

Networks

Canadian Broadcasting Corporation (CBC)

Significant changes in the technical structure of the CBC took place this year to better align the corporation's technical resources with its evolving business situation. Project planning and implementation are now functionally aligned with the media, thus enabling more effective services in both radio and television, while a core resource of specialized technology consultation is maintained centrally. In addition, the transmission activities of the CBC have been consolidated into a single unit to achieve efficiency and exploit new business opportunities.

In the area of technology, an increasing emphasis on fully digital operation is visible in both audio and video, with compression taking on an increasing role for distribution and transmission as the networks become capable and effective. Major investigations in collaboration with other Canadian organizations have led to recommendations for the use of compression within the CBC's activities that will take best advantage of its capabilities while retaining essential operational flexibility and quality. Studies have also progressed rapidly towards the implementation of fully digital radio services (DRB, in L-band based on EU-147 technology) and digital TV services (ATV).

Major implementations include:

- Three sophisticated SNG vehicles for the corporation's news services (both broadcast and cable).

- The completion of the Network Control Centre in Toronto, which has an extensive digital network of disk-based servers, multicassette systems, and digital switching to provide fully redundant operation of the distribution system for the 20 channels originating in Toronto. The digital distribution and switching system in the Broadcast Centre now aggregates 484 inputs to 480 destinations.

- Computer-based sound editing becoming the accepted norm in radio and television. Radio, in particular, is gaining a major advantage as a result of the introduction of desktop editing, simplifying journalistic activity and linking resources and destinations

effectively through digital networks and servers. It is anticipated that this technology will rapidly displace current operational methods.

With the anticipated move to digital broadcasting and the consolidation of transmission responsibilities, major changes have been made in spectrum planning activities. All aspects of the planning process, including databases, demographics, terrain, allocations, etc., are now processed automatically and interfaced to outside resources within the industry and with regulatory authorities established.

CBS

The CBS division of Westinghouse made broadcast history at NAB this year with the first over-the-air broadcast of high-definition television (HDTV) using a solid-state silicon carbide transmitter (Fig. NET-1). Silicon carbide is a high-temperature, high-voltage semiconductor that can deliver greater than three times the power of conventional silicon devices. Westinghouse has targeted a 500-W transistor as its power device, built into 1.5-kW power amplifier modules. Using these high-power transistors permits development of smaller, more energy-efficient transmitters. This solid-state transmitter technology will

ultimately cut the cost of digital TV broadcasting, thereby encouraging early adoption of HDTV throughout the world. The demonstration featured CBS affiliate KLAS-TV, Las Vegas, using the silicon carbide transmitter to broadcast a digital HDTV signal to a receiver connected to a large projection screen located at the Las Vegas Convention Center.

The CBS Television Network participated in engineering studies and the licensing process for the proposed high-definition television station to be operated by CBS affiliate WRAL-TV, in Raleigh, N.C. On June 19, 1996, the Federal Communications Commission (FCC) granted WRAL-TV the first experimental high-definition television license. As a result of close cooperation between CBS Engineering, WRAL-TV, Harris Corp., Andrew, Zenith, Snell & Wilcox, Mitsubishi, and Hewlett-Packard, the experimental station was ready to go on the air only five weeks after the license was granted. On July 23, 1996, Capitol Broadcasting's "WRAL-HD" became the nation's first experimental high-definition television station to go on the air as it began transmitting full-power test signals on Channel 32. The new station's effective radiated power is 100 kW with the antenna at 1750 ft.

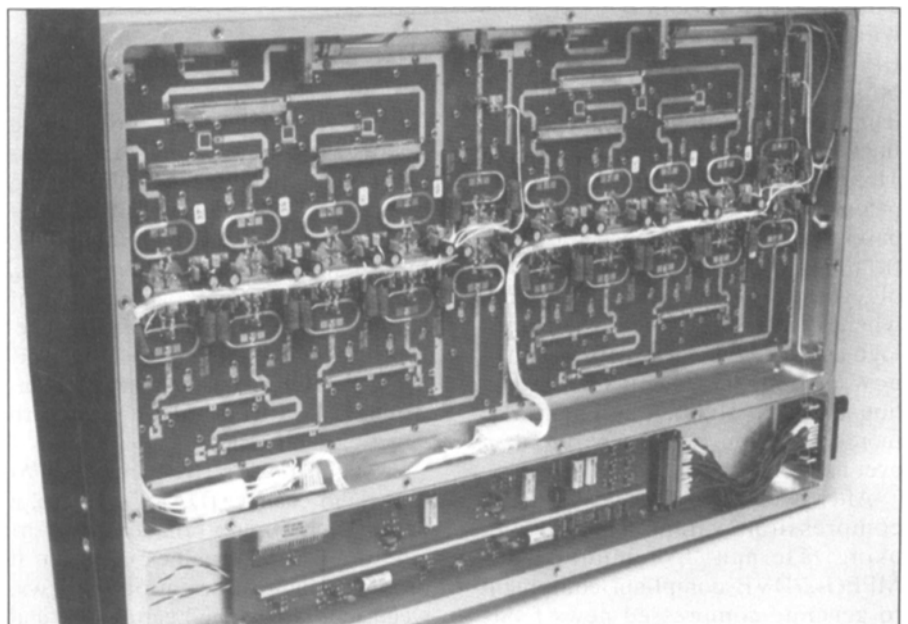


Figure NET-1. The Westinghouse solid-state silicon carbide UHF advanced television transmitter panel assembly.

