A CANADIAN SATELLITE PROGRAM PACKAGE

Feasibility Study

Prepared for the

DEPARTMENT OF COMMUNICATIONS
OTTAWA

by
Tamec Inc.
and
DGB Consultants Inc.

MARCH 1980

N O T E

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FEASIBILITY STUDY FOR A CANADIAN SATELLITE PROGRAM PACKAGE

FINAL REPORT

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1. EXECUTIVE SUMMARY

1. EXECUTIVE SUMMARY

1.1 Policy overview

The present problems associated with satellite distribution of television programs can be partly attributed, from a policy point of view, to the pursuit of conflicting objectives.

While Canada is actively encouraging the development of satellite technology, it is, at the same time, trying to protect existing institutions, which might be affected by the technology, namely the telephone and broadcasting industries.

At the same time, the United States are moving in the opposite direction; from a regulatory environement that was in many ways very strict, the United States have now decided to rely basically on market forces to decide, which cultural programs are going to be produced, at what cost, and how these will be distributed. This laisser-faire attitude is producing a real revolution which imposes two options on existing institutions: adapt or perish.

What is really happening is that, with the advent of satellite and cable and also with the advent of videotape recorders and videodisks, the people who own television sets will now be able to dictate very precisely what they want to watch.

For a while, Canada was the only country in the non communist world that had a domestic communications satellite system, combined with a cable industry that is firmly implanted in the major urban areas; in other words we had the necessary ingredients for the revolution, while other countries did not.

If for that brief period we could choose to ignore that potential revolution and pursue, in relative isolation, the policy of protecting existing institutions, we think the international context dictates a dramatic reappraisal of that policy, for the simple reason that it will not work on one hand, and that it will do a major disservice to Canada as a whole on the other hand.

We, thus, suggest that the Department of Communications take into account the broad international context to which we briefly referred when developping policies. Second, we think that the option of relying on market forces to provide answers to Canada's social economic and cultural needs is too often neglected at best, or simply not considered at all.

The rest of this second will now be devoted to specific recommendations concerning satellite utilization, and to a summary of our findings in the present research project.

1. EXECUTIVE SUMMARY (cont'd)

1.2 Telesat

1.2.1 Telesat rates

Telesat rates, even after allowing for current exchange rates, are approximately double those charged by RCA Satcom in the United States as illustrated in the following table:

TABLE 1-1

SPACE SEGMENT MONTHLY RATES OF TELESAT AND RCA SATCOM, MARCH 1980, $CAN (1)

CATEGORY	TELESAT	RCA SATCOM (1)	% DIFFERENCE OVER RCA SATCOM
Protected	$180,000	$102,549	75.5%
Unprotected	$125,000	$ 63,627	96.5%
Preemptible	$110,000	$ 45,098	143.9%
Average	$138,333	$ 70,425	96.4%

(1) Using an exchange rate of $0.85 U.S. per $Can.

This rate comparison should take into account the two following considerations:

- Both Telesat and RCA are regulated, as common carriers, on a rate of return basis; since RCA's satellites are younger than those of Telesat, they have more inflation built into their costs, which makes the comparison even worse.

- On the other hand, RCA's satellites are of a younger generation as well and have 24 transponders per satellite instead of 12 for the Anik A generation of satellites; design, testing and launch costs are thus higher on a per transponder basis with Telesat than with RCA; this argument thus makes the comparison slightly better.

In any case, these rates are the subject of a soon to be held CRTC hearing. Because the Government of Canada represents the public and owns half the shares of Telesat, we thus recommend that the Government of Canada participates actively in those hearings.

1. EXECUTIVE SUMMARY (cont'd)

1.2 Telesat (cont'd)

1.2.2 Telesat pricing philosophy

Contrary to the U.S., Canada faces a multiplicity of choices regarding distribution of TV programs; the alternatives are described and analyzed in detail in our report and, basically they consist in the choice between 6/4 GHz and 14/12 GHz satellites.

Because Telesat has not yet published rates for service in 14/12 GHz, users are not able to make a valid techno-economic comparison. We thus recommend that, these rates be published as soon as possible.

Second, whenever Telesat representatives are questionned about rates for service in 14/12 GHz, they always answer that it depends on demand, that is, the greater the demand is, the lower the price will be, and vice versa, that is the lower the demand is, the higher the price will be. Even to a first year economics student, this pricing philosophy is incorrect. We thus recommend that Telesat's pricing philosophy be based on sound economic principles.

Additionnally, Telesat currently offers discounts to large volume users (4 transponders or more). We feel that with large users such as the CBC and cable, the threat of concentration of transponders in a few hands is bad enough as it is. We thus recommend that the discount policy be abolished and that there be a single price per category of usage, whatever the volume.

1.2.3 Telesat/TCTS relationship

Satellites are a clear threat to land based intercity services provided by the telephone companies, and which are presently subsidizing local services. TCTS members who have been given complete control over the marketing of satellite services (1), are thus, in a clear conflict of interest position. Since TCTS employees are usually loaned by member companies, for a few years, one can readily imagine what would happen to their careers, if while at TCTS they had actively pursued and achieved the obsolescence of terrestrial facilities.

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(1) The marketing department of Telesat has been abolished and all the personnel has been moved to TCTS.

1. EXECUTIVE SUMMARY (cont'd)

1.2 Telesat (cont'd)

1.2.3 Telesat/TCTS relationship

While the relationship between Telesat and TCTS would be the subject of a major study by itself, one short term solution might be to allow the existence of 'Resale Common Carriers' as in the United States.

These 'Resale Common Carriers' would have the following characteristics:

- they would have to be Canadian owned;
- they would operate in 14/12 GHz only;
- they would be allowed to own and operate uplinks;
- they would be allowed to offer voice as well as video channels;
- they would be involved in satellite distribution only; anything to do with any other aspect, including of course content, would have to be performed by a separate corporate entity;
- they would be regulated on a rate of return basis;
- any organization or individual could become a 'Resale Common Carrier' as long as it would conform to the preceeding characteristics.

1. EXECUTIVE SUMMARY (cont'd)

1.3 Other policy aspects

Because of the dramatic changes that are happening in the packaging, scheduling and distribution of television programs, we urge the Department of Communications to undertake a major policy review that would attempt to define what should Canada's objectives now be, and as well, what would be the best means to achieve those objectives.

In the short term though, the present C.R.T.C. hearing's process will have to be streamlined in order not to hamper satellite distribution of television programs; we simply cannot imagine the C.R.T.C. being flooded with 300 to 500 simultaneous applications to carry a service and then the same number of applications for rate increases.

1. EXECUTIVE SUMMARY (cont'd)

1.4 Technical alternatives

Contrary to the U.S. where 6/4 GHz is firmly implanted as the technology to distribute television programs, Canada faces a multiplicity of technical choices for satellite distribution of TV programs, and not enough consideration has been given to a careful analysis of what ought to be the best system for Canada from a pure techno-economic point of view.

The following alternatives were examined in the study:

- 6/4 GHz and 1 TV carrier per transponder
- 6/4 GHz and 2 TV carriers per transponder
- 14/12 GHz and 2 TV carriers per transponder

In addition, Vidiplex technology, which can be applied to any of the preceeding alternatives, was also examined. Finally, the provision of audio bandwidth services was also considered and it is described in another section of this summary.

The optimum choice depends on a number of factors which are:

- program characteristics (Is the time zone problem serious? Is there a potential for regional services?)
- transponder costs
- earth receive costs
- uplink costs

1.4.1 6/4 GHz (1 TV carrier) versus 14/12 GHz (2 TV carriers)

The analysis we have carried proves that even with a very small number of services facing the time zone problem or regional applications, distribution in 14/12 GHz is much cheaper than in 6/4 GHz using 1 TV carrier per transponder. The basic earth receive station would cost approximately $11,000 more but even if a fabulous number were installed, this would not offset the savings generated by reduced space segment costs.

1.4.2 6/4 GHz: 1 versus 2 TV carriers

The analysis carried shows that using 2 TV carriers per transponder and larger earth stations (10 m) is less costly for society as a whole than using 1 TV carrier per transponder and smaller earth stations (4.5 m).

Because of the fact that the basic 10 m earth station costs much more than the basic 4.5 m station ($116,000 versus $24,000) the 2 TV carriers per transponder alternative would penalize smaller communities at best and become simply prohibitive at worst.

1. EXECUTIVE SUMMARY (cont'd)

1.4 Technical alternatives (cont'd)

1.4.3 6/4 GHz (2 TV carriers) versus 14/12 GHz (2 TV carriers)

Assuming that 10 TV channels have to be distributed on a national basis, the analysis carried shows that as long as there are 4 to 6 channels sensitive to the time zone problem or presenting regional applications, distribution in 14/12 GHz is less costly for Canada as a whole than 6/4 GHz and 2 TV carriers per transponder.

1.4.4 Overview of results

The following table provides a summary of our findings with the assumptions that 6 out of 10 TV channels would be sensitive to the time zone problem.

This table clearly shows that simply copying the U.S. technology constitutes the worst solution for Canada as a whole.

TABLE 1-2

ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES

	6/4 GHz (1 TV carrier)	6/4 GHz (2 TV carriers)	14/12 GHz (2 TV carriers)
Total numbers of TV channels	10	10	10
Number of channels sensitive to time zone	6	6	6
Total number of subscribers	4 million	4 million	4 million
Number of receive points	400	400	400
Earth receive station size	4.5 m	10 m	4.5 m
Earth receive station investment cost - Basic station	$ 24,000	$116,000	$ 35,000
- Per add ch.	$ 5,300	$ 5,300	$ 5,300
- TOTAL COST (10 ch)	$ 71,700	$163,700	$ 82,700
Uplink station investment cost - Basic station	$535,000	$535,000	$540,000
- Per add. ch.	$120,000	$120,000	$140,000
- TOTAL COST			
Number of transponders required	16	8	10
Unprotected space segment costs at $1.5 million annually per transponder	$24 million	$12 million	$15 million
Net present value of costs (10 years - 6%)	$220.3 million	$163.5 million	$155.3 million
Cost per subscriber per year for 10 channels			
- 1,000 subs.	$16.01	$25.39	$15.20
- 5,000 subs.	$ 8.12	$ 7.60	$ 6.17
- 50,000 subs.	$ 6.34	$ 3.60	$ 4.14
-100,000 subs.	$ 6.24	$ 3.37	$ 4.03

1. EXECUTIVE SUMMARY (cont'd)

1.4 Technical alternatives (cont'd)

1.4.5 Vidiplex

Vidiplex technology can further reduce space segment costs but at the expense of one decoder for every two channels that has to be installed at every receive point.

The analysis performed indicates that Vidiplex would produce significant savings only in the 6/4 GHz alternative using 1 TV carrier per transponder. In the other two alternatives, Vidiplex does not prove feasible.

We are not writing off Vidiplex completely though; in applications where the number of receive points is small, such as video conferencing for example, Vidiplex could produce substantial savings.

1.4.6 An optimum system

In the short term Canada faces a problem in the sense that only 6/4 GHz is presently available; we do not think that the Canadian population can be made to wait another two years before Anik C becomes available with 16 transponders in the 14/12 GHz band.

We believe though, that even if Canada starts in 6/4 GHz, conversion to 14/12 GHz will be possible and economical; earth stations designed for use in 6/4 GHz could be converted to 14/12 GHz with the simple addition of a downconverter, at a cost of approximately $2,000 per earth station.

We recommend though that potential users be made aware of the strong conversion possibility, so that they can procure a 4.5 m antenna (with a higher surface accuracy), designed for use at 14/12 GHz; present antennas designed for use at 6/4 GHz will not have to be discarded, but, when operated at 14/12 GHz, they are expected to loose 1 to 2 dB in antenna gain.

More generally, we have been surprised by the fairly low level of understanding of the economic implications of the various alternatives, shown by potential users of satellite technology. Some potential users have even gone as far as discarding 14/12 GHz technology because of statements by Telesat representatives that the Anik C generation of satellites would be used strictly for message traffic and computer communications. If these statements were made, we simply cannot understand why! The three planned Anik C satellites will provide 48 transponders or 96 television channels; TCTS members have indicated that they would be using 8 to 10 transponders, which

1. EXECUTIVE SUMMARY (cont'd)

1.4 Technical alternatives (cont'd)

1.4.6 An optimum system (cont'd)

is less than the capacity of one satellite. We have begun to suspect that some people might try to downplay Anik C satellites or even confuse people with their potential, because they represent an even bigger threath to vested interests and/or obsolete technology, than the previous generations of satellites.

1. EXECUTIVE SUMMARY (cont'd)

1.5 Distribution of U.S. networks

Distribution of U.S. signals is hampered by the wide availibility of off air signals in Canada's large urban areas, and by microwave contracts that expire late in this decade or in the early 90's. These microwave contracts represent annual expenditures of $8 million annually and the amount is constantly growing.

The alternatives examined are briefly described in the following table:

TABLE 1-3

ALTERNATIVES EXAMINED

DISTRIBUTION OF U.S. NETWORKS

NETWORKS	ORIGIN OF SIGNALS (1)	TECHNOLOGY	NUMBER OF TRANSPONDERS	COVERAGE
CBS-PBS	New York	6/4 GHz	2	All Canada - Unserved areas
CBS-PBS	New York	14/12 GHz	1	Eastern Canada- Unserved areas
3 + 1	New York Seattle	14/12 GHz	4	All Canada - Unserved areas
3 + 1	New York San Francisco	14/12 GHz	4	All Canada - All areas

(1) We have assumed that the PBS signal would be a border signal picked off-air.

Because of the fact that these satellite signals would not be distinctly different from off air signals originating from border stations, this means that microwave services from TCTS members would compete with satellite services; we assumed in the present study the reverse option, that is Telesat, through appropriate marketing policies, could also compete with TCTS.

The only practical way to achieve this objective is to use a standard rate (e.g. 15 cents per month per subscriber for a signal) while at the same time imposing a ceiling to the maximum number of subscribers that can be billed (e.g. ceiling of 10,000 or 15,000 subscribers).

1. EXECUTIVE SUMMARY (cont'd)

1.5 Distribution of U.S. networks (cont'd)

All of the alternatives would be feasible with moderate rates (15 to 25 cents per subscriber) but the short term alternatives would face the following problems:

- Total Canada distribution of CBS and PBS in 6/4 GHz does not take into account the time zone problem; while this might be acceptable in the short run, it is certainly not so in the long run.

- Because the market for CBS and PBS is widely concentrated in Eastern Canada, distribution to that area alone, in 14/12 GHz, would also be very feasible; there would, of course, be strong objections coming from the population of Western Canada.

- Distribution of the 3 + 1 in 14/12 GHz to all of Canada's unserved population requires more than the presently unserved cable market; by including conservative assumptions about the rural and remote population that could be reached by the services, the alternative is feasible economically.

- Distribution to all Canada, whether the population receives or not off air signals is the most interesting (and probably the most controversial) alternative; for a maximum amount of $4,000 to $6,000 per month, and a monthly rate of 40 cents per subscriber for the 4 channels, every community in Canada could have access to the signals originating from a distant and larger U.S. market.

This last alternative would amount in practice to cross subsidization from smaller to larger communities, which is not desirable(1), but the disadvantage should be weighed against the potential advantages:

- improving the somewhat doubtful quality of off air signals from border signals from a technical as well as from a content point of view;

- the costs would be lower than microwave costs presently paid by communities accross Canada;

- assuming that affiliates of a U.S. network basically compete with each other, this would also provide a very practical solution to the border station problem.

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(1) Microwave technology also cross subsidizes from small to large communities and especially from distant to close-by communities.

1. EXECUTIVE SUMMARY (cont'd)

1.6 English language pay-TV

We analyzed a monthly package of feature films, variety specials, sports and other programming material. The analysis aimed at providing answers to the following questions:

- Since demand estimates generated by a number of studies differ greatly, would pay-TV still be feasible, even under the most pessimistic assumptions?
- With what kind of Canadian content rules can pay-TV live with?
- Is it realistic to assume that there will be one single pay-TV package in Canada, and then to start quarrelling about who is going to control the package? Are there any other solutions?

The results show that pay-TV would be feasible even under the pessimistic scenario, where the penetration ratio peaks at 20% of basic cable subscribers.

Our research also showed that in the case of U.S. pay-TV, great importance was attached to the development of original productions available only to pay-TV subscribers; in Canada's case we have shown that substantial sums would also be available for the development of original productions. Thus we can conclude that pay-TV could live with fairly ambitious Canadian content rules as long as they are expressed in $.

Finally, we have found that under the probable and optimistic scenarios, pay-TV generates so much money that the notion of a single package simply becomes absurd. In a competitive environment, we would probably assist to the creation of many packages tailored to the needs of specific segments of the Canadian population. To achieve such a situation, which we think is desirable, the Government of Canada should make sure that nobody has full monopoly power in the packaging and distribution of pay-TV.

Pay-TV is a part (albeit an important one) of the revolution that aims at providing a greater variety of programming services to citizens. For the first time in the history of television, citizens are gradually allowed to decide what programming they will watch, when they will watch it, and how the programming material will be financed.

If the CBC, CTV and TVA want to take part in this revolution, that is fine with us; the notion though, that they should be handed a monopoly in the packaging and distribution of pay-TV is beyond our comprehension.

1. EXECUTIVE SUMMARY (cont'd)

1.7 Superstations

Superstations in this report are defined as off-the-air independent stations which are carried to distant markets via satellite and cable. In addition, we restricted the analysis to what we call 'clean' superstations; this means that the superstation candidates would have to pay national rights for programs instead of the present local rights. From a strict economic point of view this means that the additional national advertising revenues that would be generated are compared to additional programming costs. We have also assumed that the superstations would not be allowed to air different advertising material on the off-air transmitter and on the satellite feed.

This approach effectively limits the number of candidates for superstation status to CHCH and Global Television; other independent stations in Canada would have a hard time facing the additional programming costs, and in addition they rely too strongly on local advertising in their respective markets. The analysis was then narrowed down to CHCH for a number of reasons that are explained in the report.

Results show that a CHCH superstation would be feasible under the three 'Audience Share' scenarios that were developped, although the results could be strongly affected by the channel position (1) CHCH would occupy in various cable systems across Canada.

From a policy point of view though, a CHCH superstation would raise the following issues:

- Since CHCH programming consists essentially of U.S. programs, the superstation would fragment the audience of presently licensed local broadcasters, and possibly that of U.S. stations as well.

- Faced with that threat, local broadcasters would probably generate an additional demand for U.S. programs, which would in turn drive up the price of all U.S. programs.

- The net impact on local broadcasters would thus depend on their ability to raise advertising rates: some probably would be able (e.g. the booming Alberta market) while others probably would not.

- On the other hand, if Canada does not provide programming services on Canadian satellites, more and more communities will start pointing earth stations at RCA Satcom; the same damage will thus occur, but this time at the benefit of U.S. superstations.

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(1) Converter or basic service.

1. EXECUTIVE SUMMARY (cont'd)

1.8 Cable network television

Cable network television is defined in the present report as television programming services which rely on a mixture of the following financing mechanisms:

- subscriber charges
- national advertising on the satellite feed
- local advertising on cable.

We identified in our Phase I report that there is a growing number of such services in the United States and that in addition, Canadian talent in a broad sense is taking part in them:

- National Hockey League
- News From Home, produced by Global and aimed at Canadian residing in the U.S.
- Canadian Pro Football
- Multilingual Television (expected soon)

We expect this type of service to become the dominant form of cable-satellite programming in the United States, offering highly specialized services such as:

- outdoor and recreation
- travel
- household repairs and decoration
- cooking
- financial information
- news channels
- sports, sports and more sports
- etc.

This is what the revolution is all about as far as we are concerned: highly specialized programming aimed at target audiences and supported by target advertisers as well (Spalding on the sports channel, The Bay on the decoration channel, etc.).

From a public policy point of view, this type of service also raises a number of issues:

- If the programming consists in true alternative viewing, the impact on conventional television will not be as dramatic as in the superstation case.

- The mere mention of advertising on cable produces strong and highly emotional reactions in the broadcasting industry.

- Since this type of programming will eventually involve a very large number of services and, relatively speaking, smaller

1. EXECUTIVE SUMMARY (cont'd)

1.8 Cable network television (cont'd)

audiences, we do not think present Canadian content rules could be applied (1); after all, even the U.S. have difficulties in programming all these channels, and have to rely on Canada, Mexico, England, to name a few countries; the market for these services is thus already taking a strong international dimension.

- If such services become a reality, the Canadian program production industry could benefit greatly, but it will have to respond to the needs of the international market.

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(1) We are omitting the possibility of having the CBC produce everything from taxpayers money.

1. EXECUTIVE SUMMARY (cont'd)

1.9 French speaking satellite programming

Three different services were examined which are:

- TVA network
- TVFQ-99 (French TV)
- Pay television.

1.9.1 TVA network

Because of the fact that the TVA network is widely available in the province of Québec, and also because TVA has recently signed a 10 year microwave contract to serve its affiliated stations, the feasibility of satellite distribution of TVA rests entirely on the willingness of cable operators in provinces other than Quebec, to pay for the service.

Three broad alternatives have been considered which are:

- 6/4 GHz (total Canada)
- 14/12 GHz (total Canada)
- 14/12 GHz (Eastern Canada)

The following table illustrates the minimum number of subscribers that have to be reached for the service to break even at 10 cents per month.

TABLE 1-4

BREAK EVEN NUMBER OF SUBSCRIBERS
SATELLITE DISTRIBUTION OF TVA

	6/4 GHz Total Canada	14/12 GHz Total Canada	14/12 GHz Eastern Canada
Total subscribers(1) (000)	3,250	3,250	1,980
Break even (000)	1,458	1,583	833
Penetration rate necessary	44.9%	48.7%	42.1%

(1) Subscribers from the Province of Québec have been excluded.

1. EXECUTIVE SUMMARY (cont'd)

1.9 French speaking satellite programming (cont'd)

1.9.1 TVA Network (cont'd)

All alternatives would require the active cooperation and participation of the Canadian Cablesystems and Premier group to be viable.

1.9.2 TVFQ-99 (French television)

This service is a good illustration of things to come. Satellite distribution will start in September of 1980 using the 14/12 GHz portion of Anik B, moving to Anik C when it becomes operational. With approximately 800,000 subscribers, satellite distribution will amount to approximately 10 cents per month. We consider the service to be a form of pay television (universal model) consisting of 100% foreign content, duly sanctionned by the C.R.T.C.

1.9.3 Pay television

We analysed a monthly package of feature films, variety specials, sports events and other programming material; we believe the programming should consist of a majority of original French language productions, (domestic or foreign) in order to gain acceptance in the market place; dubbed material should be kept to a minimum.

As long as basic penetration of cable in Quebec grows to reach a level closer to the canadian average, we believe French language pay television to be feasible economically under the three pay to basic penetration ratios we have examined.

The results of the simulations we performed are briefly examined in the following table.

1. EXECUTIVE SUMMARY (cont'd)

1.9 French speaking satellite programming (cont'd)

1.9.3 Pay television (cont'd)

TABLE 1-5

FEASIBILITY OF FRENCH LANGUAGE PAY TV

	PESSIMISTIC	PROBABLE	OPTIMISTIC
Maximum pay to basic ratio	20%	35%	45%
Pay TV subscribers in 1990	333,000	583,000	750,000
Monthly retail price	$ 10.00	$ 10.00	$ 10.00
Net to packager	$ 5.00	$ 5.00	$ 5.00
Variable programming expenditures (per month)	$ 2.00	$ 2.00	$ 2.00
Fixed programming expenditures (annual in $000)	$ 4,000	$ 8,500	$ 11,500
Internal rate of return (before taxes)	24.2%	22.4%	21.2%

1. EXECUTIVE SUMMARY (cont'd)

1.10 Other television programming

The proposed distribution by Cable Satellite Network of Multilingual Television and Galaxie has also been examined. For the services to break even at a monthly rate of 15 cents per subscriber, they require 1.4 to 1.8 million subscribers, or 36% to 44% of the present 4 million cable subscribers; since Canadian Cablesystems seems to be backing the project, commercial feasibility seems assured.

Most significantly though, MTV will probably succeed in having their programming distributed in the United States via RCA Satcom; by responding to market needs, MTV is clearly proving that Canadians can succeed in program production at the international level.

1.11 Audio bandwith services

Once satellite distribution of television programs starts in Canada it will become fairly inexpensive to distribute audio bandwith services such as:

- radio: AM or FM, simulcasting in stereo of the sound track of a concert, etc.;
- slow-scan: transmission of audio and still pictures;
- videotex services using the vertical blanking interval of the TV signal.

If Telidon is to be successful, satellite distribution of a Telidon data bank must start as soon as possible.

While the preceeding services will probably aim at the cable industry (through the use of subcarriers) there are also some interesting possibilities for the radio broadcasting industry, through the use of separate carriers; the major impediment to those services is the fact that Telesat presently refuses to lease voice channels; once this obstacle is removed, there would be many interesting possibilities for the distribution of syndicated radio programming.

Finally, the chapter also discusses the potential of satellite distribution for one specific company which serves the cable and broadcast industry.

1. EXECUTIVE SUMMARY (cont'd)

1.12 Serving rural and remote communities

Satellite distribution removes one of the major obstacles associated with providing services to rural and remote areas, which is getting the television signals there. Because the costs associated with satellite distribution are essentially fixed, this will be true only if there is a sufficiently large national market for the service. In summary, one cannot put Rural Canada on one side and Urban Canada on the other.

The other obstacle associated with serving those areas is ground distribution costs, an obstacle which we believe can be overcome by any of the following alternatives:

- cable to areas of lower density through the use of higher basic rates or through discretionnary services;

- low power transmitters in an off-the-air broadcast mode;

- very high capacity microwave.

2. INTRODUCTION

2. INTRODUCTION

2.1 General

In June of 1979, Tamec Inc. and DGB Consultants Inc. jointly submitted an unsollicited proposal entitled 'A Feasibility Study for a Canadian Satellite Program Package' to the Department of Supply and Services and the Department of Communications.

After some discussions, it was decided that the project was of interest to both departments but that it ought to be divided in two phases. The report on phase I of the project was submitted in the early part of December, 1979; it consisted of, a detailed description of the rapid evolution that has occured in the United States in the recent past, a preliminary definition of the main policy issues for Canada, and of an identification and definition of areas of research for Phase II of the project.

The present report covers Phase II of the project and it deals essentially with the feasibility of a wide variety of satellite services for Canada. The report has also analyzed in detail the various technical alternatives available to Canada, and we have also attempted to identify why satellites have not yet had a greater impact on the production and distribution of programming services in Canada, and to outline broad measures that would suitably correct this unfortunate situation.

2.2 Structure of the report

The report is divided in 14 chapters which are:

1. EXECUTIVE SUMMARY
2. INTRODUCTION
3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA
4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES
5. COST ASPECTS OF AUDIO BANDWITH SERVICES
6. THE CABLE TELEVISION INDUSTRY IN CANADA
7. DISTRIBUTION OF U.S. NETWORKS
8. PAY-TELEVISION
9. SUPERSTATIONS
10. CABLE NETWORK TELEVISION
11. FRENCH SPEAKING SATELLITE PROGRAMMING
12. OTHER TELEVISION PROGRAMMING
13. AUDIO BANDWITH SERVICES
14. CONCLUSIONS AND RECOMMENDATIONS

2. INTRODUCTION (cont'd)

2.3 Murphy's Law and other Phase I mishaps

The detailed description of satellites services in the U.S., that was presented in our Phase I report, rested on the assumption that a new RCA satellite, due to be launched in early December, would become operational by March 1980. Thus, the description of packages referred to the proposed spectrum allocation, rather than the actual allocation at the time.

This new satelite, Satcom III provided a beautiful illustration of what is known as Murphy's Law: 'If something can go wrong, it will'. Approximately 5 days after we had submitted our Phase I report, Satcom III was successfully launched on a transfer orbit by NASA; what happened after that is not yet fully known (and perhaps never will) but it appears that when the apogee kick motor was fired, to move the satellite from the transfer to the geostationnary orbit, the satellite heated up rapidly and was then lost completely.

The commotion that this event caused to the authors of this report was insignificant compared to the feelings that were experienced south of the Canadian border.

At this moment though, it appears that this mishap will not impact seriously on the expansion of satellite services in the United States; in the short term, humbled RCA will lease 11 transponders from ATT on a pre-emptible basis at a monthly cost per transponder of $70,000(1); this rate is actually $30,000 more than RCA's FCC approved rate for preemptible service, but the RCA losses are covered by insurance.

RCA has now tried to advance the launch of a new satellite which it hopes to get operational by the end of 1981. Thus, we believe that the programming services which we described in our Phase I report will not be affected in any meaningful way.

Finally, when discussing Telesat rates in the Phase I report, we implied that the rates included not only space segment rates, but uplink as well (page 177 of Phase I report); this is not so, and this mistake has been corrected in the present report.

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(1) At current exchange rates this is still cheaper than Telesat rates by $27,647 or 33.6%.

2. INTRODUCTION (cont'd)

2.4 Acknowledgements

We would like to show our appreciation to Mr. Jacques Langlois who acted as Scientific Authority on this project and to Mr. Denis Douville who acted as Science Procurement Manager. Their cooperation was essential.

Our appreciation is also extended to all the people who made this project possible, from the ones who believed that a joint venture of Tamec Inc. and DGB Consultants Inc. could carry it out successfully, as we hope we did, to the numerous Canadian individuals and institutions who readily supplied us with their thoughts and available information on the research subject.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA

3.1 Multiplicity of choices

Cable systems operators in Canada, unlike their counterparts in the United States, have a wide variety of choices of satellites for the distribution of television signals. They can utilize the 6/4 GHz satellite systems, whose coverage pattern extends to all parts of Canada, or the 14/12 GHz system with its regional coverage, which is particularly suitable for distributing signals sensitive to time zones. In addition, depending on the satellite, a transponder can carry either one or two TV carriers. In the latter case, the transponder cost would be cut in half, but the cost of the receive earth stations tends to be more expensive. Other factors such as interference, antenna size, microwave backhaul, etc., also come into play with varying degree of requirements depending on the system. It is therefore possible to find an optimum system and configuration for television distribution in Canada.

In the United States, on the other hand, television signals are distributed exclusively in the 6/4 GHz band. Receive earth stations are more or less standardized with an antenna size of 4.5 m. This is due to two factors. First, satellite technology at the time was available only in 6/4 GHz frequency. Secondly, the so-called "satellite explosion" in the U.S. only occured during the last two years, with the procurement of a large number of television receive only (TVRO) earth stations of 4.5 m size by many cable operators. The formation of a large TVRO network in a very short period had the effect of standardizing the TVRO equipment market. Although 14/12 GHz satellites will be available shortly in the U.S. (SBS, Advanced Westar), they will be used mainly for computer communications and high-speed digital messages.

For lack of a development strategy, Canadian cable operators tend to emulate their U.S. counterparts, especially with the availability of equipment from large U.S. manufacturers right in Canada. This is detrimental to both the Canadian cable and electronic industries. Since satellite distribution for cable system is still in a developing stage in Canada, one should examine the multiplicity of choices and find an optimum system in terms of cost effectiveness, signal spillover to the U.S., protection of the Canadian electronic manufacturing industry and other factors. In the following, all the technical alternatives available for satellite distribution in Canada are described and analyzed.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.2 6/4 GHz satellites vs. 14/12 GHz satellites

The four Canadian satellite systems presently in orbit, or under construction, for commercial services (Anik A, Anik B, Anik C and Anik D) can be grouped together into two types, namely 6/4 GHz satellites and 14/12 GHz satellites. The common characteristics found in satellites of the same frequency band make this grouping a convenient one.

The 6/4 GHz satellites are:

Anik A (3 satellites)
Anik B (1 satellite)
Anik D (2 satellites)

The 14/12 GHz satellites are:

Anik B 14/12 GHz portion
Anik C (3 satellites)

3.2.1 Capacity

a) 6/4 GHz satellites

Of the three satellites in the Anik A system, only Anik A-3 is suitable for CATV traffic. Anik A-1 and Anik A-2 are now at the end of the designed lifespan. Each of them has no more than five healthy channels available, the remaining channels being either "dead" or too degraded to be of any useful service. As degradation is a continuous process, some of the remaining good tubes (TWTA) were turned off to prevent further degradation. The state of these tubes when they are re-activated is rather unpredictable; not even the tube manufacturer would be sure of a successful re-activation. Normal reliabilty consideration dictates that Anik A-1 and A-2 should not be used for any long-term commitment.

Anik A-3, on the other hand, still has nine healthy channels available. Its nominal lifespan lasts until late 1982, when Anik D will take over.

Anik B's full capacity is being utilized to carry all of Telesat's current traffic (CBC and TCTS). Therefore, it is of no interest for the discussion.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.2 6/4 GHz satellites vs. 14/12 GHz satellites (cont'd)

3.2.1 Capacity (cont'd)

a) The two Anik D satellites, each with a 24-channel capacity, will eventually replace both the Anik A and Anik B systems. These satellites are scheduled for launch in late 1982.

b) 14/12 GHz satellites

The Anik B's 14/12 GHz portion has a 4-channel capacity only, and is leased entirely to the Department of Communications for experimental purposes. However, it is understood that, by special arrangement, half of a transponder was sub-leased to a cable consortium in Quebec for the province-wide distribution of France's TV programs.

There is a tremendous capacity available in the Anik C satellites, the first of which is expected to be launched in late 1981. The three Anik C satellites have a total of 48 transponders which can carry 96 television channels. There are some misconceptions, that have persistently permeated the telecommunications industry for some time, that Anik C's are either filled up with message traffic or are designed for message only. Both of these are untrue. Anik C transponders are specially designed to handle television on a two carriers per transponder mode. Moreover, the kind of signal quality that Anik C is aiming at, is not network broadcast quality, but CATV quality with a small receiving dish. The planned utilization of Anik C by TCTS amounts to only 10 transponders (but only 8 are firm, the other 2 are uncertain), i.e. less than the capacity of one satellite. Assuming that an entire Anik C (16 transponders) is used for message traffic, and assuming further that a full Anik C is used as an in-orbit standby (an ultra-conservative approach), there is still one Anik C left which can carry 32 CATV channels. Thus, there is ample capacity for TV distribution in the Anik C system.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.2 6/4 GHz satellites vs. 14/12 GHz satellites (cont'd)

3.2.2 Coverage and Time Zones

a) 6/4 GHz satellites

All of the 6/4 GHz satellites have an all-Canada coverage. Figure 3-1 depicts the coverage pattern of Anik B, which is more or less similar to that of Anik A and Anik D. The advantage of this kind of coverage is that a single transponder will reach all parts of Canada. However, its disadvantage is that programs sensitive to time zones must be repeated on at least two transponders. The CBC English Network, for example, is carried on one transponder for Eastern Canada and repeated on another transponder for Western Canada. Thus the all-Canada coverage characteristics is being wasted for this type of signals. The Home Box Office pay-TV package in the U.S. follows the same example on RCA Satcom.

The 6/4 GHz satellites generally cover part of the U.S. as well. Their useable footprint extends to approximately the northern half of the U.S. This characteristic is seen, by some, as a boon which should be utilized for the distribution of Canadian signals to U.S. cable systems. However, there is a weakness in this approach. First, cable operators in the southern part of the U.S. cannot receive the signals. Secondly, the vast majority of cable systems in the U.S. are of small size and are unlikely to add a second dish to look at a Canadian satellite.

b) 14/12 GHz satellites

The 14/12 GHz portion of Anik B does not have any practical importance due to its low capacity and its unavailability to cable systems, therefore its coverage is not described here.

The coverage pattern of Anik C consists of four oval-shaped spot beams labeled West, West Central, East Central and East, respectively (Fig. 3-2). These beams generally cover the southern part of Canada only. The North is totally excluded. The two spot beams in the East can be combined to form a "half-Canada" beam that covers Ontario, Quebec, Newfoundland and the Maritimes. Likewise, the two

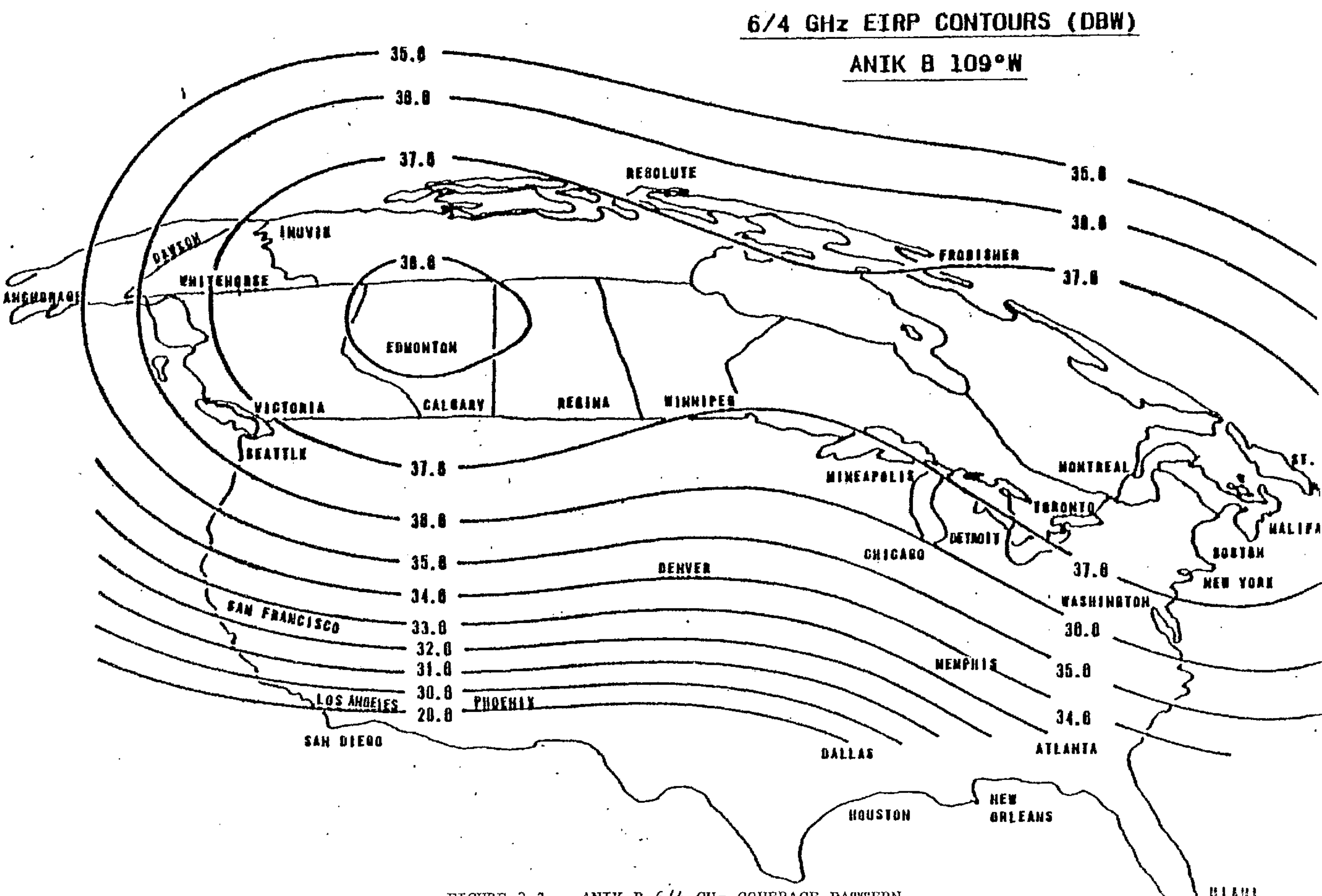

FIGURE 3.1 - ANIK B 6/4 GHz COVERAGE PATTERN

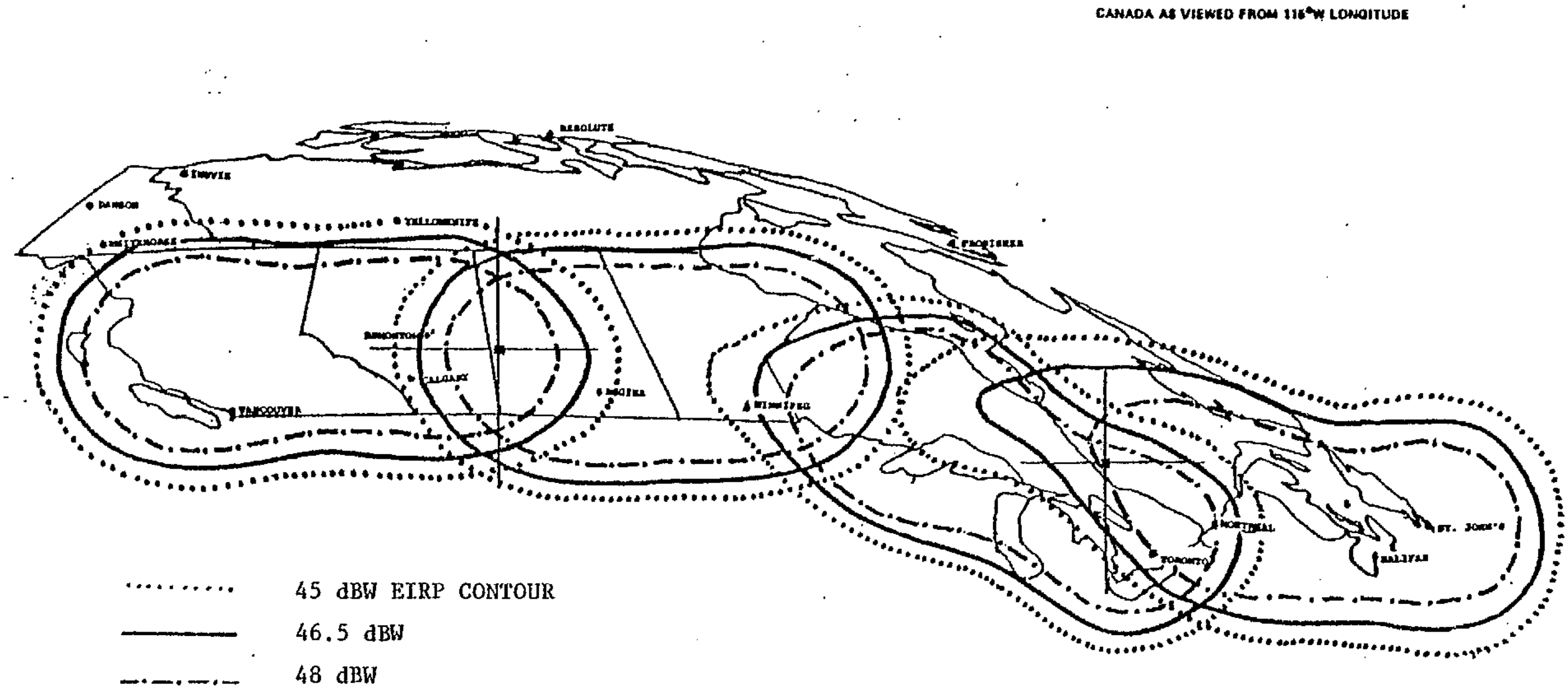

FIGURE 3.2 - ANIK C SPOT BEAM COVERAGE PATTERN

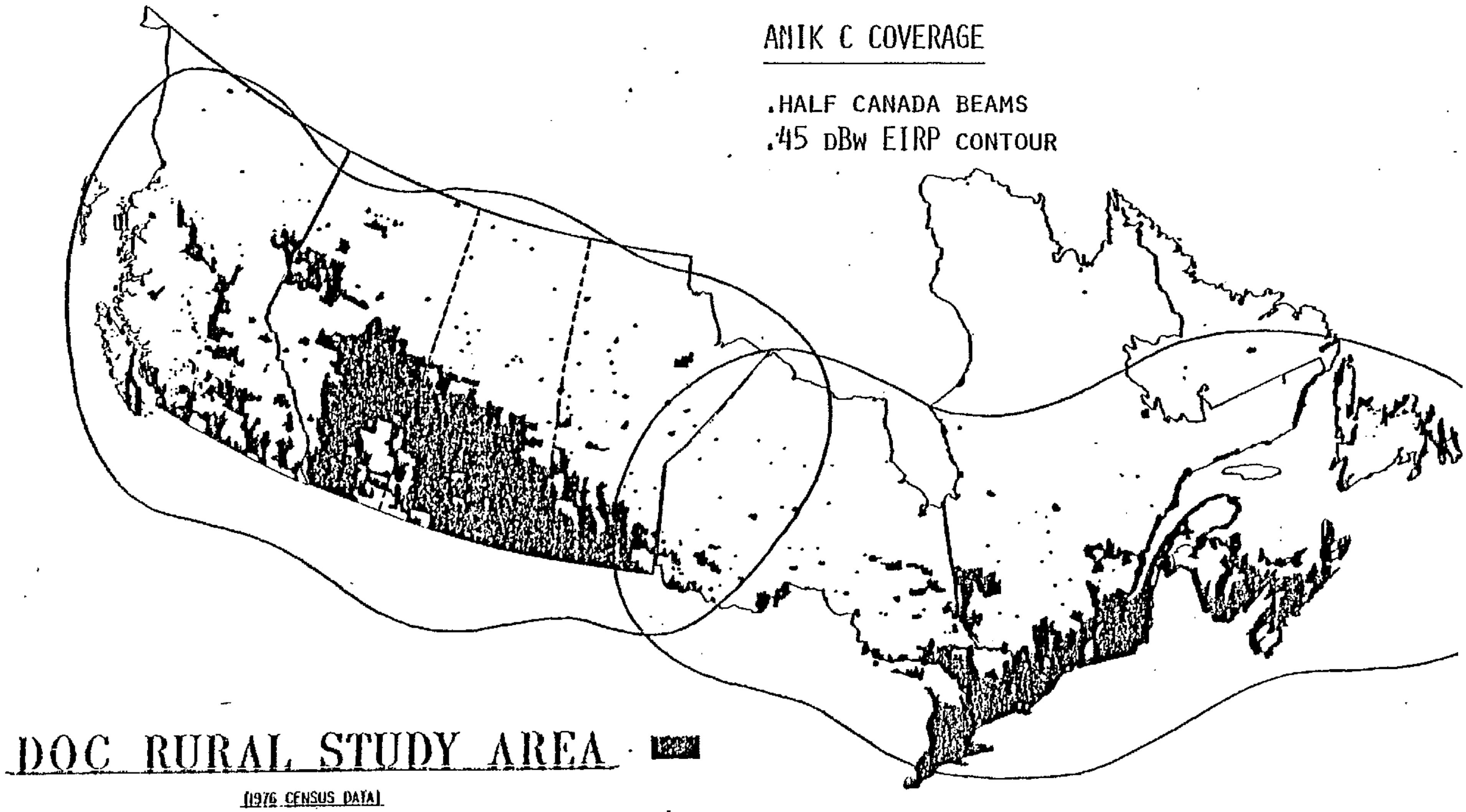

FIGURE 3.3

ANIK C COVERAGE OF RURAL AND REMOTE COMMUNITIES
HAVING POPULATION DENSITIES OF 1 RESIDENT OR MORE PER SQUARE MILE

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.2 6/4 GHz satellites vs. 14/12 GHz satellites (cont'd)

3.2.2 Coverage and Time Zones (cont'd)

b) 14/12 GHz satellites(cont'd)

beams in the West can be combined to cover the four Western provinces.

