technically competitive and to ensure the backup required at a later date, when carrying out projects that are to provide specific products.

In this sense, the "exploratory developments" are of special importance, which allow the feasibility of a new idea or technology to be confirmed. Among activities in progress during 1984, worthy of mention are a video telephone, a millimetre-wave digital link, a low cost message synthesizer and an ultrasonic coin recognition system.

In the field of technologial research, work has been carried out on frontier subjects, such as the digital processing of signals (voice and graphics) and artificial intelligence.

Of major significance, as it directly affects development work in the future, is integrated circuit design. In this sense, the integration of various technologies has continued (predoped CMOS, chip library and custom designed circuits), (1) the termination of an integrated circuit design for the medium capacity SATAI in the Teide line being worthy of special mention.

(1) These are three integrated circuit design methods. The first two are based on combining off-the-shelf components in such a way as to allow a particular final result to be obtained. In the last one, the complete design is tailor-made for a specific application.