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THE TELIDON STORY

ADDRESS

BY

DOUGLAS F. PARKHILL

ASSISTANT DEPUTY MINISTER

DEPARTMENT OF COMMUNICATIONS

TO

ROTARY CLUB

ROYAL YORK HOTEL

TORONTO

SEPTEMBER 11, 1981

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I am pleased to have this opportunity to share some thoughts with you concerning Telidon - how it began, where it stands today, and our hopes for the future. It is an exciting topic, not only because it deals with an important Canadian success story involving a unique partnership between Government and industry, but also because of what it portends for the future of Canada and the lifestyles of all of us. Today, what I would like to do in the brief time available is to present a broad overview of Telidon in which I will reminisce a little, perhaps do some pontificating, for which I hope you will forgive me, explain the basic features of the technology and the program and hopefully put the entire subject into a broader global perspective.

In this connection, I would like to begin the story by emphasizing a key point concerning the environment in which Telidon was conceived and is continuing to evolve. This is the fact that Telidon is not an isolated development but rather the latest, albeit one of the most important, of a series of events in Canada and around the world that collectively comprise what is increasingly coming to be known as the "Information Revolution". This revolution has many different roots extending back in time to the invention of the printing press five centuries ago. In our own time, they include for example, the growth of the vast publishing empires that are receiving so much attention these days, radio and television broadcasting, and more recently, the development of communication satellites.

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Important as these events are however, they are already being overshadowed by the revolutionary impact of another development that is the real basis of Telidon. This is the marriage of the distance annihilating powers of telecommunications technology with the storage and intellectual powers of computer technology to make reality of a dream that many of us have shared ever since the 1960's when terms like "computer time sharing" and "computer utility" first became popular buzz words. This is the dream of universal access to the intelligence multiplying capabilities of computers and electronic databases. In brief, it is a dream of a future where computer based services would no longer be the preserve of the few but would be available to everyone via terminals that would be as common place as telephones are today.

It would be difficult to exaggerate the impact that such a development might have. Indeed, I believe that the information revolution as it is now developing constitutes a fundamental transformation of human capabilities that will do for the realm of the mind what the industrial revolution of the nineteenth century accomplished for the physical world. Thus, just as that revolution multiplied mankind's physical strength, the information revolution promises to multiply our intellectual capabilities and the consequences will leave no individual and no institution on earth unaffected.

Typical of the hopes that this dream engendered are the following words from the introduction to a book called "The Challenge of the Computer Utility" that I wrote in 1966.

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"Today, as we cross the threshold of the third generation, the anonymity of the computer is about to disappear, for it now appears likely that the coming era will carry to fulfillment a gigantic revolution in the generation and distribution of computer power. Before that revolution has run its course, the computer will have become as much a part of our daily lives as is the telephone of today, and our society will probably have been altered almost beyond recognition. It is the theme of this book that the moving force behind this revolution will be the perfection and rapid growth of the public tele-data-processing system or computer public utility."

Now some 15 years have passed since those words were written, but is is only today that Telidon seems destined to make the dream come true. If this is correct, then the development of Telidon is a particularly fortuitous event, since it affords Canada a unique opportunity to take the lead in meeting the challenge of the information revolution and in the process to not only build a better life for all of us but at the same time to create a new, multi-faceted, world scale, high technology industry in this country.

The Canadian Federal Government's involvement with the subject matter which eventually led to Telidon began in late 1969 shortly after the formation of the Department, with a group of studies collectively

called the "Telecommission". These studies constituted one of the most ambitious and comprehensive reviews of the present state and future prospects of telecommunications ever undertaken anywhere and the general report called "Instant World" was an international best seller. Of particular concern to our subject today however, is the fact that one set of studies concerned the subject of computer communications.

The report on these studies called "Policy Considerations with Respect to Computer Utilities" painted a vivid picture of the opportunities and dangers that lay ahead as computer communications technology evolved and concluded.

