

European Broadcasting Union

The activities of the members of the European Broadcasting Union (EBU) continue to reflect changes in technology and politics. The EBU members are the public service broadcasters in all of Europe, from the islands in the Atlantic to the Ural Mountains and the countries surrounding the Mediterranean Sea.

National Television Services in the EBU Area

By far, the largest television audiences in Europe watch the terrestrial channels from their own countries, which are the basic television services offered by EBU members.

In most countries, the developments of the previous years continue; these include new broadcasters, more channels, more transmitters, enhanced services, and longer broadcasting hours. The political situation in some countries, particularly in eastern Europe, is still rather fluid, with changes either steering away from or moving back to a centralized control of broadcasting. In many nations, the programs of neighboring countries are also available, they may be officially rebroadcast on terrestrial transmitter networks or carried (officially or unofficially) on cable systems after being picked up from satellites or relayed inland from the borders.

International Broadcasting in Europe

A number of EBU members broadcast their domestic programs on satellite channels, either aiming at expatriate communities or spreading their influence and culture. There are also channels directly aimed at international audiences; sometimes these operate under "flags of convenience" and are only loosely connected to their country of origin. Many of the channels are restricted by the program suppliers, who have been able to insist that most film channels be scrambled and the access limited to one country.

The Polyglot Continent

The 40 languages and dialects broadcast in Europe (not including immigrant languages from outside the

continent) seem to be the greatest single factor holding back the development of pan-European broadcasting and the creation of common European programs produced on a large scale. The exceptions are music, sports, and news programs. Attempts have been made to bridge this language barrier by dubbing or subtitling. Many countries now have dual/stereo sound systems, which allow an original language sound track to be carried on the second sound channel. Teletext systems can carry closed subtitles in more than one language, which can be selected by the viewer. Teletext is also used extensively to transmit closed subtitles for the hearing impaired and also to transmit an audio-description channel for the visually-impaired audience.

Terrestrial Transmission Standards

The different television transmission standards used in Europe, color standards (PAL and SECAM), different channel spacing, carrier separations, and modulation methods are all relics of the more limited national horizons in the 1950s and 1960s. However, the 625-line PAL and SECAM systems used for terrestrial broadcasting give good results in all but the most critical domestic conditions and terrestrial coverage of national channels is nearly 100% in most countries. A number of countries in eastern Europe are in the process of changing to the PAL color system as their facilities are reequipped.

Standards for Satellites

Direct broadcasting by satellites to homes, as opposed to the cable relays mentioned earlier, is slowly gaining audience, but viewers need to buy new receivers and dishes. The European Union (EU) has set a technical standard, D2-MAC, for new analog satellite services in Europe, but it seems that this is likely to be overtaken by even newer digital transmission technology.

Widescreen Television

Widescreen 625-line receivers with 16:9 tubes are already being sold in Europe; a number of satellite services

are in widescreen. European broadcasters have been developing enhanced PAL/SECAM systems that will have a widescreen format and improved quality. One of these, PALplus, is scheduled to be launched in a number of countries in 1995. New receivers will switch to the correct picture shape when they recognize control signals. Current viewers can watch the same programs in letterbox format.

Eurovision

Eurovision, the system by which EBU members exchange and share programs, celebrated its 40th birthday in 1994, and it continues to be one of the EBU's most important activities. The Eurovision network (Fig. ORG-1) is made up of either permanent and temporary cable or microwave and, increasingly, satellite links. Since 1993, the system has operated from a control center in Geneva, Switzerland.

Sports events are still the backbone of the program exchanges; the other major traffic on Eurovision is the regular exchanges of news stories. The latest figures show that, in the year up to mid-1994, there were over 45,000 exchanges of program items; 18,000 of these were the regular news exchanges, totalling over 15,000 hours of television.

Euronews, a permanent 24-hour news service, is based on material from the Eurovision news exchanges. It is run by a number of EBU members on a direct broadcasting satellite. A unique technical feature of Euronews is that the programs are broadcast in five languages simultaneously; there are plans to extend this to eight.