Full operation will follow a period of testing the Grand Alliance HDTV system as recommended to the FCC by the Advisory Committee on Advanced Television Service and as documented by the Advanced Television Systems Committee (ATSC).

Channel 32 will continue to make technical measurements of digital signal propagation and test coverage of the Raleigh-Durham/Fayetteville area. Signal testing will continue until spring 1997, when actual broadcasts of regularly scheduled programming will begin. Plans call for the station to carry programming from the soon-to-be-developed national HDTV digital satellite feed from the Public Broadcasting Service. In addition, programming from the CBS Television Network will be a part of the schedule. WRAL-HD will be training staff and transmitting its own programming in the near future.

As part of CBS' ongoing "EYE-identity" campaign to link the network and the stations together as a single entity, CBS announced the availability of LIDIA™ III, an all-new, completely redesigned local identification inserted automatically (LIDIA) logo generator. The LIDIA III is manufactured by Leitch and is based on its Logomotion Logo Generator, only with a CBS custom trigger detection and control module. It is fully compatible with the current LIDIA system, and therefore existing LIDIA II and LIDIA 1A units will not become obsolete. However, LIDIA III's advanced design and optional features, such as time and temperature and improved video keying, provide enhanced performance. This allows a station to insert its transparent local logo alongside the transparent network logo when returning from commercial breaks and to display the local time and temperature whenever the "CBS This Morning" logo appears. The LIDIA III system is now providing the CBS/Westinghouse-owned stations and affiliates more valuable network exposure than ever before.

After two years of testing MPEG-2 compression systems, CBS began using Tiernan Communications MPEG-2/DVB-compliant equipment to generate compressed news feeds from the Republican National Convention in San Diego and the

Democratic National Convention in Chicago. In San Diego, CBS used six Tiernan encoders and Comstream modulators to compress and transmit six 8.4-Mbit channels within 54 MHz of one Ku-band transponder. The system was operated at 53 W for all feeds and reliable operation was obtained at power levels down below 40 W. This compares very favorably with power levels for analog systems, which range between 175 and 200 W. The compressed feeds were uplinked from one antenna to the Hughes Galaxy IV satellite and downlinked to more than 40 CBS affiliates equipped with Tiernan integrated receiver/decoders.

The Tiernan System was first used to transmit live pictures during the O. J. Simpson trial and the New Hampshire primary in February. Further experience using the Tiernan equipment in the European News Exchange (ENEX), a European news cooperative, convinced the CBS News Division that the compression equipment was ready to deploy in the U.S. market. Cost savings on the reduced space segment needed for signal transmission helped to defray the cost of the Tiernan equipment for both the network and its affiliates. CBS has purchased Tiernan compression equipment for domestic and foreign use, and parent company Westinghouse has bought three systems for Telenoticias, its 24-hour Spanish-language news network.

NHK (Japan Broadcasting Corp.)

NHK, the only public broadcasting organization in Japan, provides services through various media including two terrestrial TV channels, two direct broadcasting satellite TV channels, two medium-wave radio networks, one FM radio network, an international radio station, and a teletext service. In addition to these services, NHK provides HDTV service and international TV broadcasting to North America and Europe.

In March 1996, NHK started the FM data radio channel (DARC) service, a new FM multiplex broadcasting format, in eight major cities in Japan. It provides such information as news, weather forecasts, and earthquake and tidal wave warnings. All these programs are automatically generated

from the existing database in the NHK Broadcasting Center. DARC service also provides traffic information offered by the Vehicle Information and Communication System (VICS) Center. NHK plans to expand DARC service in conformity with receiver penetration.

Hi-Vision (HDTV) service via broadcasting satellite BS-3, begun by NHK and seven commercial broadcasters in 1994, expanded its broadcasting time from 77 to 93 hours per week in April 1996. The service is now being aired 13 hours every weekday and 14 hours over the weekend.

NHK and equipment manufacturers continued to develop and improve the performance, size, user-friendliness, and cost of new HDTV equipment. The following products were introduced in 1996: a 2/3-in. CCD camera that can be used for both NTSC and HDTV production, a 1/2-in. digital VCR that can record compressed HDTV signals up to two hours and can play back at the speed of -1 to +2 times normal speed, an HDTV codec that compresses 1.2 Gbits/sec signal to 45 Mbits/sec with MPEG-2 SP@H14, and a digital HDTV transmission system that broadcasts via a communications satellite with a 27-MHz bandwidth. By using such equipment, NHK built a new HDTV OB van that can produce NTSC and HDTV programs simultaneously. Furthermore, an HDTV camcorder is expected to be in use before long.