Even though Anik C does not cover the North, its coverage pattern is such that all cities and rural areas south of the 60th Parallel are covered. Figure 3-3 shows the half-Canada beams superimposed on the map of rural and remote communities having a population density of one resident per square mile and upwards. It can be seen that all these communities are inside the coverage area of Anik C.

Anik C is well suited for regional coverage. Figure 3-2 shows that, for example, British Columbia and Alberta fit precisely in the West spot beam. So do Saskatchewan and Manitoba in the West Central spot beam. Ontario itself requires an entire spot beam. Quebec and the Atlantic Provinces are covered by another spot beam.

For national distribution of television signals, the four regional coverages mean that the same program must be repeated on four different transponders. This is a big disadvantage in term of transponder and uplink costs. A reasonable compromise would be the use of two half-Canada beams, as described above. In this case, only one transponder would be needed for national coverage (half a transponder for Eastern Canada, and half a tranponder for Western Canada). In each beam, the program time can be arranged to differ by plus or minus one hour from the local time, therefore the time difference may be acceptable.

Anik C was not designed to combine the four transmit spot beams into a single "all Canada" transmit beam. (The uplink beam, however, is all-Canada). This is because the "all Canada" coverage requirement was not anticipated at the time of spacecraft design. At this writing, it is too late to include that feature (which is not technically difficult) in the spacecraft.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.2 6/4 GHz satellites vs. 14/12 GHz satellites (cont'd)

3.2.3 Interference and Microwave Backhaul

In the 6/4 GHz frequency bands, satellite communications share the same frequency allocations as those assigned to terrestrial microwaves. The result is that a high degree of possible interference exists between these two independent systems, especially in cities.

It is not posible to locate a multi-channel transmit earth station in a big city, because of the danger of interference into the extensive microwave networks existing in the city. Therefore, the station must be sited at a relatively undeveloped "quiet" area, and its signals are backhauled by terrestrial microwaves from the city. This would add costs in two ways: operation and maintenance of a remote site, and cost of the microwave backhaul, which is very high at the present.

If the uplink station transmits only one or two channels, it may be possible to find some non-interfering frequencies to accommodate the station right in the city. In that case, microwave backhaul is not necessary.

For the downlink receive-only stations at 4 GHz, possible interference from microwave networks may also limit the number of interference-free channels received from the satellite. In the case of serious interference, two solutions exist. Either a new site, preferrably inside or near the city, can be found or adaptive interference cancellers must be used. The latter approach is quite expensive, and may not even be practical in the case of many interferers.

For both transmit and receive earth stations in the 6/4 GHz band, frequency co-ordination and antenna siting is a very important, and frequently time-consuming, part of system design.

The 14/12 GHz band, on the other hand, is dedicated exclusively to satellite communications, therefore interference to or from terrestrial microwaves does not exist. The stations can be located anywhere, even at downtown locations. Witness the Telesat's Anik C earth stations, which are located right on the rooftop of telephone exchange buildings in large cities.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.2 6/4 GHz satellites vs. 14/12 GHz satellites (cont'd)

3.2.4 Other considerations

Aside from the capacity, coverage and interference factors, other factors are equally important in comparing the 6/4 GHz vs. 14/12 GHz systems. We will consider briefly antenna size, propagation effect, and transponder cost.

a) Antenna size

In the 6/4 GHz system, most TVRO earth stations will use 4.5 m antenna size, as those in the U.S. This is a convenient size, as it can be used in conjunction with existing low-cost transistorized amplifiers to give adequate signal-to-noise quality. A signal-to-noise ratio of 45 dB for video is generally accepted as a requirement for CATV.

In the 14/12 GHz system, an antenna size of 4.5 m can also be used with a low-cost amplifier to give a signal-to-noise of 45 dB or better. This does not seem to be an improvement from that of the 6/4 GHz system, but it must be borne in mind that this antenna size is used for the reception of two TV carriers per transponder, with its attendant advantage of reducing by half the transponder cost. It should be mentioned that the antenna has been sized for the half Canada beam (the $\frac{1}{4}$ Canada spot beam would require only 3 m size for the same signal quality).

b) Propagation effects

One problem encountered in the 14/12 GHz band is the high signal fading due to rain. Also when the signals propagate through a rain cell in the satellite-earth station path, polarization purity is degraded. These problems are quite severe in the transmission of highly reliable two-way telephone messages. For television distribution, however, they are much less pronounced.

To counter the effects of propagation, the signals are designed to have some excess power called fade margin. For TVRO terminals at 12 GHz, a fade margin of 1.5 dB would be adequate. It would mean that the signal-to-noise ratio is 45 dB for 99.5% of the time.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.2 6/4 GHz satellites vs. 14/12 GHz satellites (cont'd)

3.2.4 Other considerations (cont'd)

b) Propagation effects(cont'd)

For the other 0.5% of the time, the signal quality is less than 45 dB but is still useable. Only for 0.03% of the time (i.e. 2.5 hours per year) is the signal completely lost.

In the 6/4 GHz satellite system, propagation effects do exist, but to a much lesser extent. For television distribution, they can usually be ignored.

c) Transponder and uplink cost

In the 6/4 GHz satellites, the tariff for leasing a full time transponder is as follows (rates as of October 1979):

	Monthly	Yearly
Fully protected	$ 180,000	$ 2.16 M
Nonprotected non-preemptible	$ 125,000	$ 2.50 M
Nonprotected preemptible	$ 110,000	$ 1.32 M

Telesat has other options in which the rates are reduced by about 4 to 5% if the customer leases a minimum of 4 channels, and about 8 to 11% for 7 channels. Other options exist for 9 and 11 channels.

The cost for the use of Telesat's uplink facilities is charged separately from the transponder cost. It is noted that under present regulations only Telesat is allowed to transmit in 6/4 GHz, therefore all uplink signals must go through Telesat's facilities.

The uplink charge is approximately $250,000 to $300,000 per year for the first channel, if a new site or earth station is required. For additional channels, the cost is about $100,000 per channel per year. As an example, Telesat charged the Cable Satellite Network $252,000 annually for one uplink plus a $50,000 to $75,000 one-time charge for civil works, because a new transmit site had to be built.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.2 6/4 GHz satellites vs. 14/12 GHz satellites (cont'd)

3.2.4 Other considerations (cont'd)

c) Transponder and uplink cost (cont'd)

The Anik C transponder lease rate has not been determined as yet. But it is understood that La Sette, the distributor of TVFQ-99, has obtained the lease of half a transponder (14/12 GHz) on Anik B for approximately $800,000 per year.

The 14/12 GHz uplink rate can be expected to be cheaper than that at 6/4 GHz, as any common carrier can go up at 14/12 GHz. CNCP, for example, indicated that it can lease uplink facilities for $75,000 per channel annually. TCTS leased a channel for the Quebec cable consortium (La SETTE) for $120,000. These rates are low also because many services share the same earth station.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.3 One vs two carriers per transponder

Television signals are generally transmitted as one carrier per transponder. However, when there is a shortage of transponders, or when one wishes to reduce transponder cost, two television carriers can be transmitted in one transponder.

In order to receive signals transmitted in the two carriers/transponder mode, earth stations must utilize larger antennas and/or better low-noise amplifiers. The earth stations are therefore more expensive than those of the one carrier case, but the extra expenses are more than compensated for, by the 50% reduction in transponder cost, if the number of earth stations in the network is small; on the other hand, if the mumber of earth stations is very large, it is more economic to use the one-carrier mode, and to stick to small, inexpensive stations. This idea is better illustrated in section 3.3.3.

3.3.1 Uplink and transponder requirements

There is virtually no difference in the uplink requirements for transmitting either one or two carriers per transponder. Each carrier is assumed to have its own independant uplink chain. For the case of two carriers/transponder, some minor adjustments or addition to the uplink equipment are required, but the cost involved is extremely small. This and other problems are discussed in Section 3.3.4.

The transponder requirements, however, are more stringent for the two-carrier case. Since the two carriers are passing through the same non-linear amplifier in the satellite, spurious signals called intermodulation products are generated and "spilled over" to the adjacent transponders. To minimize this effect, the satellite output multiplexer must have sharp filtering characteristics in order to suppress the intermodulation products to a negligible level.

In Anik A and Anik B, the suppression characteristics are very inadequate, therefore intermodulation products will interfere with traffic in adjacent transponders. It is not possible, for example, to put two-carrier TV adjacent to a transponder carrying Thin Route, Medium Route, message or TDMA traffic. One may, however, put all the two-carrier transponders together in a block. This is the most practical way to circumvent the interference problem. But even with this arrangement, the interference from one two-carrier transponders into the others is still significant enough to reduce the final quality of the TV signal by about 2 to 3 dB.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.3 One vs two carriers per transponder (cont'd)

3.3.1 Uplink and transponder requirements (cont'd)

Anik C is designed specifically to operate with two TV carriers per transponder. The suppression characteristics are excellent and the two-carrier TV transponder can be assigned anywhere without significant degradation to the more sensitive message services.

Anik D is not designed specifically for two-carrier TV, however its suppression characteristics are the same as those for Anik C, therefore the same conclusions apply.

It can be summarized that Anik C and Anik D could be used for two-carrier TV easily; while Anik A and Anik B, would have some technical difficulties, these difficulties are surmountable.

3.3.2 Receive Earth Station Requirements

In the two-carrier-per-transponder mode of operation, the power of each carrier is, at maximum, only half of the power in the one-carrier case. In practice, however, in order to reduce the interference level and the crosstalk between carriers, the carrier power level is usually kept at one-third that of the single-carrier case.

In order to cope with the reduced signal level, either the antenna size must be increased or a much better low-noise amplifier (which is usually a cooled parametric amplifier) must be used, or a combination of both.

At the present time, in the 6/4 GHz band, it is found that the most cost-effective configuration would be a 10 m antenna in conjunction with a transistorized low-noise amplifier.

In the 14/12 GHz system, a 4.5m antenna, together with a 3.5 dB low-noise amplifier would be adequate for two-carrier reception.

For reception of one carrier per transponder, however, antennas can be of much smaller size. Keeping the same amplifiers as above, the antenna size should be 4.5m for the 6/4 GHz satellites and 2m for the 14/12 GHz satellites.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.3 One vs two carriers per transponder (cont'd)

3.3.3 Optimum method for different earth station network sizes

Whether one carrier or two carriers per transponder is a cost-effective method of transmission depends on the size of the earth station network. Because transponder cost in Canada is still very high, it would take a very high proportion of the total system cost for a small network of earth stations. In that case it is better to use the two-carrier method. For a very large size earth station network, however, the earth segment cost would be a larger part of the total system cost, therefore it is better to keep the stations small and simple. This means the one-carrier method is preferable. Let us illustrate this with a practical example.

Assuming one wishes to transmit 6 TV channels in the 6/4 GHz satellites, transponder and uplink costs for each transponder channel is approximately 1.5 million dollars per year (unprotected preemptible channels).

A TVRO terminal capable of receiving 6 channels costs approximately $51,000 for the one-carrier case and $143,000 for the two-carrier case (see Section 4.1.2). It is assumed that this cost is spread over a period of 10 years. To keep the example simple, no interest or inflation is taken into account. Therefore the earth station annual costs are $5,100 and $14,300, respectively, for the one and two-carrier cases.

Let us now assume a network of 50 earth stations. Table 3-1 shows that the total system annual cost (space segment and earth segment) would be $9,255,000 for the one-carrier method, and only $4,715,000 for the two-carrier method. Thus the two-carrier method would yield an annual saving of 4 million dollars.

For a larger network, say 500 earth stations, Table 3-1 shows that the one-carrier method is better. The break-even point is the point at which both methods yield exactly the same total cost, i.e. 489 stations.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.3 One vs two carriers per transponder (cont'd)

3.3.3 Optimum method for different earth station network sizes (cont'd)

TABLE 3-1

TOTAL SYSTEM COST FOR DIFFERENT NETWORK SIZES (6/4 GHz)

Assumptions: 6 TV channels
Earth station cost spread over 10 years

	1 CARRIER/ TRANSPONDER	2 CARRIERS/ TRANSPONDER	ANNUAL SAVING OF 2 CARRIER/ TRANSPONDER METHOD
No. of transponders required	6	3	
Earth Station annual cost (per unit)	$ 5,100	$ 14,300	
CASE I: 50 Earth Stations			
Transponders: annual cost	$ 9,000,000	$ 4,500,000	
Earth stations:annual cost	255,000	715,000	
Total system annual cost	$ 9,255,000	$ 5,215.000	$ 4,040,000
CASE II: 500 Earth Stations			
Transponders:annual cost	$ 9,000,000	$ 4,500,000	
Earth Stations:annual cost	2,550,000	7,150,000	
Total system annual cost	$ 11,550,000	$ 11,650,000	-$ 100,000 (Net loss)
BREAK EVEN POINT = 489 EARTH STATIONS			

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.3 One vs two carriers per transponder (cont'd)

3.3.3 Optimum method for different earth station network sizes (cont'd)

It should be interesting to use the same example with 14/12 GHz satellites and specifically the Anik C system. Let us assume the transponder and uplink cost is still the same, i.e., $1.5 million per transponder per year. The earth station cost for 6-channel receive capability is $62,000 for the 2-carrier case (see Section 4.2.2) and is estimated to be approximately $44,000 for the one-carrier case (2m dish). The earth station cost is quite lower than those of the 6/4 GHz system. All other assumptions are left the same as in the previous example.

The break-even point, this time, is 2,500 earth stations. This means that for any network size less than 2,500 stations, it is more cost effective to use the two-carrier method of transmission. The reason for this large value of break-even point is that there is very little cost difference ($18,000.) between the earth station for one carrier and two carriers. The cost difference is due entirely to the antenna, and one does not save much when going from an antenna size of 4.5m to that of 2.0m (this is no true for the previous example, when the antenna sizes are 10m and 4.5m, respectively, for the one and two-carrier method, and the cost difference is $92,000).

Thus, Table 3-2 shows that, for a network size of 50 stations, the net annual saving with the 2-carrier method is $4.4 million. For 500 stations, the saving is still $3.6 million. Only when the network is more than 2,500 stations, say 3,000 stations, should one switch to the one-carrier method.

It is interesting to note that the break-even point varies with the number of channels transmitted. This is because with a larger number of channels, the space segment cost is increasingly expensive. The earth station cost, however, does not increase as fast. The dish and amplifier are the same for all channels, only receivers are added for the additional channels. Therefore, for a larger number of channels transmitted, it takes a much larger number of earth stations to make earth segment cost an appreciable proportion of total system cost. Table 3-3 illustrates the break-even point for different numbers of channels.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.3 One Vs. two carriers per transponder (cont'd)

3.3.3 Optimum Method for different earth station network sizes (cont'd)

TABLE 3-2

TOTAL SYSTEM COST FOR DIFFERENT NETWORK SIZES (14/12 GHz)

	1 CARRIER/ TRANSPONDER	2 CARRIERS/ TRANSPONDER	ANNUAL SAVING OF 2 CARRIER/ TRANSPONDER METHOD
No. of transponders required	6	3	
Earth Station annual cost (per unit)	$ 4,400	$ 6,200	
CASE I: 50 Earth Stations			
Transponders:annual cost	$ 9,000,000	$ 4,500,000	
Earth stations:annual cost	220,000	310,000	
Total System annual cost	$ 9,220,000	$ 4,810.000	$ 4,410,000
CASE II: 500 Earth Stations			
Transponders:annual cost	$ 9,000,000	$ 4,500,000	
Earth Stations:annual cost	2,200,000	3,100,000	
Total System annual cost	$ 11,200,000	$ 7,600,000	$ 3,600,000
CASE III: 3,000 Earth Stations			
Transponders:annual cost	$ 9,000,000	$ 4,500,000	
Earth stations:annual cost	13,200,000	18,600,000	
Total System annual cost	22,200,000	23,100,000	-$ 900,000 (Net loss)

Note: Assumptions: 6 TV channels
Earth station cost spread over 10 years.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.3 One Vs. two carriers per transponder (cont'd)

3.3.3 Optimum Method for Different Earth station Network sizes (cont'd)

TABLE 3-3

BREAK-EVEN POINT BETWEEN ONE-AND-TWO-CARRIER METHODS (NUMBER OF EARTH STATIONS)

NUMBER OF TV CHANNELS	6/4 GHz SATELLITE SYSTEM	14/12 GHz SATELLITE SYSTEM
2 channels	163	833
4 channels	326	1667
6 channels	489	2500
8 channels	652	3333
10 channels	815	4167

In Canada, the number of cable systems is approximately 400. It can be safely envisaged that the total number of earth stations used for cable distribution is not much more than 500. From table 3-3 the following conclusions can be drawn.

In the 6/4 GHz satellite system, it would be more cost effective to transmit TV signals by the one-carrier method, if the number of TV channels is less than 6. For a large number of TV channels (say, 8 to 10 channels upwards) it would be more economical to adopt the two-carrier method of transmission.

In the 14/12 GHz system, taking into account the number of cable systems in Canada, it is much more cost effective to transmit two TV carriers per transponder. Fortunately, this is the way Anik C is designed.

3.3.4 Some transmission problems

In transmitting two TV carriers per transponder, some technical problems are encountered, namely, adjacent channel interference and intelligible crosstalk.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.3 One Vs. two carriers per transponder (cont'd)

3.3.4 Some transmission problems (cont'd)

Adjacent channel interference is due to the intermodulation products. As mentioned in Section 3.3.1, Anik C and Anik D have good suppression characteristics in the output multiplexer to effectively eliminate this undesirable effect. In Anik A and Anik B, however, one must "live with it". The effect on TV signals may be significant but is still acceptable for CATV quality.

The intelligible crosstalk phenomenon is also due to the passing of two carriers through the same travelling-wave tube in the satellite. This is similar to the phenomenon in poor telephone circuits, in which a signal "crosstalks" into the other. The crosstalking signal is much more annoying than white noise of the same power level, simply because it is intelligible. To reduce crosstalking between the two TV signals in the satellite, there are two methods:

- by equalizing for the amplitude and group delay in the uplink equipment and satellite transponder;
- by the Alternate Line Delay method developed by RCA. In this method, one TV baseband is unmodified while the other is modified such that every other line of the TV signal (e.g. odd lines) is reverse in phase with respect to the color subcarrier signal. This is implemented easily by a switched time delay line. After trasmitting through the satellite, at the receiving end, the odd-line phase reversal of the second TV baseband is restored to its original value. Vast improvement in crosstalk interference can be achieved with this method.

3.3.5 Implications of two carriers per transponder for cable systems

Cable systems in Canada are generally of much larger size than those in the U.S., therefore they would have the resources to afford larger earth stations than their U.S. counterparts.

The analysis in Section 3.3.3 has shown that, in the 6/4 GHz system, for a certain network size of earth stations, and for a certain number of TV channels transmitted, it is more cost effective to transmit the signals by two carriers per transponder. This finding has far-reaching ramifications in the building up of a network. In the early stage, the number of channels and earth stations are likely to be small, and one tends to procure the simplest and the least expensive earth stations (i.e. those for receiving one carrier per transponder).

3.3.5 Implications of two carriers per transponder for cable systems (cont'd)

As the system grows in terms of channel capacity and/or network size, a point is reached where one is better off with the two-carrier approach. However, by that time it may be too expensive and difficult to switch, because the existing system has already been established. This points out the importance of advance planning.

In the United States, on the other hand, there are many more cable systems (over 4,000) and most of these cable systems are relatively small; it is thus easy to understand why the U.S. cable industry pursued a policy of one TV carrier per transponder and low cost earth station in the 6/4 GHz band.

If cable systems in Canada utilize the 14/12 GHz satellites, Section 3.3.3 shows conclusively that the two-carrier approach is definitely a better choice. As the two-carrier earth stations are already of small size, there is very little saving in going to the one-carrier earth station. In addition, the one-carrier approach would mean a waste of the precious spectrum because the Anik C transponder bandwidth is quite wide (54 MHz) and is designed for two carriers.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.4 The Vidiplex technique of combining two TV signals

3.4.1 Principle of operation

This is a method developed and marketed by Thomson-CSF. Two separate video sources are combined into a single one by deleting alternate lines from each of the two video signals. They are then transmitted as a single carrier in the transponder.

A frame of the combined picture would consist of two half-pictures, each from a video source, interlaced together. A viewer would see the picture as totally jumbled as if the two videos were superimposed on each other.

At the receiving end, a decoder separates the two signals, and creates a replacement line by averaging the lines immediately above and below the missing lines. This is achieved by the use of delay circuits and interpolators. Thus the original pictures are restored.

3.4.2 Performance

Each frame of the television signal consists of 525 lines in the North American standard. By combining two video sources together with the Vidiplex technique, ones loses every other line of the picture, i.e., a frame of each TV signals now has only 262.5 lines left. Theoretically, the TV signals lose 50% of their vertical resolution.

In practice, however, very little resolution is lost, because of the characteristics of the decoding process. Because the TV signal is quite redundant, the information contained in the two successive fields of a frame is quite similar. By creating a new line from the average of the two immediately adjacent lines, most of the original information is restored.

Only in special cases does one notice the degradation, such as in scenes of very fast vertical or diagonal motion, or in rolling credits (of a movie, for example). Otherwise, the decoded signals are indistinguishable from the originals. In numerous demonstrations, trained observers found that the Vidiplex technique is quite satisfactory for CATV. Furthermore, the signal-to-noise quality of the two decoded video signals does not degrade below that of those transmitted in the conventional method.

It is noted that using the Vidiplex technique, the two source programs have to be co-located; Whereas in the two-carrier method, the two programs can originate from two earth stations at two different locations.

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.4 The Vidiplex technique of combining two TV signals (cont'd)

3.4.2 Performance (cont'd)

As for the audio signals of the two program, they can be transmitted as two seperate sub-carriers in the same transponder, or they can be multiplexed together in a single sub-carrier.

3.4.3 Combined techniques for four TV signals per transponder

The two different techniques for carrying two TV signals per transponder described above, namely the Vidiplex technique and the two-carrier technique, can be combined together for the transmission of four television programs via a single satellite transponder. This can be done in two successive stages.

First, the four TV signals are separated into two pairs. Each pair is combined, at baseband, into a single TV signal by the Vidiplex technique. This signal then modulates a carrier that occupies half of the transponder bandwidth. Thus the two carriers within the transponder can carry four TV signals.

These combined techniques have been successfully demonstrated on the RCA Satcom satellite as far back as April 1978. In the experiment, four TV signals originating from Los Angeles were transmitted in a single transponder to CATV systems in Alaska. The receive earth station was a 10 meter antenna with an inexpensive transistorized low-noise amplifier mounted right on the antenna feed. In other words, the earth station was identical to the one we described in Section 3.3.3 for the two-carrier approach.

To eliminate the visible crosstalk between the carriers, the Alternate Line Delay approach described in Section 3.3.4 was employed. The four audio signals were sent on a different transponder together with other telephone messages. However, it is possible to send the audios on two subcarriers in the same transponder, each carriers having two audio channels multiplexed together.

The video signal quality was found of excellent quality and was more than adequate for the cable distribution.

It should be noted that the Alaska network in the RCA Americom system is characterized by small network size and the potential requirement for large TV capacity to satisfy local cable needs. These were exactly the ingredients for a two-carrier-per-transponder approach, as we have shown in Section 3.3.3. As a matter of fact, a two-carrier system has been in operation for Alaska since 1977. For the same reason, a four-TV-

3. TECHNICAL ALTERNATIVES OF TELEVISION DISTRIBUTION IN CANADA (cont'd)

3.4 The Vidiplex technique of combining two TV signals (cont'd)

3.4.3 Combined techniques for four TV signals per transponder (cont'd)

per-transponder system would be ideably suited for the Alaska network.

The price uncertainty of Vidiplex equipment at the present time makes it difficult to optimize a system. However, it is believed that the cost of a Vidiplex decoder could be reduced to $20,000 to $30,000 for two TV channels, i.e., about $10,000 to $15,000 per channel. This is much less than the price differential between a 4.5 m and a 10 m dish. Therefore, the Vidiplex technique presents an extremely attractive option for cable distribution. Furthermore, this technique can be added at a later stage in the building of a network, with only minor and inexpensive changes in the earth station.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES

4.1 The 6/4 GHz System

4.1.1 Cost of an Uplink Earth Station

The cost of an uplink station can vary drastically depending on the reliability objectives, monitor and control features, the amount of civil works required, etc. In the following, we are only concerned with basic, "no frill" transmit earth stations. Deluxe versions are obviously of no interest to us.

a) Component cost

The cost data presented below has been obtained from two representative companies, Spar Aerospace Ltd. and Scientific - Atlanta. The Spar quotation is based on component cost estimate of all components and service required to make an earth station operational. The Scientific Atlanta quotation is based on a package marketed successfully by Scientific Atlanta in the U.S. and is available in Canada.

The basic components of an uplink earth station, capable of transmitting one TV channel are shown below together with their price tags (Spar quotations).

Components common to all channels

Antenna (10 m dish)	$ 85 K
Antenna foundation (standard soil condition)	$ 15 K
Antenna motor drive and associated control (tracking capability not required)	$ 10 K
De-icing equipment: - feed and subreflector	$ 5 K
- lower half of dish	$ 20 K
Permanent shelter (air conditioned and heated)	$ 20 K
Civil works	$ 20 K
Documentation	$ 10 K
Low - noise amplifier, in a redundant configuration and automatic switching	$ 20 K
Agile receiver and TV monitor	$ 15 K
Protection switching and remote control	$ 50 K
Installation and minimum testing	$ 25 K
Sub-total	$ 295 K

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.1 The 6/4 GHz System (cont'd)

4.1.1 Cost of an Uplink Earth Station (cont'd)

a) Component cost (cont'd)

Components dependent on the number of unplinks

High power amplifier (1,5 KW klystron)	$ 60 K
Combining network (approx. cost per channel)	$ 10 K
Exciter	$ 50 K
Sub-total	$ 120 K

The total earth station, in a basic configuration capable of transmitting one channel, would cost a total of $415,000 or under half a million dollars.

If additional channels are to be added, one would only need a klystron, combining waveguides and an exciter, at an incremental cost of $ 120,000 per channel.

b) Protection switching philosophy

The components that are most prone to failure are the high-power amplifier and the receiver. A high power amplifier tube typically lasts only a few thousand hours before it is replaced or refurbished. Therefore it is of standard procedure that a protection channel is provided by the use of a hot standby uplink chain. When a tube fails, the TV signal is routed to the other uplink chain.

If there is only one operational channel, the protection channel would provide a 1:1 redundancy. In practice, it is prohibitively expensive to have a protection channel for every operational channel. Therefore a 1:N redundancy approach is usually adopted. This means a protection channel would provide hot standby for N operating channels.

The station described above has limited receive capability, with a redundant low-noise amplifier and a frequency agile receiver. This would provide a means to monitor the transmitted signals and the satellite link.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.1 The 6/4 GHz System (cont'd)

4.1.1 Cost of an Uplink Earth Station (cont'd)

c) Cost of Multiple Uplinks

A basic transmit earth station, as we have learned, should consist of an operational channel as well as a protection channel. Therefore the redundant station, based on the Spar quotation, should be \$ 535,000 with the incremental cost per additionel channel of \$ 120,000.

The Scientific - Atlanta package of a redundant station is \$ 600,000 with an incremental cost per channel of \$ 160,000.

Table 4-1 lists the cost for uplink stations of various channel capability. It is noted that in all cases, a protection channel is provided.

TABLE 4-1

COST OF A MULTI-CHANNEL 6/4 GHz UPLINK STATION

Number of Uplinks	Spar	Scientific-Atlanta	Difference
Basic redundant station (1 + 1)	\$ 535 K	\$ 600 K	12 %
2 + 1	655 K	760 K	16 %
3 + 1	775 K	920 K	19 %
4 + 1	895 K	1 080 K	21 %
5 + 1	1,015 K	1 240 K	22 %
6 + 1	1,135 K	1 400 K	23 %
7 + 1	1,255 K	1 560 K	24 %
8 + 1	1,375 K	1 720 K	25 %

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.1 The 6/4 GHz System (cont'd)

4.1.1 Cost of an Uplink Earth Station (cont'd)

d) Incremental Cost for a Radio Uplink

If an uplink station for TV is already in existence, and one decides to add a radio or audio bandwidth service, there are three different ways to achieve it, depending on the flexibility one has in interfacing the TV equipment.

The least expensive method would be to carry the radio signal on a subcarrier. This is done at baseband level, and could cost approximately \$ 15,000 per radio channel.

The second method would involve the multiplexing of the signal at the intermediate frequency level and would cost about \$ 30,000.

The third method would require a seperate carrier for radio, and would cost about \$ 70,000. One needs a separate high power amplifier, but the method provides complete flexibility. The disadvantage of the first and second methods is that if the TV transmit equipment fails, the radio signal is out of service, and, finally colocation is required.

4.1.2 Cost of TVRO Earth Stations

There are many TVRO packages available in the 6/4 GHz band. The following data, which is conservative, is based on the Spar cost estimate. It is possible to obtain a package price more attractive than the one quoted, but the cost advantage is not substantial.

Unlike transmit stations, TVRO stations are assumed to have no redundancy or protection. This is because present-day low-noise amplifiers and receivers are quite reliable and of long life. Furthermore, the operation of TVRO stations is not as critical as that of transmit stations. When a component fails, one replaces it manually. Simple storage of spare equipment is required, and some companies (Scientific Atlanta, for example) provide repair service within 24 hours. Of course, the spare equipment would replace the failed component in a shorter delay than 24 hours.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.1 The 6/4 GHz System (cont'd)

4.1.2 Cost of TVRO Earth Stations (cont'd)

The components and costs of a TVRO earth station are shown below in Table 4-2 for both the one-and two-carrier approach. The antenna sizes are 4.5 m and 10 m, respectively.

TABLE 4-2

COMPONENT COST OF 6/4 GHz TVRO EARTH STATIONS

	ONE CARRIER	TWO CARRIERS
Antenna	$ 8,000	$ 65,000
Foundation	3,000	25,000
Motor drive	-	10,000
Low noise amplifier	3,000	3,000
Interfacility link	500	500
Frequency agile receiver	6,500	6,500
Installation and siting	2,000	5,000
Testing	1,000	1,000
TOTAL	$ 24,000	$ 116,000

For an additional channel, one needs to add only a fixed frequency receiver, which costs approximately $ 5,000. Also, every four channels would need a power splitter which costs very little (less than $ 500). We also assume that each channel would require additional testing of about $ 200.

Table 4-3 lists the cost of TVRO stations for multi-channel receive capability, for both one-and two-carrier approaches.

TABLE 4-3

COST OF MULTI - CHANNEL TVRO STATIONS AT 6/4 GHz

	ONE CARRIER/ TRANSPONDER	TWO CARRIERS/ TRANSPONDER
1 channel	24,000	116,000
2 channels	29,700	121,700
3 "	34,900	126,900
4 "	40,000	132,100
5 "	45,800	137,800
6 "	51,000	143,000
7 "	56,200	148,200
8 "	61,400	153,400

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.2 The 14/12 GHz System

4.2.1 Cost of an Uplink Earth Station

Following the same format as in the previous section, the cost of a 14/12 GHz uplink station is first shown as component costs, and then as a cost for a multiple channel transmit station.

The breakdown of component costs, based on an estimate by Spar Aerospace, is shown below.

Components common to all channels

Antenna (8 m dish)	$ 45 K
Antenna foundation	15 K
Antenna Motor Drive and control	10 K
De-icing: - feed and subreflector	5 K
- lower half of antenna	20 K
Permanent shelter	20 K
Civil works	20 K
Documentation	10 K
Redundant low-noise amplifier	20 K
Frequency - agile receiver and TV monitor	20 K
Protection switching and remote control	50 K
Installation and testing	25 K
Sub-total	$ 260 K

Components dependent on the number of uplinks

Klystron (750 to 1 000 W)	$ 80 K
Combining network (per channel)	$ 10 K
Exciter	$ 50 K
Sub-total	$ 140 K

A basic transmit earth station, with an operational channel and protection channel, would cost 260 + (2 x 140) = $ 540 K.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.2 The 14/12 GHz Systems (cont'd)

4.2.1 Cost of an Uplink Earth Station (cont'd)

Thus a 14/12 GHz transmit station costs about the same as one at 6/4 GHz.

Table 4-4 shows the cost of a station with multi-channel transmit capability.

TABLE 4-4

COST OF A MULTI-CHANNEL 14/12 GHz UPLINK STATION

Number of Uplinks	Cost
Basic redundant station (1 + 1)	$ 540K
2 + 1	680K
3 + 1	820K
4 + 1	960K
5 + 1	1,100K
6 + 1	1,240K
7 + 1	1,380K
8 + 1	1,520K

4.2.2 Cost of TVRO Earth Stations

The component costs as well as the cost for a multi-channel TVRO earth station are shown in Tables 4-5 and 4-6. It is noted that these costs are higher than those in the 6/4 GHz band of the same size (4.5 m), but it must be borne in mind that these 14/12 GHz stations are for the reception of two carriers per transponder.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.2 The 14/12 GHz Systems (cont'd)

4.2.2 Cost of TVRO Earth Stations (cont'd)

TABLE 4-5

COMPONENT COSTS OF 14/12 GHz TVRO
(Two carriers/transponder)

Antenna (4.5 m)	$ 18,000
Foundation	3,000
Low noise amplifier	5,000
Interfacility Link	500
Frequency - agile receiver	6,500
Installation	1,000
Testing	1,000
TOTAL	$ 35,000

TABLE 4-6

COST OF A MULTI-CHANNEL TVRO AT 14/12 GHz
(Two carriers/transponder)

1	channel	$ 35,000
2	channels	40,700
3	"	45,900
4	"	51,100
5	"	56,800
6	"	62,000
7	"	67,200
8	"	72,400

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.3 Cost of Conversion from 6/4 GHz to 14/12 GHz band

Should one decide to convert a 6/4 GHz system into a 14/12 GHz system, it is not necessary to discard the 6/4 GHz equipment. As a matter of fact, all of the 6/4 GHz TVRO stations can be kept, and with the addition of a low cost downconverter, can be converted to 14/12 GHz operation.

It is noted that the 4.5 m dish size is used both for receiving one - carrier per transponder mode at 6/4 GHz, and for receiving two-carriers per transponder at 14/12 GHz. Thus the same dish can be used for both systems. However, at higher frequency (12 GHz) the antenna gain is degraded due to the shorter wavelenghts. It is estimated that a practical 4 GHz TVRO antenna, when operated at 12 GHz, will lose about 1 to 2 dB (depending on surface accuracy) when compared to a perfectly smooth antenna. This amount of degradation should be acceptable.

Assume that the 4 GHz antenna is now operated at 12 GHz. A device called a downconverter can be connected directly to the antenna feed. The downconverter translates the frequency of the received signals to 4 GHz. The output is connected directly to the existing 4 GHz low-noise amplifier. Thus all the 4 GHz TVRO equipment can be retained for the new frequency band.

This particular downconverter is already marketed by Honeywell-Spacekom and costs only 2,000 U.S. dollars. It is an extremely cost effective method for converting satellite frequency bands.

To get around the antenna surface accuracy problem, well-planned cable operators could procure 4.5 m antennas designed for 12 GHz operation. Of course the antenna would cost more than that at 4 GHz, because of the better surface accuracy requirement. But it can be operated for both frequency bands without any degradation. Therefore the antenna could at first be used at 4 GHz, then later switched to 12 GHz without any problem.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.4 Cost of equipment for multi - TV channel per transponder transmission

4.4.1 Two - carriers per transponder

At the transmitting end, the carriers are transmitted in the normal way, each carrier occupying half the transponder bandwidth. No special, extra equipment is needed.

It may be necessary, however, to equalize for amplitude and group delay in order to reduce intelligible crosstalk between the two carriers. The equalizers are very inexpensive and cost only in the order of a few hundred dollars.

At the receiving end, it is necessary to add a half - bandwidth filter (17.5 MHz for 6/4 GHz system) at the intermediate frequency. This would cost no more than a few hundred dollars.

If the intelligible crosstalk is particularly bad, one may have to install an Alternate Line Delay processor, described in section 3.3.4, at both the transmitting and receiving end. This processor is not mass produced at the present time, but it is expected to cost about $3,000.

4.4.2 Cost of Vidiplex equipement

Vidiplex equipment are not produced in any large quantity at the present time. The price depends very much on market demand. We are particularly interested in the Vidiplex decoders, as they will be required in large quantity for TVRO's, if the Vidiplex method is adopted.

Receiving end

Thomson - CSF indicated (in January 1980) that the following price elasticity is envisaged for Vidiplex decoders :

single unit	$US 30,000
100 units	17,000
1000 units	12,000

It should be remembered that the price of a Vidiplex decoder is shared between two TV channels. Therefore the cost of Vidiplex equipment per channel will be half of that shown above.

4. ECONOMIC EVALUATION OF TÈCHNICAL ALTERNATIVES (cont'd)

4.4 Cost of equipment for multi-TV channel per transponder transmission (cont'd)

4.4.2 Cost of Vidiplex equipment (cont'd)

Transmitting end

The Vidiplex encoder at the transmitting end costs only \$ 5,000, as it is a much simpler device than the decoder.

In addition, a frame synchronizer will be needed, prior to the encoder, when combining two asynchronous feeds. Although the frame synchronizer costs \$ 23,000 (for every two TV channels), it is used only at one location, namely at the transmitting end, therefore it is not a large cost item.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.5 Economic comparison

4.5.1 Main assumptions

The choice between 6/4 GHz and 14/12 GHz depends essentially on 4 factors which are:

- package and program characteristics
- transponder costs
- costs of receive earth stations
- uplink costs

With "package and program characteristics" we are referring to the time zone problem that exists in Canada and/or to the possibility of distributing regional services, aimed at specific geographical segments of the Canadian population. Briefly stated, if the time zone problem did not exist and/or if there were no viable regional services, distribution in 6/4 GHz would definitely be the preferred alternative. On the other hand, wherever the time zone problem is crucial for a given service, this necessitates the use of two transponders in 6/4 GHz; assuming identical transponder costs in 14/12 GHz, these transponder costs would be cut in half.

Assuming for example 10 different TV channels, the number of transponders required in 14/12 GHz, using the built-in feature of 2 TV carriers per transponder, is always 10, that is 5 for Eastern Canada and 5 for Western Canada. Assuming $1.5 million per transponder, this represents annual space segment costs of $15 million.

The following table presents the number of transponders required, associated costs and difference with 14/12 GHz, under various assumptions regarding the sensitivity of the time zone problem.

TABLE 4-7

TIME ZONE PROBLEMS AND TRANSPONDER REQUIREMENTS IN 6/4 GHz

Number of channels sensitive to the time zone problem	Number of transponders required in 6/4 HGz(1)	Annual Costs in $ 000	Difference with 14/12 GHz in $ 000
10	20	$ 30,000	$ 15,000
8	18	$ 27,000	$ 12,000
6	16	$ 24,000	$ 9,000
4	14	$ 21,000	$ 6,000
2	12	$ 18,000	$ 3,000
0	10	$ 15,000	-

(1) Using 1 TV carrier per transponder.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.5 Economic comparison (cont'd)

4.5.1 Main assumptions (cont'd)

The next consideration to take into account is uplink costs, and the problem is further complicated by the fact that there are many possibilities as far as uplink configuration is concerned.

In 14/12 GHz, the uplink configuration depends strictly on the number of base uplink stations as is illustrated in the following table.

TABLE 4-8

BASE STATIONS AND ADDITIONAL CHANNELS ASSUMING 10 TV CHANNELS IN 14/12 GHz
($000)

Number of base stations	Number of additional channels	Base cost at $540 K per station	Additional channels at $140 K per channel	Total cost
2	18	$ 1,080	$ 2,520	$ 3,600
4	16	$ 2,160	$ 2,240	$ 4,400
6	14	$ 3,240	$ 1,960	$ 5,200
8	12	$ 4,320	$ 1,680	$ 6,000
10	10	$ 5,400	$ 1,400	$ 6,800

In 6/4 GHz, the uplink configuration depends on the number of base stations as well as on the number of time sensitive channels as is illustrated in the following figure.

TABLE 4-9

NUMBER OF ADDITIONAL UPLINK CHANNELS REQUIRED UNDER VARIOUS ASSUMPTIONS IN 6/4 GHz

	Number of time sensitive channels					
Number of base stations	10	8	6	4	2	0
2	18	16	14	12	10	8
4	16	14	12	10	8	6
6	14	12	10	8	6	4
8	12	10	8	6	4	2
10	10	8	6	4	2	0
Total number of transponders	20	18	16	14	12	10

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.5 Economic comparison (cont'd)

4.5.1 Main assumptions (cont'd)

Assuming base costs of \$ 535,000 and additional costs per channel of \$ 120,000, these various possibilities would result in the following costs:

TABLE 4-10

INVESTMENT COSTS FOR UPLINK UNDER VARIOUS ASSUMPTIONS (\$000)

Number of base stations	Number of time sensitive channels 10	8	6	4	2	0
2	\$3230	\$2990	\$2750	\$2510	\$2270	\$2030
4	\$4060	\$3820	\$3580	\$3340	\$3100	\$2860
6	\$4890	\$4650	\$4410	\$4170	\$3930	\$3690
8	\$5720	\$5480	\$5240	\$5000	\$4760	\$4520

The final consideration is receive earth stations; since these cost more in 14/12 GHz, the more receive points there are, the more this would offset the reduced costs of transponders.

4.5.2 The simulation model

To evaluate the many possibilities that might arise, we devised a simulation model that could rapidly indicate the preferred solution from a strict economic point of view.

The model allows the formulation of various network configurations depending on the following variables:

- Number of TV channels;
- Number of transponders required: always equal to or greater than the number of TV channels;
- Uplink characteristics (number of base stations and additional channels);
- Number of receive points.

The model simply calculates the annual costs generated by any configuration over a ten year period. The cost figures utilized are the following:

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.5 Economic comparison (cont'd)

4.5.2 The simulation model (cont'd)

TABLE 4-11

COST ASSUMPTIONS USED ($000)

		6/4 GHz	14/12 GHz
Uplink	- Base	$ 535	$ 540
	- Add. channel	$ 120	$ 140
Receive	- Base	$ 24	$ 35
	- Add. channel	$ 5.3	$ 5.3
Space segment	- Unprotected (annually)	$1500	$1500

The annual cost figures are then brought back to a net present value, using an appropriate discount rate; the alternative that produces minimum costs, thus becomes the preferred alternative for Canada as a whole.

Since constant prices are being used, a discount rate of 6% was chosen for all alternatives; this discount rate represents not only the real cost of capital but a risk factor as well. If we were to use the nominal rates of interest, say the present rate of 13%, we would also have to incorporate inflation in the cost figures.

4.5.3 6/4 GHz versus 14/12 GHz

A first set of simulations was performed with the assumption that 10 TV channels were to be distributed across Canada; we also assumed the existence of six (6) basic uplink stations which could be equipped to handle additional channels on an incremental basis.

The other assumptions used were as follows:

- Number of receive points : 400
- Total cable subscribers : 4 million

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.5 Economic comparison (cont'd)

4.5.3 6/4 GHz versus 14/12 GHz (cont'd)

The cost in 6/4 GHz depends essentially on the number of TV channels which are sensitive to the time zone problem and which require additional transponders and uplinks; the results are illustrated in the following table.

TABLE 4-12

PRESENT VALUE OF COSTS:
DISTRIBUTION OF 10 TV CHANNELS IN 6/4 GHz

Number of channels sensitive to time zone	Number of transponders	Present value of costs ($000)	Increase versus 14/12 GHz ($000)
0	10	$149,395	-$ 5,910
2	12	173,040	17,735
4	14	196,686	41,381
6	16	220,331	65,026
8	18	243,976	88,671

In 14/12 GHz, 10 transponders and 20 uplinks are required to carry 10 TV channels across Canada. The net present value of costs in that case is $155.3 million.

It thus becomes clear that, as long as there are at least 2 channels sensitive to the time zone problem, distribution in 14/12 GHz is preferable from a strict economic point of view.

Since receive earth stations cost only $11,000 more in 14/12 GHz, these results will not be affected even if the number of receive points is much greater than 400.