> "Quantum jumps in our ability to handle information are likely to be marked by fundamental changes in the nature and quality of society. Just such a transformation of information handling capability into social change happened five hundred years ago with the development of moveable type. It will almost certainly happen again through the application of computer technology."

It also posed the following "Fundamental Policy Question". "How can Canada best exploit the computer utility concept to make the potentially revolutionary benefits of computer power available to the entire public and at the same time provide effective safeguards against the misuse of that power?"

The report also made a first attempt at categorizing the various possible services under logical headings which could have formed the basis for a convenient electronic yellow pages index similar to that implemented years later in the British Viewdata system and more recently in Telidon.

The Telecommission reports aroused enormous interest throughout the country, and in particular within the Federal Government in the possibilities of computer communication systems. As a result, during the next few years there was an impressive surge of activity. This began with the Computer Communications Task Force headed by Dr. Hans Von Bayer; included the well known Green Paper on Computer Communications Policy that was issued by the Federal Government in 1972; and led in 1975 to the issuing of three White Papers which spelled out the fundamental policies which have persisted to this day in Canada with respect to computer communications. During this period two trans-continental data networks were built in Canada, one by the Trans-Canada Telephone system and the other by CNCP Telecommunications and by 1976 Canada also boasted the world's first trans-continental packet-switched network. At the same time there was an explosive growth in the business use of remote access computer systems.

In parallel with these Canadian activities, significant developments were also taking place in other countries. Japan created the world's first "wired city", the now famous "TAMA New Town".

In the United States, the remote access service bureau business became a major growth industry and in England, people like Donald Davies at the National Physical Laboratories were perfecting the technology of "packet switching".

The OECD in Paris was also a hive of activity. Guided by a specially constituted panel on computer communications policy which I had the honour of heading, a comprehensive series of studies was conducted and numerous seminars and meetings held that helped open a world perspective on the challenge of computer communication.

The OECD work culminated in February 1975 with a major international conference of senior government officials that was designed to expose the OECD member governments to the opportunities and issues associated with the marriage of computers and communications.

One of the most significant papers at this conference was presented by Professor Edwin B. Parker of Stanford University. This was a wide ranging background report on the Social Implications of computer communications in which issues like privacy, access, cultural impact and so forth were reviewed. The core of the paper however, and the reason why it has become a classic was its exposition, for the first time in such an international forum, of the conclusions of a recently completed study by Parker and his colleague Mark Porat concerning the economics of information.

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This study discussed the possible transformation of society from an industrial to a post-industrial form of information society. Furthermore, it presented the bold hypothesis, backed up by impressive evidence that this transformation was already well advanced in the more technologically advanced countries, most notably, the United States, Sweden and Canada. In such a society, Parker claimed, the provision of services, and in particular information services, would replace the traditional industries as the principal contributors to the gross national product. These services would be distributed by computer telecommunications networks and eventually such networks would serve the entire population in an economy in which there would be no "limits to growth".

The OECD Conference had an enormous impact on policy makers and led directly to a greatly increased emphasis on "Informatique", as the French called it, in such countries as Germany, France, Britain and Japan. However, it was to Canada that most experts at that time were looking for the great step forward that would bring about mass access to computer communication services. This expectation was due to the many Federal Government studies, the policy decisions that had been made and the response of the private sector in creating our magnificent data networks. Thus, we alone in the world at that time had both the basic infrastructure in place and a comprehensive national policy framework that in theory could have been the basis for a major advance.

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Despite this, thanks to one of those accidents of history that always seem to mock the efforts of prognosticaters, it was not in Canada but in Britain that the next big step forward occurred.

The reason for this was the invention by the BBC and British Post Office of two systems that permitted users to access remote data banks and computers in a simple inexpensive and convenient way using a home TV set.