Technical Cooperation

The EBU Technical Committee publishes a wide variety of documents on the engineering aspects of broadcasting. Recently published topics include:

- Advice on the preservation of endangered film programs on videotape
- Techniques to transfer film programs to videotape
- Measurement methods for the colorimetry of studio monitors

- The use of low bit rates for Eurovision circuits
- Characteristics of Eurovision receiving stations
- A multilingual glossary of terms used in television program exchanges
- Guidelines on the development of individual parts of the television chain
- Information on changes in television systems in eastern Europe

The EBU has also recently published revised texts on audio companding systems for videotapes and the use of time code on television recordings. It has also published, on D-1 format videotape, a library of 625-line video sequences for subjective assessment of new television systems.

International Academy of Broadcasting

The EBU is an active supporter of the International Academy of Broadcasting, which recently opened in Montreux, Switzerland (for many years the home of the International Television Symposium). It aims to give a post-graduate education in broadcasting to students around the world.

Digital Television in Europe — The DVB Project

In Europe, a consortium of broadcasters, members of the receiver industry, and cable and satellite operators has set up the DVB Project to coordinate the development of a range of associated systems that can be used to deliver programs by terrestrial, satellite, cable, or data transmission. The main thrust of the development is towards what is now called standard or conventional-quality services. Several services will be multiplexed on a single channel or transponder to use existing frequencies more efficiently. The technical development is well under way, and many parts of the systems are already in agreement. The EBU provides the project management for the consortium, which can be contacted at EBU Headquarters in Geneva.

Independent Television Commission (ITC), U.K.

Following changes to U.K. broadcasting legislation in 1990, the ITC has become the public body responsible for regulating commercially fund-

