NEW SERVICES: AN INTEGRATED CABLE NETWORKS'S APPROACH

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SUMMARY

Over the years cable television systems have shown their growth capabilities by offering a widening range of new services. Several systems have expanded this way to meet the specific needs of viewers. The VIDACOM™ system described in this presentation is an integrated communications system based on broadband digital transmission. This system's design enables it to support a whole range of new services from which an individual viewer can elect to receive only those of personal interest. The numerous services offered include special information, inter-personal communications, transactions, video games and software, pay-television addressing and decoding functions, opinion polling, monitoring functions, as well as hybrid services combining video, audio and informations. The VIDACOM™ system is now being introduced by Vidéotron a major Canadian cable television system. A functional description of the system and its services follows.

INTRODUCTION

The Vidéotron cable television system serves more than 600,000 subscribers in Québec, out of a potential 1,100,000 homes. Vidéotron offers its subscribers programming on 35 cable television channels since 1975, with new services being steadily added.

Principal services offered include retransmission of programmes from Canadian, American and Québec broadcast television stations. There is also a special channel that offers Québec viewers programming from France. Proceedings of the House of Commons in Ottawa and the Québec National Assembly are carried on two other channels.

Regional community channels with studios in different localities are also available for use by the public to present its own programmes of special interest.

Local programming of varied kinds is carried on specialized or thematic channels providing wide coverage of sports, arts and entertainment, science, and programming for children. Additional services include self-programming or television on request. Subscribers can select a programme from among more than 7,000 subjects offered, and see this selection inserted in the schedule of one of the channels made available for this purpose. The request is made by telephone and automatically listed in the schedule as soon as there is a time slot available.

A "Contact" information channel for subscribers allows animators to speak directly to viewers about ways to improve the quality of technical service or programming, or simply to explain the new services available. A special weekly programme called "Tne Wired City" informs subscribers about latest developments in services and new technology.

In addition to these video programming services, various channels carry alpha-numeric information on general subjects, programming schedules, weather reports, and other similar services.

A classified advertising service is available to subscribers who have articles they wish to sell. A photograph and a caption are shown on the screen while an announcer describes the article for sale.

Another entertainment service gives subscribers access to video or computer games. Using a touch-tone telephone, the subscriber can request a

particular game and then have the computer designed graphics transmitted by cable for viewing on the TV screen at home. Various subscribers can experiment with these games 24 hours a day on few cable channels.

Finally, a news and information system has been introduced, so that a local daily newspaper can provide the cable viewers with an electronic "newspaper". This service is just one of the interesting possibilities offered by TELIDON, the Canadian videotex system. In this way, several news columns are presented to all our subscribers 24 hours out of 24.

On the technical side, these various network systems are linked by satellite (provincial); long-range micro-wave networks (inter-regional); high-capacity micro-wave systems (regional); and star / tree structured cable systems based on coaxial cable technology (local). These local infrastructures also have two-way capacity.

NEW DEVELOPMENTS AND SERVICES

In addition to the services already offered, Vidéotron is now setting up a communications system capable of supporting a new range of services. The approach used is based on broadband digital communications technology adapted to cable television systems. An integrated approach making efficient use of the coaxial cable network structure makes it possible to transmit these communications services simultaneously and concurrently. It also avoids the proliferation of non-compatible communications protocols, especially the over-abundance of equipment that would otherwise be required for the user to receive these widely varied services.

This system is oriented towards the use of well known digital computer and telecommunications protocols.

In addition to the use of this integrated approach, the system is so designed that it permits progressive introduction of system functions and the ability to carry new services from time to time, as needed, based on modularity principles.

An important aspect of this system is that it has been designed in harmony with broadband cable television system characteristics based on communications models that are defined taking into account this inherent structure. This enables communications to be directed as desired, either to all subscribers, to special groups, or to individuals.

The subscriber or communications interface has basic electronic functions that permit the user to receive or access various services. Most of these services are managed and offered according to optional models or categories of services. The various interface functions are activated or deactivated as required, based on the user's options.

Some less universal services are supported by the addition of a basic interface module or by the use of peripheral terminals linked with the communications interface (ex.: personal micro-processor).

An important principle followed in developing the system was to establish relations between the video, audio and information functions. This hybrid usage makes it possible to define new communication models adapted to cable system capacities.