The first of these was called "CEEFAX" and it was the pioneering example of a class of systems that are now know generically as either "Teletext" or "Broadcast Videotex". The second, was called "Viewdata". It was developed by the Post Office and the class of systems to which it belongs is called "Interactive Videotex" or often simply Videotex. Today, the Post Office calls their Videotex service by the registered trade name "Prestel".

Even though they both employ TV sets, Teletext and Videotex operate on entirely different principles. Thus, Teletext is a "broadcast" system in which the information is superimposed on a TV signal and the flow is in one direction only - from the TV station to the customer, while Videotex is an "interactive" or "two-way system" in which the customers are connected by telephone or two-way cable networks to the central facilities and can interact directly with them.

In Teletext systems, the information is transmitted in the form of an endlessly repeating sequence of individually coded frames or pages. By setting a code corresponding to the desired subject matter, a subscriber can seize or "grab" the appropriate page as it passes by his receiver, store it and subsequently display it on his terminal. Such systems are selective, in the sense that the subscriber sees only the information that he has requested, but are none interactive, since there is no communication back from the subscriber to the information source.

The applications of course are limited to information retrieval functions. However, in addition to conventional graphical and textual teletext, these could include facsimile, electronic newspapers and one way electronic mail delivery.

In contrast to the broadcasting systems, Videotex systems permit users to interact directly with the data banks and make their selections from a theoretically unlimited number of pages. Moreover, instead of being limited to information retrieval, given the appropriate terminal equipment, users can also originate information and either send it for storage and subsequent retrieval or carry on a conversation with other subscribers. In addition, they can also access information processing and computing services and carry out a variety of combined processing communications functions, like banking, shopping, bill paying, playing games, going to school, making a reservation and so forth.

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In fact, such systems can be concerned with almost any service or function which can be related to the processing, storage, collection or distribution of information.

Just to complete our catalog of jargon terms, "Telidon" is the name of the Canadian technology which can be employed in either a videotex or a teletext mode.

Now the British invention of teletext and videotex was a magnificent achievement with important implications for the whole world. Indeed, the British Government, the Post Office and the BBC rightly deserve the congratulations of all of us, regardless of nationality, for their initiative in undertaking such a bold and imaginative program - a program that represented the first real attempt by any country to actually create a technical and institutional infrastructure capable of providing general public access to computer based services.

As you can imagine, this British initiative generated enormous interest around the world. This was particularly true in France and it was not long before the French Government announced their own videotex and teletext systems to which they applied the name Antiope. Antiope uses basically the same technology as the British systems, a technology which goes by the name of "alpha-mosaic" but it also includes a number of refinements which make Antiope more flexible and in some respects more advanced than the British system.

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Likewise in Canada, there was a great deal of interest in what was going on, and we in the Department of Communications followed with not a little envy the work of our fellow researchers in Britain. In fact, in August 1976, I recall when I was speaking in the plenary session of the International Computer Communications Conference held that year in Toronto, that I made a rather impassioned plea to Canadian organizations to follow the British example and establish viewdata services here. Later in 1977, I went even further and arranged for demonstrations of the British technology in Canada, including demonstrations at the Department of Communications. At the same time, we in the Department, began to publicize the idea of what we called a "Canadian Electronic Highway Network", one of whose basic functions would be to distribute viewdata services.

In this connection, in 1977, Roy Bright, who now heads the French Antiope marketing activities, but who at that time was in charge of international promotion and marketing for the British Post Office, offered to sell the rights to the British technology to DOC. I must say that I was tempted, but fortunately, as things turned out, a combination of lack of sufficient finances in our budget and certain doubts concerning the British technology, made us delay a decision.

All of which, brings me to Telidon and in particular to Herbert Bown, the man who is now universally acclaimed as the "FATHER OF TELIDON". Herb was one of the originally employees of the

Department of Communications, joining the Department from the Defence Research Telecommunications Establishment when the Department was formed in early 1969. From the beginning, he was interested in the use of computers for the storage and processing of visual material and eventually he succeeded in forming a small research group concerned with what was loosely termed "image communications".