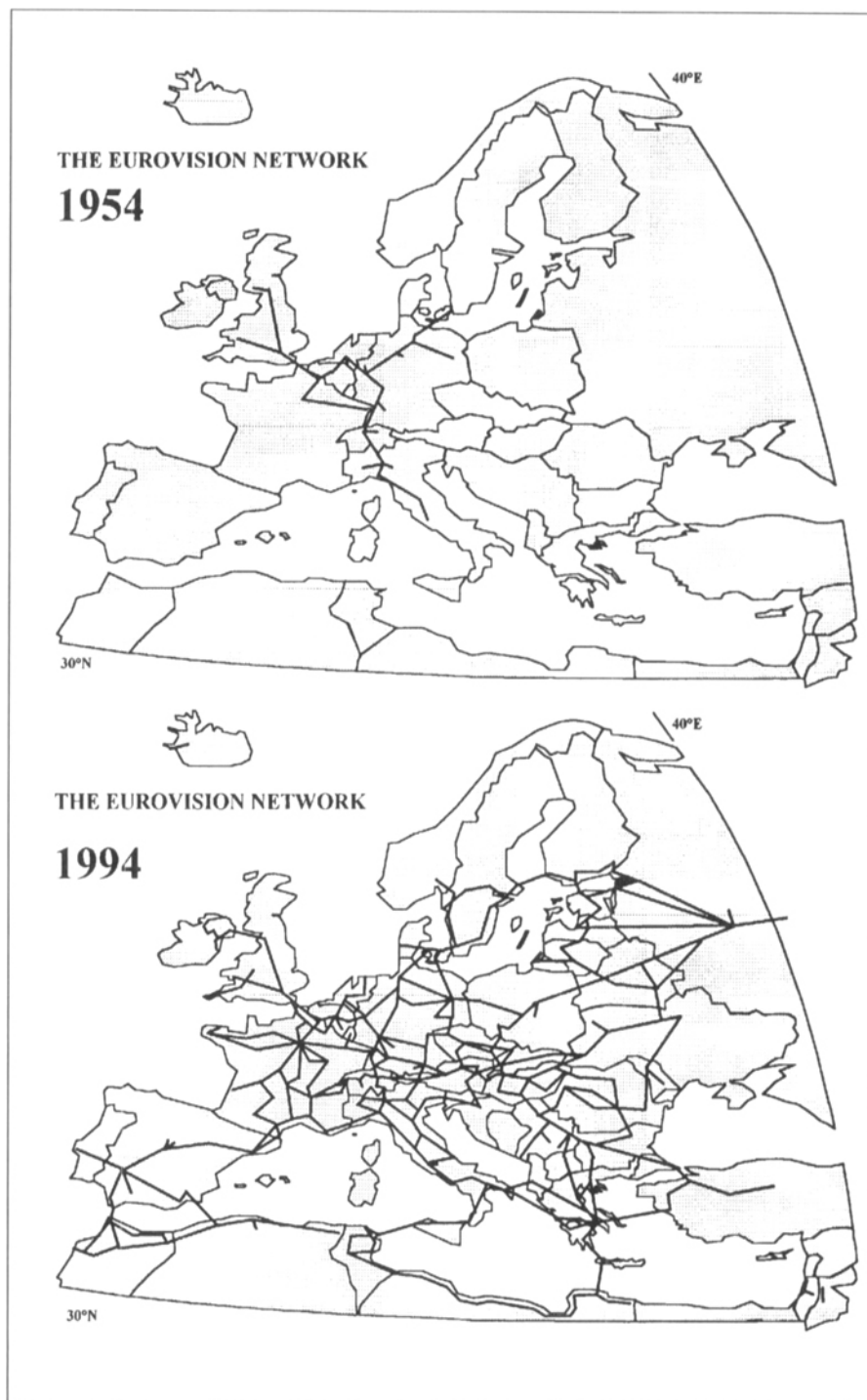


Figure ORG-1. The Eurovision network — 1954 and 1994.

ed television services provided in and from the U.K. These include Channel 3 (ITV); Channel 4; public teletext; and a range of cable, local delivery, and satellite services.

In consolidating its activities with a reduced staff, the ITC has moved to two smaller premises. The main office is in London, while engineering, finance, and other personnel are in Kings Worthy, near Winchester, in

southern England. The ITC also has a network of 12 regional offices to maintain contact with local licensees and viewers.

ITC Licensing

The initial issue of terrestrial licenses for services, starting in 1993, was given to 15 regional Channel 3 companies, a national breakfast-time channel, Channel 4, a public teletext ser-

vice, and an additional (data broadcast) commercial service. At the end of 1993 there were 114 licenses for program services and 212 licenses for cable delivery systems in the cable and satellite fields.

During 1994 the ITC issued an invitation to apply for an additional commercial license for data to be transmitted within three vertical blanking interval lines on Channel 4. Two applications were received; one was considered ineligible, and a decision on the remaining application is expected shortly.

Engineering

Although the ITC does not have direct involvement in the transmission of television services, it is active in maintaining the high standards of technical quality and reliability for its terrestrial licensees, ensuring that good use is made of the radio frequency spectrum and managing long-term research development projects for the benefit of licensees and viewers. Currently 51 main UHF transmitters and some 916 relay stations are in operation.

Technical Quality and Reliability

The basis of these requirements is set out in the ITC's Technical Performance Code and *Handbook of Technical Standards for Television Programme Production*. The areas covered include program production, acquisition, and transmission standards. In 1994 these were supplemented by a demonstration tape that aims to answer questions for anyone involved in program quality assessment. The recordings provide various examples of improvements in quality gradings based on the recommendations of the International Telecommunications Union Radiocommunications Sector (ITU-R) five-point grading scale.

Quality monitoring of signals is made in ITC offices at various points throughout the country. Additionally each ITV company provides ITC engineers with a recording or a line-feed to allow quality assessment to be made under the ideal conditions of a special-purpose viewing room. These monitoring procedures, coupled with regular breakdown reports made to the ITC, provide valuable information about the entire broadcast path.

Radio Frequency Spectrum Management

Within the U.K., use of the radio frequency spectrum is coming under close scrutiny. Two important factors are now acting as a focus: the fifth UHF terrestrial service (Channel 5) and the possibility of digital television services emerging before the end of the decade. In the case of Channel 5, since the rejection by the ITC of the single applicant for the service in 1992, the government has decreed that of the two main channels allocated earlier (35 and 37), channel 35 should be withdrawn; this channel now awaits use by digital services. The loss of this channel has meant a reduction in potential U.K. population coverage for Channel 5 from approximately 74% to 50%. ITC engineers are actively seeking international clearance for use of other frequencies; if successful, this could bring the figure back to about 70% coverage.

Research and Development

The ITC's research and development program is carried out through arrangements with companies and universities, each a leader in its field. With television research throughout Europe it currently consists of 12 projects that are coordinated by ITC project managers.

SPECTRE

The largest of these R&D projects is SPECTRE, a broad-based technical study of digital terrestrial television that contributes to a number of European enterprises and is partly funded by the European Commission. Field trials have concentrated on the development of optimal modulation and error protection systems; experiments were also performed in the critical area of single-frequency networks.