In establishing the system, two complementary models were defined; one-way and two-way. An important new range of services can be offered with the one-way model. Later, when the system possesses the two-way characteristic, a second category of services fully compatible with the first category can be added.

This document describes the kinds of services that the VIDACOM™ system can support, based on the two phases to be introduced: the one-way mode and the two-way mode. Technical aspects will not be covered here, but by presenting its several characteristics it will be possible to grasp the system's capabilities.

VIDACOM™ SERVICES

The one-way communication mode is introduced in a cable system which does not have two-way transmission characteristics. This is the situation

that exists in most systems that were set up essentially for the retransmission of broadcasting station signals. In this version, new services can be offered over the one-way system structures, while providing the possibility for further expansion when these systems are modernized to support two-way transmissions.

On the services level, it should be pointed out that the VIDACOM™ approach offers the user an interactive mode to access new services from the moment a one-way mode is structured into the system. Later evolution to a two-way mode increases the services that can be accessed by user, while these two modes remain transparent for the user.

a) Information and communications services

Depending on the transmission mode introduced, the VIDACOM™ system permits information to be distributed selectively, either to the majority of users, to special interest groups, or to individuals. The system has a technical capacity to transmit more than 1,000 pages/second, with the possibility of carrying more than 20,000 pages of information in a single cycle. These information pages are prepared from material stored in the computer data bank; the pages in each information magazine are linked for retrieval in a specific pattern.

The user can access these pages by pushing buttons on a numeric keyboard, or keypad, to call up "menus" or lists of items, indexes, or selected pages, in order to retrieve the desired information. Retrieval is rapid, taking an average of less than 2 seconds depending on the links used, and regardless of the number of active users.

Certain information categories or magazines can be accessed only by those users who have subscribed for the services in question. This information addressing procedure makes it possible to direct specific material to users in various interest groups.

The information contained in each of 20,000 pages can be changed or updated continuously to respond to the needs and interests of users. In this way, more than 200,000 pages of information can be

transmitted in a single day to all subscribers or users with access to the cable system.

A third usage mode involves communication of specific information to an individual user. A message system can be set up for selective delivery of desired content to each user, by inserting these pages in one of the cycles at the proper time. The basic information cycles of 20,000 pages are affected very little, if at all, in this type of communication.

The information thus transmitted is displayed on the user's TV screen by the VIDEOTEX presentation module, after being encoded by TELIDON Videotex process. The display is made compatible with the TELIDON encoding system, by using a sub-set called MINI-TELIDON. This approach was selected so that a decoder could be integrated in the subscriber interface at low cost.

The display decoder's features, which represent a sub-set of TELIDON possibilities, allow the information to be displayed in an alpha-geometric format which provides visual resolution and choice of colours far superior to those possible with existing alpha-mosaic systems.

Key words search can be used to access information based on alphabetical indexes provided as pages of the information pages cycle. The keypad is used for the entry of the request.

The one-way operational mode can therefore be described as a selective videotex function mode, because information can be selected without the need for two-way transmission capability. The user interacts with a data bank of 20,000 active pages in the same manner as if connected directly with a computer. It is important to note that when the interactive mode is added to the system the pages returned to each user are added to one of the cycles, but addressed specifically to each user. This is the videotex mode.

Communications services added to this interactive mode include such varied ones as inter-user electronic mail, transaction services such as access to remote data banks or computer services (commercial tele-transactions).

b) Selective video and audio services

Cable systems already carry numerous television and FM radio frequency signals. These systems now have the capacity to support more than 50 television channels.

Addressing and tele-loading functions permit remote management of access to selective services such as pay-television. The presence of TV converter and signal descrambler functions within the VIDACOM™ interface makes it possible to offer various video services such as Pay-TV in particuliar.

Using the same technological base, selective services can be provided to specific groups of users. Tele-education programmes or business conferences can be organized by selectively distributing certain content on a definite programming and scheduling basis. These video signals, which are normally scrambled, can be received only by authorized users.

A complementary service offered is stereophonic sound for Pay-TV channels. This optional interface function permits the user to link the subscriber interface with a stereophonic reproduction system to receive high fidelity sound compatible with the video quality.

c) Hybrid video / information services

The user interface has built-in electronic functions for simultaneous reception of video and information, along with mixing of the video and information content.