Shortly after it was formed, this group learned that the Department of National Defence was keenly interested in exploring ways by which commanders located in geographically separate locations could employ visual displays as a sort of electronic blackboard to convey not only textual material to one another but also graphical images like charts, diagrams, maps, weather data, and the like. Systems capable of performing this function had been in existence for some time, however, they all employed wide band-width communications links, whereas the Department of National Defence wanted to employ narrow band-width lines, that is telephone lines. Fortunately, Herb's people during their earlier research work had developed a new, revolutionary means for coding such images. This was an extremely efficient code which reduced both the amount of band-width required for transmitting information by an order of magnitude and the computer memory requirements for storage of the visual material. Consequently, the Department of Communications group was able to rather quickly develop a set of equipment for the military which met their difficult requirements. This first equipment incidentally, was produced under contract to the Department by a little known, brand new company, located in Pakenham,

Ontario, called Norpak Limited; and that, of course, was the beginning of Norpak's involvement with what later became Telidon.

The next development in the Telidon saga came in early 1978 when the Department of Communications acquired a new Deputy Minister, Bernard Ostry. Now whenever any organization whether in the Government or in the private sector, gets a new boss, all of those people who report to him, are usually required to present briefings on their programs and their responsibilities. Ostry was no exception to this rule and in May, he asked me to prepare a briefing to him on my total program and my plans for the coming year.

Now usually when giving such briefings at the Department of Communications we employ paraphernalia like Flip Charts, 35mm slides and overhead projectors. In this case however, after discussions with my managers we decided that rather than using such conventional briefing material, we would take the opportunity to introduce Mr. Ostry to our image communications work by employing television like displays in his conference room. These in turn would be connected by a telephone line to a computer located at the Communications Research Centre. This centre incidentally is in Shirley's Bay, Ontario which is about 20 miles from the Department of Communications headquarters in downtown Ottawa. In this computer we would store our information and recall it on demand using a simple keyboard. The equipment would be basically the same as that which we had developed for the Department of National Defence application except that it would be modified to simulate the operation of the British Prestel system.

The briefing was enthusiastically received by Mr. Ostry and when it was over he congratulated us and mentioned how impressed he was by the British Prestel approach. At this point, Herb replied with what Bernard Ostry was later described as the mumble that was heard around the world.

> "Yes it's impressive, but if I had my way this is not how I would design a videotex system".

Queried by Ostry as to what he meant, Herb then continued with:

> "Look, I'll show you".

He then proceeded to display on the T.V. screen a map of Canada drawn using the Prestel technique. Now I don't know how many of you have actually seen a Prestel or an Antiope system in operation, but for those of you that have, you may have noticed that it doesn't draw very impressive pictures. Both Prestel and Antiope are basically text oriented systems. They are pretty good at displaying numbers and letters; but when it comes to drawing pictures, their best efforts look as though they had been created with a set of child's building blocks. The map of Canada which Herb showed, for example, had extremely jagged edges, was only in one colour and lacked all significant internal details. When we had had a chance to examine this picture Herb continued.

> "Remember, a few moments ago we told you about our military electronic blackboard program and explained that it used a new very efficient coding scheme for graphical images. Now I'll show you the sort of pictures that could be produced by a Canadian Videotex system which employed this new coding scheme".

There then appeared a map of Canada that was as good as a high quality T.V. set could reproduce. In fact, it resembled a fine glossy print. The edges were finely drawn. All of the provinces were displayed in a variety of colours and explanatory textual material was superimposed on top of the picture.

When Ostry had had a chance to recover from the impact of this picture, Herb then proceeded to call up a number of other pages of material that employed the new coding technique to explain some of the technology of his approach and showed how it differed from the "Alpha-mosaic" technology that was used in the British and French systems. To his everlasting credits, Ostry immediately grasped the significance of what he had seen and ordered us, on a crash basis, to develop a Canadian Videotex Program designed to exploit our better mouse trap.