4.5.4 6/4 GHz: 1 TV carrier versus 2 TV carriers

Another set of simulations was also performed to evaluate the costs of using 6/4 GHz but with 2 TV carriers per transponder. These alternatives, as shown in the following table would produce substantial savings, for society as a whole, over the 1 TV carrier per transponder alternative.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.5 Economic comparison (cont'd)

4.5.4 6/4 GHz: 1 TV carrier versus 2 TV carriers (cont'd)

TABLE 4-13

COSTS OF 1 OR 2 TV CARRIERS IN 6/4 GHz
(400 RECEIVE POINTS)

NUMBER OF CHANNELS SENSITIVE TO TIME ZONES	NPV IN $000 1 TV CARRIER	2 TV CARRIERS	SAVINGS
0	$149,395	$127,683	$21,712
2	173,040	139,625	33,415
4	196,686	151,567	45,119
6	220,331	163,510	56,821
8	243,976	175,452	68,254

The only problem with the alternative is that it penalizes smaller communities as illustrated in the following table:

TABLE 4-14

COST FOR 10 TV CHANNELS PER SUBSCRIBER
PER YEAR BY SYSTEM SIZE AND ALTERNATIVE

SYSTEM SIZE	6/4 GHz 1 TV CARRIER	6/4 GHz 2 TV CARRIERS
1,000	$ 16.01	$ 25.39
2,500	10.09	12.05
5,000	8.12	7.60
7,500	7.46	6.12
10,000	7.13	5.37
25,000	6.54	4.04
50,000	6.34	3.60
75,000	6.27	3.45
100,000	6.24	3.37
300,000	6.19	3.22

Note: Assuming 6 channels sensitive to the time zone problem and a cable universe of 4 million subscribers.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.5 Economic comparison (cont'd)

4.5.4 6/4 GHz: 1 TV carrier versus 2 TV carriers (cont'd)

All systems of 2,500 and under will pay more under this alternative than under the 1 TV carrier alternative; for small rural and remote communities (100 to 250 households) the costs of this alternative would simply become prohibitive.

4.5.5 6/4 GHz (2 TV carriers) versus 14/12 GHz (2 TV carriers)

The likelihood and feasibility of 6/4 GHz and 2 TV carriers is further reduced when compared to 14/12 GHz as illustrated in the following table:

TABLE 4-15

COST OF 6/4 GHz (2 TV CARRIERS) AND 14/12 GHz (2 TV CARRIERS)

NUMBER OF CHANNELS SENSITIVE TO TIME ZONES	6/4 GHz (2 TV CARRIERS) NPV ($000)	14/12 GHz (2 TV CARRIERS) NPV ($000)	DIFFERENCE $000
0	$127,683	$155,305	-$27,622
2	139,625	155,305	- 15,680
4	151,567	155,305	- 3,738
6	163,510	155,305	8,205
8	175,452	155,305	20,147

As long as there are 6 channels or more that are sensitive to the time zone problem, the 14/12 GHz alternative proves to be more economical than the 6/4 GHz alternative, using 2 TV carriers per transponder.

If we had chosen 500 receive points instead of 400, this would increase the advantage held by 14/12 Ghz by an additional $8.1 million; this means that the break even number of channels sensitive to the time zone problem would be reduced to four (4).

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.5 Economic comparison (cont'd)

4.5.6 Vidiplex

As was explained in section 4.4.2, it is possible to use Vidiplex equipment to further reduce space segment costs. Present cost of a Vidiplex decoder is $30,000 or $15,000 per channel; with orders of 1,000 units it is expected that the price of these decoders could decrease to $12,000 or $6,000 per channel.

Whether Vidiplex is feasible or not really depends on the amount of space segment savings versus the total number of decoders that would have to be installed and their total cost. Since Vidiplex could be used with many alternatives, the following table presents the net present value of savings generated with each of these alternatives.

TABLE 4-16

NET PRESENT VALUE OF SPACE SEGMENT SAVINGS GENERATED BY VIDIPLEX PER TV CHANNEL ($000)

ALTERNATIVE	SPACE SEGMENT SAVINGS	COST OF 400 DECODERS (1)	NET SAVINGS
6/4 GHz	$ 5,850	$ 2,400	$ 3,450
6/4 GHz (2 TV carriers)	$ 2,925	$ 2,400	$ 525
14/12 GHz (2 TV carriers)	$ 2,925	$ 2,400	$ 525

(1) Assuming the lower price of $12,000 per decoder or $6,000 per channel

Thus Vidiplex is really an interesting alternative only in 6/4 GHz using one TV carrier per transponder; again though, the alternative would penalize smaller communities at the benefit of larger ones.

In the other two alternatives, the benefits presented in the preceding table would completely disappear with 500 receive points; also, it is not certain at all that the price of

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.5 Economic comparison (cont'd)

4.5.6 Vidiplex (cont'd)

decoders will come down to $12,000, and operating and maintenance expenses of Vidiplex decoding and transmitting equipment have not been included.

Where the greatest potential of Vidiplex lies is with applications where the number of receive points is small such as in video conferencing for example.

4. ECONOMIC EVALUATION OF TECHNICAL ALTERNATIVES (cont'd)

4.6 Conclusions on technical alternatives

The alternatives examined in the present chapter clearly show that the least cost solution for distribution of TV programs will be produced by the use of the 14/12 GHz satellite systems.

The analysis also shows that simply copying the U.S. technology (6/4 GHz and 1 TV carrier per transponder) constitutes the worst solution for Canada.

Our conclusions though are tentative, because of the fact that Telesat has not yet published rates for service in 14/12 GHz; unofficially though, we have learned that the rate of $1.5 million per transponder we have used in this study ($750,000 per TV channel) is very close to the rate that will be charged to La Sette for distribution of French television in the 14/12 GHz portion of Anik B.

Owners of 6/4 GHz stations will not have to discard their equipment since the addition of a downconverter at a modest cost of $2,000 will permit reception of the 14/12 GHz satellite feeds.

We urge the D.O.C. though, to make potential users fully aware of the strong conversion possibilities and advantages, so that they can at least procure antennas designed especially for service at 14/12 GHz; this would also prevent the purchase, by Quebec cable operators, of two earth stations, while in reality only one will probably be needed.

5. COST ASPECTS OF AUDIO BANDWITH SERVICES

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE

5.1 General

In addition to the video transmission service discussed in the previous sections, there exists a number of other services available that require only the bandwidth normally allocated to audio service, i.e. 5 KHz, 8 KHz or 15 KHz.

These services can be transmitted via separate carriers, or they can be multiplixed with a video signal, thus providing a very attractive alternative in terms of equipment costs and spectrum utilization.

In this section, we will discuss the cost aspects of various services of this type, such as audio broadcast signals (AM or FM radio), slow scan signals, and videotex. These services are considered complementary to video services, in the scope of this study, since they will share the same transponder. Some technical aspects will also be touched upon briefly.

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE (cont'd)

5.2 Dual sound tracks and audio broadcast signals

A video signal is usually transmitted with its associated audio signal multiplexed on a subcarrier. The subcarrier would occupy a frequency higher than that of the video baseband. It is possible to multiplex three or four audio channels with one video signal, two being the most common number of channels used.

This brings up the concept of dual sound tracks, where a video signal can be sent with two different audio signals. The two audio signals can either be related (being, for example, the left and right channels of a stereo program, or the original sound track, and its French or English version) or completely independent programs, such as an AM or FM broadcast signal added to the video sound track.

In addition to a video signal transmitted with multiplexed audio channels, it is possible to transmit up to three other audio bandwidth signals on separate carriers (as opposed to subcarriers in the above) in the same transponder, by putting those carriers at the edge of the transponder, and by sending them at a reduced level.

5.2.1 Cost of transmission by subcarriers

The insertion of a 15 KHz program audio subcarrier on a video signal will require the use of a subcarrier modulator, plus a subcarrier coupling network when more than one subcarrier is to be used. At reception, a subcarrier demodulator will be required for each subcarrier, with a power splitter for subcarriers in excess of one.

The equipement costs will be as follows:

For transmission:

1st subcarrier	:	$ 1,600
Additional subcarriers	:	$ 2,000 each

For reception:

1st subcarrier	:	$ 2,000
Additional subcarriers	:	$ 2,400 each

If a 5 KHz or 8 KHz program audio is to be multiplexed, the costs will be as follows:

For transmission:

1st subcarrier	:	$ 1,000
Additional subcarriers	:	$ 1,200 each

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE (cont'd)

5.2 Dual sound tracks and audio broadcast signals (cont'd)

5.2.1 Cost of transmission by subcarriers (cont'd)

For reception

1st subcarrier	:	\$ 400
Additional subcarriers	:	\$ 600 each

Of special interest is the transmission of a FM Stereo program by satellite; such services are already being provided in the U.S., and will probably grow substantially in the next few years.

Special equipment has been developed in order to keep the quality of the signal at a high level, and to obtain a bandwidth efficient system. With the system now in operation in the United States, three FM Stereo programs can be transmitted multiplexed with the video signal, in addition to the TV audio signal.

For transmission, the off-air pick-up of the FM Stereo stations is assumed. The system requires a FM Stereo down-converter, which translates the FM Stereo spectrum down at the subcarrier band. A deviation enhancement unit, prior to transmission, will improve the overall system signal-to-noise ratio.

At the reception, an FM Stereo upconverter will yield the FM Stereo signal at any pre-selected frequency on the FM band.

The equipment cost for transmission is as follows:

1st subcarrier	:	\$ 3,000
Additional subcarriers	:	\$ 3,400 each

The equipment cost for reception is:

1st subcarrier	:	\$ 1,200
Additional subcarriers	:	\$ 1,600 each.

5.2.2 Cost of transmission by separate carriers

The use of separate carriers to carry additional audio services will be far more expensive than the use of subcarriers discussed in the previous section, since additional equipment will be required at the transmitting and receiving earth stations.

However, greater flexibility is obtained by using this type of arrangement, since separate carriers originating from dif-

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE (cont'd)

5.2 Dual sound tracks and audio broadcast signals (cont'd)

5.2.2 Cost of transmission by separate carriers (cont'd)

ferent parts of the country can all be put in the same transponder, which is not the case for multiplexed subcarriers.

For each carrier, the equipment required will be as follows:

At the transmission

Transmitting chain	:	$ 25,000
High power amplifier	:	$ 30,000
Coupler	:	$ 10,000
TOTAL	:	$ 65,000

At the reception:

Special receiver	:	$ 7,000

5.2.3 Audio broadcast signals and simulcasting

Simulcasting is the use of two different means of transmission, at the same time, to carry the same signal. An example of such an application is the video transmission of a performing symphonic orchestra, and its audio transmitted simultaneously in stereo in the FM band for a high quality audio signal not obtainable from the TV set. Similarly, an important video news program could be transmitted also on the AM band, at the same time.

Simulcasting can be accomplished by using the same means of transmission as discussed in the previous sections, at the same costs.

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE (cont'd)

5.3 The slow scan signal

The slow scan process refers to the transmission of single frame TV pictures over conventional audio bandwidth channels. The bandwidth required is usually 8 KHz, and could be as low as 1 KHz, depending on the frequency update rate of the pictures; this reduced bandwidth insures that the information can be transmitted in the same manner as conventional audio, thus using the means of transmission described in the previous sections.

An interesting amount of information is readily convertible to single frame format; in fact, virtually anything that is now put on paper, or contained in still photographs can be converted. Examples of applications of the slow scan signal are: communications (person to person exchange of graphic information), remote sensing (weather observation, highway traffic, meter reading, etc.), security (identification, signature identification, etc.), medical (remote diagnosis transmission) and educational (instruction via still images transmitted over phone lines, FM Radio or by satellite).

In the United States, United Press International uses the slow scan signal technique to provide a 24-hour-a-day news program, called UPI Newstime. The program is distributed to cable systems by normal RF means, but in single frame format.

The viewer tuning to the appropriate TV channel sees a series of still pictures accompanied by commentary. Picture update is in the form of a slow horizontal wipe, which introduces a form of motion into the scene.

In the UPI system, visual input consists of wire photos, slides, artist's drawings and alphanumerics from an electronic character generator, while audio sources may be local announcers, tape recordings or telephone line feeds. The video programs are prepared in a video cassette; audio and video are sent to the uplink earth station by telephone lines.

The audio and video signals are multiplexed with the video signal of WTBS, Atlanta; the slow scan video signal is used to frequency modulate a subcarrier at 6.2 MHz, while the audio portion modulates a second subcarrier at 7.4 MHz.

The cost for the slow scan transmission of material, multiplexed with a video signal, is established as follows:

For the transmission path

Video Compressor (8 KHz)	$ 2,200.
Two (2) subcarrier modulators, with power supply and rack mount	$ 2,000.
Miscellaneous	$ 500.
TOTAL	$ 4,700.

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE (cont'd)

5.3 The slow scan signal (cont'd)

For the reception path:

Video expander (8 KHz)	$ 13,500.
Two subcarrier demodulators, with power supply and rack mount	$ 1,800.
Miscellaneous	$ 500.
TOTAL	$ 15,800.

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE (cont'd)

5.4 Videotex

5.4.1 Description of Videotex

Videotex is a generic name used to refer to public accessed, interactive, information retrieval services, which use domestic television receivers, suitably modified, or supplemented, as terminal equipment.

Other names are also used, such as viewdata, videotext, etc. The word "teletext", however, refers to a digital broadcasting service, associated with the normal television signal, and intended to display pages of text or elementary pictorial material on the screens of suitably-equipped television receivers. This system employs cyclic repetition of pages, and is not interactive, unlike videotex, which will provide pages on demand.

Videotex will allow the introduction of many different services for home or business applications. Electronic newspapers, electronic mail, electronic advertising, electronic games, business transactions and many other services are all possible with the new communication technology. In the future, individuals will be able to communicate with each other, and interact by being able to see the same images displayed on their individual television screens.

Videotex is actually being tested in a number of countries, including Canada. The USA have developped Green Thumb, England the Prestel, Ceefax and Oracle, Oracle systems, France, the Teletel and Antiope systems. West Germany, the Netherlands , Denmark, Finland, Sweden, Spain, Switzerland, Hong- Kong and Japan have also conducted research on videotex technology.

The European systems are generally character-oriented, which restricts the information displays to fixed format textual messages, and the display of rudimentary graphic images. Graphic images are constructed from specially identified coded graphic characters, fitted together as individual pieces of the complete picture, as in a mosaic; terminals employing this image description and display technique are referred to as "alpha-mosaic" terminals, and in that case, the resolution of the picture is limited to the display capabilities of the receiving terminal.

The Communications Research Center of the Canadian Department of Communications has been conducting research for the past five years in the area of interactive visual communication systems. They have developed a second generation videotex

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE (cont'd)

5.4 Videotex (cont'd)

5.4.1 Description of Videotex (cont'd)

system called Telidon, employing a Picture Description Instruction (PDI) system, which describes the graphic images containing geometric shapes. The PDI also includes a means of describing photographic-like images. In contrast to the European terminals, Telidon uses an alpha-geometric image description and display technique. This new approach provides much improved graphic images, and introduces a method of describing images in the database which is independent of terminal design and communication media.

The one-way videotex systems would use either the unused lines in the Vertical Blanking Interval or the full frame of a Broadcast TV signal; the interactive system could work via the telephone network, or in the near future, over two-way cable television networks. In the scope of this study, we will consider the use of the Telidon system in its non-interactive version, i.e. sent with a TV Broadcast signal.

The transmission of videotex signals by satellite will be performed by using the spare lines in the Vertical Blanking Interval of a video signal; transmission could also take place by using a separate carrier. For large databases, the videotex signal could occupy the full transponder channel if the full television frame is utilized. Interactive systems will probably use the telephone network for interaction in the near future.

5.4.2 Cost of Telidon

The Telidon videotex system is one of the more advanced system now under development; because it is still in the experimental stage, the costs are still quite high.

The actual costs for transmission of the Telidon videotex service are as follows:

Transmission:

Picture creating device	:	$ 28,000.
Central data base with mass storage (200 pages) (PDP-11-34)	:	$ 50,000
Line inserter	:	$ 25,000 to $ 50,000
Total		$ 103,000 to $ 128,000

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE (cont'd)

5.4 Videotex (cont'd)

5.4.2 Cost of Telidon (cont'd)

Some of the character line-inserter now used at CATV head-end could easily be modified for Telidon; in that case, it is expected that the cost of the line inserter would be reduced substantially.

Reception:

- A Telidon basic receiver, to be used with a home receiver set, would cost approximately $ 2,200. However, there is still some technical problems to be solved, and there would be some additional installation costs.

- A Telidon receiver, with a high resolution monitor, would now cost $ 3,500-$ 4,000.

Telidon equipment is now produced using discrete components. With mass production, and utilizing integrated circuits, the selling price of a Telidon receiver can be lowered to about $200.

5.4.3 Latest U.S. developments

Videotex is now used in the United States for teletext applications, on an experimental basis. The Broadcast Television Systems Committee, sponsored by the Electronics Industry Association, last year has established a subcommittee to study teletext services with a goal of deriving a single set of technical standards for a teletext system in the United States. Three major systems are being analyzed: The British CEEFAX/ORACLE, the French ANTIOPE, and the Canadian TELIDON systems. Recommendations in final form will be presented at the annual conference of the National Association of Broadcasters in April 1980.

Also, the U.S. Postal Service is experimenting with an international electronic message system, called Intelpost (for International Electronic Post). In the U.S., two Intelpost service centers are to operate in New York and at the U.S. Post Office Headquarters in Washington. The system is to run for a year, and initially involves, besides the United States, six countries: Argentina, Belgium, the Federal Republic of Germany, France, the Netherlands and the United Kingdom.

5. COST ASPECTS OF AUDIO BANDWIDTH SERVICE (cont'd)

5.4 Videotex (cont'd)

5.4.3 Latest U.S. developments (cont'd)

In the system, each message is scanned, stored in a computer, and then forwarded to its destination, when the overseas circuits are available and the message center ready to receive it. The received messages are also stored before being printed.

The scanner can handle paper 12.7 to 21.6 cm wide, and 12.7 to 35.6 cm long, and can read a standard business letter in a maximum of 6 seconds. The system transmits at 9.6 or 56 KBits/sec, based on traffic requirements. The charge for transmitting an 8 ½ x 11 inch page to London would be $4.

6. THE CABLE TELEVISION INDUSTRY IN CANADA

6. THE CABLE TELEVISION INDUSTRY IN CANADA

6.1 Growth of the industry

6.1.1 Overview

The growth of the Canadian cable industry since 1970 has simply been phenomenal. From just a little over 1 million subscribers in 1970 the industry will have grown to approximately 4 million subscribers at the end of 1979; this represents an annual average rate of growth of 15% as shown in the following table.

TABLE 6 - 1

CANADA

CABLE TV SUBSCRIBERS 1970 - 1979

YEAR	NUMBER OF SUBSCRIBERS	YEAR OVER YEAR INCREASE	ANNUAL RATE OF GROWTH SINCE 1970
1970	1,164,187		
1971	1,398,469	20.1%	20.1%
1972	1,689,335	20.8%	20.5%
1973	2,115,866	25.2%	22.0%
1974	2,560,787	21.0%	21.8%
1975	2,860,937	11.7%	19.7%
1976	3,143,315	9.9%	18.0%
1977	3,417,223	8.7%	16.6%
1978	3,775,633	10.5%	15.8%
1979 (1)	4,000,000	5.9%	14.7%

Source: Statistics Canada

(1) Estimated by Tamec Inc.

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.1 Growth of the industry (cont'd)

6.1.1 Overview (cont'd)

During this period Canada effectively became the first wired nation in the world, as both the penetration rate and the number of households passed increased substantially. The penetration rate is defined as the number of subscribers over the number of households passed by cable.

TABLE 6 - 2

CANADA

SUBSCRIBERS AND HOMES PASSED BY CABLE 1970 - 1979

YEAR	NUMBER OF SUBSCRIBERS	PEN. RATE IN %	NUMBER OF HOMES PASSED	YEAR OVER YEAR INCREASE OF HOMES PASSED	ANNUAL RATE OF GROWTH SINCE 1970
1970	1,164,187	48.7%	2,392,022		
1971	1,398,469	52.2%	2,681,346	12.1%	12.1%
1972	1,689,335	51.0%	3,313,147	23.6%	17.7%
1973	2,115,866	57.0%	3,715,009	12.1%	15.8%
1974	2,560,787	63.3%	4,044,559	8.9%	14.0%
1975	2,860,937	67.7%	4,223,221	4.4%	12.0%
1976	3,143,315	66.8%	4,706,402	11.4%	11.9%
1977	3,417,223	67.6%	5,051,360	7.3%	11.3%
1978	3,775,633	69.0%	5,470,710	8.3%	10.9%
1979 (1)	4,000,000	67.8%	5,902,000	7.8%	10.6%

Source: Statistics Canada

(1) Estimated by Tamec Inc.

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.1 Growth of the industry (cont'd)

6.1.1 Overview (cont'd)

This number of homes passed by cable has also to be put in perspective with the number of households in licensed areas and the total number of households in Canada as shown on table 6 - 3. Cable now passes by almost 79% of canadian homes, up from only 41% in 1970. This is quite remarkable especially if we consider that the number of canadian households has grown at a rate of approximately 2.9% a year over that period.

TABLE 6 - 3

CANADA

HOUSEHOLDS PASSED BY CABLE 1970 - 1979

YEAR	HOUSEHOLDS PASSED (1)	HOUSEHOLDS IN LICENSED AREA (2)	% 1 - 2 (3)	TOTAL NUMBER OF HOUSEHOLDS (4)	% 1 - 4 (5)	% 1 - 5 (6)
1970	2,392,022	2,985,599	80.1%	5,784,000	41.4%	51.6%
1971	2,681,346	3,095,583	86.6%	5,933,000	45.2%	52.2%
1972	3,313,147	3,711,649	89.3%	6,111,000	54.2%	60.7%
1973	3,715,009	4,079,483	90.1%	6,301,000	59.0%	64.7%
1974	4,044,559	4,365,580	92.6%	6,513,000	62.1%	67.0%
1975	4,223,221	4,499,890	93.9%	6,721,000	62.8%	70.0%
1976	4,706,402	4,985,304	94.4%	6,949,000	67.7%	71.7%
1977	5,051,360	5,218,395	95.2%	7,150,000	70.6%	73.0%
1978	5,470,710	5,792,449	94.4%	7,320,000	74.7%	79.1%
1979(1)	5,900,000	6,210,000	95.0%	7,503,000	78.6%	82.8%

Source: Statistics Canada

(1) Estimated by Tamec Inc.

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.1 Growth of the industry (cont'd)

6.1.1 Overview (cont'd)

TABLE 6 - 4

HOUSEHOLDS IN LICENSED AREAS AND TOTAL

NUMBER OF HOUSEHOLDS, 1970 - 1979

	HOUSEHOLDS IN LICENSED AREAS			TOTAL NUMBER OF HOUSEHOLDS		
YEAR	NUMBER	YEAR OVER YEAR INCREASE	ANNUAL RATE FROM 1970	NUMBER	YEAR OVER YEAR INCREASE	ANNUAL RATE FROM 1970
1970	2,985,599			5,784,000		
1971	3,095,583	3.7%	3.7%	5,933,000	2.6%	2.6%
1972	3,711,649	19.9%	11.5%	6,111,000	3.0%	2.8%
1973	4,079,483	9.9%	11.0%	6,311,000	3.1%	2.9%
1974	4,365,580	7.0%	10.0%	6,513,000	3.4%	3.0%
1975	4,400,890	3.1%	8.6%	6,721,000	3.2%	3.0%
1976	4,985,384	10.8%	8.9%	6,949,000	3.4%	3.1%
1977	5,218,395	4.7%	8.3%	7,150,000	2.9%	3.1%
1978	5,792,449	11.0%	8.6%	7,320,000	2.4%	3.0%
1979(1)	6,210,000	7.2%	8.5%	7,503,000	2.5%	2.9%

Source: Statistics Canada

(1) Estimated by Tamec Inc.

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.1 Growth of the industry (cont'd)

6.1.1 Overview (cont'd)

Operating revenues increased at an annual rate of 22% during the 1970 - 1978 period and, as was seen earlier, the increase in the number of subscribers provided much of that growth. The average revenue per subscriber increased very moderately up to 1975 but, starting that year, things changed dramatically; as the number of subscribers increased at a slower pace, the cable industry has had to rely more on rate increases.

6.1.2 Geographic distribution

The overall growth of the industry which has been described in the previous section was evident in every province of the country although growth rates in certain provinces were exceptionnaly high as fairly large systems were put in operation during the 1972 - 1978 period.

As these new systems became fully operational, the year over year increases in the number of subscribers, although quite high, have slowed considerably over the period.

Penetration rates showed the same trend as certain provinces definitely showed saturation tendencies. This was especially true in the three most populated provinces: Ontario, Quebec and British Columbia. In the last province especially, it seems that penetration rates cannot move higher than 85% - 86% and the gain in subscribers have to come from increases in the number of households passed and households in the licensed area.

TABLE 6 - 5

CANADIAN CABLE INDUSTRY

OPERATING REVENUES, 1970 - 1978

YEAR	OPERATING REVENUES $000	YEAR OVER YEAR INCREASE	NUMBER OF SUBSCRIBERS	YEAR OVER YEAR INCREASE	AVERAGE REVENUE PER SUBSCRIBER	YEAR OVER YEAR INCREASE	PRE TAX MARGIN	AFTER TAX MARGIN
1970	54,940		1,164,187		47.19			
1971	66,620	21.3%	1,398,469	20.1%	47.64	0.95%		
1972	82,464	23.8%	1,689,335	20.8%	48.81	2.46%	21.2%	11.7%
1973	106,973	29.7%	2,115,866	25.2%	50.56	3.59%	21.6%	11.9%
1974	133,433	24.7%	2,560,787	21.0%	52.10	3.05%	21.5%	10.8%
1975	162,273	21.6%	2,860,937	11.7%	56.72	8.87%	19.5%	9.9%
1976	199,215	22.8%	3,143,315	9.9%	63.38	11.74%	18.2%	9.2%
1977	232,958	16.9%	3,417,223	8.7%	68.17	7.6 %	19.4%	10.5%
1978	273,223	17.3%	3,775,633	10.5%	72.36	6.2 %	19.3%	10.2%

Source: Statistics Canada

TABLE 6 - 6

CABLE TELEVISION SUBSCRIBERS BY REGION, 1970 - 1979

	YEAR							
REGION	1972	1973	1974	1975	1976	1977	1978	1979 (1)
Atlantic	19,033	39,560	61,607	83,453	103,759	131,495	175,883	213,821
Quebec	275,081	372,032	441,106	483,866	555,538	654,731	708,796	792,634
Ontario	811,298	1,006,441	1,228,723	1,353,263	1,453,090	1,511,557	1,646,538	1,716,428
Manitoba and Saskatchewan	68,723	89,258	109,654	134,508	152,189	166,438	223,417	278,406
Alberta	57,647	120,285	171,957	203,581	227,892	257,374	285,640	318,058
British Columbia	388,283	435,304	495,075	546,439	593,066	645,552	687,019	681,777
TOTAL	1,620,065	2,062,880	2,508,122	2,805,110	3,085,534	3,367,147	3,727,293	4,001,124
Absolute increase		442,815	445,242	296,988	280,424	281,613	360,146	273,831
Year over year %		27.3%	21.6%	11.8%	10.0%	9.1%	10.7%	7.3%

Source: Statistics Canada

(1) Matthew's CATV

Note: Systems with more than 1,000 subscribers

TABLE 6 - 7

YEAR OVER YEAR INCREASES IN SUBSCRIBERS BY REGION, 1973 - 1979

	YEAR						
REGION	1973	1974	1975	1976	1977	1978	1979 (1)
Atlantic	107.8%	55.7%	35.5%	24.3%	26.7%	33.8%	21.6%
Quebec	35.2%	18.6%	9.7%	14.8%	17.9%	8.3%	11.8%
Ontario	24.1%	22.1%	10.1%	7.4%	4.0%	8.9%	4.2%
Manitoba and Saskatchewan	29.9%	22.9%	22.7%	13.1%	9.4%	34.2%	24.6%
Alberta	108.7%	43.0%	18.4%	11.9%	12.9%	11.0%	11.3%
British Columbia	12.1%	13.7%	10.4%	8.5%	8.8%	6.4%	---
TOTAL	27.3%	21.6%	11.8%	10.0%	9.1%	10.7%	7.3%

Source: Statistics Canada
(1) Matthew's CATV

Note: Systems with more than 1,000 subscribers

TABLE 6 - 8

PENETRATION RATES IN % BY REGION, 1973 - 1978

	YEAR						
REGION	1972	1973	1974	1975	1976	1977	1978
Atlantic	39.2%	43.5%	58.1%	59.5%	61.8%	62.6%	68.2%
Quebec	32.5%	40.9%	44.9%	47.6%	47.1%	49.5%	49.5%
Ontario	55.8%	62.0%	69.3%	71.6%	73.3%	73.2%	73.9%
Manitoba and Saskatchewan	49.2%	53.3%	59.4%	68.3%	73.7%	77.1%	75.0%
Alberta	26.1%	41.0%	50.4%	56.3%	58.4%	61.8%	61.2%
British Columbia	78.2%	82.4%	85.6%	86.8%	85.9%	86.4%	87.2%
TOTAL	50.1%	56.9%	63.2%	66.3%	66.8%	67.7%	68.1%

Source: Statistics Canada

Note: Systems with more than 1,000 subscribers

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.1 Growth of the industry (cont'd)

6.1.2 Geographic distribution (cont'd)

Another even more worrying sign is the constant decrease in the number of households passed per mile of cable.

TABLE 6 - 9

AVERAGE NUMBER OF HOUSEHOLDS PASSED PER MILE OF CABLE, BY REGION, 1972 - 1978

	YEAR						
REGION	1972	1973	1974	1975	1976	1977	1978
Atlantic	109.7	120.3	97.5	120.4	84.5	84.3	76.4
Quebec	210.9	201.4	184.2	163.5	172.8	164.9	160.8
Ontario	143.2	134.1	132.6	130.4	129.1	125.2	126.0
Manitoba and Saskatchewan	150.4	153.0	152.5	154.4	157.6	158.4	203.0
Alberta	131.4	113.4	120.0	124.0	120.6	117.5	119.5
British Columbia	111.5	110.4	109.3	103.8	96.4	94.9	94.3
TOTAL	147.9	139.8	136.1	131.8	128.7	125.1	125.2

Source: Statistics Canada

Note: Systems with more than 1,000 subscribers

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.1 Growth of the industry (cont'd)

6.1.2 Geographic distribution (cont'd)

Operating revenues increased at an average rate of 23% since 1972 as shown in table 6 - 10.

The rapid increase in the number of subscribers is largely responsible for this growth since the average revenue per subscriber increased at a much slower pace of 6.7% annually over the same period.

TABLE 6 - 10

OPERATING REVENUES OF THE CABLE INDUSTRY, BY REGION, 1972-1979 ($000)

	YEAR						
REGION	1972	1973	1974	1975	1976	1977	1978
Atlantic	896	2,297	3,733	5,888	7,811	10,647	14,493
Quebec	15,566	19,539	23,505	27,365	34,765	45,949	54,713
Ontario	38,478	48,978	60,710	74,676	91,760	99,776	113,653
Manitoba and Saskatchewan	3,495	4,608	5,743	6,903	8,163	9,248	12,766
Alberta	2,607	7,244	11,391	15,030	18,498	22,025	26,242
British Columbia	18,636	21,330	25,201	28,857	33,779	41,950	47,944
TOTAL	79,679	103,997	130,283	158,769	194,776	229,595	269,811
Year over year increased in %		35.62%	25.3%	21.9%	22.7%	17.9%	17.5%

Source: Statistics Canada

Note: Systems with more than 1,000 subscribers

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.1 Growth of the industry (cont'd)

6.1.2 Geographic distribution (cont'd)

But again, as the number of subscribers is growing more slowly, the industry has had to rely more heavily on rate increases which seem to have accelerated since 1975.

TABLE 6 - 11

OPERATING REVENUES PER SUBSCRIBER, BY REGION, 1972-1978

	YEAR						
REGION	1972	1973	1974	1975	1976	1977	1978
Atlantic	$47.08	$58.08	$60.59	$70.55	$75.28	$80.97	$82.40
Quebec	56.59	52.52	53.29	56.55	62.58	70.18	77.19
Ontario	47.43	48.66	49.41	55.18	63.15	66.01	69.03
Manitoba and Saskatchewan	50.86	51.63	52.38	51.69	53.63	55.56	57.14
Alberta	45.23	60.22	66.25	73.83	81.17	85.58	91.87
British Columbia	48.00	49.00	50.90	52.81	56.96	64.98	69.79
TOTAL	49.18	50.41	51.94	56.60	63.13	68.19	72.39
Year over year increase		2.50%	3.04%	8.97%	11.5%	8.0%	6.2%
Average rate of growth on 72		2.50%	2.77%	4.80%	6.44%	6.8%	6.7%

Source: Statistics Canada

Note: Systems with more than 1,000 subscribers

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.2 Structure of the industry

6.2.1 By system size

Contrary to the U.S. cable television industry, the industry is firmly implanted in large metropolitan areas; thus as the following table indicates, a relatively small number of systems represent a substantial portion of total cable subscribers.

TABLE 6 - 12

CABLE SUBSCRIBERS BY SYSTEM SIZE - 1979

		LARGE SYSTEMS		SMALL SYSTEMS		ALL SYSTEMS	
		NO OF SYSTEMS	NO OF SUBSCRIBERS (000)	NO OF SYSTEMS	NO OF SUBSCRIBERS (000)	NO OF SYSTEMS	NO OF SUBSCRIBERS (000)
50,000 +							
	number	21	2,050	378	1,951	399	4,001
	%	5.3%	51.2%	94.7%	48.8%	100%	100.0%
25,000 +							
	number	35	2,500	364	1,500	399	4,001
	%	8.8%	62.5%	91.2%	37.5%	100%	100.0%
15,000 +							
	number	60	3,000	339	1,000	399	4,001
	%	15.0%	75.0%	85.0%	25.0%	100%	100.0%
10,000 +							
	number	81	3,226	318	775	399	4,001
	%	20.3%	80.6%	79.7%	19.4%	100%	100.0%

Source: Estimated from Matthew's CATV

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.2 Structure of the industry (cont'd)

6.2.1 By system size (cont'd)

The following table presents a list of all systems with more than 50,000 subscribers and a detailed list of all systems with more than 10,000 subscribers is presented in appendix A.

TABLE 6 - 13

SYSTEMS OF 50,000 SUBSCRIBERS OR MORE BY RANK, 1979

RANK		ACTUAL NUMBER OF SUBSCRIBERS	POTENTIAL NUMBER OF SUBSCRIBERS	PENETRATION RAT %
1	Rogers Cable TV (Toronto)	309,700	437,200	70.9
2	Vancouver Cablevision (Vancouver)	220,000	235,000	93.6
3	Cablevision Nationale (Montrêal)	200,000	546,000	36.6
4	Cable TV (Montrêal)	128,000	245,000	52.2
5	Winnipeg Videon (Winnipeg)	123,000	143,585	85.7
6	Grand River Cable TV (Kitchener)	90,000	107,000	84.1
7	Ottawa Cablevision (Ottawa)	83,000	111,000	74.7
8	Maclean-Hunter Cable TV (Toronto)	78,795	106,587	73.9
9	Têlêcable de Quêbec (Quêbec)	73,000	150,000	49.0
10	Victoria Cablevision (Victoria)	72,000	76,800	94.0
11	Skyline Cablevision (Ottawa)	72,000	92,000	78.3
12	Calgary Cable (Calgary)	70,000	104,000	67.3
13	York Cablevision (Toronto)	69,500	89,000	78.1
14	QCTV (Edmonton)	65,000	116,000	56.0
15	Capital Cable TV (Edmonton)	62,250	80,000	77.8
16	London Cable TV (London)	61,500	67,000	91.8
17	Western Cablevision (Surrey)	60,000	70,000	85.7
18	Community Antenna TV (Calgary)	58,000	88,000	65.9
19	Greater Winnipeg Cablevision (Winnipeg)	53,420	59,700	89.5
20	Scarboro Cable TV/FM (Toronto)	51,000	63,000	81.0
21	Keeble Cable TV (Toronto)	50,000	68,000	73.5
SUB-TOTAL		2,050,165	3,055,072	67.1%
OTHER SYSTEMS		1,950,955	2,846,932	68.5%
TOTAL		4,001,124	5,902,004	67.8%

Source: Estimated from Matthem's CATV

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.2 Structure of the industry (cont'd)

6.2.1 By system size (cont'd)

Table 6-14 presents a summary of the characteristics of the Canadian cable television industry by system size. There are 81 systems in Canada out of 399 (20.3% of all systems) that account for more than 80% of all subscribers.

Roughly 68% of all these large system subscribers are located in Eastern Canada (2.2 million out of 3.2 million); Ontario heads the list with 42 systems and more than 1.5 million subscribers, with Quebec following with 12 systems and almost 600,000 subscribers.

Western Canada accounts for 32% of these large system subscribers (1.0 million out of 3.2 million); British Columbia heads the list with 12 systems and 534,000 subscribers while Alberta follows with 5 systems and 268,000 subscribers.

6.2.2 By company

Already dominated by large systems, the industry has also experienced a fairly important consolidation phase in the last two years or so.

As the following table indicates, the 10 largest companies in Canada account for almost 70% of total subscribers. It has also been a case of 'small fish eats big fish' in these last two years, with the acquisition of major companies by much smaller ones. The Rogers' group in that sense is particularly significant; after having acquired Canadian Cablesystems, it looks as though Premier Communications will also end up in its camp, if the transaction is approved by the C.R.T.C. The CCS-Premier group would in that case become the largest cable company in the world with more than 1.2 million subscribers in Canada alone (1).

The case of Vidéotron is also fairly interesting; after having acquired Cablevision Nationale, again subject to C.R.T.C. approval, it will end up with more than 400,000 subscribers; the new group will be dwarfed by the CCS-Premier group but one must not forget that all of Vidéotron's systems are located in the Province of Québec; Vidéotron will thus control more than half of the 800,000 subscribers market with lots of room to grow because of the present low penetration of the CNL Montreal system.

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(1) The group also owns cable systems in the United States and United Kingdom.

TABLE 6 - 14

SYSTEM SIZE AND NUMBER OF SUBSCRIBERS BY PROVINCE AND REGION, 1979

	SYSTEM SIZE								
	10,000 +			9,999 -			All systems		
PROVINCE	No of systems	No of subscribers	% subs.	No of systems	No of subscribers	% subs.	No of systems	No of subscribers	% subs.
Newfoundland	1	12,000	49.3	7	12,333	50.7	8	24,333	100.0
P.E.I.	-	--	--	2	10,500	100	2	10,500	100.0
Nova Scotia	2	48,650	46.1	17	56,698	53.9	19	105,348	100.0
New Brunswick	3	50,400	68.4	13	23,240	31.6	16	73,640	100.0
SUB-TOTAL	6	111,050	51.9	39	102,771	48.1	45	213,821	100.0
Quebec	12	568,511	71.7	112	224,123	28.3	124	792,634	100.0
Ontario	42	1,515,179	88.3	72	201,249	11.7	114	1,716,428	100.0
SUB-TOTAL EASTERN CANADA	60	2,194,740	80.6	223	528,143	19.4	283	2,722,883	100.0
Manitoba	2	176,420	93.3	8	12,763	6.7	10	189,183	100.0
Saskatchewan	2	53,000	59.9	12	36,223	40.1	14	89,223	100.0
Alberta	5	268,250	84.3	22	49,800	15.7	27	318,058	100.0
British Columbia, Yukon and N.W.T.	12	533,506	78.3	53	148,271	21.7	65	681,777	100.0
SUB-TOTAL WESTERN CANADA	21	1,031,176	80.7	95	247,065	19.3	116	1,705,891	100.0
C A N A D A	81	3,225,916	80.6	318	775,208	19.4	399	4,001,124	100.0

TABLE 6 - 15

THE 10 LARGEST CABLE COMPANIES IN CANADA, 1979

COMPANY	NUMBER OF SUBSCRIBERS (000)	% OF TOTAL	CUMULATIVE	% OF TOTAL	NUMBER OF SYSTEMS
CCS - PREMIER	1,257	31.4	1,257	31.4	23
VIDÉOTRON-CNL	413	10.3	1,670	41.7	16
MACLEAN HUNTER	283	7.1	1,953	48.8	16
CABLECASTING (1)	157	3.9	2,110	52.7	4
CABLE TV	128	3.2	2,238	55.9	1
MOFFAT COMMUNICATIONS (2)	123	3.1	2,361	59.0	1
CAPITAL CABLE	98	2.4	2,459	61.4	4
CUC LTD.	97	2.4	2,556	63.9	4
OTTAWA CABLEVISION (3)	95	2.4	2,651	66.3	4
CABLE NET LTD. (4)	93	2.3	2,744	68.6	8
SUB-TOTAL	2,744	68.6	2,744	68.6	81
ALL OTHER COMPANIES	1,257	31.4	1,257	31.4	318
TOTAL	4,001	100.0	4,001	100	399

(1) Includes Greater Winnipeg Cablevision of which Selkirk Holdings is a shareholder
(2) Moffat Communications also has another very small cable system (300 subscribers)
(3) Includes the Ottawa system of which Selkirk Holdings is also a shareholder
(4) Parent company is Agra Industries Ltd.

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.3 Cable subscribers projections

6.3.1 Households

To conform to Statistics Canada's calculation of licensed households and penetration rates, we have utilized their estimation of total household figures. These total household figures, however, are based on 1971 census projections and, as such, underestimate among other things, the increasing divorce rate and advent of single person dwellings.

New household projections based upon 1976 census material indicate that, even under the most pessimistic assumptions, the growth in households has not dropped below 2.5% since 1976, and wil continue at this rate at least until 1990.

Assuming a 2.5% growth rate and a total household count of 7.32 million in 1978, the number of households in Canada should reach, as Table 6-16 indicates, 9.8 million by 1990. Presently, there are over 7.5 million households in Canada.

6.3.2 Licensed households

Licensed households now account for 80% of total canadian households.

We have assumed without undue simplification that, urban licenses are now presently saturated. Furthermore, it is expected that 50% of all areas now classified by DOC as rural communities, (and not presently serviced by cable) will be licensed by 1990(1).

This potential growth in licensed households roughly translates into an annual increase of 3.6%, of which, 2.5% is required to cover the growth of households within existing licenses and, 1.1% is required to extend service to remote areas.

6.3.3 Homes passed

At least 94.4% of licensed households in Canada are presently passed by cable. We expect the percentage of households passed to remain relatively stable, growing steadily to 96% by 1982 and remaining constant thereafter.

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(1) Rural Canada accounts for 24% of total canadian households. Aproximatively, 10% of rural households are now presently serviced by cable. Our assumptions indicate, therefore, that 60% of rural households will be cabled by 1990.

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.3 Cable subscribers projections (cont'd)

6.3.4 Cable subscribers

The ratio of cable subscribers-to-homes passed, historically, is leveling off at 70%. A scenario of steady growth, however, is adopted in which the percentage of basic cable subscribers to homes passed gradually increases to 80% by 1990. This assumes, a priori, that premium television and other services are formally introduced by the early 1980's. Given this forecast, cable subscribers should grow to slightly over 6.8 million by 1990.

TABLE 6 - 16
C A N A D A
CABLE SUBSCRIBERS PROJECTION TO THE YEAR 1990

YEAR	1 TOTAL CANADIAN HOUSEHOLDS (000)	2 TOTAL LICENSED HOUSEHOLDS		3 HOUSEHOLDS PASSED IN LICENSED AREA		4 CABLE SUBSCRIBERS	
		% of 1	(000)	% of 2	(000)	% of 3	(000)
1978	7320	79.1	5793	94.4	5471	69.8	3776
1979	7503	80.1	6010	95.0	5710	69.9	3998
1980	7691	81.1	6237	95.0	5925	70.7	4189
1981	7883	82.1	6472	95.0	6148	71.6	4402
1982	8080	83.1	6715	96.0	6446	72.4	4667
1983	8282	84.1	6965	96.0	6686	73.4	4908
1984	8489	85.1	7224	96.0	6935	74.3	5153
1985	8702	86.1	7492	96.0	7192	75.2	5408
1986	8920	87.1	7769	96.0	7458	76.1	5676
1987	9143	88.1	8055	96.0	7733	77.1	5962
1988	9371	89.1	8350	96.0	8016	78.1	6261
1989	9605	90.1	8654	96.0	8308	79.0	6563
1990	9846	90.1	8871	96.0	8516	80.0	6813

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.4 Conclusions on the cable television industry

6.4.1 The emerging force

In our opinion the industry is shaping up as a major force in the telecommunications industry. It is already firmly implanted in all of Canada's urban areas and from a corporate point of view, a few giant companies are rapidly emerging. We are thus likely to see further concentration in the coming years as more emphasis is put on research and development of new services.

The industry is still small compared to the telephone industry but the bandwidth of the coaxial cable, that is already in place, is a tremendous asset for the cable industry as well as a tremendous menace for the telephone industry. What role should the cable industry play in Canada is clearly outside our mandate, but it is becoming apparent that the narrow definition of an extension of the broadcasting system, that simply improves the quality of off air signals, does not fit the reality anymore. Policymakers will thus be confronted with the delicate task of better defining that role in the years to come; we think that policymaking, in that sense, should not lose sight of the international (we should probably say United States) context against which the cable industry is developing. Cable is rapidly developing in that country, with major multinational companies becoming participants; if Canada does not take that factor into account, we might end up at the end of this decade, with all of the major technological developments and new services coming from that country, and the Canadian telecommunications industry will have joined the rest of the industrial sectors in the branch plant economy.