PALplus

Working with several other U.K. broadcasters and equipment manufacturers, the ITC is contributing to the international PALplus project, whose objective is to enhance the current PAL transmission system so that it can carry sharper widescreen pictures in a format compatible with existing receivers. The ITC has completed the compilation of the full system specification with PALplus and has demonstrated its implementation in a com-

plete hardware encoder/decoder chain. This equipment was used in an experimental transmission of a film on Channel 4 and has also been tested over the Videotron cable network in southern England. Later in 1994 both Channel 4 and Granada Television announced that they will present a limited number of broadcasts in this format.

MVDS

Recently completed is the ITC Microwave Video Distribution System (MVDS) prototype transmission equipment for microwave (40.5-GHz) propagation studies. This is now installed in Oxfordshire and is being monitored over an extended period to acquire the data necessary to construct a propagation model for MVDS spectrum planning.

Colorimetry

New developments and technical practices within the studio are under constant examination in order to keep *The ITC Handbook of Technical Standards for Television Programme Production* up to date. This document is revised regularly to take account of the increasing use of digital audio and video technology and emerging wide-screen systems. Colorimetry is a particularly active area of study; ITC work is coordinated with that of others through the EBU.

Other Areas

Work continues in research and development concerning the ghost cancellation reference (GCR) signal, a new loudness meter, and other innovations.

Digital Television

In 1993, the ITC issued a document on digital television, with the purpose of launching a public discussion on the important policy issues surrounding the impact of the recent technical work on digital terrestrial transmission, including the ITC's own R&D work in this area. More than 50 responses were received, representing a wide range of views and interests. In general, the responses helped bring into focus the major hurdles that need to be surmounted in launching a U.K. strategy for digital terrestrial television. In 1994, ITC staff followed up a number of the comments, so that a more com-

plete analysis might be presented to the government and other interested parties.

Motion Picture and Television Engineering Society of Japan, Inc. (MP TES Japan)

Overview

The large-scale economic deceleration that began in 1991 is still continuing in Japan and has had a strong influence in the field of motion pictures and television. For example, the number of companies at the annual motion-picture and television equipment exhibition decreased, and the demonstrations were smaller. However, during these three difficult years, several countermeasures, such as lower bank rates, increased investment for public facilities by government, decreasing income and district taxes, and reconstructing of companies, have gradually improved the Japanese economy.

Television

A wide-frame type of television was introduced for consumer use, and field tests on Japanese enhanced TV (EDTV-II) were carried out. Approval is expected soon, and actual test broadcasting will be carried out in the next year.

Currently the letterbox frame is preferred, as can be seen by an NTSC 4:3 aspect-ratio TV set. However, manufacturers are afraid of losing viewers because of the smaller picture area in the frame. Although the wide-frame TV set is being sold in the current format, most sets are still of the 4:3 type; as a result, the future of EDTV-II broadcast is still uncertain. It seems that most people in the world recognize that future TV will be broadcast at a frame of 16:9. In addition, broadcast of the Japanese type of HDTV, Hi-Vision, was started in November as a pre-stage of an authorized one. Manufacturers are studying how to effectively adapt the wide-frame receiver sets for the three types of broadcast systems (NTSC, EDTV-II, and Hi-Vision). The progress of microelectronics has been accelerating digitalization on various equipment in the search for high-quality picture, sound, and stability. This applies not only to equipment but also to the design of total systems for program

production and broadcasting.

Additional study and investigation on digital broadcasting has been carried out in various places and forms. Another feature of digital technology is data compression. This was utilized in the nonlinear editing equipment that was widely exhibited at the International Broadcast Equipment Exhibition, held in November at Makuhari. One problem is that different compression rates are used by each manufacturer; however, standardization is expected.

Multimedia

The term "multimedia" is being used so often in every field that it creates great expectations — and some confusion — for many people. The broadcast and CATV stations have been trying to release some restrictions on the application of fiber-optic cable and digital-signal transmission. The worldwide standardization of digital compression techniques accelerates the video CD industry and multi-channel broadcast. Color film for motion pictures has been improving every year, and the picture quality of new products is still better than that of magnetic tape.

Motion Pictures

There is good news for people in the motion-picture field. The number of movie theaters in Japan increased with the recovering economy, even though only by 1%, after more than 30 years of decrease. This is due mainly to the rebuilding of some districts. In order to make a city or town more active, new types of movie theaters were constructed to include such attractions as department stores and large-scale supermarkets. The numbers of viewers in 1994 increased about four times compared with the previous year. It is expected that movie theaters will increase to 2.5 times the present number by the year 2000.