From this point on things moved very swiftly. In June, a document entitled "A Canadian Electronic Highway Network" was available and was distributed among a number of government departments. This was followed by a series of demonstrations and briefings concerning our proposed program to members of the Cabinet and senior officials. Then on August 15th, 1978 the Department announced that Canada now had its own superior videotex system. This announcement took place at a well attended press conference where the system was demonstrated to the media.

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Immediately following the press conference, we moved to establish a formal organization within the research sector of DOC to spearhead what even then was viewed as a national effort. Such an effort, in which there would be the closest possible cooperation and coordination of activities between Government and Industry, we realized was abolutely essential if Canada, with our limited resources and our late start was to be able to compete effectively with our well heeled competitors in Europe. By January 1979, this organization was pretty well in place with all technical responsibilities in the capable hands of Herb Bown at the Communications Research Centre and coordination and promotional activities in another group located at departmental headquarters. To head this latter activity, I was extremely fortunate in being able to recruit John Madden, an old research sector colleague, who until August 1978 had been on leave of absence at Simon Fraser University. John played one of the most important roles in the whole Telidon Program and when he left the Department in November 1980 to join A.E.L. Microtel in British Columbia, it was a major loss. On the other hand, it also turned out to be an excellent example of technology transfer from the Government to the Private Sector for, once he reached B.C., John wasted no time in convincing his new company and its owners the British Columbia Telephone Company to start their own Telidon Program. To date this program has resulted in a major field trial by the British Columbia Telephone System and the development of a new business oriented Telidon terminal that is now being produced by A.E.L. Microtel.

John's departure was also the occasion for a reorganization and expansion of the program. This resulted in the formation of an integrated Telidon program office under Herb Bown, who was now given responsibility for all aspects of the program, technical, administrative, international, and marketing. He continued in this position until last month when he too was lured away by the private sector and moved to the original Telidon company, Norpak Limited, where he is currently the Vice-President, Corporate Development.

The period of Herb's stewardship was probably the most important and productive of the entire Telidon story. During this time, Telidon moved from a promising but still controversial "technology in search of a market" to the threshold of mass use and general recognition as the world's leading videotex and teletext system. In this connection, all of Canada and indeed the world owes Herb Bown an enormous debt for first inventing Telidon and then, successfully managing our important national effort. Certainly he richly deserves the accolade "FATHER OF TELIDON" by which he is everywhere known.

Now I would like to turn away from history and discuss that unique partnership between Government and Industry that constitutes the core of the Telidon program and to which I referred at the beginning of this talk. This partnership is aimed at nothing less than creating as quickly as possible a basic new industrial infrastructure in this country which will serve the needs of all of our citizens everywhere in Canada. This structure is an extremely complex one involving many different enterprises, some of which are regulated monopolies, others, governmental

groups and still others, fully competitive enterprises. All of these, however, must function together as a system if the industry is to develop properly and any of the individual elements is to succeed. In this connection, the key role of the Government is to act as a catalyst to and bring together these diverse elements into a viable industrial infrastructure with common standards. The basic elements of this structure are as follows:

1. Manufacturing Industry which includes the manufacturers of consumer and business terminals, information provider terminals, computers, telecommunications equipment, the broadcast inserter equipment for teletext systems, cable interface hardware, etc.

   It is assumed that the companies involved are and will remain competitive and non-regulated but build their equipment to common standards.

2. The Distributors - These include Telephone Carriers, Cable companies and Broadcasters who supply the communications links over which the services are distributed. They are all regulated and in the case of Telcos and Cable Companies are natural monopolies.

3. The Information and Service Providers - In theory there can be an unlimited number of such competitive, unregulated enterprises ranging in size from individual "cottage industry type" businesses to multi-national corporations and government departments. They produce the content either on behalf of others or for direct sale to the public over the media at prices which they set.