6.4.2 Cable and the rural areas

Television services to rural Canada have been studied in depth by the Department of Communications; the research material clearly demonstrates that the cable industry is guilty on two counts in that area. It shows clearly that, first, cable has not expanded significantly in rural Canada and second that because it has been providing so many new services to urban areas, it is in effect constantly widening the TV gap between urban and rural Canada.

Leaving aside the past and concentrating on how the situation might involve in the future we would like to submit the following techno-economic considerations.

The first problem associated with serving the poorly served areas is getting the signals there. During the seventies,

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.4 Conclusions on the cable television industry (cont'd)

6.4.2 Cable and the rural areas (cont'd)

technology played a major role in solving part of the problem; microwave transmission enabled large and smaller distant cities to have access to better television services. If one looks at the following table, one can see that cable has not exactly been standing idle at providing better television services to all Canadians.

During the period of nine years from 1970 to 1979, the proportion of households not passed by cable has decreased from 51.6% in 1970 to 21.3% in 1979; the proportion of households not licensed has similarly decreased from 48.4% of total households to 17.2%.

Presently though, one cannot expect conventional technology to reduce the gap much further; the unserved areas are more distant on one hand, and consist of smaller population groups on the other hand; the costs of bringing the signals via microwave thus become astronomical on a per household per channel basis.

TABLE 6 - 17

HOUSEHOLDS SERVED BY CABLE, 1970 AND 1979

	1970		1979	
	NUMBER IN 000	% OF TOTAL HOUSEHOLDS	NUMBER IN 000	% OF TOTAL HOUSEHOLDS
Total households	5,784	100.0%	7,503	100.0
Households in licensed areas	2,986	51.6	6,210	82.8
Households passed by cable	2,392	41.4	5,902	78.7
Households not licensed	2,798	48.4	1,293	17.2
Households not passed	2,986	51.6	1,601	21.3

6. THE CABLE TELEVISION INDUSTRY IN CANADA (cont'd)

6.4 Conclusions on the cable television industry

6.4.2 Cable and the rural areas (cont'd)

Satellite technology, because it is insensitive to distance is obviously the solution to the problem but because the costs of the technology are fixed and fairly high (especially in Canada) services have to rely on a large subscriber base.

When one considers satellite technology, one simply cannot separate rural and remote communities from urban Canada; and the argument we are putting forth will become stronger in the future as we move from mass appeal programming to specialized audiences programming.

Assuming that satellite technology solves the first problem (getting the signals there) we are then left with the second problem which is ground distribution costs.

Again there are a number of technological options to solve that second problem such as:

- low power transmitters
- very high capacity microwave
- cable

The last option (cable) is strongly affected by the density of the population, by the number of households passed per mile of cable. What is the minimum number of households per mile that can justify cable? The answer depends on two factors which are the technological costs, and the cash flow that can be generated per household.

If for example a discretionary service such as pay TV increases the cash flow per household, this means that cable is feasible in lower population density areas, which in turn means that more of rural Canada will have access to better television services via cable, than would otherwise be the case.

A P P E N D I X "A"

LIST OF CABLE SYSTEMS OF 10,000 SUBSCRIBERS OR MORE

NEWFOUNDLAND

RANK	NAME OF SYSTEM	LOCATION	NUMBER OF SUBSCRIBERS
1	Avalon Cablevision Ltd.	St.John's	12,000
	Systems of more than 15,000 subscribers		0
	Systems between 10 and 15,000 subscribers		12,000
	Systems of more than 10,000 subscribers		12,000
	All others systems		12,333
	Provincial Total		24,333

PRINCE EDWARD ISLAND

			SYSTEM
Systems of more than 15,000 subscribers	0	0	0
Systems between 10,000 and 15,000 subscribers	0	0	0
Systems of more than 10,000 subscribers	0	0	0
All other systems	12,600	10,500	2
Provincial Total	12,600	10,500	2

QUÉBEC

RANK	NAME OF SYSTEM	LOCATION	NUMBER OF SUBSCRIBERS
1	Cablevision Nationale Ltée	Montréal	200,000
2	Cable TV Inc.	Montreal	128,000
3	Télécable de Québec	Quebec City	73,000
4	Télécable Vidéotron Ltée	Longueuil	34,500
5	Cablevision Nationale Ltée	Sherbrooke	27,000
6	Laurentian Cablevision Ltée	Hull	20,500
7	Télésag Inc.	Chicoutimi	18,000
8	La Belle-Vision Inc.	Trois-Rivières	17,711
9	Cablevision Bas St-Laurent	Rimouski	14,300
10	Télécable de la Rive-Sud Inc.	Lévis	12,200
11	Télécable Vidéotron	Gatineau	12,000
12	Cablestrie Inc.	Drummondville	11,300
	Systems of more than 15,000 subscribers		518,711
	Systems between 10,000 and 15,000 subscribers		49,800
	Systems of more than 10,000 subscribers		568,511
	All other systems		224,123
	Provincial Total		792,634

ONTARIO

RANK	NAME OF SYSTEM	LOCATION	NUMBER OF SUBSCRIBERS
1	Rogers Cable TV Ltd.	Toronto	309,700
2	Grand River Cable TV Ltd.	Kitchener	90,000
3	Ottawa Cablevision Ltd.	Ottawa	83,000
4	Maclean-Hunter Cable TV Ltd.	Toronto	78,795
5	Skyline Cablevision Ltd.	Ottawa	72,000
6	York Cablevision Ltd.	Toronto	69,500
7	London Cable TV Ltd.	London	61,500
8	Scarboro Cable TV/FM Ltd.	Toronto	51,000
9	Keeble Cable TV Ltd.	Toronto	50,000
10	Niagara Co-Ax Ltd.	Hamilton	37,000
11	Pine Ridge Cable TV	Oshawa	33,578
12	Rogers Cable TV Ltd.	Brampton	33,000
13	Maclean-Hunter Cable TV Ltd.	London	31,700
14	Maclean-Hunter Cable TV Ltd.	Thunder Bay	30,051
15	Sudbury Cable Services Ltd.	Sudbury	28,320
16	Credit Valley Cable TV/FM Ltd.	Missisauga	25,200
17	Classic Communications Ltd.	Richmond Hill	24,600
18	Jarmain Cable TV Ltd.	Brantford	23,700
19	Kingston Cable TV Ltd.	Kingston	23,500
20	Mountain Cablevision Ltd.	Hamilton	23,000
21	Graham Cable TV/FM Ltd.	Toronto	22,900
22	Maclean-Hunter Cable TV Ltd.	Guelph	21,680
23	Wired City Communications Ltd.	Toronto	20,200
24	Peterborough Cable TV Ltd.	Peterborough	20,100
25	Huron Cable TV Ltd.	Sarnia	19,954

ONTARIO (cont'd)

RANK	NAME OF SYSTEM	LOCATION	NUMBER OF SUBSCRIBERS
26	Lake Superior Cablevision Ltd.	Sault Ste-Marie	19,500
27	Cablevue Ltd.	Belleville	18,500
28	Maclean-Hunter TV Ltd.	Ste-Catherines	17,500
29	Cornwall Cablevision Ltd.	Cornwall	16,569
30	Timmins Cable Services Ltd.	Timmins	16,000
31	Citizens Cable TV Ltd.	Burlington	15,000
32	Armstrong Comunications Ltd.	Welland	14,000
33	Maclean-Hunter Cable TV Ltd.	Malton	13,195
34	Barrie Cable TV/FM Ltd.	Barrie	13,017
35	Oakville Cablevision Ltd.	Oakville	12,000
36	Maclean-Hunter Cable TV Ltd.	Hamilton	11,200
37	Niagara Co-Ax Ltd.	Hamilton	11,000
38	All View Cable Service Ltd.	St-Thomas	10,950
39	Western Cable TV Ltd.	Woodstock	10,900
40	Chatham Cable TV Ltd.	Chatham	10,848
41	Jarmain Cable TV Ltd.	Newmarket	10,750
42	Maclean-Hunter Cable TV Ltd.	North Bay	10,272
	Systems of more than 15,000 subscribers		1,387,047
	Systems between 10,000 and 15,000 subscribers		128,132
	Systems of more than 10,000 subscribers		1,515,179
	All other systems		201,249
	Provincial Total		1,716,428

MANITOBA

RANK	NAME OF SYSTEM	LOCATION	NUMBER OF SUBSCRIBERS
1	Winnipeg Videon Ltd.	Winnipeg	123,000
2	Greater Winnipeg Cablevision Ltd.	Winnipeg	53,420
	Systems of more than 15,000 subscribers		176,420
	Systems between 10,000 and 15,000 subscribers		0
	Systems of more than 10,000 subscribers		176,420
	All other systems		12,763
	Provincial Total		189,183

SASKATCHEWAN

RANK	NAME OF SYSTEM	LOCATION	NUMBER OF SUBSCRIBERS
1	Cable Regina Ltd.	Regina	28,000
2	Saskatoon Telecable Ltd.	Saskatoon	25,000
	Systems of more than 15,000 subscribers		53,000
	Systems between 10,000 and 15,000 subscribers		0
	Systems of more than 10,000 subscribers		53,000
	All other systems		36,223
	Provincial Total		89,223

ALBERTA

RANK	NAME OF SYSTEM	LOCATION	NUMBER OF SUBSCRIBERS
1	Calgary Cable TV Ltd.	Calgary	70,000
2	QCTV Ltd.	Edmonton	65,000
3	Capital Cable TV Ltd.	Edmonton	62,250
4	Community Antenna TV Ltd.	Calgary	58,000
5	Cablevision Lethbridge Ltd.	Lethbridge	13,000
	Systems of more than 15,000 subscribers		255,250
	Systems between 10,000 and 15,000 subscribers		13,000
	Systems of more than 10,000 subscribers		268,250
	All other systems		49,808
	Provincial Total		318,058

BRITISH COLUMBIA

RANK	NAME OF SYSTEM	LOCATION	NUMBER OF SUBSCRIBERS
1	Vancouver Cablevision Ltd.	Vancouver	220,000
2	Victoria Cablevision Ltd.	Victoria	72,000
3	Western Cablevision Ltd.	Surrey	60,000
4	Fraser Cablevision Ltd.	Coquitlam	42,000
5	Cable West TV Ltd.	Vancouver	38,812
6	Delta Cable Ltd.	Delta	19,000
7	Central Interior Cablevision Ltd.	Prince George	18,106
8	Mainline Cablevision of Kamloops	Kamloops	15,500
9	Kelowna Cable TV Ltd.	Kelowna	15,000
10	Cable West TV Ltd.	Nanaimo	12,454
11	Valley Televue Ltd.	Chilliwack	10,634
12	MSA Cablevision Ltd.	Abbotsford	10,000
	Systems of more than 15,000 subscribers		500,418
	Systems between 10,000 and 15,000 subscribers		33,088
	Systms of more than 10,000 subscribers		533,506
	All other systems		143,521
	Provincial Total		677,027

YUKON AND M.W.T.

			SYSTEM
Systems of more than 15,000 subscribers	0	0	0
Systems between 10,000 and 15,000 subscribers	0	0	0
Systems of more than 10,000 subscribers	0	0	0
All other systems	6,300	4,750	2
Provincial Total	6,300	4,750	2

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA

7.1 Actual distribution

Television signals from the three major U.S. networks and PBS are widely available off the air in Canada and in addition, in the past five or six years, we have witnessed the formation of microwave networks, all across Canada, bringing the familiar 3 + 1 to distant markets where no off the air signals are available.

The four following tables illustrate the actual distribution of U.S. signals in Canada, by province, through cable.

As one can readily see, the market for satellite distribution of U.S. signals is seriously limited in the short run, due to the wide availibility of the signals.

But, as these tables have also pointed out, there is a fairly large number of subscribers who have to depend on terrestrial microwave for the importation of U.S. signals.

TABLE 7-1

NUMBER OF CABLE SUBSCRIBERS RECEIVING AN ABC SIGNAL

	ORIGINATION				
Province or region	Off air	Microwave	Sub-Total	Not available	Total subscribers
Yukon - N.W.T.	-	-	-	5,000	5,000
British Columbia	600,000	68,000	668,000	32,000	700,000
SUB-TOTAL - PACIFIC AND NORTH	600,000	68,000	668,000	37,000	705,000
Alberta	2,000	313,000	315,000	5,000	320,000
Saskatchewan	-	70,000	70,000	20,000	90,000
Manitoba	2,000	185,000	187,000	13,000	200,000
SUB-TOTAL - PRAIRIES	4,000	568,000	572,000	38,000	610,000
SUB-TOTAL - WESTERN CANADA	604,000	636,000	1,240,000	75,000	1,315,000
Ontario	1,450,000	155,000	1,605,000	115,000	1,720,000
Quebec	515,000	215,000	730,000	70,000	800,000
SUB-TOTAL - ONTARIO QUEBEC	1,965,000	370,000	2,335,000	185,000	2,520,000
New-Brunswick	11,000	59,000	70,000	5,000	75,000
Nova Scotia	-	105,000	105,000	-	105,000
Prince Edward Island	-	11,000	11,000	-	11,000
Newfoundland	-	25,000	25,000	-	25,000
SUB-TOTAL - ATLANTIC	11,000	200,000	211,000	5,000	216,000
SUB-TOTAL EASTERN CANADA	1,976,000	570,000	2,546,000	190,000	2,736,000
CANADA	2,580,000	1,206,000	3,786,000	265,000	4,051,000

Source: Matthew's CATV and various other sources.

TABLE 7-2

NUMBER OF CABLE SUBSCRIBERS RECEIVING A NBC SIGNAL

ORIGINATION					
Province or region	Off air	Microwave	Sub-Total	Not available	Total subscribers
Yukon - N.W.T.	-	-	-	5,000	5,000
British Columbia	590,000	82,000	672,000	28,000	700,000
SUB-TOTAL - PACIFIC AND NORTH	590,000	82,000	672,000	33,000	705,000
Alberta	2,000	289,000	291,000	29,000	320,000
Saskatchewan	-	80,000	80,000	10,000	90,000
Manitoba	3,000	185,000	188,000	12,000	200,000
SUB-TOTAL - PRAIRIES	5,000	554,000	559,000	51,000	610,000
SUB-TOTAL - WESTERN CANADA	595,000	636,000	1,231,000	84,000	1,315,000
Ontario	1,425,000	270,000	1,695,000	25,000	1,720,000
Quebec	498,000	154,000	652,000	148,000	800,000
SUB-TOTAL - ONTARIO QUEBEC	1,923,000	424,000	2,347,000	173,000	2,520,000
New-Brunswick	11,000	59,000	70,000	5,000	75,000
Nova Scotia	-	105,000	105,000	-	105,000
Prince Edward Island	-	11,000	11,000	-	11,000
Newfoundland	-	25,000	25,000	-	25,000
SUB-TOTAL - ATLANTIC	11,000	200,000	211,000	5,000	216,000
SUB-TOTAL EASTERN CANADA	1,934,000	624,000	2,558,000	178,000	2,736,000
CANADA	2,529,000	1,260,000	3,789,000	262,000	4,051,000

Source: Matthew's CATV and various other sources

TABLE 7-3

NUMBER OF CABLE SUBSCRIBERS RECEIVING A CBS SIGNAL

	ORIGINATION				
Province or region	Off air	Microwave	Sub-Total	Not available	Total subscribers
Yukon - N.W.T.	-	-	-	5,000	5,000
British Columbia	575,000	70,000	645,000	55,000	700,000
SUB-TOTAL - PACIFIC AND NORTH	575,000	70,000	645,000	60,000	705,000
Alberta	2,000	312,000	314,000	6,000	320,000
Saskatchewan	-	80,000	80,000	10,000	90,000
Manitoba	1,000	175,000	176,000	24,000	200,000
SUB-TOTAL - PRAIRIES	3,000	567,000	570,000	40,000	610,000
SUB-TOTAL - WESTERN CANADA	578,000	637,000	1,215,000	100,000	1,315,000
Ontario	1,430,000	275,000	1,705,000	15,000	1,720,000
Quebec	508,000	154,000	662,000	138,000	800,000
SUB-TOTAL - ONTARIO QUEBEC	1,938,000	429,000	2,367,000	153,000	2,520,000
New-Brunswick	-	-	-	75,000	75,000
Nova Scotia	-	-	-	105,000	105,000
Prince Edward Island	-	-	-	11,000	11,000
Newfoundland	-	-	-	25,000	25,000
SUB-TOTAL - ATLANTIC	-	-	-	216,000	216,000
SUB-TOTAL EASTERN CANADA	1,938,000	429,000	2,637,000	369,000	2,736,000
CANADA	2,516,000	1,066,000	3,582,000	469,000	4,051,000

Source: Matthew's CATV and various other sources

TABLE 7-4

NUMBER OF CABLE SUBSCRIBERS
RECEIVING A PBS SIGNAL

	ORIGINATION				
Province or region	Off air	Microwave	Sub-Total	Not available	Total subscribers
Yukon - N.W.T.	-	-	-	5,000	5,000
British Columbia	555,000	80,000	635,000	65,000	700,000
SUB-TOTAL - PACIFIC AND NORTH	555,000	80,000	635,000	70,000	705,000
Alberta	2,000	294,000	296,000	24,000	320,000
Saskatchewan	-	80,000	80,000	10,000	90,000
Manitoba	2,000	185,000	187,000	13,000	200,000
SUB-TOTAL - PRAIRIES	4,000	559,000	563,000	47,000	610,000
SUB-TOTAL - WESTERN CANADA	559,000	639,000	1,198,000	117,000	1,315,000
Ontario	1,565,000	-	1,565,000	155,000	1,720,000
Quebec	438,000	33,000	471,000	329,000	800,000
SUB-TOTAL - ONTARIO QUEBEC	2,003,000	33,000	2,036,000	484,000	2,520,000
New-Brunswick	23,000	38,000	61,000	14,000	75,000
Nova Scotia	-	62,000	62,000	43,000	105,000
Prince Edward Island	-	-	-	11,000	11,000
Newfoundland	-	-	-	25,000	25,000
SUB-TOTAL - ATLANTIC	23,000	100,000	123,000	93,000	216,000
SUB-TOTAL EASTERN CANADA	2,026,000	133,000	2,159,000	577,000	2,736,000
CANADA	2,585,000	772,000	3,357,000	694,000	4,051,000

Source: Matthew's CATV and various other sources

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.2 Microwave distribution

There are presently 9 microwave systems distributing U.S. channels in every province of Canada. These microwave systems are briefly described in the following table.

7.2.1 British Columbia

The Interior Cable Operators Associates microwave network actually distributes the 4 U.S. networks. Out of the 80,000 subscribers included in the systems served by the network, about 66,000 are receiving ABC, and about 68,000 are receiving CBS. All subscribers are receiving NBC and PBS.

The detailed list of communities served by the network, number of signals received by each of them and annual microwave costs are presented in the next table. The total annual cost for these U.S. signals amounts to $1,046,400; contracts expire in 1991. The small community of Fernie, B.C., with its 2,100 subscribers is served by MKC Properties Microwave Network of Alberta and receives ABC, NBC and CBS.

7.2.2 Alberta

The MKC Properties Microwave Network distributes the 4 U.S. networks to its affiliated systems. Out of the 315,000 subscribers included in the systems served by the network, 290,000 subscribers are receiving NBC, 313,000 are receiving CBS, 293,000 are receiving PBS. All subscribers are receiving ABC.

For the first 2 signals (ABC-PBS) there is a subscriber related charge which is a minimum of 40 cents per subscriber per month for the large systems of Calgary and Edmonton and which can range from 60 cents to $1.00 per subscriber per month for the other systems. These charges result in monthly payments of $147,000. For the other two signals (CBS-NBC) there is a fixed charge of $37,800. broken down in the following fashion: $28,400 paid by the cable systems that own MKC properties; $4,400 paid by the Medecine Hat and Lethbridge systems; $5,000 spread between 10 cable operators. The total annual cost reaches $2,217,600. for these U.S. signals. Contracts expire in 1990.

TABLE 7-5

DISTRIBUTION OF U.S. SIGNALS BY MICROWAVE, 1979

NAME OF MICROWAVE SYSTEM	PROVINCES SERVED	NUMBER OF SUSCRIBERS RECEIVING 1 OR MORE CHANNELS BY MICROWAVE	ANNUAL MICROWAVE EXPENSES U.S. AND CAN. SIGNALS	ESTIMATED EXPENSES FOR U.S. SIGNALS	EXPIRATION DATE OF MICROWAVE CONTRACTS
Interior Cable Operators	B. Columbia	80,000	1,046,000	$1,046,000	1991
MKC Properties	Alberta-B.C.	315,000	2,218,000	2,218,000	1990
Saskatchewan Telephone	Saskatchewan	63,000	420,000	420,000	N.A.
MTS Inter-City Broadband Network	Manitoba	186,000	249,000	249,000	1980
Cable North Microwave	Ontario	107,000	1,531,000	812,000	1992
Greg Bruce Microwave	Ontario	6,000	165,000	165,000	N.A.
SOLV Signals Ltd.	Ontario/Quebec	196,000	300,000	195,000	1987
Microbec Inc.	Quebec	179,000	1,135,000	596,000	1988
Chamcook Ltd.	Atlantic	199,000	1,370,000	1,370,000	N.A.
TOTAL		1,331,000	8,434,000	$7,071,000	

Source: Estimated from various sources

TABLE 7-6

MICROWAVE DISTRIBUTION AND COST OF U.S. SIGNALS IN BRITISH COLUMBIA 1979

SYSTEM LOCATION	NUMBER OF SUBSCRIBERS	NUMBER OF U.S. SIGNALS RECEIVED BY MICROWAVE	ANNUAL COSTS $	AVERAGE MONTHLY COST PER SUBSCIBER PER SIGNAL $
Hope	1,400	3	28,800	$0.57
Kamloops	15,500	4	116,400	$0.16
Kelowna-Penticton	24,500	4	133,200	$0.11
Kitimat-Prince Rupert Terrace	9,990	2	376,800	$1.58
Merritt	2,126	2	25,200	$0.49
Prince George-Quesnel-Williams Lake	18,106	4	294,000	$0.39
Vernon	8,200	4	72,000	$0.18
TOTAL B.C.	79,822	4	$1,046,400	—

TABLE 7-7

MICROWAVE DISTRIBUTION AND COST OF U.S. SIGNALS IN ALBERTA, 1979

COMMUNITY	NUMBER OF U.S. SIGNALS	NUMBER OF SUBSCRIBERS	ANNUAL COST IN $	AVERAGE MONTHLY COST PER SUBSCRIBER PER SIGNAL IN $
Calgary (1)	4	128,000	$784,800	$0.13
Edmonton (1)	4	127,250	781,200	0.13
Lethbridge	4	13,000	120,000	0.19
Medecine Hat	4	9,960	98,112	0.21
Other cable systems (2)	2 to 4	36,790	433,488	0.33 (3)
TOTAL ALBERTA	---	315,000	$2,217,600	---

(1) There are 2 large cable systems in each city
(2) Includes 13 systems
(3) Using an average of 2 signals

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.2 Microwave distribution (cont'd)

7.2.3 Saskatchewan

The Saskatchewan microwave network actually distributes only 2 U.S. networks (CBS and NBC). All the 62,750 subscribers are receiving both networks for a monthly subscriber related charge of $0.50 per potential subscriber for a total actual monthly charge of $35,000 or $420,000 a year.

Within a year, the affiliated systems will receive two other networks (ABC and PBS) for $39,400 per month or $472,800 per year.

Also expected, Prince Albert with its 10,000 potential subscribers will receive the 4 networks for $10,000 per month or $120,000 per year.

The total expected annual microwave cost for Saskatchewan will then reach $1,012,800 per year.

7.2.4 Manitoba

MTS Inter-City Broadband Network distributes the 4 U.S. networks to its affiliated systems. All the 186,000 subscribers included in the systems served by the microwave network are receiving ABC, NBC and PBS; about 177,000 subscribers are receiving CBS.

The two cable systems of Winnipeg pay $6,268 per month for the 4 networks. Three small communities member of Valley Cable pay $1.60/subscriber/ month for 3 networks. Selkirk, Brandon, Portage-La Prairie are on a two year interim contract expiring in September 1980 and they are paying $14,000/month for 3 signals. The total annual microwave cost for these U.S. signals presently amounts to $248,976.

Manitoba Telephone has proposed a new overall microwave plan for Manitoba systems. Winnipeg subscribers would pay $0.65 per month for the 4 networks (or $43,000 per month), plus a fixed charge of $6,268 per month in order to subsidize all the other small northern systems.

The total annual cost of the plan would amount to $1,800,000.

TABLE 7-8

MICROWAVE DISTRIBUTION AND COST OF U.S. SIGNALS IN SASKATCHEWAN, 1979

SYSTEM LOCATION	NUMBER OF SUBSCRIBERS	NUMBER OF U.S. SIGNALS RECEIVED	ANNUAL COST	AVERAGE MONTHLY COST PER SUBSCRIBER PER SIGNAL
Moose Jaw	7,000	2	N.A.	N.A.
North Batteford	2,750	2	N.A.	N.A.
Regina	28,000	2	N.A.	N.A.
Saskatoon	25,000	2	N.A.	N.A.
TOTAL SASKATCHEWAN	62,750	2	$420,000	$0.28

TABLE 7-9

MICROWAVE DISTRIBUTION AND COST OF U.S. SIGNALS IN MANITOBA, 1979

SYSTEM LOCATION	NUMBER OF SUBSCRIBERS	NUMBER OF U.S. SIGNALS RECEIVED	ANNUAL COST	AVERAGE MONTHLY COST PER SUBSCRIBER PER SIGNAL
Winnipeg	176,420	4	75,216.	$.01
Selkirk	1,000	3		$0.50
Brandon	6,500	3	168,000.(1)	$0.50
Portage La Prairie	1,750	3		$0.50
Morden	300	4	5,760.	$0.40
TOTAL MANITOBA	185,970	4	248,976.	

(1) Annual cost for Selkirk, Brandon and Portage La Prairie.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.2 Microwave distribution (cont'd)

7.2.5 Ontario

Three microwave networks are presently distributing U.S. networks in Ontario.

Northern Microwave Ltd. distributes NBC and CBS to about 13 systems in different localities. The detailed list of systems served, number of subscribers and signals received are presented in the next table. All of the 107,000 subscribers included in the member systems are actually receiving both U.S. networks. All systems served, plan to receive ABC and PBS by the end of the year except North Bay, Eliot Lake and Blind River which are already receiving them over-the-air from Michigan. The total annual microwave cost for U.S. signals actually reaches $811,740.

SOLV Signals Ltd. distributes U.S. networks in both Ontario and Quebec.

It distributes ABC, NBC and CBS to all the 155,000 subscribers of the two Ottawa systems and to the 32,500 subscribers of Hull and Gatineau. The total annual cost for these services reaches $170,000. The contract expires in 1987. Additionally, Pembrooke, Ontario receives a CBS signal for $25,000. per year. Ottawa Cable plans to add the two other networks to Pembrooke at the end of 1980.

Grey Bruce Microwave Ltd. distributes NBC and CBS to the Hanover, Kincardine and Port Elgin systems. All 6,100 subscribers of these systems are receiving the signals at a total annual cost of $164,700. Grey Bruce Microwave charges $2.25/per sub/per month for the service.

7.2.6 Quebec

The main microwave network in Quebec is Microbec Inc. owned by an association of Quebec cable operators.

Microbec distributes ABC, NBC and CBS to 18 affiliated systems. All the 180,000 subscribers included in those systems receive ABC and about 154,000 receive NBC and CBS. The detailed list of affiliated systems, number of subscribers, signals received and cost per system are presented in the next table. (As Microbec also distributes CFCF, the Montreal CTV affiliate and French television, the total annual microwave cost reaches $1,135,132.). The annual cost for U.S. signals only is estimated at $596,233.

TABLE 7-10

MICROWAVE DISTRIBUTION AND COST OF U.S. SIGNALS IN ONTARIO, 1979

SYSTEM LOCATION	NUMBER OF SUBSCRIBERS	NUMBER OF U.S. SIGNALS RECEIVED BY MICROWAVE	ANNUAL COST $	AVERAGE MONTHLY COST PER SUBSCRIBER PER SIGNAL
Barrie-Orillia	20,867	2	72,000	$0.14
Collingwood	4,000	2	15,300	$0.16
Gravenhurst	2,800	2	N.A.	N.A.
Huntsville	2,080	2	5,040	$0.10
Kirkland Lake	3,100	2	N.A.	N.A.
Midland	6,978	2	27,600	$0.16
New Liskeard	2,350	2	N.A.	N.A.
North Bay	10,272	2	79,200	$0.32
Owen Sound	8,467	2	33,600	$0.17
Parry Sound	1,700	2	24,000	$0.58
Sudbury	28,320	2	408,600	$0.60
Timmins	16,000	2	146,400	$0.38
Hanover	2,800	2	75,600	$1.13
Kincardine	2,200	2	59,400	$1.13
Port Elgin	1,100	2	29,700	$1.13
Ottawa-Hull-Gatineau	187,500	3	170,000	$0.03
Pembrooke	8,300	1	25,000	$0.25
TOTAL - ONTARIO	308,834	-	$1,171,440	---

TABLE 7-11

MICROWAVE DISTRIBUTION AND COST OF U.S. SIGNALS IN QUEBEC, 1979

SYSTEM LOCATION	NUMBER OF SUBSCRIBERS	NUMBER OF U.S. SIGNALS RECEIVED BY MICROWAVE	ANNUAL COST $	AVERAGE MONTHLY COST PER SUBSCRIBER PER SIGNAL
Alma	5,000	1	16,290	$0.27
Baie-Comeau	4,000	1	26,746	$0.56
Cap-de-la-Madeleine	9,000	3	34,681	$0.11
Chicoutimi	18,000	1	82,013	$0.38
Dolbeau	3,200	1	8,258	$0.22
Forestville	350	1	12,900	$3.07
Lévis	12,200	3	15,030	$0.03
Montmagny	1,200	1	14,500	$1.00
Québec	73,000	3	112,752	$0.04
Rimouski	14,300	1	79,982	$0.47
St-Félicien	4,800	1	5,122	$0.09
Sept-Iles	6,800	1	78,327	$0.96
Shawinigan	9,800	3	32,794	$0.09
Trois-Rivières	17,711	3	76,839	$0.12
TOTAL - QUEBEC	179,361	-	$596,234	---

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.2 Microwave distribution (cont'd)

7.2.7 Atlantic

Chamcook Communications Ltd. distributes ABC, NBC and PBS in the Atlantic Provinces. Out of the 199,000 subscribers included in affiliated systems, about 100,000 are receiving PBS. All subscribers are receiving both ABC and NBC.

The detailed list of affiliated systems, microwave charge paid follows in the next table. The total annual microwave cost reaches over $1,370,000 for those signals.

TABLE 7-12

MICROWAVE DISTRIBUTION AND COST OF U.S. SIGNALS IN THE ATLANTIC PROVINCES, 1979

SYSTEM LOCATION	NUMBER OF SUBSCRIBERS	NUMBER OF U.S. SIGNALS RECEIVED BY MICROWAVE	ANNUAL COST $	AVERAGE MONTHLY COST PER SUBSCRIBER PER SIGNAL
NEW BRUNSWICK				
Bathurst	3,200	2	75,200	$0.98
Chatham	3,200	2	44,583	$0.58
Dalhousie	1,020	2	29,010	$1.19
Fredericton	12,400	2	22,529	$0.08
Moncton	16,000	3	94,850 *	$0.25*
Saint-John	22,000	3	70,544 *	$0.13*
Sussex	1,300	2	22,560	$0.72
TOTAL - NEW BRUNSWICK	59,120		359,276.	
NOVA SCOTIA				
Amherst	3,000	2	34,380	$0.48
Antigonish	800	2	9,220	$0.48
Bedford	7,000	3	21,732 *	$0.13*
Bridgewater	2,312	2	35,550	$0.64
Dartmouth	18,650	3	69,431 *	$0.16*
Digby	N.A.	2	N.A.	N.A.
Glace Bay	7,500	2	92,664	$0.51
Halifax	30,000	3	183,787	$0.17
Kingston	2,720	3	10,945 *	$0.17*
Liverpool	1,267	2	20,415	$0.67
New Glasgow	7,100	2	43,724	$0.26
Port Hawkesbury	1,100	2	9,546	$0.36
Sydney	9,300	2	141,141	$0.63
Truro	6,700	2	23,143	$0.14
Windsor	1,975	2	11,417	$0.24
Wolfville-Kentville	3,800	3	13,741	$0.15
Yarmouth	2,066	2	32,230	$0.65
TOTAL - NOVA SCOTIA	105,290		753,066	

* Cost for 2 signals only.

TABLE 7-12 (cont'd)

MICROWAVE DISTRIBUTION AND COST OF U.S. SIGNALS IN THE ATLANTIC PROVINCES, 1979 (cont'd)

SYSTEM LOCATION	NUMBER OF SUBSCRIBERS	NUMBER OF U.S. SIGNALS RECEIVED BY MICROWAVE	ANNUAL COST $	AVERAGE MONTHLY COST PER SUBSCRIBER PER SIGNAL
PRINCE EDWARD ISLAND				
Charlottetown	6,800	2	56,011	$0.34
Summerside	3,700	2	47,280	$0.53
TOTAL - P.E.I.	10,500		103,291.	
NEWFOUNDLAND				
Cornerbrook	4,200	2	24,000	$0.24
Gander	1,600	2	6,420	$0.17
Grand Falls	3,100	2	14,160	$0.19
Port-aux-Basques	1,200	2	3,600	$0.13
St.John's	12,000	2	93,600	$0.33
Stephenville	1,733	2	13,800	$0.33
TOTAL - NEWFOUNDLAND	23,833		155,580	
TOTAL - ATLANTIC	198,743	3	$1,371,213	

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.3 Rural and remote communities

The following table briefly describes the availability of U.S. signals throughout rural Canada. Assuming an average of 3 persons per household, this means that close to 1.6 million households do not have access to a single american signal. This represents a vast untapped market for all television programming services via satellite, including U.S. networks.

Satellite overcomes one of the major obstacles of providing service to rural and remote areas, which is getting the television signals in those areas; the costs related to satellite distribution being essentially fixed, thus the costs of serving rural and remote areas become negligible, provided there is a sufficiently large total market for those services.

TABLE 7-13

AVAIBILITY OF AMERICAN TV IN RURAL CANADA

PROVINCE	NUMBER OF CHANNELS AND POPULATION (000) 0	1	2	3 or more	TOTAL RURAL POPULATION
British Columbia	264	137	5	170	576
Alberta	488	-	2	9	499
Saskatchewan	449	1	-	-	450
Manitoba	312	2	13	7	334
Ontario	1,163	52	116	343	1,674
Quebec	1,113	66	88	225	1,492
New Brunswick	282	-	4	72	358
Nova Scotia	337	-	9	37	383
P.E.I.	77	-	10	-	87
Newfoundland	257	-	19	2	278
CANADA	4,742	258	266	866	6,132

Source: Television Network Coverage in Rural Canada compared with that in the Census Metropolitan areas, C.D. Gormak, D.O.C., August 1978.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.3 Rural and remote communities (cont'd)

The second obstacle to overcome is the cost of ground distribution which depends essentially on two factors closely interrelated together:

- the density of subscribers per mile of cable
- the cash flow per subscriber that can be generated.

In other words, the higher the cash flow per subscriber (be that the result of higher basic rates or of discretionnary services such as pay TV) the lower the density of subscribers per mile of cable can be, and vice-versa.

Since providing services to rural and remote communities has been the subject of intensive studies by the Department of Communications, we did not attempt to study in detail the market for satellite services in rural and remote communities.

Additionnally for most of the services that are analyzed in this report, rural and remote communities are not, as will be shown, essential to the economic viability of those services; they can simply improve this economic viability, allowing for either a greater flow of money geared towards program production, or lower rates for the services or a combination of both.

For the distribution of U.S. networks though, it is a different story; since the market in urban areas is severely limited in the short run, the impact of rural Canada is much greater, and, as will be seen later, even essential under some assumptions.

Our approach was thus to use extremely conservative assumptions regarding the distribution of U.S. signals in Canada; throughout this chapter we used the assumption that 100,000 households or 5% of rural households would subscribe to U.S. signals delivered via satellite.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.4 A short term plan

7.4.1 The border station problem

The border station issue has been a focal point of debate for many years now, but the possible distribution of U.S. signals via satellite in Canada brings forth two questions which are:

- Which stations shall be distributed?

  Any of the present border stations or a more distant station from a larger market like New York for example?

  What are the cost implications of the various alternatives?

- Since a satellite signal from any U.S. network would not be distinctly different from border signals, there is bound to be competition from microwave systems that can carry these border stations. If, in effect, we have to assume that TCTS can compete against Telesat, shall we also assume that Telesat can compete against TCTS?

The situation can be illustrated with one concrete example, which in our opinion, typifies the problem that has to be faced. The cable system of Quebec City presently boasts 73,000 subscribers and it presently receives three U.S. networks via microwave; PBS is not presently carried but would be added on for an additionnal monthly cost of $4,000. Thus, if a satellite feed costs more than 5 or 6 cents per month, the cable system of Quebec City will not subscribe to it.

On the other hand, in the short term, a satellite signal cannot be marketed for 5 or 6 cents per subscriber, essentially because TCTS members are sitting on microwave contracts that expire in 1988 at the earliest.

But what about the possibility of charging a higher price per subscriber but imposing a ceiling on the maximum number of subscribers, in any cable system, that can be billed? At 25 cents per subscriber for example but with a ceiling of 15,000 subscribers, the cable system in Quebec City would be paying $3,750. monthly for a satellite signal, and it would most probably subscribe to it.

Is such a marketing strategy feasible? Are there other large cable systems that would also get reduced rates under such a scheme?

These are the questions we are now going to examine.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.4 A short term plan (cont'd)

7.4.2 Definition of alternatives

Distribution by satellite of U.S. signals would have to take into account in the short term, the microwave reality described in the preceeding sections.

We are thus left with two broad alternatives which are:

1) Distribution of CBS and PBS in 6/4 GHz
2) Distribution of CBS and PBS in 14/12 GHz

The economic feasibility of these alternatives will now be examined.

7.4.3 Distribution of CBS and PBS in 6/4 GHz

This alternative would involve the following:

1- Importation by microwave of the WCBS signal in New York City into Canada in the Toronto-Buffalo area

-or-

Off air pick up of WIVB, the CBS affiliate in Buffalo.

2- Off air pick up of WNED, the PBS affiliate in Buffalo.

3- Uplink of both signals from a single station on Anik A-3.

a) Costs

This alternative would involve the following cost on an annual basis. For the space segment, we have assumed the published Telesat rate of $1.5 million per unprotected transponder; for uplink, conversations with Telesat representatives have indicated a cost of $250,000 for the first channel on a given station and a cost of $100,000 per additionnal channel on the same station. Additionnally, Eastern Microwave Ltd, a private U.S. common carrier, has indicated a monthly cost of approximately $8,000 to pick a signal off the air in the New York area and bring it to the Canadian frontier; finally, CP Telecommunications has indicated a microwave cost of approximately $2,000 monthly to bring the signal from the Canadian frontier to a suitable uplink in the Toronto area; in the present study we have assumed a total monthly cost of $12,500 or $150,000 annually.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.4 A short term plan (cont'd)

7.4.3 Distribution of CBS and PBS in 6/4 GHz (cont'd)

TABLE 7-14

ANNNUAL COSTS OF DISTRIBUTION OF CBS AND PBS IN 6/4 GHz IN $000

	WCBS WNED	WIVB WNED
Space Segment	$3,000.	$3,000.
Uplink	$ 350.	$ 350.
Microwave	$ 150.	nil
Annual cost	$3,500.	$3,350.
Monthly cost	$ 292.	$ 279.
Monthly cost (per signal)	$ 146	$ 140.

One can readily see that importing the signal from New York, which alleviates the problems related to border stations, increases the cost by approximately 4.5%.

b) Market and revenues

The two following tables describe what would be the short term market for the distribution of CBS and PBS via satellite in 6/4 GHz.

Evidently, the service would face the time zone problem in the Western Provinces.

Additionnally, the short term market for rural Canada has been estimated at 100,000 households, or approximately 6.5% of rural households which presently receive no U.S. signals.

Finally, we have pursued the marketing policy of charging 25 cents per subscriber per month but of limiting the number of subscribers to 15,000 in any cable system or community.

TABLE 7-15

MARKET POTENTIAL AND REVENUES FOR A CBS SATELLITE FEED IN 6/4 GHz
TOTAL CANADA COVERAGE

	TOTAL SUBSCRIBERS	EXCESS OF 15,000 IN ANY SYSTEM	NET	REVENUES AT $0.25 MONTHLY $	REVENUES AT $0.25 ANNUALLY $
Cable					
Western Canada	100,000	nil	100,000	25,000	300,000
Ontario	15,000	nil	15,000	3,750	45,000
Northern Ontario (1)	110,000	14,000	96,000	24,000	288,000
Quebec	138,000	3,000	135,000	33,750	405,000
Atlantic	216,000	20,000	196,000	49,000	588,000
SUB-TOTAL	579,000	37,000	542,000	135,500	1,626,000
Rural Canada	100,000	---	100,000	25,000	300,000
TOTAL	679,000	37,000	642,000	160,500	1,926,000

(1) The subscribers of these systems presently receive CBS by microwave but not ABC; the present study assumes the replacement of CBS by ABC on the microwave feed, and satellite reception of CBS.

TABLE 7-16

MARKET POTENTIAL AND REVENUES FOR A PBS SATELLITE FEED IN 6/4 GHz
TOTAL CANADA COVERAGE

	TOTAL SUBSCRIBERS	EXCESS OF 15,000 IN ANY SYSTEM	NET	REVENUES AT $0.25 MONTHLY $	ANNUALLY $
Cable					
Western Canada	117,000	nil	117,000	29,250	351,000
British Columbia (1)	15,000	nil	15,000	3,750	45,000
Ontario	155,000	14,000	141,000	35,250	423,000
Quebec	329,000	64,000	265,000	66,250	795,000
Atlantic	93,000	---	93,000	23,250	279,000
SUB-TOTAL	709,000	78,000	631,000	157,750	1,893,000
Rural Canada	100,000	---	100,000	25,000	300,000
TOTAL	809,000	78,000	731,000	182,750	2,193,000

(1) The subscribers of these systems presently receive PBS by microwave but not ABC; the present study assumes the replacement of PBS by ABC on the microwave feed, and satellite reception of CBS.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.4 A short term plan (cont'd)

7.4.3 Distribution of CBS and PBS in 6/4 GHz (cont'd)

On a combined basis, the two services would thus generate \$4,119,000 or a surplus of funds of \$619,000. The average number of subscribers for billing purposes would be 686,500. Considering that at \$3.5 million annually, the services break even at 583,333 subscribers paying a monthly fee of \$0.25, this leaves the service with a security margin of 147,667 subscribers or 20.2% in the case of PBS, and 58,667 subscribers or 9.1% in the case of CBS.

We feel that these margins are fairly comfortable and that, at the worse, the services would become profitable over a 15 to 18 months period, due to normal cable growth and expansion in rural areas.

TABLE 7-17

REVENUES AND EXPENSES
DISTRIBUTION OF CBS AND PBS VIA SATELLITE IN 6/4 GHz,
TOTAL CANADA COVERAGE (\$000)

Revenues	
Cable	\$ 3,519
Rural Canada	\$ 600
TOTAL	\$ 4,119
Expenses	
Space segment	\$ 3,000
Uplink	\$ 350
Microwave (1)	\$ 150
TOTAL	\$ 3,500
NET	\$ 619

(1) The more expensive solution of importing the New York signal was used.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.4 A short term plan (cont'd)

7.4.4 Distribution of CBS and PBS in 14/12 GHz

Since the market for the CBS and PBS signals is widely concentrated in Eastern Canada, one short term solution would be to serve that area alone, using the built in feature of two TV carriers per transponder.

a) Assuming again $1.5 million for a transponder, $350,000 for the two uplinks, and $150,000 annually to microwave the CBS signal from New York to Canada, the costs would be as follows.

TABLE 7-18

ANNUAL COSTS OF HALF CANADA DISTRIBUTION OF CBS AND PBS IN 14/12 GHz, IN $000

	WCBS WNED	WIVB WNED
Space segment	$ 1,500	$ 1,500
Uplink	350	350
Microwave	150	---
TOTAL	$ 2,000	$ 1,850

b) Market and revenues

The service does not face any time zone problem since distribution is limited to Eastern Canada. The rural market has been estimated at 70,000 households and the marketing policy has been left unchanged.

On a combined basis, the two services would generate $3,243,000 or a surplus of funds of $1,243,000. The average number of subscribers for billing purposes would be 541,000. Considering that at $2.0 million annually, the services break even at 333,333 subscribers paying a monthly fee of $0.25, this leaves the service with a security margin of 235,667 subscribers or 41.4% in the case of PBS, and 178,667 subscribers or 34.9% in the case of CBS.