Film Residue

Environmentally speaking, the disposal of the liquid residue from film developing is a serious problem. For long periods it was discarded in the ocean; however, the London Treaty mandates that the liquid has to be treated on land within one year. New effective treatment is being utilized for

still pictures through the effort of film manufacturers. However, in the case of motion-picture film developed in huge laboratories, progress has been very slow in the past two years. Some new technologies and equipment are currently being investigated.

N TL (formerly National Transcommunications Ltd.), U.K.

At NTL, the year was dominated by the implementation of MPEG-2 video compression. Leading up to the launch of a complete end-to-end system, the central MPEG-2 encoding/decoding process was shown publicly by NTL for the first time at exhibitions in Las Vegas, London, Singapore, and Beijing. The final product, developed in conjunction with News Datacom and Comstream, was launched at IBC amid worldwide interest. STAR-TV, based in Hong Kong, will use the system for its 32-channel DigiSTAR service due in 1995. Also, NTL's MPEG-2 technology will be used for a direct-to-home service in South Africa, also due this year.

Meanwhile, first-generation System 2000 MPEG-1-based equipment was delivered to such diverse users as BBC World Service TV, Reuters, United Artists, Thai Sky, and the Shinawatra Group. To address the market for domestic digital receivers, NTL formed a joint venture with Pace Micro Technology Ltd.

Anticipated demand for MPEG-2 products was such that NTL's Advanced Products Div. set up a new manufacturing facility in Eastleigh, Hampshire, in mid-1994. The new factory has 2,000 sq. m. of floor space and includes specialized areas for system integration and customer support, making the company a full-fledged manufacturer of digital TV systems.

Test transmissions by NTL and Eutelsat in 1994 proved that a digital television signal can be added to an existing analog satellite channel without interference in a single 36-MHz transponder, allowing an inexpensive and gradual transition to digital broadcasting. The MPEG digital pictures were generated by NTL using System 2000 equipment (Fig. ORG-2) and uplinked from the company's Croydon operations center in south London to Eutelsat II-F1 at 13°E. While allowing