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4. The Public Data Base Operators - These organizations store information and programs and run programs on behalf of those Information and Service Providers who do not have their own computers. They are the logical outgrowth or today's time shared computer service bureaus and like them are likely to remain competitive, and largely unregulated except perhaps with respect to privacy protection and data base integrity.

5. System Operator - This is a vaguely defined term which at one extreme is sometimes applied to the data base operators but at the other could include the operator of an integrated complex of terminals, computers and communications links that provides a particular service. For example, in the case of the Federal Government's public information service, the responsibility for operating the system on the government's behalf has been contracted to the Infomart Corporation.

6. Miscellaneous

This includes a variety of functions such as directory services, billing services, tele-mail, etc. In addition, it could include organizations that perform a combination of the more fundamental functions, for example, electronic publishers who perform both an information generation and an information storage function. It could also include providers of turnkey systems.

The Telidon Program as it has now evolved involves many different actors including broadcasters, telephone companies, cable companies, both the manufacturing and information supplier industries, publishers, Federal Government departments and provincial governments.

If so many different partners involved in such a complex melange of activities are to work together in a coordinated fashion then there is an obvious need for a great deal of consultation. In the case of the Telidon program, this consultation is provided by the Canadian Videotex Consultative Committee. This Committee, which also includes consumer, university and labour representation, provides a tremendously useful national focus for continuing consultation, cooperation and exchange of information. The Committee meets four times a year and now includes about thirty members, who for the most part, are very senior representatives from the various groups concerned.

In order to provide a broader base and to facilitate cooperation in the intervals between the quarterly meetings, the Committee has also spun off a number of sub-committees or working groups dealing with specialized areas. These groups are open to any interested person in Canada and now include; a group concerned with the effect of videotex on individuals and society chaired by Professor Ann Cameron, the Head of the Department of Sociology at the University of New Brunswick; one on legal issues, chaired by George Fierheller, the President of Premier Cable in Vancouver; a group on education, chaired by Peter Bowers of the Ontario Educational Communications Authority; a group on industrial strategy and marketing, jointly chaired by Des Cunningham, the Chairman of the Board of Gandalf Industries, and David Carlisle, the President of the Infomart Corporation; a sub-committee on information providers, chaired by Gerry Haslam, the President of VISPAC, which incidentally stands for Videotex

Information Service Providers Association of Canada; a sub-committee on Telidon and Captioning, chaired by Keith Glegg, Vice-President, Industry of the National Research Council, and last but not least, a critically important sub-committee on standards, chaired by Bob Bennett of the Department of Communications. It would be difficult to exaggerate the importance of the work of these sub-committees. Their members constitute what amounts to a national network of informed individuals, all of whom are working in some aspect of the Telidon Program and who are in constant communication with one another.

As a result of this close industry/government cooperation, progress on the Telidon program since the technology was unveiled on August 15th, 1978, has been spectacular.

In Canada, field trials are now under way or planned in every province of the country except Prince Edward Island. At last count, there were 12 of these, and taken together, they probably constitute the most extensive and diversified set of trials undertaken anywhere. They are characterized by the fact that they:

1. Cover the entire country from coast-to-coast.
2. Involve many different transmission media: viz., conventional telephone, switched optical fibre, satellite, cable (both broadcast and two-way packet switched), over the air blanking interval TV and hopefully FM radio.

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3. Include both rural and urban environments.

4. Include material in both French and English.

5. Involve dozens of different information providers from both the private and public sectors.

6. Are jointly funded by the Federal Government and the sponsors.

Also in Canada, three operational systems are now under way or will be shortly. Two of these are commercial systems. One "The Grass Roots Service", provides a variety of Telidon services to farmers throughout Manitoba and is a joint project of the Manitoba Telephone Systems and the Infomart Corporation. Another is an international service, with terminals in cities throughout the world operated by the Teleglobe Corporation. In addition, as I am sure most of you know by now, two weeks ago the province of Ontario's Ministry of Industry and Tourism announced the largest Telidon system yet. This will be a tourist information service employing some 2,000 Telidon terminals scheduled to open early next year.