TABLE 7-19

MARKET POTENTIAL AND REVENUES FOR A CBS SATELLITE FEED IN 14/12 GHz, HALF CANADA COVERAGE

	TOTAL SUBSCRIBERS	EXCESS OF 15,000 IN ANY SYSTEM	NET	REVENUES AT $0.25 MONTHLY $	REVENUES AT $0.25 ANNUALLY $
Cable					
Ontario	15,000	---	15,000	3,750	45,000
Northern Ontario (1)	110,000	14,000	96,000	24,000	288,000
Quebec	138,000	3,000	135,000	33,750	405,000
Atlantic	216,000	20,000	196,000	49,000	588,000
SUB-TOTAL	479,000	37,000	442,000	110,500	1,326,000
Rural Canada	70,000	---	70,000	17,500	210,000
TOTAL	549,000	37,000	512,000	128,000	1,536,000

TABLE 7-20

MARKET POTENTIAL AND REVENUES FOR A PBS SATELLITE FEED IN 14/12 GHz, HALF CANADA COVERAGE

	TOTAL SUBSCRIBERS	EXCESS OF 15,000 IN ANY SYSTEM	NET	REVENUES AT $0.25 MONTHLY $	REVENUES AT $0.25 ANNUALLY $
Cable					
Ontario	155,000	14,000	141,000	35,250	423,000
Quebec	329,000	64,000	265,000	66,250	795,000
Atlantic	93,000	---	93,000	23,250	279,000
SUB-TOTAL	577,000	78,000	499,000	124,750	1,497,000
Rural Canada	70,000	---	70,000	17,500	210,000
TOTAL	647,000	78,000	569,000	142,250	1,707,000

(1) See remarks on Table 7-15

TABLE 7-21

REVENUES AND EXPENSES
DISTRIBUTION OF CBS AND PBS VIA SATELLITE IN 14/12 GHz,
EASTERN CANADA COVERAGE ($000)

Revenues	
Cable	$ 2,823
Rural Canada	$ 420
TOTAL	$ 3,243
Expenses	
Space segment	$ 1,500
Uplink	$ 350
Microwave (1)	$ 150
TOTAL	$ 2,000
NET	$ 1,243

(1) The more expensive solution of importing the New York signal was used

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.5 A medium term plan: serving the unserved areas

7.5.1 The time zone problem

None of the alternatives considered in the short term treated in a satisfactory manner the time zone problem which Canada faces. The first alternative, that is the use of Anik A satellites in 6/4 GHz serves all Canada but viewers in Western Canada would receive prime time programming during late afternoon in some cases; while this alternative is acceptable in the short term (it is better than to receive nothing), in the long term it is clearly not acceptable.

The second alternative is even worse in the sense that it does not provide services to Western Canada; this would raise serious problems regarding the equality of services, not only from a public policy point of view, but even from the cable television industry itself.

We thus have to look at another alternative in the long run which would provide better service to all Canadians.

7.5.2 The alternative

We will consider only 14/12 GHz service in this alternative with its built-in feature of two TV carriers per transponder.

For Eastern Canada, the service would involve:

- Carriage of the three commercial networks from New York to Canada
- Off air pick up of PBS in the Buffalo area
- Uplink of the four signals on two transponders of Anik C when it becomes operational in 1982.

For Western Canada, the service would involve:

- Off air pick up of the four Seattle affiliates of ABC, NBC, CBS and PBS in the Vancouver area

- Uplink of the four signals on two transponders of Anik C when it becomes operational in 1982.

The service would thus require the use of four transponders; it is now easy to understand why distribution in 6/4 GHz was not considered since this would have required the use of 8 transponders.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.5 A medium term plan: serving the unserved areas (cont'd)

7.5.3 Feasibility

a) Costs

The same assumptions have been kept regarding costs that is:

- transponders: $1.5 million per year each (4)
- uplinks: $250 annually for the first signal on a given station (2) and $150,000 annually for additionnal signals (6)
- microwave: $150,000 annually per channel from New York (3)

The total cost of providing the four U.S. networks in two time zones would thus amount to $7,850,000 annually, which by the way is less than the cable industry will be spending on microwave to bring in U.S. channels from 1981 on.

TABLE 7-22

ANNUAL COSTS OF DISTRIBUTION OF THE 3 + 1
IN 14/12 GHz ON ANIK C ($000)

COST CATEGORY	EASTERN CANADA	WESTERN CANADA	TOTAL
Space segment	$3,000	$3,000	$6,000
Uplink	700	700	1,400
Microwave	450	---	450
TOTAL	$4,150	$3,700	$7,850

b) Market projections

The same approach was used as in the short term plan, that is we defined a market consisting of cable subscribers and rural citizens which do not presently receive the four signals: as well, the excess of subscribers in any system of 15,000 subscribers or more was also eliminated.

Finally, the market in rural Canada was again estimated at 100,000 subscribers for each signal.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.5 A medium term plan: serving the unserved areas (cont'd)

7.5.3 Feasibility (cont'd)

The results, using 1979 data, are presented in the four following tables.

TABLE 7-23

MARKET FOR AN ABC SIGNAL, 1979 DATA

	TOTAL	EXCESS OF 15,000 IN ANY SYSTEM	NET MARKET
Western Canada	75,000	----	75,000
Ontario	115,000	----	5,000
Québec	70,000	----	70,000
Atlantic	5,000	----	5,000
SUB-TOTAL	265,000	----	265,000
Rural Canada	100,000	----	100,000
TOTAL	365,000	----	365,000

TABLE 7-24

MARKET FOR A NBC SIGNAL, 1979 DATA

	TOTAL	EXCESS OF 15,000 IN ANY SYSTEM	NET MARKET
Western Canada	84,000	----	84,000
Ontario	25,000	----	25,000
Quebec	148,000	14,000	134,000
Atlantic	5,000	----	5,000
SUB-TOTAL	262,000	14,000	248,000
Rural Canada	100,000	----	100,000
TOTAL	362,000	14,000	348,000

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.5 A medium term plan: serving the unserved areas (cont'd)

7.5.3 Feasibility (cont'd)

TABLE 7-25

MARKET FOR AN CBS SIGNAL, 1979 DATA

	TOTAL	EXCESS OF 15,000 IN ANY SYSTEM	NET MARKET
Western Canada	100,000	----	40,000
Ontario	15,000	----	15,000
Quêbec	138,000	14,000	134,000
Atlantic	216,000	20,000	196,000
SUB-TOTAL	469,000	34,000	435,000
Rural Canada	100,000	----	100,000.
TOTAL	569,000	34,000	535,000

TABLE 7-26

MARKET FOR A PBS SIGNAL, 1979 DATA

	TOTAL	EXCESS OF 15,000 IN ANY SYSTEM	NET MARKET
Western Canada	117,000	----	117,000
Ontario	155,000	14,000	141,000
Quebec	329,000	64,000	265,000
Atlantic	93,000	----	93,000
SUB-TOTAL	694,000	78,000	616,000
Rural Canada	100,000	----	100,000
TOTAL	794,000	78,000	716,000

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.5 A medium term plan: serving the unserved areas (cont'd)

7.5.3 Feasibility (cont'd)

The next step, since service in 14/12 GHz will not be available until 1982, was to forecast the preceeding data to that year of reference where service would begin. Three scenarios were developped using different growth rates for each scenario and each of the two broad categories of subscribers.

The growth projections are presented in the following table and in addition, since microwave contracts start expiring in 1988, we assume that additional cable subscribers would receive the services according to the following schedule:

1989: 150,000 subscribers
1990: 200,000 subscribers
1991: 250,000 subscribers

TABLE 7-27

GROWTH PROJECTIONS USED

	MARKET	
SCENARIO	CABLE	RURAL
Pessimistic	3%	10%
Probable	4%	15%
Optimistic	5%	20%

The same marketing approach was used as in the short term plan, that is, subscribers would be charged a monthly rate of $0.25 per signal up to a maximum of 15,000 subscribers in any system.

All alternatives have proven feasible in the sense that the net present value over the 10 year period, using a discount rate of 12%(1), is positive; the results are summarized in the following table and are presented in detail in appendix B.

(1) 12% before taxes.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.5 A medium term plan: serving the unserved areas (cont'd)

7.5.3 Feasibility (cont'd)

TABLE 7-28

DISTRIBUTION OF FOUR U.S. SIGNALS IN 14/12 GHz
N.P.V., INTERNAL RATE OF RETURN AND BREAK EVEN

SCENARIO	N.P.V. ($000)	I.R.R. %	YEAR OF BREAK EVEN
Pessimistic	$ 1,066	16.3%	10
Probable	$ 5,578	32.8%	8
Optimistic	$10,894	50.3%	6

The feasibility of the pessimistic scenario depends entirely on the expiration of microwave contracts from 1989 onward, and in that sense these results should be treated with care.

On the other hand, there are positive factors which we have not taken into account; for example, there are presently a number of cable systems that offer U.S. signals of very poor quality and which would probably gladly substitute a good quality satellite signal.

Our second remark concerns audio services which we have not taken into account in the present analysis; it must be remembered that the present alternative only serves the unserved areas, and that, if these areas are poorly served in terms of television services, there is also a strong possibility that they might be poorly served in terms of good quality radio services.

We thus made the following assumptions regarding radio services in order to estimate what would be their impact on the overall feasibility of the alternative;

- three FM signals
- monthly subscriber rate: 1 cent per signal
- penetration: 60% of PBS subscribers

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.5 A medium term plan: serving the unserved areas (cont'd)

7.5.3 Feasibility (cont'd)

The feasibility of all alternatives is improved substantially as shown in the following table; again detailed results are presented in appendix B.

TABLE 7-29

DISTRIBUTION OF FOUR U.S. SIGNALS AND THREE AUDIO IN 14/12 GHz:
N.P.V., INTERNAL RATE OF RETURN AND BREAK EVEN

SCENARIO	N.P.V. at 12% ($000)	I.R.R. %	YEAR OF BREAK EVEN
Pessimistic	$ 2,314.	21.8%	9
Probable	$ 6,927.	39.8%	7
Optimistic	$12,362.	59.5%	6

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.6 A medium term plan: Canada Wide distribution

7.6.1 Introduction

As was pointed out earlier, there is wide distribution of U.S. signals in Canada either because they are often available off the air, or because TCTS salesman have shown particular craftsmanship in putting together microwave deals in the last 5 or 6 years.
The previous alternative, described in section 7.5 of the present chapter, focused on servicing the unserved areas, but there are also a number of reasons why the service would prove attractive to communities where one or more U.S. networks are presently available.

Let us first consider the areas presently served by microwave; in the previous section, we assumed that these cable systems would start receiving the satellite feed only after their microwave contracs expire; from a marketing point of view though, provided the satellite rate is reasonable, a cable system might prefer to offer the satellite feed right away, even if this means some form of duplication while the microwave contracts still last; further, by offering the satellite service on the basic service, and moving the microwave feed on the converter service, there would be less subscriber reaction if the cable operators decide not to renew microwave contracts. Additionnally, in some areas, the present border signals are not totally acceptable from a technical as well as from a content point of view; the ABC signal for example, carried on Microbec in the Province of Quebec, is picked off the air from an obscure UHF station in the Burlington, Vermont area.

Our second consideration concerns areas that are presently served off the air. Again, for a number of cable systems, the quality of off the air signals offered is very poor and they would probably gladly substitute a good quality satellite signal, provided again the price is right. The case of large metropolitan areas, located near the U.S. border is somewhat more complex. Montrêal, for example actually distributes the four U.S. networks, but the authors of this report know for a fact that the PBS signal, to name one, is of poor technical quality, although we are not entirely sure whether the blame lies in signal reception or in the cable systems themselves; for a large Metropolitan area like Montreal, a satellite signal from New York would also prove fairly attractive from a content point of view, since Montreal (and for that matter the entire Province of Quebec) is presently served by very small network affiliates located in Plattsburgh, N.Y. and Burlington, Vt.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.6 A medium term plan: Canada Wide distribution (cont'd)

7.6.1 Introduction (cont'd)

Toronto and Vancouver have less of a problem regarding the origin of their U.S. signals, although Buffalo and Seattle cannot exactly be considered as capitals of the world. As far as the province of Alberta is concerned, the technical quality of signals is acceptable, because these are carried by microwave, but again, serving the booming Alberta market with signals from Spokane, Washington is clearly not an optimum solution.

The Atlantic Provinces face essentially the same problems as in the Province of Quebec; they are being served by stations originating from Bangor, Maine.

Another significant aspect of the question though, lies in the fact that the major cable companies in Canada are considering the expansion of their systems to 52 channels; this represents a significant increase over current capacity that varies between 24 and 35 channels; thus, even duplicate signals, but originating from a major market like New York, would be fairly attractive to major cable systems; these additionnals channels will generate a substantial demand for programming material.

7.6.2 The alternative

This alternative would involve the following from a supply point of view:

a) Eastern Canada

- Importation by microwave of the three commercial networks from New York at an estimated annual cost of $450,000.

- Off air pick up of the PBS station in the Buffalo area.

- Uplink of the four signals on two transponders of Anik C at an estimated annual cost of $3.7 million ($700,000 for uplink and $3 million for space segment)

b) Western Canada

- Importation by microwave of the three commercial networks from San Francisco at an estimated annual cost of $1.2 million.

7.6.2 The alternative (cont'd)

- Off air pick up of the PBS, Seattle affiliate in the Vancouver area.

- Uplink of the four signals on two transponders of Anik C at an estimated annual cost of $3.7 million.

The total annual cost of this alternative would thus become $9 million.

From a marketing point of view, there are a number of factors to consider. If one wants the large metropolitan areas, that have access to signals that are not distinctly different for free, to subscribe to the satellite services, these will have to be marketed very aggressively.

In Chapter 6, we evidenced the fact that large systems dominated the Canadian cable scene. Would it be conceivable thus to have a situation where U.S. signals would be attractive not only from a content point of view but from a cost point of view as well? The next section will thus examine various prices per subscriber, maximum number of subscribers, break even points, generated by various pricing strategies.

7.6.3 Feasibility

First, it has seemed useful to present a summary of the characteristics of the cable television industry, by system size.

The next step was to use various monthly rates under which the systems would be charged, using also a maximum number of subscribers (ceiling) for any system; for example assuming a monthly rate of 10 cents and a ceiling of 10,000, no system would pay more than $1,000 per signal or $4,000 per month for the four U.S. signals.

Table 7-31 presents the results that would be obtained, using rates of 5,10 and 15 cents per subscriber, and ceilings of 10000, 15000, 25000 and 50000 subscribers, assuming that all systems would subscribe to all services.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.6 A medium term plan: Canada Wide distribution (cont'd)

7.6.3 Feasibility (cont'd)

TABLE 7-30

CABLE TV SUBSCRIBERS BY SYSTEM SIZE, 1979

SYSTEM SIZE	NUMBER OF SYSTEMS	NUMBER OF SUBSCRIBERS IN LARGE SYSTEMS (000)	NUMBER OF SUBSCRIBERS IN SMALL SYSTEMS (000)	TOTAL (000)
50,000 +	21	2,050	1,950	4,000
25,000 +	35	2,500	1,500	4,000
15,000 +	60	3,000	1,000	4,000
10,000 +	81	3,225	775	4,000

The monthly rate of 5 cents per subscriber can be discarded at least in the short run because losses, on an annual basis are too important.

We will thus focus our attention on the monthly rates of 10 and 15 cents per channel and will introduce the following considerations.

1- For ceilings of 50,000 and 25,000 respectively the alternative would require the active cooperation of the CCS-Premier Group since they would be absorbing a large part of the costs, as shown in the following table.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.6 A medium term plan: Canada Wide distribution (cont'd)

7.6.3 Feasibility (cont'd)

TABLE 7-31

REVENUE AND EXPENSE PROJECTIONS UNDER VARIOUS ASSUMPTIONS
FOR THE FOUR U.S. NETWORKS ON AN ANNUAL BASIS

MONTHLY RATE PER SIGNAL	MAXIMUM NUMBER OF BILLING SUBSCRIBERS	REVENUES FROM LARGE SYSTEMS $000	REVENUES FROM SMALL SYSTEMS $000	TOTAL REVENUES $000	TOTAL COSTS $000	NET $000
5 cents	50,000	2,520	4,680	7,200	9,000	-1,800
	25,000	2,100	3,600	5,700	9,000	-3,300
	15,000	2,160	2,400	4,560	9,000	-4,440
	10,000	1,944	1,860	3,804	9,000	-5,196
10 cents	50,000	5,040	9,360	14,400	9,000	5,400
	25,000	4,200	7,200	11,400	9,000	2,400
	15,000	4,320	4,800	9,120	9,000	120
	10,000	3,888	3,720	7,608	9,000	-1,392
15 cents	50,000	7,560	14,040	21,600	9,000	12,600
	25,000	6,300	10,800	17,100	9,000	8,100
	15,000	6,480	7,200	13,680	9,000	4,680
	10,000	5,832	5,580	11,412	9,000	2,412

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.6 A medium term plan: Canada Wide distribution (cont'd)

7.6.3 Feasibility (cont'd)

TABLE 7-32

CCS-PREMIER'S CONTRIBUTION TO COSTS UNDER VARIOUS CEILINGS AND MONTHLY RATES ($ MILLION)

	MONTHLY RATE	
CEILING	10 CENTS	15 CENTS
50,000		
$ million	$ 3.4	$ 5.1
%	37.8%	56.7%
25,000		
$ million	$ 2.1	$ 3.2
%	23.3%	35.0%
TOTAL COSTS	$ 9.0	$ 9.0

If this active cooperation became a reality though, the other cable systems would come under a domino effect to some extent; if CCS subscribers in the Toronto area started receiving U.S. signals from New York, Maclean Hunter subscribers in the same area would start pressuring their cable company for the same services. At these ceiling levels however, the costs of acquiring not distincly different signals would also become an important consideration for many large cable systems.

And even if the large cable systems went along, at ceilings of 50,000 and 25,000 respectively, the alternatives would generate substantial profits; so there would be pressure for a rate reduction of some kind.

2- For ceilings and 15,000 on 10,000 respectively the alternative needs less of an active cooperation from the CCS-Premier group since they would be absorbing a much smaller proportion of total costs as shown in the following table.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.6 A medium term plan: Canada Wide distribution (cont'd)

7.6.3 Feasibility (cont'd)

TABLE 7-33

ROGERS-CCS-PREMIER'S CONTRIBUTION TO COSTS UNDER VARIOUS CEILINGS AND MONTHLY RATES ($ MILLION)

	MONTHLY RATE	
CEILING	10 CENTS	15 CENTS
15,000		
$ million	$ 1.4	$ 2.1
%	15.6%	23.3%
10,000		
$ million	$ 1.0	$ 1.5
%	11.1%	16.7%
TOTAL COSTS	$ 9.0	$ 9.0

In this case also, the domino effect would probably work the other way around, that is the services would be very attractive for other large and small cable systems, which would put pressure on the CCS-Premier group to provide the services to their subscribers.

3- The alternative has assumed annual space segment costs of $6.0 million, for four transponders. Those costs could be reduced to $5.0 million in the short term by using preemptible status (instead of unprotected, non preemptible) and by a 5% discount for leasing at least 4 transponders. And in addition, the CTRC hearing, whose aim is to review Telesat rates, has not yet taken place; space segment and uplink rates could thus be further reduced.

4- The alternative assumes that PBS would be picked off air in the Buffalo and Seattle areas; this reduces microwave costs on American soil but makes the service slightly less attractive.

5- The alternative has not taken into account the marketing of audio bandwith services or for that matter the marketing of

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.6 A medium term plan: Canada Wide distribution (cont'd)

7.6.3 Feasibility (cont'd)

all services to Rural Canada which, as was mentionned earlier, represents an untapped source of 2 million households. This is where an 'entrepreneur' in the true economic sense could play a major role, and it is irrelevant wether this 'entrepreneur' is a member of the cable television industry or not. Consider the following scenario:

- the services are marketed at 15 cents per channel with a ceiling of 10,000 subscribers; this means that no cable system in Canada would pay more than $6,000 monthly for the 4 U.S. signals.

- with such an aggressive pricing strategy a minimum of 100,000 households in rural Canada are reached which provides and additionnal $750,000 in annual revenues.

- audio bandwith services, marketed jointly with the television services, (FM and/or Telidon and /or slow scan services) generate additionnal revenues of $250,000 to $500,000.

- with the additionnal cash flow generated by rural Canada and audio bandwith services, the 'entrepreneur' can make further adjustments to the rates for television services, thus further reducing the possibility of a coalition amongst large cable companies.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.7 Conclusions on the distribution of U.S. networks

7.7.1 Overall considerations

Distribution of U.S. networks signals in Canada is judged to be feasible economically by the authors of this report, although some difficulties are still to be encountered.

Because of the fact that distribution in 14/12 GHz is clearly the preferable solution, the basic obstacle lies in the fact that this system is not yet available on a commercial basis in Canada; if distribution of these signals has to wait for the availability of 14/12 GHz, there is the real danger that more microwave contracts will be signed and that the already thin short term market within the cable television industry will simply dissappear.

This cable television market, however small, is absolutely essential to the commercial success of satellite distribution of U.S. signals; thus, the only practical short term alternative might be to start distribution as soon as possible in 6/4 GHz even if this means a later conversion to Anik C in 14/12 GHz; the technical and cost implications of such a conversion are discussed in Chapter 4 of this report.

Another remark we would like to make concerns 'entrepreneurship' to which we alluded to earlier; Home Box Office certainly had that quality when it went ahead with satellite distribution of pay TV and so did Southern Satellite Systems when they began distribution of the Turner superstation. Such 'entrepreneur' qualities would definitely be an asset in the distribution of U.S. signals in Canada.

Finally, the regulatory environment will also play a major role if these services are to be successful. Whether the services ought to be permitted or not is clearly outside our mandate, but this policy issue is briefly discussed further on. What concerns us here are more practical aspects such as licensing and rate increase procedures for individual cable systems; if the present process is not streamlined or modified to accomodate a large number of simultaneous requests, this will seriously compromise the economic viability of the services, and especially so in the short run.

7.7.2 Telesat/TCTS considerations

One of the reason why the market is fairly limited, at least in the short run, should be apparent by now.

7.7.2 Telesat/TCTS considerations (cont'd)

While TCTS members were delaying (successfully, one might mention) satellite delivery of U.S. networks in Canada through high rates for transponders, uplink and receive stations ownership (during the period ownership was restricted), their salesmen aggressively marketed microwave contracts, all across Canada, that expire in the late 80's or the early 90's. Canada is now stuck for a decade with obsolete, costly equipement that has had the further effect of increasing the dimensions of the border station problem in our country, without improving, to any extent, services in rural and remote areas.

If during the industrial revolution in England, one had given powers over the marketing and development of the steam engine to, say, sailboat manufacturers, the world would probably still be debating the advantages and disadvantages of the same steam engine.

There were certainly many aspects to consider in the decision to have Telesat join TCTS, but out of the consequences that could have been forecasted before implementing the decision, the one we described was certainly easy to predict and clearly understandable. One cannot reasonnably ask the people who are selling long distance microwave services to also sell satellite services; it clearly has to be one or the other.

7.7.3 Marketing considerations

Because of the fact that satellite signals of the four U.S. networks would not be distinctly different from presently available border stations signals, and also because most of Canada's urban areas are located close to the U.S. border, this imposes two conditions, if satellite delivery of U.S. signals is to be successful economically.

1- The signals should originate from stations that do not presently serve Canada, and from a market as large as possible, so that the subscribrs perceive them, to some extent, as different from the border stations signals.

2- Because the satellite services would always compete with terrestrial carriage of border stations, they have to be made attractive to the large urban areas located near the U.S. border; the only way to achieve such an objective is by limiting (as we have assumed) the amount of subscribers that can be billed in any given system; this in effect amounts to cross-subsidization from small to large communities.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA (cont'd)

7.7 Conclusions on the distribution of U.S. networks (cont'd)

7.7.4 Policy considerations

This last aspect, of cross subsidization from small to large communities, which is clearly not desirable but is necessary, should be weighed against the positive effect that satellite distribution would have on the border station problem:

- in some cases the border stations would disappear from Canadian TV screens completely

- in other cases the border stations could be moved to the converter service or to an impaired channel without such a request being even made by any regulatory body.

- in all cases, assuming that network affiliates basically compete with each other, this would significantly reduce the audience of border stations, without affecting the audience of Canadian stations.

- microwave distribution also produces cross subsidization not only from small to large communities but also from distant communities to ones that are located near a border signal.

8. ENGLISH LANGUAGE PAY TV

8. ENGLISH LANGUAGE PAY-TV

8.1 Introduction

The pay-TV concept examined in this report is that of a standard monthly discretionnary package of feature films, variety specials, sports and other programming material.

Subscribers would have to pay a flat monthly fee of $10 approximately, in addition to their basic cable rate.

Since pay-TV has been the subject of a great number of studies we took a slightly different approach for pay-TV than we did for the other programming services.

More specifically, we concentrated our attention on the three following issues.

a) Pay to basic ratios: since demand estimates, generated by a number of studies, fluctuate widely, we first wanted to see if this factor was crucial to the commercial success of pay-TV. In other words, if Canadians behave very differently from Americans, will pay-TV still be feasible?

b) Canadian content: since this is generally recognized as one of the major obstacles to the introduction of pay-TV in Canada, we wanted to study its impact on the feasibility of the project. In other words, with what kind of Canadian content rules could a pay-TV package live with?

   There was a 'market' reason as well to look at Canadian content. From the research material we had gathered on U.S. packages, we had come to the conclusion that, although the core of a pay package consisted of feature films, a strong package of original productions, generally not available on conventional television, was what 'cemented' the loyalty of subscribers.

   In that sense, high quality productions tailored to the real needs of the Canadian market, would become more than a necessary condition for license renewal: they would be mandatory for commercial success.

c) The National Approach: this is probably the issue that has bothered the most the authors of this report. Whether one questions the cable or broadcasting industries, or policymakers, pay-TV seems to be conceived as a big, single monolithic 'thing'. The issue, from that point of view, then becomes strictly a question of who controls, packages and reaps the enormous profits of the 'thing'(1).

(1) We generally refer to this growing Canadian characteristic as 'gunpowder counting', while at the same time rarely firing the gun.

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.1 Introduction (cont'd)

In one respect we dismissed this approach entirely; in our chapter on French language satellite programming we studied the feasibility of a pay-TV package tailored to the needs of the French speaking population. We simply do not believe that dubbed material can achieve success in the marketplace.

But getting back to English language pay-TV, the following are some of the considerations that motivated us to question the 'National Monolithic Approach':

- Is the English speaking population as monolithic as the pay package owuld be? Are there segments of the population that are likely to be irritated by the presence of sensitive material in a pay package? What about the segments who might be irritated by the absence of sensitive material?

- Are there not segments of the population that would like to see less variety specials in a package, because they have easy access to them in Toronto, and segments that would like to see more because they rarely have a chance to see any in North Bay?

- If pay-TV is forced to behave in a monopolistic fashion, is there a chance that it will do exactly that? Monopolies, in economic theory, charge higher prices and/or restrict output which produces higher profits than would otherwise be the case in a competitive environment. This then forces government to step in, to monitor and control the behaviour of the monopolist, both from the price and the output point of view.

- Would it be possible and feasible to prevent this last characteristic by permitting and even actively encouraging the existence of more than one pay-TV package? Is this an efficient way of making sure that prices will not be set abnormally high, and that production will be higher than it would be under the monopolistic environment? Is this approach, of relying more on market forces, to determine what shall be produced at what cost, better, equal or worse than having bureaucrats decide on the same issues?

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.2 The approach

Taking into account the preceeding considerations, we used the following approach to analyze the feasibility of pay-TV:

- We defined market projections for three scenarios (pessimistic, probable, optimistic) and a monthly retail price of $10.

- We then estimated the costs associated with:

  a) Satellite distribution.
  b) Administrative and overhead costs.
  c) Variable programming costs, mainly associated with the acquisition of feature films.
  d) The cable operator margin.

- Then, using sensitivity analysis, we estimated the level of fixed programming costs, associated with original productions, that would produce a 20% pre-tax return.

- Finally, the results are judged both quantitatively and qualitatively, according to the programming concepts being proposed.

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.3 Review of U.S. characteristics

8.3.1 Programming and scheduling characteristics

First, it has seemed useful to review the programming and scheduling characteristics of the main pay-TV packages in the United States.

These consist mainly of recent and classic movies and, in less proportion, of variety specials and sports events. The standard package contains 17 to 28 new events per month: 11 to 17 new movies, 3 to 5 new specials and if the package offers sports, is shows 4 to new sports events per month. The number of encore events is generally not greater than 7 per month.

The optimum number of monthly movie repeats is about 4. Specials and sports serve essentially to increase the package variety and appeal and to prevent high disconnect rate. The typical HBO schedule is 12 hours/day and the mix 60% movies, 20% sports, and 20% other.

The table 8-1 describes the characteristics of the two main U.S. Pay-TV packages. Considering cable subscribers viewing preferences in English Canada, we would suggest that the package contains 60% movies and documentary films, 20% sports and 20% variety specials.

TABLE 8-1

PROGRAMMING AND SCHEDULING ON HBO AND SHOWTIME

HBO		SHOWTIME
26-18	New events in monthly schedule	17-20
17	New movies per month	11-13
5	New specials per month	3-4
4-6	New sports events per month	0
7	Number of encore events per month	2-3
6-7	Average number of plays per new movie	7-8
150	Program slots per month	116
270	Number of hours on the air per month	225
$12 million	Budget for original production 1979	$8 million
60	Number of specials to be produced in 1979	35-50
$100-$300	Average price range per special ($000)	$100-$200

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.3 Review of U.S. characteristics (cont'd)

8.3.2 Profile of U.S. pay-TV subscribers

Pay-television households tend to be upper income, better educated, heavier TV viewers, from larger families with household heads between 35 and 49, and have more full-time working women. Basic cable subscribers tend to be less educated, lower and middle income, average-size families with older household heads. Pay-cable subscribers attend more concerts, stage shows, etc., than the population at large, but they attend much less movies.

The same people who subscribe to Pay-TV are 25% above average in sporting event attendance, 20% above average in attendance at live entertainment events, and 9% above average in movie-going. There is no evidence to suggest that either cable or pay-cable, with its plethora of sports offering, impacts attendance at live sports events. Pay-cable does not impact attendance at live entertainment events. Pay-cable subscribers attend more concerts, stage shows, etc. than the population at large. Much to the chagrin of theatre owners, pay-TV has rather dramaticaly impacted theatre attendance. Close to 90% of pay-cable subscribers indicate movies as the reason for subscribing to pay-TV. They want to see movies uninterrupted, unedited and uncensored; second, showing a movie prior to conventional television or exclusive showing on pay-TV is also an important consideration.

Among non-pay homes, the predominant reason for not subscribing to pay-TV is cost. More basic cable subscribers (35.2%), who are already paying $7-10 a month for basic service, give cost as a reason for not subscribing, than do non-cable subscribers (26.7%).

The predominant reason, today, for subscribing to cable TV is to gain access to more programs, channels and services. Improved reception comes in a distant second. As with pay-cable, cost remains a major obstacle to subscribing to cable. Close to 25% of non-cable homes claim they don't subscribe because regular television meets their viewing needs. The CROP Pay-TV survey performed in 1978 gives a similar but less extensive profile of the potential Canadian pay-TV subscriber.

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.3 Review of U.S. Characteristics (cont'd)

8.3.1 Profile of U.S. Pay-TV subscribers (cont'd)

TABLE 8-2

REASONS PEOPLE SUBSCRIBE TO CABLE (U.S. 1979)

	BASIC CABLE	PAY-CABLE
More channels, hours, Program choice	59.0%	59.4%
Better reception and UHF	40.1%	30.6%
Sports	10.8%	12.5%
Movies	5.3%	13.5%
PBS	8%	5.3%
To get pay-TV	-	14.3%
Other	11.4%	15.5%

Source: Cablevision, May 79.

TABLE 8-3

REASONS PEOPLE DO NOT SUBSCRIBE TO CABLE

Cost	45%
Regular TV meets needs	34%
Other	12%
Low TV interest	11%
Negative cable experience	3%

Source: Cablevision, May 79.

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.3 Review of U.S. characteristics (cont'd)

8.3.2 Profile of U.S. Pay-TV subscribers (cont'd)

TABLE 8-4

REASONS PEOPLE SUBSCRIBE TO PAY-CABLE

Movies uncut, uninterrupted, no commercials	23.3%
Movies current/missed seeing at theatre	22.7%
Movies/home convenience/scheduling	22.4%
Movies in general	22.1%
Program Variety	12.7%
Other	11.2%
Sports	10.0%
Economy vs theatre	8.2%
Specials/"on location"	4.5%

Source: Cablevision, May 79.

TABLE 8-5

REASONS PEOPLE DO NOT SUBSCRIBE TO PAY-TV

	NON-CABLE	BASIC CABLE
Cost	26.9%	35.2%
Low TV interest	9.0%	6.3%
Low movie interest	-	4.8%
Regular TV/basic cable meets needs	13.2%	4.8
Pay-cable movie quality	-	7.5%
Pay-cable movie repeats	-	5.7%
Sexy, violent movies	10.2%	12.6%
Other reasons	18.3%	15.1%
Cable available at location	19.5%	-

Source: Cablevision, May 79.

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.4 Market projections

Three scenarios have been developped for english language pay-TV but certain common assumptions have been used for all three scenarios. We intend by English Canada pay-TV market, all Canadian provinces except Quebec. All subsequent references will follow the same definition.

8.4.1 Households in licensed area

In 1978, there were 4,217,000 households in licensed areas in English Canada, out of 5,346,000 households or 78.4% of total households. We have assumed in the present analysis that the number of English Canadian households will grow at an average annual rate of 2.6% reaching 7,292,000 households in 1990. During the same period, we also expect the proportion of households in licensed areas to grow from 78.4% to 90% bringing the total number of households in licensed areas to aproximately 6,571,000 households, which represents an annual growth rate of 3.2% from 1978.

8.4.2 Percentage passed by cable

In 1978, 95.8% of households in licensed areas in English Canada were passed by cable. We did assume that this level almost reached its peak and and we kept it constant at 96% for the whole period.

8.4.3 Penetration (basic service)

In 1978, the penetration rate reached 76%. We have assumed that the penetration rate will grow at an average annual rate of 6% reaching 81.6% in 1990. The total number of English Canadian cable subscribers was 3,067,000 in 1978 and we expect it to grow at 4.4% per year to 5,146,000 subscribers in 1990.

8.4.4 Pay-to-basic ratios

We developped three pay-to-basic ratios scenarios based essentially on the U.S. experience and on the 1978 CROP pay-TV survey.

In 1978, only 6% of Canadian cable subscribers had heard a lot about pay-TV and only 15% had heard some thing about it, while 64% had heard nothing or almost nothing about pay-TV. In addition, 4% of these cable subscribers were very likely to take a pay package at its introduction and 10% likely to take that package; 77% of basic subscribers would not have taken the package at that time.

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.4 Market projections (cont'd)

8.4.4 Pay-to-basic ratios (cont'd)

As shown in the next table, the P/B ratio in the United States has been following an exponential trend and does not yet give any evidence of possible saturation. U.S. systems are relatively new, compared to Canadian systems and, as mentionned before, this will effectively limit the possible level of pay-TV penetration achievable in Canada to a much lower level. Canadian climatic conditions will probably influence positively the pay-TV penetration, inducing cable subscribers to reduce their movie theatre attendance. Finally, English Canadians viewing preferences favor a high U.S. origin in program content, especially for entertainment.

TABLE 8-6

PAY-TV SUBSCRIBERS IN THE UNITED STATES (000)

DATE	PAY-CABLE	MDS-STV	TOTAL PAY-TV SUBSCRIBERS	CABLE SUBSCRIBERS	P/B RATIO (1)
Sept. 77	1,336	N/A	1,336	13,300	10.0%
Sept. 78	2,522	114	2,642	13,500	18.7%
Sept. 79	4,458	306	4,764	14,850	30.0%
Febr. 80	5,751	400	6,151	15,313	37.6%

Source: Cablevision
(1) Pay-cable subscribers only

Taking into account all these factors we thus defined three scenarios which are presented in the following table. In the pessimistic scenario, pay-TV penetration would saturate at 20% while in the probable and optimistic scenario, the penetration rates would be 35% and 45% respectively.

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.4 Market projections (cont'd)

8.4.4 Pay to basic ratios (cont'd)

TABLE 8-7

PAY TO BASIC PENETRATION RATIOS

YEAR	PESSIMISTIC	PROBABLE	OPTIMISTIC
1981	4%	10%	14%
1982	11%	19%	24%
1983	15%	26%	33%
1984	18%	31%	40%
1985 and after	20%	35%	45%

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.5 Cost structure

Having defined the market projections, we then estimated the costs associated with:

- satelite distribution of the package
- administrative and overhead cost
- variable programming costs.

Then, using sensibility analysis, we estimated the amount of fixed programming costs which would produce a return before taxes of 20%. The results are then compared to the overall programming concepts being proposed and judged qualitatively and quantitatively.

8.5.1 Satellite distribution

The package would be distributed via Anik C in 14/12 GHz in the Western and Eastern time zone using two half-transponder, one for each time zone. Distribution costs have been estimated as follows:

- space segment costs: 2 half-transponders x $750,000/each
- uplink : 2 uplink channels x $100,000/each
- TOTAL : $1,700,000

In the feasibility analysis we have used a figure of $2 million annually.

8.5.2 Administrative overhead and other costs

This cost category would include such costs as:

- annual administrative and overhead costs
- start-up expenses (initial acquisition of programs, playback facilities)

The cost estimates we have used in the three scenarios are as follows:

	1981 $000	1982 and after $000
Pessimistic	$ 2,000	$ 1,000
Probable	$ 2,500	$ 1,250
Optimistic	$ 3,000	$ 1,500

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.5 Cost structure (cont'd)

8.5.3 Programming costs

We estimate that variable programming costs, essentially associated with the acquisition of feature films would not exceed $2 per subscriber per month.

The reasoning behind this assumption rests on the oligopolistic structure of the industry. There are three major pay-TV packagers in the United States (HBO, Showtime, Warner) which can exert considerable influence over the prices which are paid to movie distributors; this of course is especially true of HBO, which has been able to reduce considerably the price it pays for movies in the past two or three years (1).

With the possible introduction of pay-TV in Canada, we expect this influence to reach North American proportions. Pay-TV packagers are definitely expected to line up with the major U.S. parkagers and thus increase their bargaining power with movie distributors and independent producers (2).

8.5.4 Cable operator margin

We have assumed that the cable operator's margin would be 50%. It has been estimated that such a margin would be sufficient to cover the exhibition costs of the pay-TV package; this margin would be slightly lower than in the United States (55%) but cable systems are generally larger in Canada; the potential economies of scale thus make us believe that cable operators would not strongly object to the lower percentage figures.

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(1) See our Phase I report.
(2) This would even seem mandatory since HBO, for example, owns world wide pay-TV rights for a large number of Canadian films.

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.6 Feasibility

Results of the simulations are briefly summarized in the following tables. The results show that, in the pessimistic scenario, an internal rate of return 20.0% before taxes is achieved with fixed programming expenditures of $18.5 million anually: in the probable scenario, fixed programming expenditures can be nearly doubled at $35.5 million annually to achieve an internal rate of return of 20%; finally, in the optimistic scenario, these expenditures could reach $46.0 million annually.

TABLE 8-8

PESSIMISTIC SCENARIO
LEVEL OF FIXED PROGRAMMING EXPENDITURES AND
INTERNAL RATE OF RETURN

ANNUAL FIXED PROGRAMMING EXPENDITURES (000)	INTERNAL RATE OF RETURN
$ 19,500	16.5%
$ 19,000	18.6%
$ 18,500	20.9%
$ 18,000	23.1%
$ 17,500	25.5%

TABLE 8-9

PROBABLE SCENARIO
LEVEL OF FIXED PROGRAMMING EXPENDITURES AND
INTERNAL RATE OF RETURN

ANNUAL FIXED PROGRAMMING EXPENDITURES (000)	INTERNAL RATE OF RETURN
$ 36,000	18.4%
$ 35,500	19.7%
$ 35,000	21.4%
$ 34,500	22.4%
$ 34,000	23.8%

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.6 Feasibility (cont'd)

TABLE 8-10

OPTIMISTIC SCENARIO
LEVEL OF FIXED PROGRAMMING EXPENDITURES AND
INTERNAL RATE OF RETURN

ANNUAL FIXED PROGRAMMING EXPENDITURES (000)	INTERNAL RATE OF RETURN
$ 47,000	18.6%
$ 46,500	19.7%
$ 46,000	20.7%
$ 45,500	21.8%
$ 45,000	22.9%

Detailed projections are presented in the following three outputs, but can be briefly summarized as follows:

TABLE 8-11

FEASIBILITY OF ENGLISH LANGUAGE PAY-TV

	PESSIMISTIC	PROBABLE	OPTIMISTIC
Internal rate of return (%)	20.9%	21.0%	20.7%
Net present value at 12% ($ million)	$13.2	$22.4	$27.6
First year of positive cash flow	4	4	4
Year of break even (discounted)	8	8	8
Capital required ($ million)	$23.9	$39.9	$51.5
Programming expenditures as a % of gross revenue to packager	81.4%	84.5%	85.5%
Total programming expenditures during the 10 year period ($ million)	$363.7	$664.3	$864.5
Total gross revenues during the 10 year period	$446.7	$785.8	$1,011.2

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PAY TELEVISION:PESSIMISTIC
****

PAY TELEVISION

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SUBSCRIBER PROJECTION										
LICENSED HOUSEHOLDS	4740	4915	5097	5286	5481	5684	5895	6113	6339	6573
PERCENT PASSED BY CABLE	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
PASSED BY CABLE	4550	4719	4893	5074	5262	5457	5659	5868	6085	6310
PERCENT PENETRATION	78.2	78.6	79.0	79.3	79.7	80.1	80.5	80.8	81.2	81.6
BASIC SUBSCRIBERS	3558	3708	3864	4026	4195	4370	4553	4744	4943	5149
PAY TO BASIC RATIO	4.0	11.0	15.0	18.0	20.0	20.0	20.0	20.0	20.0	20.0
PAY SUBCRIBERS	142	408	580	725	839	874	911	949	989	1030
REVENUE AND EXPENSE PROJECTION ($000)										
MONTHLY RATE	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
ANNUAL REVENUES	17080	48944	69544	86955	100669	104888	109282	113858	118622	123583
CABLE OPERATOR MARGIN	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
CABLE REVENUES	8540	24472	34772	43478	50334	52444	54641	56929	59311	61792
NET TO PACKAGER	8540	24472	34772	43478	50334	52444	54641	56929	59311	61792
EXPENSES										
SATELLITE DISTRIBUTION	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
VARIABLE PROGRAMMING COSTS	3416	9789	13909	17391	20134	20978	21856	22772	23724	24717
FIXED PROGRAMMING COSTS	18500	18500	18500	18500	18500	18500	18500	18500	18500	18500
ADMIN. AND OVERHEAD	2000	1000	1000	1000	1000	1000	1000	1000	1000	1000
TOTAL EXPENSES	25916	31289	35409	38891	41634	42478	43356	44272	45224	46217
NET REVENUE	-17376	-6817	-637	4587	8701	9966	11285	12657	14087	15575
N.P.V. AT 12 P.C.	-17374	-23462	-23970	-20705	-15176	-9521	-3803	1922	7611	13228
INTERNAL RATE OF RETURN	-100.0	-100.0	-100.0	-99.0	-17.1	-1.7	7.7	13.8	17.9	20.9

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PAY TELEVISION:PROBABLE

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PAY TELEVISION

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SUBSCRIBER PROJECTION										
LICENSED HOUSEHOLDS	4740	4915	5097	5286	5481	5684	5895	6113	6339	6573
PERCENT PASSED BY CABLE	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
PASSED BY CABLE	4550	4719	4893	5074	5262	5457	5659	5868	6085	6310
PERCENT PENETRATION	78.2	78.6	79.0	79.3	79.7	80.1	80.5	80.8	81.2	81.6
BASIC SUBSCRIBERS	3558	3708	3864	4026	4195	4370	4553	4744	4943	5149
PAY TO BASIC RATIO	10.0	19.0	26.0	31.0	35.0	35.0	35.0	35.0	35.0	35.0
PAY SUBCRIBERS	356	705	1005	1248	1468	1530	1594	1660	1730	1802
REVENUE AND EXPENSE PROJECTION ($000)										
MONTHLY RATE	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
ANNUAL REVENUES	42701	84540	120544	149756	176170	183554	191244	199251	207589	216271
CABLE OPERATOR MARGIN	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
CABLE REVENUES	21350	42270	60272	74878	88085	91777	95622	99625	103794	108135
NET TO PACKAGER	21350	42270	60272	74878	88085	91777	95622	99625	103794	108135
EXPENSES										
SATELLITE DISTRIBUTION	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
VARIABLE PROGRAMMING COSTS	8540	16908	24109	29951	35234	36711	38249	39850	41518	43254
FIXED PROGRAMMING COSTS	35000	35000	35000	35000	35000	35000	35000	35000	35000	35000
ADMIN. AND OVERHEAD	2500	1250	1250	1250	1250	1250	1250	1250	1250	1250
TOTAL EXPENSES	48040	55158	62359	68201	73484	74961	76499	78100	79768	81504
NET REVENUE	-26690	-12888	-2087	6677	14601	16816	19123	21525	24027	26631
N.P.V. AT 12 P.C.	-26690	-38197	-39860	-35108	-25829	-16287	-6598	3138	12842	22446
INTERNAL RATE OF RETURN	-100.0	-100.0	-100.0	-99.0	-18.6	-2.3	7.5	13.8	18.0	21.0

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PAY TELEVISION:OPTIMISTIC
****

PAY TELEVISION

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SUBSCRIBER PROJECTION										
LICENSED HOUSEHOLDS	4740	4915	5097	5286	5481	5684	5895	6113	6339	6573
PERCENT PASSED BY CABLE	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
PASSED BY CABLE	4550	4719	4893	5074	5262	5457	5659	5868	6085	6310
PERCENT PENETRATION	78.2	78.6	79.0	79.3	79.7	80.1	80.5	80.8	81.2	81.6
BASIC SUBSCRIBERS	3558	3708	3864	4026	4195	4370	4553	4744	4943	5149
PAY TO BASIC RATIO	14.0	24.0	33.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0
PAY SUBCRIBERS	498	890	1275	1610	1888	1967	2049	2135	2224	2317
REVENUE AND EXPENSE PROJECTION ($000)										
MONTHLY RATE	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
ANNUAL REVENUES	59781	106788	152998	193234	226505	235998	245885	256180	266900	278062
CABLE OPERATOR MARGIN	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
CABLE REVENUES	29891	53394	76499	96617	113252	117999	122942	128090	133450	139031
NET TO PACKAGER	29891	53394	76499	96617	113252	117999	122942	128090	133450	139031
EXPENSES										
SATELLITE DISTRIBUTION	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
VARIABLE PROGRAMMING COSTS	11956	21358	30600	38647	45301	47200	49177	51236	53380	55612
FIXED PROGRAMMING COSTS	46000	46000	46000	46000	46000	46000	46000	46000	46000	46000
ADMIN. AND OVERHEAD	3000	1500	1500	1500	1500	1500	1500	1500	1500	1500
TOTAL EXPENSES	62956	70858	80100	88147	94801	96700	98677	100736	102880	105112
NET REVENUE	-33066	-17464	-3601	8470	18451	21300	24265	27354	30570	33919
N.P.V. AT 12 P.C.	-33066	-48658	-51529	-45500	-33774	-21688	-9394	2979	15326	27557
INTERNAL RATE OF RETURN	-100.0	-100.0	-100.0	-99.0	-19.6	-3.0	6.9	13.3	17.7	20.7

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.7 Interpretation of results

Whether each scenario is feasible or not, really depends on the costs associated with original productions. This is the most difficult aspect of the question, and we have had to use estimates that could differ greatly in reality, depending on the exact nature of the programming material.