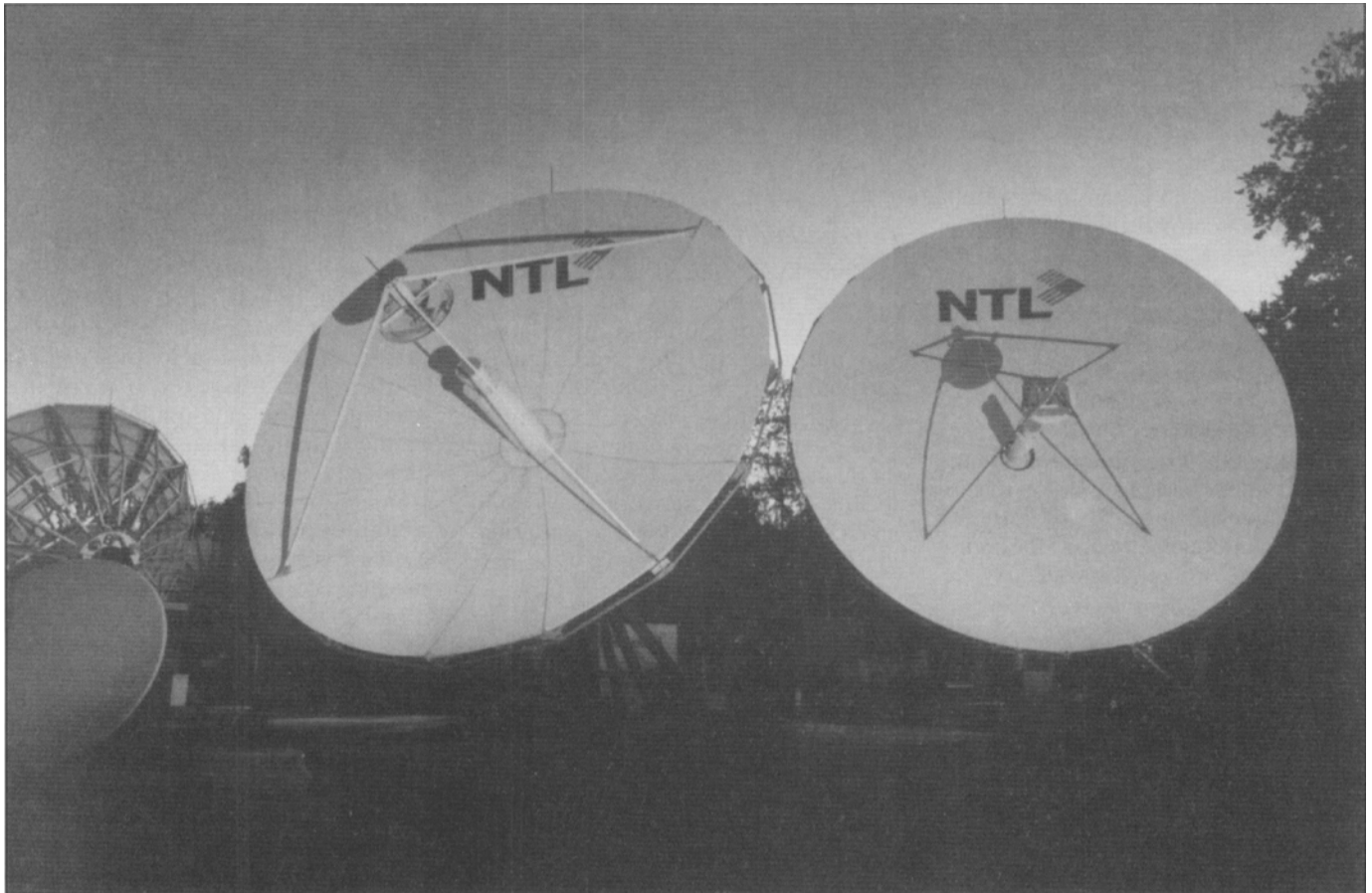


Figure ORG-2. NTL satellite transmitting equipment.

a gradual transition between the two technologies, the simulcast option enables digital to be introduced for cable heads while maintaining analog for direct-to-home reception. Alternatively, it could allow broadcasters to use the same transponder for high-quality satellite news gathering (SNG).

NTL's video compression system was chosen for tests by America's National Broadcasting Co. (NBC) to assess the potential of digital SNG. The results show that standard-size SNG uplinks could be used digitally with much lower power, even for C-band satellites, previously inaccessible to "fly-away" uplinks. The tests were done in conjunction with NBC and Advent Communications, which provided the uplink, and were designed to evaluate digital compression for SNG purposes. The use of a satellite in an inclined orbit served to make conditions less than ideal, which is often the situation in the news-gathering environment.

For an analog satellite uplink, a prohibitive 3.5-kW transmit power (75

dBW from a 1.9-m antenna) would theoretically be required for C-band operation. The ruggedness of the NTL System 2000 video compression equipment allowed the power level to be reduced by at least 18 dB while still decoding perfectly. The tests showed that high-quality digital pictures and sound can be transmitted to a news center from compact fly-away satellite equipment using spot, hemi, or global beams operating at much lower power or with a smaller antenna than for analog TV signals.

NTL's own teleport continued to develop with the addition of a 13-m dish that accesses Intelsat at 57°E over the Indian Ocean. An early application was to provide a digitally compressed service between the BBC and TV New Zealand. Further uplinking contracts won by NTL during the year were from SIS (racing coverage to Malaysia, Sri Lanka, South Africa, and the Middle East), MBC, Music Choice Europe, and TV Asia (Astra 1D); the latter three required further dish antennas to be built.

On the domestic transmission front,

NTL won a renegotiated contract from the Welsh Fourth Channel, which included not only transmission but also distribution of S4C programs to transmitters throughout Wales. To meet the requirement NTL has extended its digital telecommunications network in the southern and western parts of Wales to replace current studio-to-transmitter feeds.

ITV transmitter reengineering reached another milestone in October when the last of the old Pye 10+10 kW installations was switched off at Redruth in Cornwall. This was the last of 13 NTL reengineering projects in which Harris Allied all-solid-state medium-power transmitters have been installed.

In addition to receiving an Emmy award for its NBC Barcelona Olympics installation, Nexus International, NTL's broadcast systems division, built a new studio installation in Moscow for the all-state Russian broadcasting service. Nexus also won a large contract from Canal+ to build a new pay-TV station in Chile, complete with three main UHF terrestrial transmitters.