On the manufacturing side, progress has also been very encouraging. User terminals and decoders for converting standard television sets into Telidon terminals are now available from Northern Telecom, AEL Microtel, Electrohome Limited and Norpak Limited. Both Northern Telecom and Norpak are offering Information Provider terminals on a commercial basis and Norpak and a number of other companies are now manufacturing the various hardware and software components required.

for establishing teletext services. VISPAC, the National organization of Information Providers to which I referred a few moments ago, now has over 50 members. Consequently there now exists in Canada a strong nucleus around which the all important content industry of the future can develop.

Internationally, Telidon has also scored some remarkable successes. Operational or trial systems are now running in the United States, Australia, Venezuela, and Switzerland and announcements of new systems in other countries are expected shortly. Of major significance, was the adoption in May of this year of a new standard by AT&T that is based upon Telidon and which was in fact worked out by AT&T and Department of Communications engineers working together in a lengthy series of meetings. This Telidon based standard is expected to become the standard for North America.

The list of successes in the United States grows daily. Last time that I counted, Canadian Cable Systems had succeeded in obtaining the franchise for Telidon based cable services in Portland, Oregon and Minneapolis; the U.S. Cable Company, Cox Cable Systems was proposing Telidon in several other cities. The largest and most prestigious Teletext trial in the United States was up and running in Washington, D.C. over the PBS outlet WETA; the Los Angeles Times Mirror organization had adopted Telidon and their system is expected to be running by the beginning of next year, while most important of all, the Time Life Corporation will be running an extremely ambitious satellite based Telidon service also scheduled to enter its first trial phase early next year.

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In Conclusion

So that's where we stand today - Telidon is no longer a gleam in the eye of a few technological enthusiasts and futurists at the Department of Communications, but is now a major national program, that has already made Canada a world leader in the race to fulfill the promises of the information revolution.

But what of the future - where do we expect to be, let's say in 1985. In this connection, probably the best guide is provided by the set of objectives that were presented to Cabinet Ministers when the government approved the $27.4M augmentation to the Telidon Program last February. These objectives were stated as follows:

1. By 1985, we expect to see operational videotex services in all major centres in Canada and in most of the rural areas. They will involve both telephone based and cable based services.

2. There will be two national teletext services in both official languages, one operated by the CBC and the other by CTV.

3. Canadian manufactured Telidon terminals and adaptors will be available as standard over-the-counter retail merchandise from electronics stores throughout the country.

4. Telidon will have become the North American standard.

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5. The Federal Government's Public Information Telidon Service will be fully operational throughout Canada.

6. A number of provincial government public information services based upon Telidon will also be operational.

7. A viable electronic publishing business will have been established.

8. An important export business, supplying hardware systems and information will exist.

9. The first operational mobile services for aircraft and ships will have started and plans will be well under way for similar services for automobiles.

With respect to the market, the Industry and Marketing Sub-committee of the CVCC has come up with the following forecast for December 1985.

1. There will be 500,000 terminals in use.

2. Consumer service expenditures will exceed $100 million per annum.

3. The business service expenditures will be approaching the $1 billion per annum figure.

4. The export of turnkey systems will account for earnings in the range of $150 million per annum.

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Most importantly, industry will now be poised for takeoff into an era of rapid expansion with growth rates in the 30% per year region for the rest of the decade.

Admitedly, these represent exciting prospects but they are as nothing compared to what the coming decades and centuries will bring. For the information revolution as it is now developing, represents for mankind one of the most momentous adventures in the history of our species, an adventure whose potential was expressed many years ago in the following quotation from one of my favourite authors, H.G. Wells.

> "The past is but the beginning of a beginning, and all that is or has been is but the twilight of the dawn".

Thank you.

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