We estimate that good quality variety specials would cost anywhere between $150,000 and $300,000; there would be 3 such original productions each month in the pessimistic scenario, 4 in the probable scenario, and 5 in the optimisti scenario.

The sports events would range anywhere between $30,000 to $50,000 per event, and there would be 4,5 or 6 such events depending on the scenario.

These assumptions are illustrated in the following table.

TABLE 8-12

NUMBER OF ORIGINAL PRODUCTIONS AND UNIT COSTS

	S C E N A R I O S		
PROGRAMMING	Pessimistic	Probable	Optimistic
Variety specials			
Number per month	3	4	5
Unit cost (000)	$150 - $300	$150 - $300	$150 - $300
Sports			
Number per month	4	5	6
Unit cost (000)	$ 30 - $ 35	$ 40 - $ 45	$ 50 - $ 55

The assumptions have then been compared to the annual budget forecasted for original programming.

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.7 Interpretation of results (cont'd)

TABLE 8-13

ANNUAL BUDGETS AND FIXED PROGRAMMING EXPENDITURES ($000)

	Pessimistic		Probable		Optimistic	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Annual budget	$18,500	$18,500	$35,000	$35,000	$46,000	$46,000
Programming costs						
Specials	$ 5,400	$10,800	$ 7,200	$14,400	$ 9,000	$18,000
Sports	$ 1,440	$ 1,680	$ 2,400	$ 2,700	$ 3,600	$ 3,960
Sub total	$ 6,840	$12,480	$ 9,600	$17,100	$12,600	$21,960
Balance for other programming	$11,660	$ 6,020	$25,400	$17,900	$33,400	$24,040

8. ENGLISH LANGUAGE PAY-TV (cont'd)

8.8 Conclusions on pay-TV

The preceeding results clearly show that, whatever the scenario, English language pay television is feasible.

Second, enough money is generated in each scenario to permit substantial efforts in terms of original production; thus, content rules that would be expressed in $ would not 'kill' pay-TV in any scenario; it is an entirely different story though, if content rules are expressed in hours of programming or especially in terms of prime time programming.

Third, both the probable and optimistic scenarios generate so much money, that they become absurd.

The concept of a single, monolithic pay-TV agency under these scenarios becomes very hard to believe, and if market forces were left to dictate a solution, there would most certainly be more that one pay-TV package on the market.

Thus, assuming that content rules are set at a level which can be met (and there seems to be room to do that), the best avenue for policymakers would then be to make sure that the system is wide open to Canadian producers; we think, the best way to achieve that objective is through multiple pay-TV packagers, where neither the broadcast or cable industries are able to gain full monopolistic control.

One must remember that pay television is part of the revolution that will enable Canadian citizens to have access to varied and competitive programming services; to legislate pay-TV into a monopolistic structure, while it does not yet exist, would in our opinion be a disservice to Canadians in terms of restricted output, and higher prices than they would normally face.

9. SUPERSTATIONS

9. SUPERSTATIONS

9.1 Introduction

This section will deal with the possibility of allowing an 'English' independent station to nationally distribute its signal through satellite-cable technology. The phenomenon otherwise known as a 'superstation' evolved historically following the explosion of programming within the U.S. on Satcom I.

The following sections will place the U.S. experience within historical context and will identify potential options for Canada.

To develop a feasibility model, a potential candidate for a Canadian superstation will be identified and interpreted for market and rate card data. Subscriber growth assumptions, viewing levels, audience shares as well as a rate card will then form the basis of the revenue forecast; step-up fees and various departmental expenditures will constitute operating expenses.

The superstation, financially, is expected to perform as a typical broadcaster; an income statement, a sources and uses of funds, and balance sheet criteria are generated by the superstation model and will form the basis of the feasibility analysis.

Financial viability, as in other sections, is determined through investment return and payback criteria.

Our conclusion will end with a discussion of the economic impact of a superstation.

9. SUPERSTATIONS (cont'd)

9.2 Synopsis of the U.S. Scenario

During phase I, four superstations were evaluated:

WTBS, Atlanta, Ga.
WGN, Chicago, Ill.
WOR, New York, N.Y.
KTVU, Oakland, Ca.

The first candidate, WTBS, was identified as the only 'willing' superstation; all others were classified as 'unwilling'.

WTBS is exploiting its superstation status by attempting to maximize the advertising potential of national audience coverage. To date, its efforts have not been successful.

The reluctant stations, given the increased coverage area, fear potential reprisal by programming suppliers. They are without control of their signal, and face potential step-up fees; without the endorsement of the advertising community, they are skeptical of the additional audiences acquired.

WTBS is labeled as a 'hybrid' broadcaster, a licensee who confuses the distinction between content and carriage (ironically the Canadian Association of Broadcasters have always interpreted the cable industry as hybrid carriers).

As a hybrid station, WTBS is able to retain its traditional over-the-air market while simultaneously exploiting 'network' potential audiences (the wired nation concept) without a system of affiliates.

This type of national exposure completely denies the CATV operator any access to content, and is tentamount to the creation of a network without any exposure to local origination efforts.

The future of superstations within the United States, as a 'hybrid' beast, is bleak. What is developing and, which will form the core of the next chapter, is the evolution of cable network television. These types of packages allow CATV operators with access to content and permit cultural expression at the local level.

9. SUPERSTATIONS (cont'd)

9.2 Synopsis of the U.S. Scenario (cont'd)

The likely course for independent broadcasting superstations is the regionalization of the phenomenon. As the wired nation concept evolutes within the Unites States, cable operators might increasingly rely on satellite feeds instead of terrestrial microwave to receive distant signals.

A regional 'hybrid' broadcaster encourages local identity and facilitates the packaging of a product suitable for public needs. In this sense, the impact of a 'network without affiliates' is at least localized at the regional level.

Whether the regional superstation remains in hybrid form, or completely relies on cable technology for its audience is a question of profit motive as well as to how North America develops as a wired nation.

9. SUPERSTATIONS (cont'd)

9.3 Potential Options for Canada

9.3.1 Program production

Advertising revenue is the base of the private broadcasting industry and to a certain extent the public broadcasting system. Advertising expenditures in Canada are chronically low and insufficient, if compared to U.S. standards, to generate high quality programming. Canadians in turn, have been forced to supplement their television systems through public subsidy.

A superstation, whether it is at the national or regional level, is a policy option if it is able to generate additionnal advertising revenues to support and improve the quality of programming. It is not a policy option, if the net effect is a redistribution of advertising revenues within the broadcasting industry.

9.3.2 Program distribution

A superstation, as defined, does not assume carriage responsibility of the signal. This task is delegated to a resale common carrier. The cost associated with signal distribution is financed through subscription, ie. subscriber charges at the CATV's operator end.

Canadian extension of services to Northern areas is remarkable; yet, many rural communities, let alone remote areas, still do not receive alternate programming, eg. an independent station. As the wiring of Rural Canada intensifies, the demand for alternative viewing, within these areas, will increase.

U.S. signals could be imported to satisfy this demand, but on the other hand, a complementary package including a Canadian independent could be imported just as well.

9.3.3 The approach adopted in the study

Potential 'English' candidates for superstation status have been identified in all provinces except Atlantic Canada. The question now becomes one of distinguishing between options.

Ideally, Canada should adopt a regional approach to a super-station concept. Media perception and transponder availability issues, developed below, indicate that as an

9. SUPERSTATIONS (cont'd)

9.3 Potential Options for Canada (cont'd)

9.3.3 The approach adopted in the study (cont'd)

immediate option the possibilities of exploiting the superstation concept at the regional level are limited.

Feasibility therefore is analyzed at the national level and will entail propelling one independent to superstation status.

The solution adopted is a 'market' approach and does not include the possibilty that regional independents attain superstation status through public subsidy.

9. SUPERSTATIONS (cont'd)

9.4 Identification and selection of potential candidates

Potential superstation candidates were identified as follows:

CHCH-TV, Hamilton, Ontario
CKGN-TV, Toronto, Ontario
CKVV-TV, Vancouver, B.C.
CITV-TV, Edmonton, At.
CKNP-TV, Winnipeg, Man.

Stations are evaluated by market data, rating points, programming orientation and advertising rates.

CHCH and Global (CKGN) were identified as likely candidates. They are both located within Canada's top market and, as such, they would be most apt to manage the transition from local to national coverage. 'Other' candidates were excluded principally because of their dependence on local advertising (CHCH and Global's sales time are largely national).

In terms of programming orientation, the redeeming quality sought is a mass appeal station, able to compete directly with U.S. rival stations. Again CHCH and Global are strong contenders. Both stations have achieved significant market inroads and are able to generate large audience shares.

We have chosen CHCH as the likely candidate. Although CHCH slightly outperforms Global in terms of audience shares within the Toronto central area, overall audience performance between the two stations is not significantly different (both stations actively exploit content quotas by maximizing the airing of U.S. programming during prime and afternoon blocks). The selection of CHCH, therefore, should be construed as an arbritary decision.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model

9.5.1 Introduction

Implicit throughout the analysis, is the availability of two half transponders for Eastern and Western Canada coverage on Anik C in 14/12 GHz.

The production span is limited to 10 years. Operating revenues and expenses are developped by excluding CHCH's existing operation from that of its potential superstation operation. While indivisibilities are bound to occur in the area of national advertising rates and departmental expenses, the reality of the situation was sacrificed for the objectivity of our analysis.

9.5.2 Audience assumptions

a) Introduction

An English Canada cable subscribers projections to the year 1990 have been provided previously within the pay television chapter. We will retain these projections as forming the core of all future superstation audiences. Additionnal audience assumptions have been made and are dealt with in the following sections.

b) Median household size

Census material in 1971 and 1976, and Statistics Canada projections for 1978 and 1981 indicate that, population growth is slowing to approximately 1.1% annually. In contrast, household growth is averaging 2.6% annually(1).

Given these assumptions, which are summarized in the following table, a median household size of 3.1 will be utilized in converting CATV households to national audience figures.

(1) English Canada population and household projections to 1981 are slightly more optimistic than national rates since Quebec's population and household figures, are expected to grow at 0.5% and 2.3% respectively.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.2 Audience assumptions (cont'd)

TABLE 9-1

ENGLISH CANADA MEDIAN HOUSEHOLD SIZE

YEAR	POPULATION (000)	HOUSEHOLDS (000)	MEDIAN HOUSEHOLD SIZE
1971	15,541	4,451	3.5
1976	16,759	5,086	3.3
1978	17,198	5,376	3.2
1981	17,910	5,802	3.1

c) CHCH normal coverage area

In 1978, CHCH reached 5,486,000 people, principally within the Toronto, Hamilton, London and Kitchener CMA's.

CHCH's total CATV coverage, based on a median household size of 3.1 persons, is presently 3,188,000 people or 58% of its potential audience.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.2 Audience assumptions (cont'd)

TABLE 9-2

CHCH-TV NORMAL COVERAGE AREA, 1978

MARKET AREA	POPULATION (000)
Toronto CMA	2,837
Hamilton CMA	528
London CMA	271
Kitchener CMA	280
Other(1)	
TOTAL	5,486
Total CATV subscribers receiving CHCH-TV signal	1,028,400
Total CATV population based on 3.1 persons per household	3,188,040

(1) Corresponds to full coverage area outside major CMA's.

d) CHCH potential superstation audience

The sheer size of the Toronto market should not be overlooked. The normal CATV coverage of CHCH, 1,028,400 households, accounts for 32% of total English Canada cable households.

CHCH, nevertheless, stands to double its audience if propelled to superstation status. English Canada CATV coverage at the end of 1978 has been established at 3,067,000 households; if we substract CHCH'S normal CATV

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.2 Audience assumptions (cont'd)

coverage of 1,028,400 households and multiply by a median household size of 3.1, CHCH stands to gain an audience of 6,319,660.

Table 9-3 provides a market breakdown of CHCH's potential CATV audience of 2,038,600 households. Table 9-4 summarizes the distribution of the household count by major market type.

TABLE 9-3

POTENTIAL CHCH SUPERSTATION AUDIENCE

	1978
Total english CATV households	3,067,000
Less CHCH normal CATV coverage area	1,028,400
Total households excl. normal coverage area	2,038,600
Median household size	3.1
Potential national audience excluding normal coverage area	6,319,660

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.2 Audience assumptions (cont'd)

TABLE 9-4

ENGLISH CANADA MARKET BREAKDOWN OF POTENTIAL CHCH SUPERSTATION AUDIENCE

1	2		
Market	Total households (000)	CATV HOUSEHOLDS	
		% of 2	(000)
CHCH Superstation audience	3,616	56	2,039
TOP MARKETS			
Vancouver/Victoria	500	87	435
Ottawa/Hull	227	70	159
Winnipeg	200	77	154
Edmonton	187	65	122
Calgary	166	71	118
MAJOR MARKETS			
Halifax	82	68	30
Regina	52	54	28
Sudbury	45	62	28
St.John's	37	32	12
Oshawa	44	78	34
Saskatoon	46	54	25
Thunder Bay	38	79	30
Saint John	35	63	22
OTHER	1,957	43	842

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.2 Audience assumptions (cont'd)

TABLE 9-5

PERCENT DISTRIBUTION OF CHCH SUPERSTATION AUDIENCE BY MARKET TYPE

	CATV HOUSEHOLDS (000)	%
Top markets	988	48.5%
Major markets	209	10.3%
Other markets	842	41.2%
Total CHCH superstation audience	2,039	100%

e) Penetration of package

This variable is not as critical as the pay-to-basic ratio for premium television services.

As in the United States, the only cost borne by the subscriber of a superstation is that related to the carriage attribute of the signal. Assuming an annual transponder charge of $1.5 million, and uplink charges of $200,000, the cost to the subscriber, if 100% of cabled households outside CHCH normal coverage were to receive the signal today would be in the vincinity of .07¢ per month. Our point is that cost aspects of distribution will not be a singificant factor in determining the feasibility of the superstation.

Realistically, given the proper regulatory context, CHCH's superstation audience should be tied to overall cable subscriber growth, i.e. it should reach 100% of the CATV population outside the normal coverage area.

It is assumed that the CHCH signal will not be placed on a converter service but will be available as a basic service

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.2 Audience assumptions (cont'd)

to all CATV subscribers. To accomodate difficulties associated with system channel capacity we expect CHCH's penetration rate to reach 50% of the CATV audience following start-up, growing to 75% by the second year, and reaching 100% of households by the third year of operation.

f) Projected CHCH superstation audience to 1990

As table 9-6 indicates, CHCH's superstation audience is expected to grow to 11.3 million by 1990. In addition to a median household size of 3.1 persons and a penetration rate of 100%, this projection is based upon a slower annual increase of cable subscribers within CHCH's normal coverage area.

The national English subscriber growth rate was previously established at 4.4%, while CHCH's normal CATV coverage area is expected to grow at 3.2%. The 1.2 percentage point discrepancy is accounted for by the extension of CATV service to rural areas.

9.5.3 Rate card and related criteria

a) Introduction

In this section, viewing levels, audience shares and equitable CPM rate are developped to build a superstation rate card.

b) Terminology

The following terminology will be utilized:

Central area:

A defined geographical area loosely related to Statistics Canada's census metropolitan areas in large urban areas.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

TABLE 9-6

PROJECTED CHCH SUPERSTATION AUDIENCE

YEAR	TOTAL ENGLISH CATV COVERAGE (000)	LESS CHCH NORMAL CATV COVERAGE (000)	TOTAL HOUSEHOLDS EXCLUDING NORMAL COVERAGE AREA (000)	OVERALL PENETRATION OF CHCH PACKAGE TO CABLE SYSTEMS (%)	MEDIAN HOUSEHOLD SIZE	POTENTIAL NATIONAL AUDIENCE EXCLUDING NORMAL COVERAGE AREA (000)
1978	3,067	1,028	2,039			
1981	3,548	1,130	2,418	50%	3.1	3,748
1982	3,735	1,166	2,569	75%	3.1	5,973
1983	3,892	1,203	2,689	100%	3.1	8,336
1984	4,047	1,242	2,805	100%	3.1	8,696
1985	4,220	1,281	2,939	100%	3.1	9,111
1986	4,401	1,323	3,078	100%	3.1	9,542
1987	4,596	1,365	3,231	100%	3.1	10,016
1988	4,800	1,409	3,391	100%	3.1	10,512
1989	5,001	1,454	3,547	100%	3.1	10,996
1990	5,146	1,500	3,646	100%	3.1	11,303

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

Normal coverage area:

An area defined to include the total audience to a specified station (also known as 'full' coverage area)

Superstation audience:

Potential national audience less the normal coverage area of a specified station. Analogically a superstation CATV audience denotes all cable households receiving the signal outside the station's specified normal coverage area.

Viewing level:

The percentage of the population tuned in for any given time period.

Average audience: (¼ hr. av.)

The estimated average number of people tuned in any quarter hour over a specified span of time. For example:

STATION 'A' MONDAY 8:00 PM - 9:00 PM

	AUDIENCE
8:00 - 8:15 PM	24,000
8:15 - 8:30 PM	24,800
8:30 - 8:45 PM	25,600
8:45 - 9:00 PM	25,900
AVERAGE	25,075

Rating:

The percentage of the population who are tuned to a particular station. An 'all station' rating within a designated market area is equivalent to a viewing level.

Audience share:

The percentage of the total television audience tuned to a particular station. The base for ratings is population estimates, the base for shares is viewers.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

Cost per thousand (CPM):

A measure of the cost efficiency of a media buy, combining audience share and cost in one estimate.

$$\text{C.P.M.} = \frac{\text{\$ cost (of announcement)}}{\text{audience (in 000's)}}$$

c) Time classification

The following time classification has been developed to accomodate daily viewing patterns.

TABLE 9-7

CHCH-TV TIME CLASSIFICATION

LABEL	TIME (M-S)	OTHER TERMINOLOGY
AAA	6:30 PM-11:00 PM	prime
AA	11:00 PM-12 MID	fringe
	4:00 PM-6:30 PM	fringe
A	12:00 PM-4:00 PM	12 noon-4:30 PM
B	6:00 AM-12:00 PM	sign on-12 noon
C	12:00 AM-1:30 AM	12md-sign off

d) Viewing levels

CHCH's potential average audience, by time block is depicted in Table 9-8. Viewing levels conform to national averages where the largest audience segments are attained during prime and fringe hours.

e) Audience share

We have developed 3 scenarios for audience shares. All scenarios are tied to CHCH's present performance within its own coverage area; each will vary according to the degree of audience loyalty.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

TABLE 9-8

DAILY VIEWING PATTERN OF CHCH's SUPERSTATION AUDIENCE

	SUPERSTATION AUDIENCE:	7,495,800(1)
TIME BLOCK	VIEWING LEVEL	CHCH ¼ HR. AVERAGE AUDIENCE
AAA	37%	2,773,446
AA	20%	1,499,166
A	10%	749,580
B	5%	374,790
C	4%	299,832

i) CHCH present market performance

CHCH's audience performance is analysed within its major market, the Toronto central area.

The station's performance during prime time, as Table 9-9 displays is remarkably strong, being out-performed by only one station, CTV's flagship station, CFTO-TV.

Strong performance is also attained during the noon-to-4:30 pm time block. With an all station rating of 9%, CHCH's audience share is 24%. This afternoon audience is largely composed of the female population, 18 years of age and over.

CHCH'S audience share in all other time blocks is below 10%. CHCH's fringe audience share is especially weak if we consider that the 'all station' rating for this time segment is subtantially higher than remaining time blocks A, B and C.

CHCH averages a two percent rating from sign on to sign off (6:00 am - 1:30 am) which translated into an average audience share of 11%.

(1) Projected 1981 superstation audience assuming 100% penetration of package.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

TABLE 9-9

CHCH PRIME TIME AUDIENCE PERFORMANCE

C.A.: TORONTO Pop.: 2,864,000

Time block (M-S) 7:00-11:00 PM

STATION	RATING	AUDIENCE SHARE	AUDIENCE
All stations	37	100	1,600,000
CBLT (CBC)	5	12	192,000
CFTO (CTV)	7	19	304,000
CHCH (ind.)	5	14	224,000
CICO (TVO)	1	2	32,000
CITY (IND)	4	10	160,000
CKGN (Global)	4	12	192,000
WIVB (CBS)	3	8	128,000
WGR (NBC)	3	8	128,000
WKBN (ABC)	3	8	128,000
WUTV (IND)	1	2	32,000
Others	2	6	96,000

Source: BBM, Fall 1979

Note: Figures may not add to total due to rounding.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

TABLE 9-10

AUDIENCE PERFORMANCE BY TIME BLOCK

C.A. TORONTO Pop.: 2,864,000

TIME BLOCK (M-S)	RATING	SHARE	AUDIENCE
AAA (prime)			
All stations	37	100	1,600,000
CHCH	5	14	224,000
AA (fringe)			
All stations	20	100	572,800
CHCH	1	6	34,368
A (12 noon-4:30 PM)			
All stations	9	100	257,760
CHCH	2	24	61,862
B (sign on-12 noon)			143,200
All stations	5	100	10,024
CHCH	-	7	
C (12 mid-sign off)			114,560
All stations	4	100	9,165
CHCH	-	8	
ALL TIME PERIODS (sign on-sign off)			
All stations	15	100	429,600
CHCH	2	11	47,256

Source: BBM, Fall 1979

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

ii) Projected superstation audience shares

The possibility of an explosive impact, i.e., intense viewer loyalty, following start-up is implicit within each scenario. CHCH is not a young and struggling broadcaster; to project that CHCH's audience share will grow steadily over a ten year period is unrealistic.

Maximum impact is reached within two years following start-up under the optimistic scenario, three years under the probable scenario and five years for the pessimistic assumption. Table 9-11 summarizes these audience share projections by time block.

f) Superstation rate card

i) Introduction

A cost efficiency, a measure of the cost effectiveness of purchased time, is an elusive concept since it is an ex-post phenomenon.

A national advertiser maximizes his purchased time by reaching the largest mass possible. A rate card, usually quoted on a 30 second basis, should in turn, reflect an equitable price, by which an advertiser can effectively allocate his funds; yet, at the very best, a rate card is a reflection of past performance.

While the resources of BBM are massive, they are not instantaneous. An advertiser purchases a spot, with an expectation that a stations' past performance will, within reason, be maintained in the near future. If for any reason these expected audience shares drop, the advertiser is in effect a net-looser.

Analogously, a broadcaster's first years of operation are associated with bringing the station out of the red, that is, developping audience shares to some expected level of stability. Throughout the initial years of operation the broadcaster's rate card is not built upon the premise that audience shares are zero or practically non-existent, rather they are built upon the assumption that bookings will be zero or insubstantial. The broadcaster may offer the advertiser tantalizing frequency plans (discounts), but his

TABLE 9-11

PROJECTED AUDIENCE SHARES (%)

CATEGORY	YEAR				
	1981	1982	1983	1984	1985 and after
AAA-Optimistic	7	14	14	14	14
Probable	4	8	14	14	14
Pessimistic	2	5	8	11	14
AA -Optimistic	3	6	6	6	6
Probable	2	4	6	6	6
Pessimistic	1	2	3	4.5	6
A -Optimistic	12	24	24	24	24
Probable	8	16	24	24	24
Pessimistic	4	8	13	18	24
B -Optimistic	3	7	7	7	7
Probable	2	4	7	7	7
Pessimistic	1	2.5	4	5.5	7
C -Optimistic	4	8	8	8	8
Probable	3	5	8	8	8
Pessimistic	1	2.5	4	6	8

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

single announcement rate will remain compatible as well as competitive with the announcement rates of his rivals.

We will develop the superstation rate card from an entirely different perspective. We will assume that information is indeed instantaneous and that advertisers need only be charged according to the superstations actual audience share. The superstation will not have a rate card per se, rather it will have a single announcement charge based upon an equitable CPM rate.

This facilitates the analysis by limiting the amount of variables to be projected. It also enables us to avoid any pitfalls in establishing a rate card for a program package which, essentially, has never yet been tested on the market.

The following sections deal with establishing a realistitic CPM rate. The U.S. situation is briefly analysed and CHCH's home market efficiencies are compared to CTV's national rate.

ii) CHCH's U.S. counterpart: WTBS

As we pointed out in Phase I, a spot purchase on Ted Turner's WTBS superstation is a bargain. The cost efficiency of this media buy lies somewhere between a local and national rate and does provide national advertisers with an incentive to consider purchasing time on WTBS.

Within the Canadian context, both the ability and willingness of the CHCH superstation to compete solely through pricing strategy is questionable if not unpractical.

Media purchasers at the national level deal with mass numbers. WTBS greatest hurdle, to date, lies in convincing advertisers that U.S. CATV penetration rates are significant enough to meet mass audience requirements. Although WTBS has managed to increase its audience to 6 million households, roughly 90% of the total U.S. population of 232 million still do not receive the signal.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

CHCH, on the other hand, by merely doubling its audience through superstation status stands to reach, initially, if we include its normal coverage area, 69% of the English Canadian population!

The essential point is that the CHCH's spread between its local rate and potential national rate, given Canada's present CATV penetration level, cannot be as substantial as its U.S. counterpart. The ability of the CHCH station to outmanoeuvre network rivals will depend not only upon pricing strategy, but will also depend to a considerable degree upon non-price strategies, e.g. programming formats.

The projected cost efficiency or cost per thousand, nevertheless, should lie somewhere in between a full network purchase and a local. It should be priced attractively, at least in as much as it should provide a true alternative media purchase to potential advertisers.

iii) Network cost efficiencies

Unfortunately, network audience shares are compiled by BBM on a program basis and not by time blocks; accordingly CPM rates are analysed by quartiles. Furthermore, CBC's full or metronet network is excluded from the analysis since their rate card is also built around their program schedule(1). In contrast, CTV provides national 30 second announcement rates by time classification.

As table 9-12 illustrates, audience levels vary widely in all time classifications by type of programming. U.S. programming delivers the cheapest CPM rate during prime time hours and during afternoon hours when soap operas are aired.

The median cost per thousand rates calculated in table 9-13 should be construed as indicative and not necessarily as average cost efficiencies for each time block. For instance, CTV's top rated show for the week of October 29th - November 4th was the movie

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(1) Judging from CBC's audience levels and spot rates it appears that it does not actively exploit the full potential of air sale revenues.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

TABLE 9-12

CTV NETWORK AUDIENCE SHARES AND 30 SECOND ANNOUNCEMENT RATES

AREA: ENGLISH CANADA POP.: 17,609,400

TIME BLOCK	AUDIENCE(1) LOWER QUARTILE (000)	MEDIAN (000)	UPPER QUARTILE (000)
AAA			
U.S. content	1795	2220	2559
Can. content	1190	1300	1511
AA	373	720	767
A	442	1200	1619
B	175	250	475
C(2)			

CTV 30 SECOND ANNOUNCEMENT RATE(3)

AAA U.S.	AAA CAN.	AA	A	B	C1
6030 $	$4240	2330	1650	500	

(1) Audience assumptions are upward biased. In addition to the fact that the English speaking population within Quebec is significant, 60% of Francophones within Montreal alone are bilingual and susceptible to watching English television programs.
(2) No network service
(3) Single spot purchase

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

TABLE 9-13

CTV NETWORK COST EFFICIENCIES BY TIME BLOCK
AUDIENCE SHARE ASSUMPTIONS

TIME BLOCK	LOWER QUARTILE	MEDIAN	UPPER QUARTILE
AAA			
U.S. content	$3.36	$2.72	$0.95
Can. content	$3.56	$3.26	$2.81
AA	$6.25	$3.24	$3.04
A	$3.73	$1.38	$1.02
B	$4.00	$2.00	$1.05
C	--	--	--

blockbuster "JAWS" which averaged an audience share of 27% for an audience of 6,333,000. This translates, given CTV's triple A U.S. announcement rate of $6030, into a CPM of less than one dollar.

iv) CHCH cost efficiencies

National advertising is classified as either a network buy or a selective buy. CHCH is a selective buy(1) with CPM rates, as Table 9-14 reveals, which are competitive with network rates. The cost efficiency achieved during prime time hours should not be considered surprising; CHCH is evidently a station which understands the value of maximizing U.S. content during prime time hours.

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(1) National advertising as we previously noted accounts for over 95% of total CHCH's air sale time.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

v) Projected superstation cost efficiency and rate card

Given the structure of the evidence presented, we have opted during prime time hours, for a cost efficiency of $2.50 in all years following start-up. Cost per thousand rates in all other time blocks will be set at $2.75.

An example of CHCH's rate card is provided in table 9-15. Cost per thousand rates are fixed, announcement rate vary according to audience assumptions.

TABLE 9-14

CHCH COST EFFICIENCIES

AREA: Normal coverage area POP.: 5,436,000

	TIME BLOCK				
	AAA	AA	A	B	C
Av. gter hr. audience (%)	37	20	9	5	4
Audience (000) (all stations)	2,030	1,097	494	274	219
CHCH audience share (%)	14	6	24	7	8
CHCH audience (000)	284	66	119	19	18
Single spot price ($)	675	350	338	75	75
Average CPM	$2.38	$5.30	$2.85	$3.95	$4.28

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.3 Rate card and related criteria (cont'd)

TABLE 9-15

SUPERSTATION RATE CARD
AN ILLUSTRATION OF PRIME TIME 30 SECOND ANNOUNCEMENT
RATES OVER A TEN YEAR PERIOD

YEAR	1 POTENTIAL SUPERSTATION AUDIENCE (000)	2 VIEWING LEVEL % of 1	 (000)	3 AUDIENCE SHARE(1) % of 2	 (000)	4 CPM(1)	5 30 SECOND SPOT RATE (4/3) ($)
1981	3,748	37	1387	4	55	2.50	139
1982	5,973	37	2210	8	177	2.50	442
1983	8,336	37	3084	14	432	2.50	1,079
1984	8,696	37	3217	14	450	2.50	1,126
1985	9,111	37	3371	14	472	2.50	1,180
1986	9,542	37	3530	14	494	2.50	1,236
1987	10,016	37	3706	14	519	2.50	1,297
1988	10,512	37	3889	14	545	2.50	1,361
1989	10,996	37	4068	14	570	2.50	1,424
1990	11,303	37	4182	14	585	2.50	1,464

1. Probable scenario

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.4 Operating revenues

a) Daily operating revenues

i) Booking policy

The superstation will offer advertisers, on a daily basis, single 30 second 'announcement' slots. Dollar volume discounts, mandatory or discount packages and frequency plans are not developed at the level of feasibility analysis(1).

ii) Advertising slots

Twenty-four advertising slots, of 30 seconds a piece, are available per hour of programming. The number of occasions are tabulated in the following table.

TABLE 9-16

TOTAL NUMBER OF OCCASIONS AVAILABLE BY TIME BLOCK

TIME BLOCK	TOTAL 30 SECONDS OCCASIONS
AAA	108
AA	72
A	108
B	144
C	36
DAILY TOTAL	468

(1) 'Mandatory' packaging requires an advertiser buying U.S. prime time or afternoon blocks, to purchase certain other categories of time. To qualify for a package 'discount' an advertiser must purchase a specified quantity of Canadian content. Frequency plans, statistically evaluated through a rating point system, are available for advertisers who are seeking target audiences or who are seeking to maximize the number or proportion of different people reached at least once by the specified number of advertisements.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.4 Operating revenues (cont'd)

iii) Booking rate

Over a ten year period the following booking rates are expected.

TABLE 9-17

PROJECTED BOOKING RATE BY TIME BLOCK

YEAR	TIME BLOCK				
	AAA	AA	A	B	C
1981	25	5	5	5	5
1982	30	10	10	10	10
1983	50	20	25	20	20
1984	70	30	40	30	30
1985	90	40	55	40	40
1986	100	50	75	50	50
1987	100	50	75	50	50
1988	100	50	75	50	50
1989	100	50	75	50	50
1990	100	50	75	50	50

With 468 slots available daily, and prime and afternoon blocks favored over other time blocks, the superstaiton, within 6 years of start-up, is expected to maintain an overall booking of 67%.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.4 Operating revenues (cont'd)

b) Annual operating revenues

i) Sale of advertising time

On the basis of an audience share, cost per thousand, total slots, and percent booking the dollar volume of advertising sales are determined. During summer months, daily sales in all time blocks are adjusted downward by 25% to reflect the expected drop-off in total audiences. Annual operating revenues from the sale of advertising time is then determined simply by multiplying peak and off-peak daily sales by the number of peak and off-peak operating days. In this case 273 and 93 days respectively.

ii) Syndication and production revenues

As it will be discussed in the following section we have assumed that CHCH will purchase the national rights to all of its programming. CHCH, therefore, stands to loose from national coverage, revenue which is normally generated from the sale or syndication of its joint production efforts.

We have estimated CHCH's production revenues in 1979 at $750,000 (2.5% of total revenue). It is also expected that production revenues, in constant dollars, will continue to grow modestly at 4% annually. These dollar volumes, subsequently, have been deducted from the superstation's revenue statement.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.5 Cost assumptions

a) Capital costs

There are no significant investment costs. The cost of distributing the signal, including the microwave feed to uplink facilities is born by an independant or second party, e.g. a resale common carrier. The absence of any capital costs is clearly demonstrated if we consider that instead of a microwave feed the signal could just as well be picked up off-the-air.

b) Step-up fees

i) Introduction

CHCH will purchase the national rights to all of its programming. This will entail step-up fees which will vary by type of programming.

Programming costs are distributed over;

- local production efforts
- joint-canadian production
- foreign programming (non-movies)
- movie packages
- sports

ii) Local and joint-canadian production efforts

No step-up fees are associated with local production efforts since talent and writer fees are usually bought-out prior to actual production. Stepping up the scale, CHCH should expect to incur a step-up fee from anywhere between 25% to 35% to cover copyright/talent fees associated with its joint-production efforts.

iii)U.S. network and syndicated material

If CHCH adopts a 'one-stop, one-contract, one-print' approach to the purchasing of U.S. network and syndicated material it could minimize step-up expenses to 30%.

The actual percentage increase for U.S. programming could vary from anywhere between 50% to over 100%. U.S. program purchasing is presently a sellers market.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.5 Cost assumptions (cont'd)

CHCH's scramble to acquire national rights could leave many other independent broadcasters empty handed for program material. As a result, bidding for U.S. program material would increase and a likely outcome, at least in the short term, would be a sharp rise in programming costs. This is potentially a very dangerous situation, especially if we consider that the cost of 'popular' U.S. programs has more than doubled since 1978.

iv) Movie packages

Step-up fees within this category are extensive. An identical movie package, according to copyright law cannot be sold to two broadcasters within the same coverage area. CHCH's task is formidable; it must develop a unique movie package that can assure both distributors and broadcasters alike that there will not be any duplication of effort across Canada.

v) Sports

Step-up fees for the national rights to local sporting events should range between 30% to 50%. Judging by the success of Madison Square Garden and ESPN on Satcom I, the actual increase should approach the upper expected limit.

vi) Estimated superstation step-up fees

We have estimated CHCH's annual programming expenditures at $18.5 million. It is expected the CHCH will incur step-up fees of 13.9 million (75% of CHCH's present program budget) This dollar volume is also expected to grow in real terms by 4% annually.

c) Departmental expenses

i) Promotion

An advertising budget of $3,000,000 is assumed during the first year of operation, decreasing to $2,000,000 in the second year and finally falling to $1,500,000 for the third year and after.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.5 Cost assumptions (cont'd)

Initially alternative media purchases are required. As public awareness for the service grows, CHCH will be in the position to fully exploit its self-image by utilizing unbooked advertising slots.

ii) Commissions

An advertising agency commission of 15% is deducted from the nominal value of purchased 30 second announcement rates. Since sales are directed toward national advertisers an additional 10% is deducted to account for 'rep' house commissions.

iii)Administration

Administrative expenses are estimated at 8% of total advertising revenues. Logically, certain administrative economies will be attained if CHCH propells itself to superstation status.

d) Financial and related criteria

The superstation's income statement, sources and uses of funds, and balance sheet are developed as in any typical broadcasting entity.

All prices are constant. A cash injection of $500,000 following start-up is required. A debt-to-equity ratio of 80/20, a long term interest rate of 12% and a full corporate tax rate of 50% are also assumed.

Debt is automatically repayed according to cash flow. All surpluses of funds (after taxes) are diverted into a programming fund.

A current ratio ranging from 2.0 to 2.5 is expected. Table 9-18 summarizes balance sheet criteria. 'Cash balances' are generated to the extent that funds are insufficient to maintain the desired current ratio. 'Cash balances' as defined do not exemplify industry averages.

9. SUPERSTATIONS (cont'd)

9.5 The superstation model (cont'd)

9.5.5 Cost assumptions (cont'd)

TABLE 9-18

SUMMARY OF BALANCE SHEET CRITERIA

ITEM	FUNCTION (f)	AS % OF (f)
Accounts payable	Operating revenues	14%
Prepaid expenses	Operating expenses	8%
Inventory	Operating expenses	2%
Accounts payable	Operating expenses	12%
Unearned fees	Operating revenues	1.5%

9. SUPERSTATIONS (cont'd)

9.6 Feasibility

The results of the simulations are summarized in Table 9-19. Complete print-outs of the three scenarios tested, are found in appendix C.

All scenarios are feasible. Audience share assumptions have a significant impact upon investment criteria. The pessimistic scenario generates an internal rate of return of 14% for a net present value (NPV) discounted at 12%, of $4.2 million. The probable and optimistic scenarios generate a return of over 20% with NPV's of respectively $14.5 million and $17.7 million.

The payback period (the first year in which NPV after taxes is greater than zero) is 8 years for both the optimistic and probable scenario and.10 years for the pessimistic scenario.

The surplus of funds generated after taxes increases over 10 years, to $74.5 million under the optimistic assumption, an increase of 7 % over the pessimistic scenario.

To test the impact of gradually increasing audience shares (over ten years) the production span was increased to twenty years and an additional test was conducted. A positive cash flow was reached by the 5th year of operation; a positive internal rate of return was only generated by the 12th year of operation.

9. SUPERSTATIONS (cont'd)

9.6 Feasibility (cont'd)

TABLE 9-19

FEASIBILITY OF SUPERSTATION PACKAGE

	PESSIMISTIC	PROBABLE	OPTIMISTIC
Internal rate of return (A.T.) (%)	14.1%	20.1%	22.6%
Net present value at 12% (A.T.) ($ million)	$4,193	$14,450	$17,716
First year of positive cash flow	4	4	4
Year of break even (discounted)	10	8	8
Cumulative gross revenues (over 10 years) (000)	$481,236	$505,712	$511,244
Cumulative operating revenues (000)	$345,365	$353,443	$355,269
Cumulative programming fund generated (000)	$ 69,354	$ 73,879	$ 74,498

9. SUPERSTATIONS (cont'd)

9.7 Conclusions

9.7.1 General

The notion of a 'superstation' that is, a mass appeal station geared toward the maximum amount of U.S. programming is an attractive one, at least financially. To maintain the objective level of our analysis, critical values have been isolated and were either fixed or varied according to a prestipulated set of definitions. We will now relax these assumptions. The following items of interest will be dealt with:

- time-sensitivily
- head-end packaging
- superstation audience
- media perception
- economic impact
- policy options.

9.7.2 Time-sensitivity

Viewing levels by time block do not vary significantly by region.

Advertising support for the superstation would falter if, for instance, its prime time signal was being fed to Vancouver residents in eastern standard time. Yet, prohibitive carriage costs would also destroy the concept of a relatively inexpensive package accessible to all.

Idealistically two half transponders are needed to assure that viewing levels conform to national norms. Technical options, transponder availability, and carriage costs have been dealt with in previous chapters; it suffices to point out that, two half transponders on 14/12 GHz technology can provide a superstation with an adequate footprint, for under 10 cents per month per subscriber.

If 6/4 technology is opted for, and one transponder only is used, the best solution is to retain 'opposite' standard time coverage; CHCH would be fed on Pacific Standard Time and would loose maximum viewing levels within the Maritime Provinces and Ontario (1).

The loss of maximum viewing levels is not a forfeit of all potential advertising revenues. The media purchase, however, is statistically more difficult to interpret and will adversely affect the rate card.

(1) CATV households outside CHCH's normal coverage area.

9. SUPERSTATIONS (cont'd)

9.7 Conclusions (cont'd)

9.7.3 Head-end packaging

Cable operators could involuntarily, or voluntarily for that matter, place the service on a converter service.

We estimate that at most 30% to 40% of households own or are equipped with a converter.

If this scenario develops, there is very little incentive for the broadcaster to extend service nationally, unless converter penetration increases dramatically.

9.7.4 The superstation audience

Our definition of 'English' Canada excludes Quebec. The BBM bureau of measurement when compiling audiences for network viewing, include both English and Bilingual viewers. Advertisers are also perceiving that English announcements are beginning to permeate and reach into 'French' homes. Our point is that CHCH or other superstation will have a definite impact upon Quebec's English as well as Bilingual populated areas.

9.7.5 Media perception

National advertising on CHCH is presently a selective buy; by going superstation, it becomes, by the sheer size of its coverage are, a network purchase.

The percent distribution of CHCH's superstation audience, as displayed in Table 9-5, is biased towards rural areas. Top markets (pop. 500,000+), Vancouver/Victoria, Ottawa/Hull, Winnipeg, Edmonton and Calgary account for 48% of the total superstation CATV audience. Rural and secondary markets, on the other hand, account for 52% of the total CATV audience. The distortion is eliminated, of course, if we include CHCH's normal coverage area as part of the total CHCH audience.

An advertiser may be enthusiastic about purchasing time in Toronto or Vancouver but not in Thunder Bay or St. John's. In this case, the advertiser is better off in purchasing two 'selective' spots than in buying time on CHCH.

The success of a superstation lies in convincing potential advertisers that full coverage is remunerative; otherwise, its rate card will suffer disproportionally to the step-up fees it will incur.

9. SUPERSTATIONS (cont'd)

9.7 Conclusions (cont'd)

9.7.6 Audience fragmentation

i) The concept

The underlying rationale behind audience fragmentation is that viewers watch no more nor less today, than they did a decade ago. A typical viewer watches 22 hours of television per week. The stability of this key variable is remarkable if we consider the introduction of colour television, the addition of new licenses and the growth of cable television since 1969.

The importation of a distant signal, given per capita viewing levels, is a threat to an existing broadcaster's market share. Slices of the pie become smaller; and unless the licensee is able to raise his advertising rate, an erosion of his revenue base is inevitable.

The issue at stake is not strictly audience fragmentation, rather it is a question of whether or not broadcasters are able to withstand any further erosion of their revenue through an adjustment in their rate card. CHCH was originally licensed because it was felt that CFTO-TV would not unduly suffer. The reasoning was correct, a sufficient demand for advertising time existed to offset any erosion of existing market shares. Unfortunately, this type of reasoning cannot be applied in all markets across Canada.

In a recent CRTC hearing, in which the CBC's Newfoundland television service was required to cease local advertising as a condition of license renewal, is a sad reflect of licensed areas within secondary and rural communities across Canada. The threat of a superstation is real to these licensees, and their ability to withstand further erosions of their market is questionable.

While it is not possible to translate audience share losses into dollar losses, we can identify the impact a superstation will have on audience shares.

ii) Superstation market inroads

The impact of audience fragmentation will vary with the number of foreign signals available.

9. SUPERSTATIONS (cont'd)

9.7 Conclusions (cont'd)

9.7.6 Audience fragmentation (cont'd)

Stations within areas where CATV penetration is low or non existent are the most vulnerable to the importation of distant signals. Conversely, where cable penetration is substantial, and U.S. signals are available, major audience losses have already occurred. Since 1969, U.S. stations have managed to increase their audience by 3.1% annually. U.S. television presently accounts for approximately 22.5% of weekly hours of viewing in Canada.

Table 9-21 and 9-22 illustrate the impact of a superstation upon audience shares. The minimum impact scenario assumes that Canadian viewers attach a certain degree of loyalty to their home stations. The net effect is a marginal loss in audience shares for local broadcasters; the brunt of the impact is felt by the U.S. signal. The probable scenario, on the other hand, causes an equivalent loss in audience shares on the part of local and U.S. stations.

TABLE 9-20

ILLUSTRATION OF AUDIENCE FRAGMENTATION
VANCOUVER PRIME TIME: ALL STATIONS PERFORMANCE
MINIMUM IMPACT

C.A. Vancouver Pop. 1,169,000

Time block: 7:00-11:00 pm (M.S.)