Included in the first group of services in this category are video captioning for the hearing handicapped, or to provide translations from another language. The system has the capability for captions to be either window displayed or superimposed on the image. The positioning of the captions is defined when the programming is being prepared.

This type of captioning is also used when the user operates the terminal. Thus, at the user's option, the lower portion of the picture on the screen can be replaced by a "menu" of available services to permit to the user to make a choice.

When desired, the time, date and station selected can be displayed superimposed on the screen.

When certain information is desired, this can be displayed in full page format (videotex mode) at the bottom of the screen or superimposed on the image. The user is thus able to consult the information without missing anything in the video programme being watched.

When specialized video services or documentaries are being transmitted, this hybrid mode can be used to complement a video programme making information available to the user on request. This information can be superimposed, either partially or completely over the video picture.

d) Telematic services

The user interface has other communications functions as diversified as the information and communications services described here. By adding an external communications module, this interface can communicate with peripheral units and transfer certain service content to these external units.

One example of these peripheral services involves the use of a teleprinter to printout certain information when the content format is compatible. A user can retrieve information for display on the TV screen, and then have the information he wishes to retain printed out for a permanent record.

Another application involves providing access to software programmes for use with personal micro-computers. A user so equipped could consult a diversified software "library" accessible by either the one-way or two-way mode, as the case may be. This software would be available in different types and formats to conform with the model of personal micro-computers used by the subscriber. These software programmes could have uses as varied as desired, including computer games, management models, tele-education, word processing and other functions.

This mode of communications by means of an interface access port enables various peripheral units to be linked with a high-capacity communications system to access various telematic services.

e) Video games and internal functions of user interface

The VIDACOM™ user interface capacity is based on its internal programming. This programming is dynamic in the sense that it can be modified or adapted with changing and growing operating needs.

This interface programming makes it possible to offer the user self-programming services for utility functions. Some examples of these functions are: selection of preferred TV channels, useful information packages, controlled access (by password) to certain programme, and programme listings by channel and viewing times.

This self-programming capacity at times can also serve other purposes, such as the tele-loading of special software in the user interface to perform certain special functions. In view of the residual capacity available in the interface, it is possible to load programmes or software to make video mini-games of attractive quality available to the user. When the self-programming functions described in the previous paragraph are temporarily eliminated, the allotted capacity can be augmented to accomodate games of average complexity. In this mode, the graphics generator is used to produce the necessary images on the television screen. This graphics generator has specific functions enabling it to produce the special animations used to play these video games.

f) Tele-command and tele-reading services

These services group all the communications transactions involved in the remote control of certain functions. Among these is tele-loading of options related to services accessible to an individual user. The remote authorization for access to certain information magazines or material depends on whether or not the user has subscribed for these services (tiers).

Another group of tele-loading services comprises special addressing transactions for the management of energy usage, by electric utilities for instance. This provides the energy companies with a method for controlling energy consumption in their systems by making load shedding during peak load periods. In another application, electric utilities can adjust meter rates by remote control during peak demand periods to encourage users to make a personal decision to cut power consumption.

These services use the one-way transmission mode that permits telecommand functions, but not the capability to verify receipt of the command.

When the two-way mode is added, a tele-reading can be made following the tele-command, or tele-readings alone can be made, as desired. This latter operational mode is used for fire, burglar and security alarm systems, as well as for monitoring functions of various kinds.

Whatever the nature of these various services, certain tele-command transactions can be provided as complementary services (teleprinter operation).

CONCLUSION

Information services enter a new era with the advent of VIDACOM™ system broadband communications. This integrated system can provide services of varied kinds, by using an exploiting the special features and capabilities of the cable systems.

The Vidéotron System in Montréal will be conducting experiments with this technology and introducing the services described, starting in July 1982, with the help of 250 user interface prototypes. After the necessary adjustments have been made following these experiments, Vidéotron initially plans to install 100,000 of these interface units during the first year of operation, starting in September 1983. Integration tests are now in the final stages for all procedures related to transmission of these services on the cable systems and communications management from the head ends.

Several large North American cable systems are now evaluating this system and the services it will carry. It can thus be anticipated that VIDACOM™ will quickly be adopted by several cable companies. It should be pointed out here that this technology is also applicable to cable systems of average size.