During the Atlanta Olympic Games, NHK broadcast more than 270 hours of HDTV programming. NHK and ZDF, one of the leading broadcasters in Germany, jointly produced HDTV programs in both 1125 and 1250 HDTV formats and exchanged programs through digital standards converters. After being compressed to 45 Mbits/sec, HDTV programs were transmitted to Japan through undersea optical fiber cables.

Considering these developments, program production environment for HDTV became nearly the same as NTSC production environment. NHK is trying to integrate NTSC and HDTV program production systems and is replacing current NTSC production facilities with HDTV facilities in preparation for the Olympic Games in Nagano in 1998.

Zweites Deutsches Fernsehen (Germany)

Since January 1, 1996, ZDF (Mainz, Germany) has been on the air with its MPEG-2-coded and fully DVB-compliant main program via the ASTRA system. The video part is currently coded with 5.2 Mbit/sec compression within a share of 6 Mbits/sec on transponder 88. With the launch of ASTRA 1G in mid-1997, ZDF will fill a complete transponder, increasing transmission capacity from 6 to about 35 Mbits/sec. As this significant step is approaching, ZDF has already arranged a tight schedule for preparations, planning a digital broadcast control center combined with a new uplink station at Mainz. Considering the potential of interactivity provided by the latest generations of set-top boxes, and further considering an enormous increase of service offerings, an until now unknown quantity of options for the viewer may very

well be predicted. This leads to the growing importance of electronic program guides (EPGs).

In this new field ZDF plans to install concepts of its own and to stimulate further ideas. An EPG, as understood from a service provider's point of view, defines itself as customized guide to the potential options of services offered via a set-top box. Competing service providers will have distinct target profiles and core features of their services. Taking this into consideration, it is obvious that the possibility to offer service-specific EPGs becomes an important indicator for open competition. A system that achieves this far-reaching key demand has been designed by ZDF together with partners.

The technical provision for building independent EPGs is based on an application interface (API), which allows the delivery of dedicated software into the set-top box. Such soft-

ware shapes a variety of applications and in particular facilitates loadable EPGs. Thus the question of neutrality turns out to be simpler than before: How impartial are the advance selection processes in order to start an EPG?

It was this question in particular that led to a kind of basic EPG called "Navigator," which is started right after the set-top box is switched on. Navigator leads towards a selection or a bouquet of services. Once a selection is made, the service itself can take over, executing control with an EPG application of its own. There is just one restriction to the EPG: the mandatory option allowing the viewer to instantly re-activate Navigator on button-press. However, the concept of Navigator and EPGs will no doubt prove to be an essential jigsaw-piece for the launch of competing services sharing a single set-top box.

International Overview

Australia

Atlanta Olympics

The Seven Network provided Australia's coverage of the Olympic Games in Atlanta, broadcasting 300 hours of the event. Seven's facilities were supplied and installed by the Toronto-based Applied Electronics, Ltd.; almost all of the equipment was rented, predominantly because the coverage was in NTSC. For the 1992 Barcelona Olympics, which was broadcast in PAL format, Seven purchased equipment and after the Games used that equipment to update their facilities in the network's stations.

The Seven Network has acquired the Australian rights to all further Olympics up to 2008.

Olympics Games 2000

The contract to build the main stadium that will be used at the Olympic Games in Sydney in the year 2000 has been awarded to the Multiplex Co. The stadium will have a permanent capacity for 85,000 spectators, with an additional 25,000 seats for the

Olympics, raising the capacity to 110,000. It is believed that this will be the largest stadium ever used for an Olympics.

As mentioned in the 1993 Progress Report, a working party was set up to assist in the Sydney bid for the 2000 Olympics. That working party consists of members from the Seven, Nine, and Ten commercial television networks; Australian Broadcasting Corp. (ABC) Television; ABC Radio; the Special Broadcasting System (SBS); Foxtel; and Global Television. It is providing advice for radio and television coverage to architects and designers.

Digital Compression System for ABC-TV News Interchange

The Australian Broadcasting Corp. (ABC) has recently completed a project to provide its own television news interchange facility. The ABC decided some time ago that it would be more cost-effective to provide its own earth station facilities rather than use those provided by the domestic satellite carrier, Optus. The project consisted of placing antennas, uplinks,

downlinks, and monitor and control facilities at all capital city studios. Switching of uplinks to the satellite is nationally controlled from Sydney. Other earth stations located in diverse sites in Australia and Papua, New Guinea, can also access the satellite if required. The ABC started using this system in February 1996.

Demand for the use of this facility is very high and the ABC needs to hire additional capacity from the carriers in order to meet various program commitments. With the implementation of its own earth station infrastructure, the ABC realized that, with the use of digital compression techniques, there was an opportunity to increase the capacity of the TV interchange facility. The ABC utilizes one-half of a Ku-band transponder, which is sufficient capacity to establish three high-quality digital video compression (DVC) channels using the MPEG-2 format.

Trials carried out before full-scale implementation enabled program producers to assess the impact of digital technology on post-production processing and other factors. Results