	AUDIENCE SHARE (1)			
	YEAR			
STATION TYPE	0	1	2	3
All stations	100%	100%	100%	100%
Local stations	60	60	58	56
Superstation	-	4	8	14
Foreign/other stations	40	36	34	30

(1) All station rating of 37% of total population

9. SUPERSTATIONS (cont'd)

9.7 Conclusions (cont'd)

9.7.6 Audience fragmentation

ii) Superstation market inroads (cont'd)

TABLE 9-21

ILLUSTRATION OF AUDIENCE FRAGMENTATION
VANCOUVER PRIME TIME: ALL STATIONS PERFORMANCE
PROBABLE IMPACT

C.A. Vancouver Pop. 1,169,000

Time block: 7:00-11:00 pm (M.S.)

	AUDIENCE SHARE (1)			
	YEAR			
STATION TYPE	0	1	2	3
All stations	100%	100%	100%	100%
Local stations	60	58	56	53
Superstation	-	4	8	14
Foreign/other station	40	38	36	33

Little credence should be attached to the minimum impact scenario except possibly within fringe hours where traditionnally, a core Canadian audience exists for news services. During prime, afternoon and late time blocks, Canadians have always preferred U.S. entertainment programming whether it is on a Canadian or U.S. station.

(1) All station rating of total population

9. SUPERSTATIONS (cont'd)

9.7 Conclusions (cont'd)

9.7.6 Audience fragmentation (cont'd)

iii) Assessment of superstations market inroads

Audience fragmentation is inevitable if a superstation policy is adopted. The actual threat, nevertheless, should be qualified; the superstation's audience is initially a CATV audience, where major audience losses have already occurred. The question now becomes one of weighing society's net benefits and net losses, and of identifying how many stations are unable to withstand further inroads on their audience shares.

9.7.7 Programming costs

A good proxy of the level of excess demand for 'popular' U.S. programming material are inventory levels of syndicated and network distributors.

Additional advertising revenues generated by the superstation could be outweighed by costs if inventory levels fall to zero following the scramble for national rights.

10. CABLE NETWORK TELEVISION

10. CABLE NETWORK TELEVISION

10.1 Introduction

Cable network television designates programming services which are distributed via satellite and cable, and which rely for financing on the following mechanisms:

- subscriber charges
- national advertising on the satellite feed
- local advertising on cable

10.2 Programming concepts

A number of such services are already available in the United States, and as we mentioned in our Phase I report, we expect strong growth in that area.

Sports actually dominate cable network television with such services as:

- Madison Square Garden Sports
- National Hockey League
- Thursday Night Baseball
- Entertainment and Sports Programming Network
- Canadian Pro-Football

Canada is thus already an important supplier of talent for this type of programming.

Other programming services, available presently or in the near future, are:

- Satellite Program Network
- Cable News Network
- 50+ network
- Multilingual Television
- BBC programming

Again, Canadian production and talent is already playing an important role, with Global producing news programs for Canadians residing in the U.S. and, of course, the soon expected MTV, which has said it will feature CBC programming.

Even though the services are very different, they share a few basic concepts together;

- the programming is highly specialized, aimed at target audiences which cannot be satisfied by conventional broadcasting;

10. CABLE NETWORK TELEVISION (cont'd)

10.2 Programming concepts (cont'd)

- they still need a sufficiently large national audience, which can now be reached economically through satellite and cable;

- contrary to superstations, the services thus provide true alternative viewing;

- the services come closer to the video publishing concept, as with magazines, as opposed to the mass audience concept, as with daily newspapers.

10.3 Media perception

As with WTBS, Ted Turner's superstation, the greatest difficulty encountered by this type of service lies in attracting advertising support.

The argument goes beyond the issue that CATV penetration rates are still low in the U.S. and especially so in large metropolitan areas; it is more a question of the inability or unwillingness of the advertising community to accept anything less than mass numbers when dealing with the television screen.

A vicious circle has thus developped to some extent; advertising support is difficult to obtain because of the lack of programming material, and vice-versa. This explains partly why Canadian producers are actively pursued presently, but major U.S. organizations are also building up their capability and inventory of this type of specialized programming.

We have yet to conceptualize how the media would interpret Cable Network Television in Canada. As in the United States, statistical measurement of target audiences have not been developped which in turn does not allow the advertiser to quantitatively measure the cost efficiency of the buy. If the advertiser is satisfied with a rough order of magnitude, then the Canadian situation is at least encouraging by simple virtue of present CATV penetration.

Realistically, if we apply broadcasting methodology, the CPM rate should be expensive, precisely because one is reaching a target audience and not just the mass.

10. CABLE NETWORK TELEVISION (cont'd)

10.4 Policy considerations

The mere mention that local advertising might be permitted on cable is likely to cause turmoil, to say the least, in the broadcasting community but we think there are a number of reasons, from a policy point of view, to start considering the problem right away and even perhaps permitting some services on an experimental basis:

- the services would provide alternative viewing; thus they would probably not seriously fragment the audience of conventional broadcasters (they would add viewing hours mostly);

- we expect strong growth in the U.S. for these services, and eventually Canada will be confronted with them, whether we like it or not; we think it is best to develop policies before a potential problem reaches gigantic proportions, and not after when it becomes to late to do anything;

- combined with the large U.S. market, the services could provide a substantial market for the Canadian production industry.

10. CABLE NETWORK TELEVISION (cont'd)

10.5 The approach

10.5.1 General

The analysis performed assumes the use of 14/12 GHz satellites, using two half transponders for Eastern and Western Canada coverage, at an annual cost of $1.5 milion for space segment and $300,000 for uplink. The network would bear the responsibility of:

- satellite distribution
- national advertising
- subscription rate policy.

CATV household projections used, are identical to 'English' Canada projections provided in Chapter 9. Network audiences in turn are estimated upon a median household size of 3.1.

Following a start-up date of 1981, three years are allotted for system channel capacity before the network achieves 100% penetration in all systems. Also implicit is the assumption that all CATV operators market the package as part of their basic service (this is not pay-TV).

10.5.2 Revenue projections

We performed a simple projection of revenues over a ten year period, for a typical service, using the following assumptions:

Pessimistic scenario:	Station rating : 1% $ CPM - $ 5.00 subscriber rate per month : 10¢
Optimistic scenario :	Station rating : 1% $ CPM - $5.00 growing at 5% annually subscriber rate per month : 10¢

The impact of these assumptions is illustrated in the three following tables. The results show that even with these modest assumptions, the service would generate substantial revenues over the ten year period.

While we are not in a position to judge the overall feasibility of the service, essentially because programming costs have not been estimated, we can conclude that cable network television is very likely to attrack substantial interest in Canada.

10. CABLE NETWORK TELEVISION (cont'd)

10.5 The approach (cont'd)

10.5.2 Revenue projections (cont'd)

TABLE 10-1

NETWORK AUDIENCE, RATING, CPM AND 60 SECONDS ANNOUNCEMENT RATES TO THE YEAR 1990

	1	2	3		4	5
YEAR	ENGLISH CATV HOUSEHOLDS (000)	NETWORK AUDIENCE(3) (000)	RATING		CPM ($)	60 SECONDS ANNOUNCEMENT RATE (4.3) ($)
			% OF 2	000		
1981	1974 (1)	5499	0	-	5.00	-
1982	2801 (2)	8684	.5	43	5.25	228
1983	3892	12065	1	121	5.50	664
1984	4047	12546	1	125	5.80	728
1985	4220	13082	1	131	6.10	798
1986	4401	13643	1	136	6.40	873
1987	4596	14248	1	143	6.70	955
1988	4800	14880	1	149	7.00	1042
1989	5001	15503	1	155	7.35	1139
1990	5146	15953	1	159	7.70	1228

(1) Based on 50% penetration
(2) Based on 75% penetration
(3) Median household size of 3.1

10. CABLE NETWORK TELEVISION (cont'd)

10.5 The approach (cont'd)

10.5.2 Revenue projections (cont'd)

TABLE 10-2

PESSIMISTIC SCENARIO
CABLE NETWORK CUMULATIVE ADVERTISING REVENUES
AND SUBSCRIBER FEES

	($000)
Cumulative advertising sales (over ten years)	$ 36,408
Cumulative subscription fees	$ 48,812
Total cumulative gross revenues	$ 85,220

TABLE 10-3

OPTIMISTIC SCENARIO
CABLE NETWORK CUMULATIVE ADVERTISING REVENUES
AND SUBSCRIBER FEES

	($000)
Cumulative advertising sales (over ten years)	$ 95,861
Cumulative subscription fees	$ 48,812
Total cumulative gross revenues	$144,673

10. SATELLITE CABLE NETWORK (cont'd)

10.6 Conclusions

We thus believe there is a strong growth potential for cable network television, which in turn would have a substantial impact on the program production industry.

This type of programming though is already taking a strong international dimension; if Canadian producers are to benefit from this, they will have to produce programs not only for Canada, but for the international market as well.

We thus urge the D.O.C. to address in depth this highly sensitive but very important issue, not only from the program production point of view, but also from the point of view of Canadian citizens who will also demand true alternative viewing.

11. FRENCH SPEAKING SATELLITE PROGRAMMING

11. FRENCH SPEAKING SATELLITE PROGRAMMING

11.1 Télé Métropole: The French Superstation

11.1.1 Introduction

As has been revealed by now, Cable Satellite Network (CSN) a consortium of cable operators intends to distribute CFTM-TV, Télé Métropole, the flagship station of the TVA network starting in June of this year, if given approval by the CRTC.

The TVA network is already widely available in the Province of Quebec through CFTM and 8 affiliates; it presently reaches 96% of the Quebec population. In that sense, Télé Métropole (or any other affiliate for that matter) can hardly become a 'willing' superstation in the Ted Turner, WTBS sense. French speaking audiences, outside the Province of Quebec, are simply too small to materially affect audience patterns and thus, advertising revenues.

There might have been a possibility some months ago of a joint deal between the TVA network and the cable television industry for satellite distribution of TVA; TVA could have used satellites for distribution to its affiliates in the Province of Quebec and to cable systems outside the Province of Quebec; this did not materialize when TVA signed a 10 year microwave contract to distribute its signal to its affiliates at an annual cost of $700,000.

We refer to this as a technical possibility that existed, since there were absolutely no discussion between TVA and the cable industry; TVA thus, passed the occasion to achieve a status very similar to the one enjoyed by Spanish International Network (S.I.N.) in the United States which has both broadcast and cable affiliates.

11.1.2 The alternatives

There are thus three broad alternatives for satellite distribution of TVA which are:

- distribution in 6/4 GHz (total Canada);
- distribution in 14/12 GHz (total Canada);
- distribution in 14/12 GHz (Eastern Canada).

The first two alternatives serve all of Canada while the last alternative serves only Eastern Canada, where the french speaking population is widely concentrated.

The costs associated with these alternatives are as follows:

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.1 Tél̄é Métropole: The French Superstation (cont'd)

11.1.2 The alternatives (cont'd)

TABLE 11-1

COSTS OF SATELITE DISTRIBUTION OF TVA UNDER VARIOUS ALTERNATIVES ($000)

COSTS	ALTERNATIVES 6/4 GHz	14/12 GHz (total Canada)	14/12 GHz (Eastern Canada)
Space segment (unprotected)	$1,500	$1,500	$ 750
Uplink	$ 250	$ 400	$ 250
TOTAL	$1,750	$1,900	$1,000

11.1.3 Feasibility

The following table illustrates the difficulties associated with the marketing of Télé Métropole and the necessity of obtaining the active cooperation of the cable television industry in English Canada, and especially in Ontario, if satellite distribution of TVA is to be commercially viable.

Practically all of the population whose mother tongue is French is concentrated in Eastern Canada (97.2%) and, evidently, especially so in Quebec (84.7%).

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.1 Télé Métropole: The French Superstation (cont'd)

11.1.3 Feasibility (cont'd)

TABLE 11-2

POPULATION WHOSE MOTHER TONGUE IS FRENCH
BY PROVINCE AND REGION, 1976

PROVINCE OR REGION	NUMBER (000)	%
Newfoundland	2.8	(1)
Prince Edward Island	6.6	0.1%
Nova Scotia	36.9	0.6%
New Brunswick	223.8	3.8%
Sub-Total Atlantic	270.0	4.6%
Quebec	4,989.2	84.7%
Ontario	462.1	7.8%
Sub-Total Eastern Canada	5,721.3	97.2%
Manitoba	54.7	0.9%
Saskatchewan	26.7	0.5%
Alberta	44.4	0.8%
British Columbia	38.4	0.7%
Northwest Territories and Yukon	1.6	(1)
Sub-Total Western Canada	165.9	2.8%
CANADA	5,887.2	100.0%

(1) Less than 1/10 of 1%

Source: Statistics Canada

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.1 Télé Métropole: The French Superstation (cont'd)

11.1.3 Feasibility (cont'd)

The following table illustrates the number of subscribers that have to be reached to break even on satellite distribution of Télé Métropole.

TABLE 11-3

BREAK EVEN NUMBER OF SUBSCRIBERS
UNDER VARIOUS ASSUMPTIONS

ALTERNATIVE MONTHLY RATE PER SUBSCRIBER	THOUSANDS OF SUBSCRIBERS 6/4 GHz (total Canada)	14/12 GHz (total Canada)	14/12 GHz (Eastern Canada)
5 cents	2,917	3,167	1,666
10 cents	1,458	1,583	833
15 cents	972	1,056	556
20 cents	729	792	417

Because of the fact that the majority of cable systems in the province of Quebec will not be able to receive the service, since they are already receiving Télé-Métropole or an affiliate, the service cannot be marketed, in the short term at least, for less than 10 cents per month.

It should not be forgotten, however, that there is still a portion of the rural population of Quebec that has access to 0 or 1 french language TV channel as shown in the following table.

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.1 Télé Métropole: The French Superstation (cont'd)

11.1.3 Feasibility (cont'd)

TABLE 11-4

RURAL POPULATION IN THE PROVINCE OF QUEBEC
HAVING ACCESS TO 0 OR 1 FRENCH LANGUAGE TV CHANNEL, 1978

NUMBER OF TV CHANNEL	NUMBER (000)	%
0	29.8	2.0
1	364.1	24.4
2 or more	1,098.5	73.6
TOTAL	1,492.4	100.0

Source: Television Network Coverage in Rural Canada compared with that in the Census Metropolitan Areas, C.D. Gormack, D.O.C., August 1978.

Assuming that Radio Canada is available to the population that receives only one channel, this means there is approximately 130,000 households that do not receive TVA.

One has to note though that, since the publication of the preceeding statistics, TVA has expended its coverage through three new affiliates in Rimouski (CFER-TV), Rivière-du-Loup (CIMT-TV) and Rouyn-Noranda (CFEM-TVP); these affiliates also have rebroadcasting stations located in the following cities:

Affiliate	Rebroadcasting station
Rimouski (CFER-TV)	Sept-Iles (CFER-TV-1)
Rivière-du-Loup (CIMT-TV)	Edmunston (CIMT-TV-1)
Rouyn-Noranda (CFEM-TV)	Lithwin Mines (CFEM-TV-1)

TVA estimates that it now serves 96.5% of the total 1,845,000 Quebec households, and that in addition it serves close to 200,000 households outside Quebec. We thus, estimate that 50,000 to 60,000 households do not presently receive TVA in the province of Quebec; these would be located mostly in the Gaspé peninsula and in isolated mining, forestry and resource development areas of Quebec.

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.1 Télé Métropole: The French Superstation (cont'd)

11.1.3 Feasibility (cont'd)

The following table thus illustrates one blunt fact about satellite distribution of TVA, that is, one should simply ask the Canadian Cablesystem - Premier group if they are willing to subscribe to the service, or not, at 10 cents per subscriber. If the answer is yes, then the service is viable and if not, one should simply forget about satellite distribution of TVA.

TABLE 11-5

FEASIBILITY OF SATELLITE DISTRIBUTION OF TVA UNDER VARIOUS ASSUMPTIONS

	ALTERNATIVE		
SUBSCRIBERS (000)	6/4 GHz Total Canada	14/12 GHz Total Canada	14/12 GHz Eastern Canada
Subscribers outside Quebec	3,200	3,200	1,930
Unserved Quebec subs.	50	50	50
TOTAL SUBSCRIBERS	3,250	3,250	3,250
Break even at 10 cents	1,458	1,583	833
% penetration necessary	44.9%	48.7%	42.1%
Canadian Cablesystems Premier subscribers	1,200	1,200	784
Percentage of break even	82.3%	75.8%	94.1%
Total subscribers without CCS-Premier	2,050	2,050	1,196
% penetration necessary without CCS-Premier	71.1%	77.2%	69.6%

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.1 Télé Métropole: The French Superstation (cont'd)

11.1.3 Feasibility (cont'd)

Under the three alternatives, the active cooperation of CCS-Premier is vital because by themselves, they represent from 76% to 94% of the break-even number of subscribers.

11.1.4 Conclusion on satellite distribution of TVA

For the TVA network, satellite distribution to its affiliates in 6/4 GHz was simply too expensive. At more than $2 million annually for a protected grade of service this simply cannot match the annual microwave costs of $800,000.

An arrangement with the cable television industry could have made things easier though, but, like most broadcasters in this country, TVA seems to behave as if cable did not exist.

The viability of satellite distribution of TVA thus, rests fully on the shoulders of the CCS-Premier group whatever the technical alternative that is considered.

11. <u>FRENCH SPEAKING SATELLITE PROGRAMMING</u> (cont'd)

11.2 <u>La Sette (TVFQ-99)</u> (cont'd)

11.2.1 <u>Is TVFQ-99 a pay package?</u>

Let us consider for a moment the characteristics of TVFQ-99:

- It consists of 50 hours per week of original programming drawn from the three french networks;
- the programming is offered free from commercial interruptions;
- the programming schedule runs from 17h00 to 24h30 and is repeated from 9h00 to 17h00 the next week;
- the material consists of six broad families of programming (drama, arts, documentaries, youth and sports) but it does not contain any feature films;
- the programming can be offered only by cable operators who have to become shareholders of La Sette.

Thus, as far as we are concerned, and except for the fact that the package does not contain any feature films, TVFQ-99 is clearly a form of pay television (universal model), duly sanctionned by the CRTC and consisting of 100% foreign content.

11.2.2 <u>Present distribution</u>

TVFQ-99 is presently distributed to 23 cable systems representing approximately 500,000 subscribers. Programming is distributed by cable from La Sette's head office in Brossard to the large cable systems in the Montreal area; terrestrial microwave is also used to distribute programming to all members of the Microbec network except for the Saguenay-Lac St-Jean area which is served by cassette distribution, as in all other cable systems.

11.2.3 <u>Satellite distribution</u>

Satellite distribution of TVFQ-99 is planned for September 15, 1980, using the 14/12 GHz portion of Anik B, and a one quarter Canada beam. The cost of the space segment is rumored to be around $825,000 annually, while uplink should be in the area of $100,000, using a Bell owned station located in downtown Montreal. Some negociations were also undertaken with CP Telecommunications which has the right to uplink in 14/12 GHz; this is probably the main reason the price offered by a TCTS member was driven down substantially from previously announced rates.

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.2 La Sette (TVFQ-99) (cont'd)

11.2.4 Feasibility

La Sette forecasts that within a year they will serve the vast majority of Quebec cable subscribers numbered at 800,000. This means that satellite distribution costs themselves will amount to approximately 10 cents per month per subscriber.

Cable systems are charged approximately 50 cents per subscriber per month for the service which includes not only distribution but transformation from SECAM to NTSC standards as well as administrative and overhead costs; programming costs are not included because they result from a cultural agreement between the governments of the Province of Quebec and France.

Operating costs of La Sette have not been made available to us but with facilities that they evaluate at $1 million and 15 employees, annual operating costs cannot in our opinion exceed $1 million annually, in addition to satellite distribution.

This means that in our opinion, a net cash flow of 25 cents to 30 cents per subscriber per month will be generated on a regular basis when the objective of 800,000 subscribers is met, or more than $2.5 million annually.

What these sums are going to be used for, we are really not in a position to say actually, but we strongly suspect that they might, eventually, fund additionnal programming for the cable television industry.

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television

11.3.1 Introduction

Again, the basic concept examined in this section is that of a monthly package. Universal pay television has been dealt with in the section describing La Sette programming and pay per program does not easily lend itself to satellite distribution because of the highly discretionnary aspect.

The monthly package also has another advantage which is that the distributor can introduce and schedule programming that has less broad appeal; the package then becomes similar to a magazine that has to have general appeal but which can also feature specialized articles (religion, music etc...); this of course would be absolutely impossible under a pay per program approach.

The approach used is very similar to the one we described in the main pay TV chapter that is:

- We defined market projections for three scenarios (pessimistic, probable, optimistic) and a monthly retail price of $10.

- We estimated the costs associated with:

  a) Satellite distribution
  b) Administrative, overhead costs
  c) Variable programming costs associated with the acquisition of feature films
  d) The cable operator margin

- Then, using sensitively analysis, we estimated the level of fixed programming costs that would produce a pre-tax return of 20%.

- Finally, the level obtained is judged both qualitatively and quantitatively according to the programming concept being proposed.

11.3.2 The concept

The pay television television concept examined in this section is a monthly discretionnary package centered around the following programming philosophy.

- Feature films

  As in all pay TV systems currently operating in the United

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television (cont'd)

11.3.2 The concept (cont'd)

States, feature films will form the core of the pay package.

There should be 6 to 8 films per month, consisting mostly of french language original productions (canadian or foreign); in our opinion there should not be more than 3 or 4 dubbed productions each month.

- Specials

To take into account french language viewing patterns, variety specials and other entertainment material should also be included in the package. We have assumed the original production of a minimum of 2 variety specials per month, which would be replayed as 'encores' some months later, bringing the total number of specials aired in a given month to a minimum of four.

- Sports

Audience viewing patterns have shown that sports are popular face amongst french language viewers.

We thus, have assumed that 4 sports events per month would be aired; these would be sports not aired on the conventional broadcasting system such as junior league hockey, amateur boxing, etc.

- Other programming material

While we are not in a position at this stage to precisely define the nature of this programming material we think that market research, once pay TV is under way, would identify other categories of programming aimed at more specialized audiences and which would be used essentially as a retention tool to help maintain penetration of the pay package and alleviate the potential disconnect problem.

11.3.3 Market projections

Three scenarios have been developped for french language pay television but certain common assumptions have been used for all three scenarios.

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television (cont'd)

11.3.3 Market projections (cont'd)

- Households in licensed areas

In 1978, there were 1,576,000 households in licensed areas in the Province of Quebec, out of 1,944,000 households (81% of total households). We have assumed in the present analysis that households will grow at an average annual rate of 2.3% reaching 2,554,000 households by 1990. During the same period we also expect the proportion of households in licensed areas to grow from 81% to 90% bringing the total number of households in licensed areas to approximately 2,300,000 households which represents an annual growth rate of 3.2% from 1978.

- Percentage passed by cable

In 1978, 91% of households in licensed areas in the Province of Quebec were passed by cable, versus almost 95% for the national average. We thus assumed an initial figure of 93% in 1981, growing to 96% by 1984 and the following years.

- Penetration (basic service)

As was pointed out in Chapter 6, penetration of cable in the Province of Quebec is much lower than in the rest of Canada. This fact can be attributed to the cultural factor in general and to some technical problems in the large Montreal cable systems. With the acquisition of Cablevision Nationale by Vidéotron, we expect both factors to play a lesser role in the future, since Vidéotron attaches much importance to both the programming needs of the communities it serves, and the technical quality of the signals it distributes; the technical management of Cablevision Nationale has also been greatly improved in the last year or so.

If one excluded the large CNL Montreal system from the provincial total, penetration in the Province of Quebec would stand at 60%. We have, thus, assumed that the initial penetration rate in 1981 would be 53% growing to 76% approximately in 1990.

- Pay to basic ratios

The pay to basic ratios we have used in the present analysis rely basically on the same assumptions as the one described in the main chapter on pay TV; we think there is

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television (cont'd)

11.3.3 Market projections (cont'd)

not a significant enough difference between the english and french speaking market to warrant different assumptions, provided of course, that the overall package fits the requirements of the marketplace. The assumptions used are presented in the following table and all assume a monthly retail price of $10.00.

TABLE 11-6

FRENCH LANGUAGE PAY TV:
PAY TO BASIC RATIOS

	SCENARIO		
YEAR	PESSIMISTIC	PROBABLE	OPTIMISTIC
1981	4%	10%	14%
1982	11%	19%	24%
1983	15%	26%	33%
1984	18%	31%	40%
1985 and after	20%	35%	45%

11.3.4 Cost methodology

Our approach was the same as the one we used in the main chapter on pay TV that is after having defined market projections, we then estimated the costs associated with:

- satellite distribution
- administrative and overhead costs
- variable programming costs associated essentially with the film package.

Then using sensitively analysis, we estimated the amount of fixed programming costs which would produce a return before taxes of 20%. This level is then compared to the overall programming concept being proposed and judged both quantitatively and qualitatively.

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television (cont'd)

11.3.4 Cost methodology

a) Satellite distribution

Because of the fact that the french speaking population is widely concentrated in Eastern Canada, and especially so in the Province of Quebec, we have assumed that french language pay-TV would be distributed via Anik C in 14/12 GHz in Eastern Canada only, sharing a transponder with another unspecified service. Distribution costs have been estimated as follows:

- space segment costs : $ 750,000
- uplink : $ 100,000
- total : $ 850,000

In the feasibility analysis we have used a figure of $1 million.

b) Administrative, overhead and other costs

This cost category would include such costs as:

- one time charge for initial acquisition of programs for inventory purposes, start up expenses, playback facilities, etc;
- annual administrative and overhead costs.

The costs estimates we have used in the three scenarios are as follows on an annual basis:

	1981 (000)	1982 after (000)
Pessimistic	$1,500	$ 750
Probable	$2,000	$1,000
Optimistic	$2,500	$1,250

c) Variable programming costs

These costs are essentially associated with the acquisition of films which form the core of the pay package; we estimate that the cost of 6 to 8 films per month would not exceed $2.00 per subscriber.

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television (cont'd)

11.3.4 Cost methodology (cont'd)

d) Cable operator margin

We assumed, as in the main pay TV chapter, that this margin would be 50% of the monthly retail price; again, this is slightly lower than what the cable operator retains in the United States (approximately 55%) but cable systems in Quebec are larger on the average than their U.S. counterparts; the potential economies of scale resulting from this larger size make us believe that cable operators would not strongly object to the lower percentage figure.

11.3.5 Feasibility

Results of the simulations are briefly summarized in the following table. The results show that, in the pessimistic scenario, an internal rate of return of 20% before taxes is achieved with fixed programming expenditures of $4 million annually; in the probable scenario, fixed programming expenditures can be more than doubled at $8.5 million annually to achieve an internal rate of return of 20%; finally, in the optimistic scenario, these expenditures could reach $11.5 million annually.

TABLE 11-7

PESSIMISTIC SCENARIO

LEVEL OF PROGRAMMING EXPENDITURES AND INTERNAL RATE OF RETURN

ANNUAL FIXED PROGRAMMING EXPENDITURES (000)	INTERNAL RATE OF RETURN BEFORE TAXES
$3,000	40.3%
$3,500	31.7%
$4,000	24.2%
$4,500	17.6%
$5,000	11.6%

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television (cont'd)

11.3.5 Feasibility (cont'd)

TABLE 11-8

PROBABLE SCENARIO

LEVEL OF PROGRAMMING EXPENDITURES AND INTERNAL RATE OF RETURN

ANNUAL FIXED PROGRAMMING EXPENDITURES (000)	INTERNAL RATE OF RETURN BEFORE TAXES
$7,500	31.2%
$8,000	26.6%
$8,500	22.4%
$9,000	18.5%
$9,500	14.8%

TABLE 11-9

OPTIMISTIC SCENARIO

LEVEL OF PROGRAMMING EXPENDITURES AND INTERNAL RATE OF RETURN

ANNUAL FIXED PROGRAMMING EXPENDITURES (000)	INTERNAL RATE OF RETURN BEFORE TAXES
$10,500	27.7%
$11,000	24.3%
$11,500	21.1%
$12,000	18.1%
$12,500	15.2%

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television (cont'd)

11.3.5 Feasibility (cont'd)

Detailed projections are presented in the following three outputs but can be briefly summarized as follows:

TABLE 11-10

FEASIBILITY OF FRENCH LANGUAGE PAY TV

	PESSIMISTIC	PROBABLE	OPTIMISTIC
Internal rate of return (%)	24.2%	22.4%	21.2%
Net present value at 12% ($million)	$6.1	$8.9	$10.0
First year of positive cash flow	4	4	4
Year of break even (discounted)	8	8	8
Capital required ($million)	$7.3	$12.9	$17.1
Programming expenditures as a % of gross revenue to packager	70.4%	76.8%	78.7%
Total programming expenditures during the 10 year period ($million)	$92.6	$177.4	$233.9
Total gross revenues during the 10 year period	$131.5	$231.1	$297.3

11.3.6 Conclusions on french language pay TV

Whether each scenario is feasible or not really depens on the costs associated with original productions. This is the most difficult aspect of the question and we have had to use estimates that could differ greatly in reality depending on the exact nature of the programming material.

We estimate that good quality variety specials would cost anywhere between $100,000 and $150,000; there would be 2 such original productions each month in the pessimistic scenario,

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FRENCH LANGUAGE PAY TV:PESSIMISTIC
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PAY TELEVISION

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SUBSCRIBER PROJECTION										
LICENSED HOUSEHOLDS	1732	1787	1845	1904	1965	2027	2092	2159	2228	2300
PERCENT PASSED BY CABLE	93.0	94.0	95.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
PASSED BY CABLE	1611	1680	1752	1828	1886	1946	2009	2073	2139	2208
PERCENT PENETRATION	53.0	55.5	58.0	60.5	63.0	65.5	68.0	70.5	73.0	75.5
BASIC SUBSCRIBERS	854	932	1016	1106	1188	1275	1366	1461	1562	1667
PAY TO BASIC RATIO	4.0	11.0	15.0	18.0	20.0	20.0	20.0	20.0	20.0	20.0
PAY SUBCRIBERS	34	103	152	199	238	255	273	292	312	333
REVENUE AND EXPENSE PROJECTION ($000)										
MONTHLY RATE	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
ANNUAL REVENUES	4098	12309	18295	23882	28516	30596	32781	35073	37479	40003
CABLE OPERATOR MARGIN	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
CABLE REVENUES	2049	6154	9147	11941	14258	15298	16390	17537	18740	20002
NET TO PACKAGER	2049	6154	9147	11941	14258	15298	16390	17537	18740	20002
EXPENSES										
SATELLITE DISTRIBUTION	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
VARIABLE PROGRAMMING COSTS	820	2462	3659	4776	5703	6119	6556	7015	7496	8001
FIXED PROGRAMMING COSTS	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
ADMIN. AND OVERHEAD	1500	750	750	750	750	750	750	750	750	750
TOTAL EXPENSES	7320	8212	9409	10526	11453	11869	12306	12765	13246	13751
NET REVENUE	-5271	-2057	-262	1415	2805	3429	4084	4772	5494	6251
N.P.V. AT 12 P.C.	-5271	-7108	-7316	-6309	-4527	-2581	-512	1647	3866	6120
INTERNAL RATE OF RETURN	-100.0	-100.0	-100.0	-99.0	-16.2	.2	10.2	16.7	21.1	24.2

FRENCH LANGUAGE PAY TV:PROBABLE

PAY TELEVISION

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SUBSCRIBER PROJECTION										
LICENSED HOUSEHOLDS	1732	1787	1845	1904	1965	2027	2092	2159	2228	2300
PERCENT PASSED BY CABLE	93.0	94.0	95.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
PASSED BY CABLE	1611	1680	1752	1828	1886	1946	2009	2073	2139	2208
PERCENT PENETRATION	53.0	55.5	58.0	60.5	63.0	65.5	68.0	70.5	73.0	75.5
BASIC SUBSCRIBERS	854	932	1016	1106	1188	1275	1366	1461	1562	1667
PAY TO BASIC RATIO	10.0	19.0	26.0	31.0	35.0	35.0	35.0	35.0	35.0	35.0
PAY SUBCRIBERS	85	177	264	343	416	446	478	511	547	583
REVENUE AND EXPENSE PROJECTION ($000)										
MONTHLY RATE	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
ANNUAL REVENUES	10244	21261	31711	41130	49903	53544	57366	61378	65589	70006
CABLE OPERATOR MARGIN	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
CABLE REVENUES	5122	10630	15856	20565	24952	26772	28683	30689	32794	35003
NET TO PACKAGER	5122	10630	15856	20565	24952	26772	28683	30689	32794	35003
EXPENSES										
SATELLITE DISTRIBUTION	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
VARIABLE PROGRAMMING COSTS	2049	4252	6342	8226	9981	10709	11473	12276	13118	14001
FIXED PROGRAMMING COSTS	8500	8500	8500	8500	8500	8500	8500	8500	8500	8500
ADMIN. AND OVERHEAD	2000	1000	1000	1000	1000	1000	1000	1000	1000	1000
TOTAL EXPENSES	13549	14752	16842	18726	20481	21209	21973	22776	23618	24501
NET REVENUE	-8427	-4122	-987	1839	4471	5563	6710	7914	9177	10502
N.P.V. AT 12 P.C.	-8427	-12107	-12893	-11584	-8743	-5586	-2187	1393	5099	8886
INTERNAL RATE OF RETURN	-100.0	-100.0	-100.0	-99.0	-21.0	-3.3	7.4	14.4	19.1	22.4

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FRENCH LANGUAGE PAY TV:OPTIMISTIC
****

PAY TELEVISION

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SUBSCRIBER PROJECTION										
LICENSED HOUSEHOLDS	1732	1787	1845	1904	1965	2027	2092	2159	2228	2300
PERCENT PASSED BY CABLE	93.0	94.0	95.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
PASSED BY CABLE	1611	1680	1752	1828	1886	1946	2009	2073	2139	2208
PERCENT PENETRATION	53.0	55.5	58.0	60.5	63.0	65.5	68.0	70.5	73.0	75.5
BASIC SUBSCRIBERS	854	932	1016	1106	1188	1275	1366	1461	1562	1667
PAY TO BASIC RATIO	14.0	24.0	33.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0
PAY SUBCRIBERS	120	224	335	442	535	574	615	658	703	750
REVENUE AND EXPENSE PROJECTION ($000)										
MONTHLY RATE	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
ANNUAL REVENUES	14342	26856	40249	53071	64161	68842	73756	78915	84328	90007
CABLE OPERATOR MARGIN	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
CABLE REVENUES	7171	13428	20124	26535	32081	34421	36878	39458	42164	45004
NET TO PACKAGER	7171	13428	20124	26535	32081	34421	36878	39458	42164	45004
EXPENSES										
SATELLITE DISTRIBUTION	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
VARIABLE PROGRAMMING COSTS	2868	5371	8050	10614	12832	13768	14751	15783	16866	18001
FIXED PROGRAMMING COSTS	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500
ADMIN. AND OVERHEAD	2500	1250	1250	1250	1250	1250	1250	1250	1250	1250
TOTAL EXPENSES	17868	19121	21800	24364	26582	27518	28501	29533	30616	31751
NET REVENUE	-10697	-5693	-1675	2171	5498	6903	8377	9925	11548	13252
N.P.V. AT 12 P.C.	-10697	-15781	-17116	-15571	-12076	-8160	-3916	574	5238	10017
INTERNAL RATE OF RETURN	-100.0	-100.0	-100.0	-99.0	-23.6	-5.5	5.6	12.8	17.7	21.1

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television (cont'd)

11.3.6 Conclusions on french language pay TV (cont'd)

3 in the probable scenario, and 4 in the optimistic scenario

Sports events would range anywhere between $20,000 to $40,000 per event, depending on the scenario.

These assumptions are illustrated in the following table.

TABLE 11-11

NUMBER OF ORIGINAL PRODUCTIONS AND UNIT COSTS

PROGRAMMING	SCENARIO		
	PESSIMISTIC	PROBABLE	OPTIMISTIC
Variety specials			
Number per month	2	3	4
Unit cost (000)	$100-$150	$100-$150	$100-$150
Sports			
Number per month	4	4	4
Unit cost (000)	$20-$30	$25-$35	$30-$40

The assumptions have then been compared to the annual budget forecasted for original programming.

The pessimistic scenario becomes dangerously close to become unfeasible while the probable and optimistic scenario provide some security margin for investment in other programming material.

More generally though one must not forget that we have assumed that a substantial improvement in the penetration rate would occur during the next decade in the Province of Quebec; for such a situation to occur there has to be substantial technical improvements in the larger Montreal cable systems and an increase in the overall level of good quality programming. If these conditions are not met, and/or if rules regarding the content of pay TV are too strict, french language pay television might be in jeopardy.

11. FRENCH SPEAKING SATELLITE PROGRAMMING (cont'd)

11.3 French language pay television (cont'd)

11.3.6 Conclusions on french language pay TV (cont'd)

TABLE 11-12

ANNUAL BUDGETS AND PROGRAMMING EXPENDITURES ($000)

	PESSIMISTIC		PROBABLE		OPTIMISTIC	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Annual budget	$4,000	$4,000	$8,500	$8,500	$11,500	$11,500
Programming costs						
Variety specials	$2,400	$3,600	$3,600	$5,400	$ 4,800	$ 7,200
Sports	$ 960	$1,440	$1,200	$1,680	$ 1,440	$ 1,920
Sub-Total	$3,360	$5,040	$4,800	$7,080	$ 6,240	$ 9,120
Balance for other programming	$ 640	(neg.)	$3,700	$1,420	$5,260	$ 2,380

12. OTHER TELEVISION PROGRAMMING

12. OTHER TELEVISION PROGRAMMING

12.1 General

Included in this chapter is a brief description of the other television programming services which might be available to Canadians in the short term. The programming services involved are:

- Multilingual television
- Children programming
- Other television programming.

Other specialized programming services have also been described in Chapter 10, entitled Cable Network Television.

12.2 Multilingual Television

Multilingual Television (MTV) is already distributed throughout Southern Ontario from a UHF transmitter located at the top of the CN tower. MTV is one of the most audacious programming concepts ever put together in Canada and perhaps even in the entire North American continent. MTV produces and airs programs in 26 different languages.

MTV has recently reached an agreement with Cable Satellite Network, whereby CSN would distribute MTV's service via satellite, across Canada. The agreement, which covers a six month experimental period, will provide over 60 hours each week of multilingual and multicultural programming.

The following schedule is envisaged for the service:

- Monday to Friday : 17:00 to 03:00

- Saturday and Sunday : 17:00 to 02:00

Under the agreement, CSN would not only absorb playback, uplink and space segment costs but would also pay MTV $26,000 a month that would go towards supporting additionnal programming at MTV and for copyright payments.

Since CSN intends to distribute both MTV and Galaxie (children programming) on the same transponder, the joint economics of the service will be examined in section 12.4.

12. OTHER TELEVISION PROGRAMMING (cont'd)

12.3 Children programming (Galaxie)

Cable Satellite Networks also intends to distribute over the same transponder a service of more than 20 hours of weekly children programming, and which could later expand to approximately 45 hours weekly according to the following schedule:

- Initial : 14:00 to 17:00
- Later : 11:00 to 17:00

The package would be designed by TV Ontario but would also include acquisition of programs from all regions of Canada.

It has to be noted that this alternative would provide an entirely bridged service with MTV, which at 17:00 would follow with multicultural children programming until 19:00.

The total package would thus provide a true viewing alternative to children (and their parents as well) which usually have to view game shows and soap operas at this time of the day.

Again CSN would absorb playback, uplink and space segment costs, and would provide copyright payments as well; negociations with TVO are not yet complete but we undersand that the copyright payment could be in the order of $500,000 to $1 million annually.

12. OTHER TELEVISION PROGRAMMING (cont'd)

12.4 Joint economics of MTV and Galaxie

The following table presents a summary of estimated costs for both packages as well as break even points for the services. CSN has indicated that it intends to market the services jointly in the following fashion:

- 10 cents for each service
- 15 cents for both of them.

TABLE 12-1

FEASIBILITY OF MTV AND GALAXIE

COST CATEGORY	MINIMUM	MAXIMUM
Uplink	$ 150	$ 150
Space segment (unprotected)	$ 1,500	$ 1,500
MTV payments(1)	$ 312	$ 312
Galaxie payments	$ 500	$ 1,000
Other costs(2)	$ 100	$ 200
Total costs	$ 2,522	$ 3,162
Number of subscribers required at 15 cents/month	1,423,000	1,757,000
Percent penetration over 4 million subscribers	35.6%	43.9%

(1) Monthly payments of $26,000 have been projected on an annual basis.
(2) Playback, promotion and other costs.

Taking into account the fact that Canadian Cablesystems is probably backing the project(1), we expect the services to be economically feasible and again, audio bandwith services and the Rural Canada market will simply improve the overall feasibility.

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(1) We cannot imagine CSN proposing the service without such a commitment.

12. <u>OTHER TELEVISION PROGRAMMING</u> (cont'd)

12.4 <u>Joint economics of MTV and Galaxie</u> (cont'd)

The most significant aspect of the question though lies in distribution of the programming material over a much wider geographical basis than Canada. We have learned that MTV is actively pursuing that option, and that they may end up, with a major U.S. distributor and packager, as partners to distribute multicultural programming (and even, to our own astonishment, CBC programming) to the U.S. market via RCA Satcom satellites.

In our opinion, in the long run this is the only way we can achieve the dual objective of giving Canadian citizens the programming they want, while at the same time developing a vigourous program production industry. Canadians will have to take risks in developing high quality products, and will have to go out and sell these products in the international marketplace.

Finally, we would also like to point out that MTV currently has to rely basically on retail advertising in its UHF operation in the Toronto area. With satellite distribution in Canada, and possibly the United States, we expect this to change dramatically; as it is happening in the United States, for so many services, we expect that large national advertisers will provide support for the service, which would put MTV in a much stronger position to expand program production.

12. OTHER TELEVISION PROGRAMMING (cont'd)

12.5 Other television programming

As satellite utilization is growing closer in Canada, it seems that numerous programming options are being envisaged; the list is too long to afford a detailed study of each service so we will simply define a list of those services and identify the main considerations affecting these services(1).

The list includes:

- an arts and culture channel
- religious programming
- programming aimed at older citizens

These programming concepts share these common characteristics;

- distribution costs, even with Telesat's current rates do not constitute the main obstacle to the services;

- the services respond to real needs in the market (Canada's population for example is rapidly growing older) but these needs cannot be satisfied by the existing broadcasting system; as long as The Incredible Hulk, Wonder Woman or other similar programming is being watched by one more teenager than what any other programming material would reach, that is exactly what the broadcasting system will give us;

- the most significant aspect is the cost of producing programming material for such specialized audiences; the only way to spread these costs is to produce programming that aims at the larger international marketplace;

- since all these programming concepts aim at specialized audiences, it seems mandatory to give them the best time slots available across Canada; the only way to economically achieve this objective is through the use of 14/12 GHz satellites.

(1) Readers are advised to look at Chapter 10: Cable Network Television, as well.

13. AUDIO BANDWITH SERVICES

13. AUDIO BANDWITH SERVICES

13.1 General

Audio bandwith services treated in this chapter can be classified as follows:

- radio services
- slow scan services
- videotex services

Also, because a specific provider of information services has some plans for its use of satellite technology, we have decided to devote the first section of this chapter to this particular candidate: Broadcast News, an affiliate company of the Canadian Press.

13.2 Broadcast News

13.2.1 Services presently offered

Broadcast News provides news services to the broadcast and cable industry; these services consist of:

- a wire service for private broadcasting stations;

- BN Cable, an alphanumerical product specially tailored for TV display;

- BN Voice, a supplementary service of audio news available to radio broadcasting stations. In addition to the national service, Broadcast News also operates regional audio services in British Columbia, Ontario and in the Prairies. The two-way regional systems enable participating stations to exchange news and information freely and to provide full time coverage of provincial legislatures.

13. AUDIO BANDWITH SERVICES (cont'd)

13.2 Broadcast News (cont'd)

13.2.2. Clientele

The wire service presently serves 295 radio stations and 64 television stations throughout Canada. The English service is prepared and transmitted from Toronto with regional news inserted from seven points across the country; the French service on the other hand is prepared and transmitted from Montreal.

A brief description of the clientele is presented in the following table:

TABLE 13-1

CLIENTELE OF BROADCAST NEWS WIRE SERVICE, SEPTEMBER 1979

REGION	AM	FM	TOTAL RADIO	TV STATIONS
Atlantic	40	1	41	5
Quebec	27	10	37	14
Ontario	81	17	98	18
Prairies	59	9	68	18
B.C.-Yukon	48	3	51	9
TOTAL	255	40	295	64

Source: Broadcast News

BN Cable presently serves 103 cable systems representing more than 2.8 million subscribers or 70% of all cable subscribers. A brief description of BN Cable's clientele is presented in the following table.

13. AUDIO BANDWITH SERVICES (cont'd)

13.2 Broadcast News (cont'd)

13.2.2 Clientele (cont'd)

TABLE 13-2

CLIENTELE OF BN CABLE, SEPTEMBER 1979

REGIONS	SYSTEM SIZE 5,000 OR LESS	5,000 TO 10,000	10,000 TO 15,000	15,000 TO 25,000	25,000 TO 50,000	50,000 PLUS	TOTAL
Atlantic							
No of systems	7	6	2	3	1	-	19
No of subscribers	20,100	46,950	27,400	60,650	33,000	-	188,100
Quebec							
No of systems	12	6	2	2	2	2	26
No of subscribers	28,330	45,650	26,600	36,100	63,500	274,000	474,180
Ontario							
No of systems	7	-	5	9	4	8	33
No of subscribers	23,700	-	60,200	189,400	126,600	805,700	1,205,600
Prairies							
No of systems	4	3	1	1	1	4	14
No of subscribers	60,478	24,820	14,600	25,000	28,000	283,000	435,898
British Columbia							
No of systems	-	3	1	2	2	3	11
No of subscribers	-	23,105	10,100	35,271	82,000	358,000	508,476
Canada							
No of systems	30	18	11	17	10	17	103
No of subscribers	132,608	140,525	138,900	346,421	333,100	1720,700	2,812,254

Source: Estimated by Tamec Inc., from Broadcast News and Matthew's CATV

13. AUDIO BANDWITH SERVICES (cont'd)

13.2 Broadcast News (cont'd)

13.2.2 Clientele (cont'd)

Finally, BN Voice serves 99 radio stations distributed in the following fashion.

TABLE 13-3

CLIENTELE OF BN VOICE, SEPTEMBER 1979

	NUMBER OF RADIO STATIONS		
REGION	AM	FM	TOTAL RADIO STATIONS
Atlantic	10	--	10
Quebec	2	--	2
Ontario	20	10	30
Prairies	40	2	42
British Columbia/ Yukon	14	1	15
Canada	86	13	99

Source: Broadcast News

Note: English Service only; French service has approximately 10 clients.

13.2.3 Broadcast News and satellite distribution

Present distribution costs for all of Broadcast News Services are in the order of $1.2 to $1.5 million annually. Since this amount is very close to the cost of a full time transponder, obviously satellite distribution is of great interest to Broadcast News. To us, though, this is just the tip of the iceberg, since present technology used limits not only the technical quality of actual services (75 BAUD rate for wire and cable services, 3 KHz for voice services), but it also severely limits expansion possibilities for new specialized services.

13. AUDIO BANDWITH SERVICES (cont'd)

13.2 Broadcast News (cont'd)

13.2.3 Broadcast News and satellite distribution (cont'd)

Such services, under active consideration, include sports information, detailed stock market quotations and other financial information.

The technologies used to distribute these services could include either or all of the following:

- Telidon in the vertical blanking interval of a television signal.

- Slow-scan, using an 8 to 15 KHz circuit.

- Voice circuits ranging from 5 to 15 KHz and FM stereo.

Depending on the clientele one wants to serve with a specific service, it might be preferable to use subcarriers for certain services and separate carriers for others.

Services for cable for example might well use subcarriers (or the vertical blanking interval, in the case of Telidon) of a main television service.

Services for the broadcasting industry, while they could use, in some cases, subcarriers of a main television service, would probably be better off using separate carriers.

13.2.4 Cable services

The use of subcarriers on a main television service would enable Broadcast News to greatly expand current services to the cable television industry. Services under consideration would use one or both of the following technologies:

- Telidon
- Slow-scan

Telidon services would enable Broadcast News to improve significantly both the quantity and the quality of alphanumerical services currently offered to cable.

With slow-scan, BN News could offer a service similar to UPI's Newstime in the U.S., consisting of still pictures and audio.

13. AUDIO BANDWITH SERVICES (cont'd)

13.2 Broadcast News (cont'd)

13.2.5 Broadcast services

The main impact of satellite technology though, would probably be (from BN News point of view) on the broadcasting industry. Using separate carriers, preferably on a separate transponder that is not shared with a TV service, BN News could distribute all of its current services to the broadcasting industry (wire and voice services). Technical quality of the voice services would also be greatly improved from the present 3 KHz services and present level of service could also be greatly improved in terms of content.

What has prevented Broadcast News of making such services a reality is the refusal of Telesat to lease voice channels, on the grounds that the Telesat Act specified television channels.

13. AUDIO BANDWITH SERVICES (cont'd)

13.3 Radio services

13.3.1 Specialized radio services on cable

Chapter 5 of this report provided information on the costs aspects of audio bandwith services. It was demonstrated in this chapter that using a subcarrier on a main television service, receive costs for a FM quality signal would amount to approximately $1600, which by any measure is very reasonable.

The difficulties in evaluating the feasibility of such radio services lie in two areas respectively:

1- Rates for audio bandwith services are not known.
2- Some radio services could be supported both by a subscriber charge and advertising revenues.

What we did, thus, was first to establish two scenarios concerning space segment costs of audio bandwith services; we then performed a theoretical analysis of what would be the break even number of subscribers for the services under 2 monthly rates and a cable universe of 4 million subscribers(1).

The results are illustrated in the following table and they show that, under such assumptions, the break even point would vary from 200,000 to 800,000 subscribers or 5% to 20% of the actual cable market.

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(1) Uplink investment costs are negligible and have been omitted.

13. AUDIO BANDWITH SERVICES (cont'd)

13.3 Radio services (cont'd)

13.3.1 Specialized radio services on cable (cont'd)

TABLE 13-4

BREAK EVEN POINTS OF VARIOUS AUDIO BANDWITH SERVICES UNDER VARIOUS ASSUMPTIONS

	OPTIMISTIC		PESSIMISTIC	
Space segment costs				
Annual	$ 50,000		$100,000	
Monthly	$ 4,167		$ 8,333	
Monthly subscriber rate	1 cent	2 cents	1 cent	2 cents
Break even				
No of subscribers	417,000	209,000	834,000	417,000
% of cable universe	10.4%	5.2%	20.8%	10.4%

These numbers would seem to us reasonable, and would indicate that, once the main television services get under way, they are likely to be followed fairly rapidly by a number of radio services.

The most likely candidates would in our opinion be the following applications:

- simulcasting: this would provide a FM quality soundtrack to a main television service; this would be particularly useful for concerts and some feature films shown on pay-TV for example;

- audio background for the alphanumerical channels: this would be appreciated by the cable operators, as copyright payments and rules would be shifted to the provider of such a service; the service would likely contain advertising;

- specialized services dedicated to one category of programming such as a classical or jazz station; or programming related to news and information; again the services would likely contain advertising aimed at specific audiences.

13. AUDIO BANDWITH SERVICES (cont'd)

13.3 Radio services (cont'd)

13.3.2 Radio networking

The potential of satellites for radio networking was briefly touched upon when discussing the case of Broadcast News.

What we see here, generally speaking, is a possibility a greatly strenghtening the potential of the private radio broadcasting industry, especially in smaller markets, with satellite distribution of high quality syndicated programming.

This programming could consist of news, interviews and general information as well as sports coverage.

Again feasibility of the services is extremely difficult to evaluate both because space segment rates for audio bandwith channels are not available, and because advertising would also generate revenues; also the economics of radio programming have not been studied in depth in this report.

The following table thus, presents hypothetical revenues for radio networks of various sizes. The following assumptions have been made, which we feel are conservative:

- member stations would be charged the equivalent, per hour, of the cost of a 1 minute commercial at the local level; the average figure used is $25(1)

- the network would also air 2 thirty second commercials per hour on the satellite at a rate which varies with the number of member stations

- the network would be on the air 6 hours per day or 2,000 hours per year approximately.

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(1) Which could also be a minimum cost.

13. AUDIO BANDWITH SERVICES (cont'd)

13.3 Radio services (cont'd)

13.3.2 Radio networking (cont'd)

TABLE 13-5

SATELLITE RADIO NETWORKS
HYPOTHETICAL REVENUES UNDER VARIOUS ASSUMPTIONS

Number of member stations	25	50	75	100
Charge per hour to member stations	$25	$25	$25	$25
Satellite advertising rate	$150	$200	$250	$300
Number of commercial per day	12	12	12	12
Daily revenues ($)				
Member stations	$625	$1250	$1875	$2500
Advertising	$1800	$2400	$3000	$3600
Total	$2425	$3650	$4875	$6100
Annual revenues ($000)	$ 885	$1332	$1779	$2227

The results shown in the previous table are fairly impressive. If audio bandwith channels were available from Telesat, there is no question in our mind that we would witness the formation of radio networks, using satellite distribution.

13. AUDIO BANDWITH SERVICES (cont'd)

13.4 Slow-scan

Slow-scan services have been described in Chapter 5 of this report and have been briefly referred to in the present chapter, in the section dealing with Broadcast News.

Evidently slow scan could provide a news type of service similar the one provided by UPI in the United States. There are also other applications where the technology would be interesting such as:

- real estate listings for high price residences in large urban areas

- careers and professions listings for highly skilled and professional personnel.

13.5 Videotex

Videotex technology in general and the Telidon technology in particular face a chicken and egg problem: there are no Videotex data banks because there are no terminals in service and vice versa.

The strategy Canada should adopt should be to break the vicious cycle in the following fashion:

- establishment of 5 or 6 small size data banks of national interest (100 pages or less) related to general news, financial information, travel, and other subjects.

- satellite distribution of the 5 or 6 services through the vertical blanking internal of the same number of TV signals or through subcarriers.

- design of a decoder that would reduce the present price of more than $2,000 to a retail value of $1,000.

- define and implement a marketing plan that would produce a 1% to 2% penetration of the decoders over the 4 million cable subscribers (40,000 to 80,000 units) over a short period.

- adopting the same strategy for the U.S. market with an objective of ½ of 1% of the 15 million subscribers (75,000 units)

14. CONCLUSIONS AND RECOMMENDATIONS

14. CONCLUSIONS AND RECOMMENDATIONS

14.1 A policy overview

The question arose during the course of the study as to why such a study was necessary in the Canadian context? After all, Canada not only had the first domestic communications satellite system in the non communist world but it also had the first broadband telecommunications network (firmly implanted in large urban areas) in the world as well.

The answer to that question is certainly a complex one, but in general terms we could say that it lies, in terms of policy making, in the pursuit of conflicting objectives. While on one hand, Canada wants to make sure it is not left behind in terms of high technology development, it is also attempting, at the same time, to protect existing institutions:

- Satelites are fine, but as long as they do not threaten too much land based microwave systems.

- New telecommunications services are also wonderful, but as long as the existing broadcasting system is not affected too much by them.

Part of the answer (or the blame) may also lie with Canadian citizens and institutions as well; we seem to have developped the bad habit of trying to 'split up the cake' before the cake is actually baked; in many cases also, we have become a nation who dedicates substantial efforts to what we call 'gunpowder counting': only once in a while, to reassure ourselves more than anything else, do we actually fire the gun.

While all this is happening in our country, the United States, our neighbour and largest industrial power in the world, is moving in the opposite direction; it is letting (and even facilitating) a real revolution take place. With quasi-total deregulation, almost anyone can now do, what it wants to do, when it wants to do it, how it wants to do it, and at the price it wants to do it. Existing institutions who feel threatened only have two choices: adapt or disappear into oblivion.

Getting back to Canada though, we feel the threat of satellites and cable to existing institutions is very real.

On the carrier side, the existing local plant of the telephone companies is basically obsolete and is being subsidized by the provision of intercity services, be they voice, data or video; and cable, which is partly responsible for the first ill, wants to use satellites to reduce the costs of intercity services.

14. CONCLUSIONS AND RECOMMENDATIONS

14.1 A policy overview (cont'd)

On the content side, the existing broadcasting system wants to supply to advertisers the largest audience possible with the smallest amount of programming; cable, on the other hand, wants to supply the largest amount of programming to the smallest audience possible.

What Canada should do exactly about this real threat is too complex an issue to treat in this report; what we want to offer will thus be two broad considerations.

First policymaking should take into account the broader international context; if we attach too much importance in protecting existing institutions, while other countries do not, we might end up as an undevelopped country by the year 2,000. The energy crisis, the industrial world is now facing, is due to a large extent, to the fact that a large part of the world's GNP consists in physical transportation and distribution of information, a process which is highly energy intensive. The revolution we are talking about aims at replacing that process by the electronic transport and distribution of the same information. If we don't join this revolution in order to protect the twisted pair and the broadcast transmitter we might be very sorry in a decade or so.

Second, we would also like to point out that the threat to existing institutions is not particular to the telecommunications sector; to us, it is a continuous process that happens all the time in all areas of human activity; Canada, throughout its history and for the greatest benefits of its citizens, has generally allowed changes to take place. To us, this is the only way to improve the overall standard of living of Canadians.

From a content point of view the approach could also be the same. In almost every other sector of the economy but the culture sector, Canada has always tended to specialize in a few areas where it can satisfy both the domestic market and export as well, while importing the rest of the products and services it needs.

Up to now, Canada has not adopted this attitude regarding the production of television programs; the results are that the flow of foreign programs is still growing on one hand, and that Canadian programming is often of lower quality whose aim is often perceived as a necessary condition for license renewal but not more than that.

A vigourous program production industry which would try to satisfy the needs of the international market place, as well as of Canada, might provide a better answer to the problem.

Generally speaking thus, we feel that the option of relying on market forces to provide answers to Canada's social, economic and cultural

14. CONCLUSIONS AND RECOMMENDATIONS

14.1 A policy overview (cont'd)

needs is too often neglected at best, and not considered at all, at worse. What we recommend is that this option, as well as other options, be included in evaluating, formulating and implementing policies.

The rest of this section will now be devoted to specific recommandations directly related to the provision of satellite services.

14. CONCLUSIONS AND RECOMMENDATIONS

14.2 Telesat

14.2.1 Telesat's pricing philosophy

Whenever Telesat's marketing representatives are asked about space segment rates, the answer is always the same: it depends on demand, that is if demand is large, rates per transponder will be low and if demand is small, rates per transponder will be high.

From a strict economic point of view, this logic is correct only when the volume of demand for a given product or service will affect the economics of supplying the product or service. Telidon or Vidiplex decoders are a good illustration of this; if demand is sufficiently large, production will shift from the use of, off the shelf components and manual 'handicraft' assembly, to intergrated circuits and automated assembly.

The same reasoning though cannot be applied to satellite channels; once a satellite is put on geostationnary orbit, that is it, as far as costs are concerned; there is no way that the volume of demand will influence costs to any significant extent. Transponders then become more like cans of tomato juice on supermarket shelves; if these start piling up, the rational strategy is to reduce prices not raise them.

We, thus, recommend that Telesat's pricing philosophy be based on basic economic principles.

Our second comment concerns rate reductions for volume users, whereby rates are reduced by 4% or 5% if a user contracts for 4 transponders or more, and 8 to 11% for 7 transponders; as well, other options exist for 9 and 11 channels. This policy produces in effect a form of cross subsidization from small to large users; again, we recommend that an end be put to that policy. The threat of concentration coming from the cable industry, commercial broadcasters and the CBC (which seems to have an insatiable appetite for transponders) is such, that Telesat should not encourage it further with this kind of policy.

14.2.2 Telesat rates

Our first recommandation concerns not the magnitude of these rates, (as one might rightfully expect) but their absence.

As was explained previously, Canada faces a very important and immediate technological choice regarding distribution of television programs; Canada has to decide whether it will use the Anik C generation of satellites which operate in 14/12 GHz or the Anik A or D generation of satellites which operate in 6/4 GHz.

14. CONCLUSIONS AND RECOMMENDATIONS (cont'd)

14.2 Telesat (cont'd)

14.2.2 Telesat rates (cont'd)

A rational choice, based on the principle that costs should be minimized, is actually impossible to make since Telesat has not yet published rates for service in 14/12 GHz.

We thus first recommend that these rates be published as soon as possible, so that users can make valid economic choices.

As far as the magnitude of the rates is concerned, the following table illustrates the difference between Telesat's rates and those from RCA Satcom in the United States; as one will notice, we have tried to be generous to Telesat by taking into account the present exchange rate(1) of the Canadian dollar.

TABLE 14-1
TELESAT AND RCA SATCOM RATES

GRADE OF SERVICE	RCA SATCOM SYSTEM(2) $U.S.	$CAN.(3)	TELESAT RATES $CAN.	DIFFERENCE IN $CAN.	% DIFFERENCE FROM RCA SATCOM RATES
Protected	$87,166	$102,548	$180,000	$77,451	75.5%
Unprotected	$54,083	$ 63,627	$125,000	$61,373	96.5%
Preemptible	$38,333	$ 45,098	$110,000	$64,902	143.9%
Average	$59,861	$ 70,424	$138,333	$70,286	99.8%

These rates show that even after allowing for an exchange rate of $0.85 (U.S.) per $Can., Telesat rates are on the average 100% higher than on the RCA Satcom system. In addition, we dare not make the comparison for two transponders; with the further reduction offered by the RCA Satcom system, the comparison would simply become embarrassing.

Because Canada has a smaller population, a time zone problem as in the U.S., and a french speaking population concentrated in Eastern Canada, these higher rates have a much more pronounced impact, relatively speaking, as illustrated in the following table.

(1) One should ask Telesat if they are planning to lower their rates whenever the Canadian dollar gets stronger.
(2) Period of service: 1/8/79 to 31/7/80 and assuming leasing of one transponder.
(3) One $ can = $0.85 U.S.

14. CONCLUSIONS AND RECOMMENDATIONS (cont'd)

14.2 Telesat (cont'd)

14.2.2 Telesat rates (cont'd)

TABLE 14-2

BREAK EVEN NUMBER OF SUBSCRIBERS AT 10 CENTS PER MONTH FOR VARIOUS GRADES OF SERVICES

COMPANY	PROTECTED	UNPROTECTED	PREEMPTIBLE
RCA Satcom			
Total subscriber market	15 million	15 million	15 million
Break even number	872,000	541,000	383,000
% of total subscribers	5.8%	3.6%	2.6%
Telesat			
Total subscriber market	4 million	4 million	4 million
Break even number	1.8 million	1.25 million	1.1 million
% of total subscribers	45.0%	31.3%	27.5%

In addition, we would also like to point out that on one hand, RCA Satcom is regulated, as Telesat is, on a rate of return basis, and on the other hand, RCA's satellites being in general newer than those of Telesat's current satellites, their rate base could be relatively higher than Telesat's base (on a per transponder basis).

On the other hand, RCA's satellites are of a younger generation and have 24 transponders per satellite versus 12 for the Anik A generation of satellites; design, testing and launch costs are thus much lower on a per transponder basis in RCA's case.
Nevertheless, as the following table indicates, rates of RCA Satcom extend to the 1988 period of service as illustrated in the following table.

14. CONCLUSIONS AND RECOMMENDATIONS (cont'd)

14.2 Telesat (cont'd)

14.2.2 Telesat rates (cont'd)

TABLE 14-3

RCA SATCOM RATES IN $U.S. FOR VARIOUS GRADES OF SERVICE

PERIOD (1)	PROTECTED	UNPROTECTED	PREEMPTIBLE
1980	$ 87,166	$54,083	$38,333
1981	97,666	64,583	42,917
1982	109,583	76,500	47,917
1983	116,583	83,500	53,750
1984	116,583	83,500	(2)
1985 to 1988	120,750	87,667	

(1) Period ending on July 31st of each year
(2) Rates not published after 1983 term

This means that even though RCA Satcom will have to launch at least three new satellites by the end of 1988 (1), their 1988 rates will still be lower than current Telesat rates.

14.2.3 Telesat/TCTS relationship

One of the main culprits for the present low level of satellite utilization is, in our opinion, the decision to have Telesat join TCTS; amongst other things, this has resulted in the pure and simple abolition of Telesat's marketing department; the entire personnel, telephone numbers, letterheads, and even business cards, now say one thing in unison: TCTS.

As long as this exclusive relationship prevails, this will continue to hamper satellite utilization in Canada; in simple terms, one cannot ask the same people to market both satellite services and intercity microwave services: the conflicts of interest simply become too important.

While the relationship between Telesat and TCTS could be the subject of a major study by itself, what could be envisaged in the short term is the following:

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(1) Satcom III, Satcom IV and Satcom V

14. <u>CONCLUSIONS AND RECOMMENDATIONS</u> (cont'd)

14.2 <u>Telesat</u> (cont'd)

14.2.3 <u>Telesat/TCTS relationship</u> (cont'd)

- modify present regulation to allow, as in the United States, for the existence of Resale Common Carriers;
- these 'Resale Common Carriers' would operate only in 14/12 GHz; there fore the TCTS network integrity argument, which aplies in 6/4 GHz, would be respected;
- these would also be allowed to own and operate uplinks, subject to technical regulation only;
- the Resale Common Carriers would be performing a carriage function only and would be subject to rate of return regulation;
- any Canadian controlled organization willing to meet the preceeding criteria could become a Resale Common Carrier.

14. CONCLUSIONS AND RECOMMENDATIONS (cont'd)

14.3 Technical alternatives

Although cable operators in Canada face a multiplicity of choice with four generations of satellites to choose from, the technical and financial analysis in previous chapters have made it fairly evident that cable distribution is best served by Anik C in the 14/12 GHz frequency band. The best advantage of Anik C is that even with fairly small (4.5 m) receive earth stations, the satellite can be operated in a two-carrier per transponder mode, thereby cutting transponder cost in half. Of course, one can operate in this mode with other satellites in 6/4 GHz (Anik A, Anik B and Anik D), but only in conjunction with large and expensive receive earth stations.

Other advantages of Anik C includes: no interference to and from terrestrial microwave, no microwave backhaul required, transmit earth stations can be located anywhere, even at downtown locations.

We may also add that existing regulations allow ownership of 14/12 GHz transmit stations by any common carrier. At the present time, there are seventeen registered common carriers in Canada, and this fact alone will tend to make rental costs of uplink facilities more competitive than those at 6/4 GHz.

If the detractors of Anik C say that the satellite does not cover the North and is therefore unfit to serve the Canadian public as a whole, we hasten to point out that there is an antenna pointing mechanism in Anik C that permits it to shift the coverage to the North and still serve the South adequately, as far as cable distribution is concerned. Although Anik C is optimized for Southern Canada, Telesat has found that one can command the antenna 0.4 degree to the North, and the 45 dBW EIRP contour (the contour for CATV coverage) would cover almost entirely 100% of the Canadian land mass including the North. We also hope that, by this time, certain rumors about Anik C satellites being either filled with message traffic, or designed for message traffic, only, are proved completely unfounded.

As Anik C is not available for service until late 1981 or early 1982, one must use 6/4 GHz satellites temporarily. This is presently the case with the Cable Satellite Network, which has arrangements to rent transponder channels from Anik A-3. We believe, however, that cable operators should have a plan to convert to the Anik C system when it is operational.

Happily, the conversion of 6/4 GHz receive earth stations into 14/12 GHz is fairly simple and inexpensive. With the addition of a downconverter, some crystals and filters, which will cost approximately two thousand dollars, an existing 4 GHz TVRO can be made to operate at 12 GHz without discarding any equipment. However, the 4 GHz antenna would lose about 1 to 2 dB in gain due to surface inaccuracy when operating at 12 GHz. Well planned cable operators should buy antennas suitable for operation in both frequency bands.

14. CONCLUSIONS AND RECOMMENDATIONS (cont'd)

14.3 Technical alternatives (cont'd)

It is therefore recommended that Anik C be utilized for cable distribution in Canada, with initial distribution via Anik A-3 and conversion to Anik C when it is available. We believe cable operators in Canada should not emulate their counterparts in the U.S., and should use the best kind of technology available for them in Canada. Simply copying U.S. technology constitutes, in our opinion, the worst solution for Canada. In the long run, the course of action we are recommending would prove to be profitable to both the Canadian cable industry and electronic manufacturing industry.

14. CONCLUSIONS AND RECOMMENDATIONS (cont'd)

14.4 Programming services

We hope to have shown in this report that although current rates for satellite utilization are fairly high, most of the services analyzed would probably be feasible. The other major culprit, for the present low level of satellite utilization, then becomes regulation regarding content and pricing.

If satellite distribution of television programs is to be permitted, the hearing process will have to be streamlined; we simply cannot imagine the CRTC having to simultaneously handle 300 applications for permission to carry one single service and the same number of applications for rate increases.

As far as content is concerned, the issue is certainly a complex one and was briefly touched upon at the beginning of this chapter. Simple arithmetics make us wonder though, that if we are having difficulties in producing programs for a few networks and a few independant stations, what in the world would happen if we had to program 100 channels?

In our opinion, there will thus have to be a major policy review of present canadian content regulation. Finally, the explosion on the U.S. market could prove to be a real bonanza for Canadian producers; we think there is a need for appropriate policies that would encourage Canadian producers to take full advantage of this growing and gigantic market.

14. CONCLUSIONS AND RECOMMENDATIONS (cont'd)

14.5 Rural and remote communities

Improvement of services to rural and remote communities faces two problems basically, which are:

- getting the signals there
- ground distribution

As for as getting the signals there is concerned, satellite distribution will definitely play a major role in reducing the monthly cost to pennies on a per channel, per subscriber basis. This will be true though, as long as there is a sufficiently large national market for each service. Thus, our essential conclusion is that one cannot separate Rural Canada from Urban Canada, in any policy consideration.

Rural and remote communities will then be left with the problems related to ground distribution; we believe that there are a number of technological solutions to these problems including cable and off-air broadcast using low power transmitters. In any event, the growing number of 'illegal' stations pointed at U.S. satellites is a living proof that these problems can be surmounted.

14. CONCLUSIONS AND RECOMMENDATIONS (cont'd)

14.6 Satellites and Telidon development

An area where rapid growth is anticipated is in videotex services, and quick action is required in order to ensure a Canadian foothold in the market. Technically speaking, we are ahead of the U.S. with the development and impending field trials of the Telidon system, which many experts assess to be superior to the other systems. The U.S. do not have a videotex standard at the present time, but they are studying the three major broadcasting videotex (or teletext) systems with the objective of choosing one for the United States. These systems are: the British Ceefax/Oracle, the French Antiope, and the Canadian Telidon system.

The Telidon system has a major advantage, namely, it is compatible with the U.S. television standard (NTSC). However, the British Ceefax system is well developed (field trialed in 1973 and broadcast off-air in Britain since 1975), and the British have adopted an agressive marketing approach with respect to the potential U.S. market. Major demonstrations were shown to the FCC, and to various electronic conferences. Field trials were held over station KSL-TV in Salt Lake City. The British home market is substantial with 100,000 teletext decoders in 1980 and the total is expected to double in 1981, even though decoders are still fairly expensive. It is projected that after 1981, the decoder will cost only about 20% of the price of a colour TV set, and the teletext market would be really booming.

It is worth noting that in the U.S., arrangements have been made to deliver the news services of UPI and Reuters to cable head-ends using Info-Text, which is the Ceefax system adapted to NTSC standard.

In Canada, both the software and hardware for Telidon have been developed, and we should be moving at faster pace on the implementation aspects. We recommend Telidon be implemented on a satellite cable package in a broadcast mode using the vertical blanking interval of the TV signals. Initially, one can circumvent the present high cost of decoders by installing decoders only at cable head-ends which act as character generators. With a large subscriber base, we are insulated against a possible U.S. "invasion", if the U.S. adopt the Ceefax system. With speedy action, however, we might be even able to sell Telidon to the U.S. and capture a large market.

7. DISTRIBUTION OF U.S. NETWORKS IN CANADA

A P P E N D I X "B"

DISTRIBUTION OF U.S. NETWORKS

FOUR U.S.CHANNELS AND ZERO AUDIO-PESSIMISTIC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
	SUBSCRIBER PROJECTIONS (000)									
ABC NETWORK										
CABLE	281	289	298	307	316	326	336	496	556	617
RURAL	100	110	121	133	146	161	177	195	214	236
TOTAL	381	399	419	440	463	487	513	690	770	852
NBC NETWORK										
CABLE	263	271	279	287	296	305	314	473	533	593
RURAL	100	110	121	133	146	161	177	195	214	236
TOTAL	363	381	400	420	442	466	491	668	748	829
CBS NETWORK										
CABLE	461	475	489	504	519	534	550	717	784	852
RURAL	100	110	121	133	146	161	177	195	214	236
TOTAL	561	585	610	637	665	695	728	912	998	1087
PBS NETWORK										
CABLE	654	674	694	715	736	758	781	954	1028	1103
RURAL	100	110	121	133	146	161	177	195	214	236
TOTAL	754	784	815	848	882	919	958	1149	1243	1339
AUDIO BANDWITH SERVICES										
NUMBER OF SUBCARRIERS	0	0	0	0	0	0	0	0	0	0
PEN OVER PBS SUBS (P.C.)	0	0	0	0	0	0	0	0	0	0
NUMBER OF SUBSCRIBERS	0	0	0	0	0	0	0	0	0	0
	MONTHLY RATES PER CHANNEL									
TELEVISION SERVICES	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
AUDIO BANDWITH SERV	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

FOUR U.S.CHANNELS AND ZERO AUDIO-PESSIMISTIC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
REVENUE PROJECTIONS										
TELEVISION SERVICES										
ABC	1143	1198	1257	1320	1388	1460	1538	2071	2311	2557
NBC	1089	1143	1200	1261	1327	1396	1474	2005	2243	2487
CBS	1683	1754	1830	1911	1996	2086	2183	2736	2995	3262
PBS	2262	2351	2444	2543	2647	2758	2874	3448	3728	4017
SUB TOTAL	6177	6446	6732	7036	7359	7702	8069	10260	11277	12323
AUDIO BANDWITH SERV	0	0	0	0	0	0	0	0	0	0
TOTAL REVENUES	6177	6446	6732	7036	7359	7702	8069	10260	11277	12323
EXPENSE CATEGORIES										
NUMBER OF TRANSPONDERS	4	4	4	4	4	4	4	4	4	4
NO OF UPLINK STATIONS	2	2	2	2	2	2	2	2	2	2
NO OF ADD CHANNELS	6	6	6	6	6	6	6	6	6	6
NO OF MICROW CH (N.Y.)	3	3	3	3	3	3	3	3	3	3
REVENUES AND EXPENSES										
TOTAL REVENUES	6177	6446	6732	7036	7359	7702	8069	10260	11277	12323
SPACE SEGMENT	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
UPLINK	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
MICROWAVE	38	38	38	38	38	38	38	38	38	38
TOTAL EXPENSES	7588	7588	7588	7588	7588	7588	7588	7588	7588	7528
NET	-1411	-1141	-855	-552	-229	115	481	2672	3690	4736
NPV AT 12 P.C.	-1411	-2429	-3111	-3504	-3650	-3584	-3341	-2132	-642	1066
INTERNAL RATE OF RETURN	-100.00	-100.00	-100.00	-100.00	-100.00	-99.06	-99.00	-4.44	8.57	16.28

FOUR U.S. CHANNELS AND ZERO AUDIO-PROBABLE

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
SUBSCRIBER PROJECTIONS (000)										
ABC NETWORK										
CABLE	287	298	310	323	336	349	363	528	593	658
RURAL	100	115	132	152	175	201	231	266	306	352
TOTAL	387	413	443	475	511	550	594	794	899	1010
NBC NETWORK										
CABLE	268	279	290	301	314	326	339	503	567	631
RURAL	100	115	132	152	175	201	231	266	306	352
TOTAL	368	394	422	454	488	527	570	769	873	983
CBS NETWORK										
CABLE	470	489	508	529	550	572	595	768	843	919
RURAL	100	115	132	152	175	201	231	266	306	352
TOTAL	570	604	641	681	725	773	826	1034	1149	1271
PBS NETWORK										
CABLE	666	693	720	749	779	810	843	1026	1111	1198
RURAL	100	115	132	152	175	201	231	266	306	352
TOTAL	766	808	853	901	954	1011	1074	1292	1417	1550
AUDIO BANDWITH SERVICES										
NUMBER OF SUBCARRIERS	0	0	0	0	0	0	0	0	0	0
PEN OVER PBS SUBS (P.C.)	0	0	0	0	0	0	0	0	0	0
NUMBER OF SUBSCRIBERS	0	0	0	0	0	0	0	0	0	0
MONTHLY RATES PER CHANNEL										
TELEVISION SERVICES	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
AUDIO BANDWITH SERV	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

FOUR U.S. CHANNELS AND ZERO AUDIO-PROBABLE

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
REVENUE PROJECTIONS										
TELEVISION SERVICES										
ABC	1161	1240	1328	1425	1532	1651	1783	2381	2696	3031
NBC	1104	1181	1266	1361	1465	1582	1711	2306	2618	2950
CBS	1710	1811	1922	2042	2174	2319	2478	3163	3447	3812
PBS	2298	2423	2558	2704	2862	3034	3222	3877	4252	4649
SUB TOTAL	6273	6656	7074	7531	8033	8586	9195	11668	13014	14442
AUDIO BANDWITH SERV	0	0	0	0	0	0	0	0	0	0
TOTAL REVENUES	6273	6656	7074	7531	8033	8586	9195	11668	13014	14442
EXPENSE CATEGORIES										
NUMBER OF TRANSPONDERS	4	4	4	4	4	4	4	4	4	4
NO OF UPLINK STATIONS	2	2	2	2	2	2	2	2	2	2
NO OF ADD CHANNELS	6	6	6	6	6	6	6	6	6	6
NO OF MICROW CH (N.Y.)	3	3	3	3	3	3	3	3	3	3
REVENUES AND EXPENSES										
TOTAL REVENUES	6273	6656	7074	7531	8033	8586	9195	11668	13014	14442
SPACE SEGMENT	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
UPLINK	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
MICROWAVE	38	38	38	38	38	38	38	38	38	38
TOTAL EXPENSES	7588	7588	7588	7588	7588	7588	7588	7588	7588	7588
NET	-1315	-932	-514	-56	446	998	1607	4080	5426	6854
NPV AT 12 P.C.	-1315	-2146	-2556	-2596	-2312	-1746	-931	914	3106	5578
INTERNAL RATE OF RETURN	-100.00	-100.00	-100.00	-100.00	-99.00	-15.75	1.75	18.30	27.26	32.81

FOUR U.S CHANNELS AND ZERO AUDIO-OPTIMISTIC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
	SUBSCRIBER PROJECTIONS (000)									
ABC NETWORK										
CABLE	292	307	322	338	355	373	391	561	631	703
RURAL	100	120	144	173	207	249	299	358	430	516
TOTAL	392	427	466	511	562	622	690	919	1061	1219
NBC NETWORK										
CABLE	273	287	301	316	332	348	366	534	603	674
RURAL	100	120	144	173	207	249	299	358	430	516
TOTAL	373	407	445	489	539	597	664	892	1033	1189
CBS NETWORK										
CABLE	480	504	529	556	583	613	643	825	909	995
RURAL	100	120	144	173	207	249	299	358	430	516
TOTAL	580	624	673	728	791	861	942	1184	1339	1511
PBS NETWORK										
CABLE	679	713	749	786	825	867	910	1105	1203	1303
RURAL	100	120	144	173	207	249	299	358	430	516
TOTAL	779	833	893	959	1033	1115	1209	1464	1633	1819
AUDIO BANDWITH SERVICES										
NUMBER OF SUBCARRIERS	0	0	0	0	0	0	0	0	0	0
PEN OVER PBS SUBS (P.C.)	0	0	0	0	0	0	0	0	0	0
NUMBER OF SUBSCRIBERS	0	0	0	0	0	0	0	0	0	0
	MONTHLY RATES PER CHANNEL									
TELEVISION SERVICES	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
AUDIO BANDWITH SERV	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

FOUR U.S CHANNELS AND ZERO AUDIO-OPTIMISTIC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
REVENUE PROJECTIONS										
TELEVISION SERVICES										
ABC	1176	1280	1398	1532	1687	1865	2070	2758	3184	3657
NBC	1119	1220	1335	1466	1618	1792	1993	2677	3100	3568
CBS	1740	1872	2020	2185	2372	2584	2826	3551	4017	4532
PBS	2337	2499	2678	2876	3098	3346	3626	4391	4900	5458
SUB TOTAL	6372	6871	7430	8061	8775	9587	10514	13377	15201	17215
AUDIO BANDWITH SERV	0	0	0	0	0	0	0	0	0	0
TOTAL REVENUES	6372	6871	7430	8061	8775	9587	10514	13377	15201	17215
EXPENSE CATEGORIES										
NUMBER OF TRANSPONDERS	4	4	4	4	4	4	4	4	4	4
NO OF UPLINK STATIONS	2	2	2	2	2	2	2	2	2	2
NO OF ADD CHANNELS	6	6	6	6	6	6	6	6	6	6
NO OF MICROW CH (N.Y.)	3	3	3	3	3	3	3	3	3	3
REVENUES AND EXPENSES										
TOTAL REVENUES	6372	6871	7430	8061	8775	9587	10514	13377	15201	17215
SPACE SEGMENT	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
UPLINK	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
MICROWAVE	38	38	38	38	38	38	38	38	38	38
TOTAL EXPENSES	7588	7588	7588	7588	7588	7588	7588	7588	7588	7588
NET	-1216	-717	-157	473	1187	1999	2927	5790	7614	9628
NPV AT 12 P.C.	-1216	-1856	-1981	-1644	-890	245	1728	4347	7422	10894
INTERNAL RATE OF RETURN	-100.00	-100.00	-100.00	-99.00	-6.90	15.39	28.66	39.75	46.22	50.26

FOUR U.S. CHANNELS AND THRE AUDIO-PESSIMISTIC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
SUBSCRIBER PROJECTIONS (000)										
ABC NETWORK										
CABLE	281	289	298	307	316	326	336	496	556	617
RURAL	100	110	121	133	146	161	177	195	214	236
TOTAL	381	399	419	440	463	487	513	690	770	852
NBC NETWORK										
CABLE	263	271	279	287	296	305	314	473	533	593
RURAL	100	110	121	133	146	161	177	195	214	236
TOTAL	363	381	400	420	442	466	491	668	748	829
CBS NETWORK										
CABLE	461	475	489	504	519	534	550	717	784	852
RURAL	100	110	121	133	146	161	177	195	214	236
TOTAL	561	585	610	637	665	695	728	912	998	1087
PBS NETWORK										
CABLE	654	674	694	715	736	758	781	954	1028	1103
RURAL	100	110	121	133	146	161	177	195	214	236
TOTAL	754	784	815	848	882	919	958	1149	1243	1339
AUDIO BANDWITH SERVICES										
NUMBER OF SUBCARRIERS	3	3	3	3	3	3	3	3	3	3
PEN OVER PBS SUBS (P.C.)	60	60	60	60	60	60	60	60	60	60
NUMBER OF SUBSCRIBERS	452	470	489	509	529	552	575	690	746	803
MONTHLY RATES PER CHANNEL										
TELEVISION SERVICES	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
AUDIO BANDWITH SERV	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

FOUR U.S. CHANNELS AND THRE AUDIO-PESSIMISTIC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
REVENUE PROJECTIONS										
TELEVISION SERVICES										
ABC	1143	1198	1257	1320	1388	1460	1538	2071	2311	2557
NBC	1089	1143	1200	1261	1327	1398	1474	2005	2243	2487
CBS	1683	1754	1830	1911	1996	2086	2183	2736	2995	3262
PBS	2262	2351	2444	2543	2647	2758	2874	3448	3728	4017
SUB TOTAL	6177	6446	6732	7036	7359	7702	8069	10260	11277	12323
AUDIO BANDWITH SERV	163	169	176	183	191	199	207	248	268	289
TOTAL REVENUES	6340	6616	6908.	7219	7549	7901	8276	10508	11545	12613
EXPENSE CATEGORIES										
NUMBER OF TRANSPONDERS	4	4	4	4	4	4	4	4	4	4
NO OF UPLINK STATIONS	2	2	2	2	2	2	2	2	2	2
NO OF ADD CHANNELS	6	6	6	6	6	6	6	6	6	6
NO OF MICROW CH (N.Y.)	3	3	3	3	3	3	3	3	3	3
REVENUES AND EXPENSES										
TOTAL REVENUES	6340	6616	6908	7219	7549	7901	8276	10508	11545	12613
SPACE SEGMENT	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
UPLINK	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
MICROWAVE	38	38	38	38	38	38	38	38	38	38
TOTAL EXPENSES	7588	7588	7588	7588	7588	7588	7588	7588	7588	7588
NET	-1248	-972	-679	-369	-38	313	688	2920	3958	5025
NPV AT 12 P.C.	-1248	-2115	-2657	-2919	-2944	-2766	-2417	-1096	502	2314
INTERNAL RATE OF RETURN	-100.00	-100.00	-100.00	-100.00	-100.00	-99.00	-99.00	3.10	14.84	21.84

FOUR U.S. CHANNELS AND THREE AUDIO-PROBABLE

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
	SUBSCRIBER PROJECTIONS (000)									
ABC NETWORK										
CABLE	287	298	310	323	336	349	363	528	593	658
RURAL	100	115	132	152	175	201	231	266	306	352
TOTAL	387	413	443	475	511	550	594	794	899	1010
NBC NETWORK										
CABLE	268	279	290	301	314	326	339	503	567	631
RURAL	100	115	132	152	175	201	231	266	306	352
TOTAL	368	394	422	454	488	527	570	769	873	983
CBS NETWORK										
CABLE	470	489	508	529	550	572	595	768	843	919
RURAL	100	115	132	152	175	201	231	266	306	352
TOTAL	570	604	641	681	725	773	826	1034	1149	1271
PBS NETWORK										
CABLE	666	693	720	749	779	810	843	1026	1111	1198
RURAL	100	115	132	152	175	201	231	266	306	352
TOTAL	766	808	853	901	954	1011	1074	1292	1417	1550
AUDIO BANDWITH SERVICES										
NUMBER OF SUBCARRIERS	3	3	3	3	3	3	3	3	3	3
PEN OVER PBS SUBS (P.C.)	60	60	60	60	60	60	60	60	60	60
NUMBER OF SUBSCRIBERS	460	485	512	541	572	607	644	775	850	930
	MONTHLY RATES PER CHANNEL									
TELEVISION SERVICES	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
AUDIO BANDWITH SERV	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

FOUR U.S. CHANNELS AND THREE AUDIO-PROBABLE

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
REVENUE PROJECTIONS										
TELEVISION SERVICES										
ABC	1161	1240	1328	1425	1532	1651	1783	2381	2696	3031
NBC	1104	1181	1266	1361	1465	1582	1711	2306	2618	2950
CBS	1710	1811	1922	2042	2174	2319	2478	3103	3447	3812
PBS	2298	2423	2558	2704	2862	3034	3222	3877	4252	4649
SUB TOTAL	6273	6656	7074	7531	8033	8586	9195	11668	13014	14442
AUDIO BANDWITH SERV	165	174	184	195	206	218	232	279	306	335
TOTAL REVENUES	6438	6830	7258	7726	8240	8804	9427	11947	13320	14777
EXPENSE CATEGORIES										
NUMBER OF TRANSPONDERS	4	4	4	4	4	4	4	4	4	4
NO OF UPLINK STATIONS	2	2	2	2	2	2	2	2	2	2
NO OF AOD CHANNELS	6	6	6	6	6	6	6	6	6	6
NO OF MICROW CH (N.Y.)	3	3	3	3	3	3	3	3	3	3
REVENUES AND EXPENSES										
TOTAL REVENUES	6438	6830	7258	7726	8240	8804	9427	11947	13320	14777
SPACE SEGMENT	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
UPLINK	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
MICROWAVE	38	38	38	38	38	38	38	38	38	38
TOTAL EXPENSES	7588	7588	7588	7588	7588	7588	7588	7588	7588	7588
NET	-1149	-757	-329	139	652	1217	1839	4359	5732	7189
NPV AT 12 P.C.	-1149	-1825	-2088	-1989	-1575	-884	48	2020	4335	6927
INTERNAL RATE OF RETURN	-100.00	-100.00	-100.00	-99.00	-99.00	-2.72	12.55	26.92	34.88	39.79

FOUR U.S CHANNELS AND THREE AUDIO-OPTIMISTIC

SUBSCRIBER PROJECTIONS (000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
ABC NETWORK										
CABLE	292	307	322	338	355	373	391	561	631	703
RURAL	100	120	144	173	207	249	299	358	430	516
TOTAL	392	427	466	511	562	622	690	919	1061	1219
NBC NETWORK										
CABLE	273	287	301	316	332	348	366	534	603	674
RURAL	100	120	144	173	207	249	299	358	430	516
TOTAL	373	407	445	489	539	597	664	892	1033	1189
CBS NETWORK										
CABLE	480	504	529	556	583	613	643	825	909	995
RURAL	100	120	144	173	207	249	299	358	430	516
TOTAL	580	624	673	728	791	861	942	1184	1339	1511
PBS NETWORK										
CABLE	679	713	749	786	825	867	910	1105	1203	1303
RURAL	100	120	144	173	207	249	299	358	430	516
TOTAL	779	833	893	959	1033	1115	1209	1464	1633	1819
AUDIO BANDWITH SERVICES										
NUMBER OF SUBCARRIERS	3	3	3	3	3	3	3	3	3	3
PEN OVER PBS SUBS (P.C.)	60	60	60	60	60	60	60	60	60	60
NUMBER OF SUBSCRIBERS	467	500	536	575	620	669	725	878	980	1092

MONTHLY RATES PER CHANNEL

TELEVISION SERVICES	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
AUDIO BANDWITH SERV	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

FOUR U.S CHANNELS AND THREE AUDIO-OPTIMISTIC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
REVENUE PROJECTIONS										
TELEVISION SERVICES										
ABC	1176	1280	1398	1532	1687	1865	2070	2758	3184	3657
NBC	1119	1220	1335	1466	1618	1792	1993	2677	3100	3568
CBS	1740	1872	2020	2185	2372	2584	2826	3551	4017	4532
PBS	2337	2499	2678	2876	3098	3346	3626	4391	4900	5458
SUB TOTAL	6372	6871	7430	8061	8775	9587	10514	13377	15201	17215
AUDIO BANDWITH SERV	168	180	193	207	223	241	261	316	353	393
TOTAL REVENUES	6540	7051	7623	8268	8998	9828	10775	13694	15554	17608
EXPENSE CATEGORIES										
NUMBER OF TRANSPONDERS	4	4	4	4	4	4	4	4	4	4
NO OF UPLINK STATIONS	2	2	2	2	2	2	2	2	2	2
NO OF ADD CHANNELS	6	6	6	6	6	6	6	6	6	6
NO OF MICROW CH (N.Y.)	3	3	3	3	3	3	3	3	3	3
REVENUES AND EXPENSES										
TOTAL REVENUES	6540	7051	7623	8268	8998	9828	10775	13694	15554	17608
SPACE SEGMENT	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
UPLINK	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
MICROWAVE	38	38	38	38	38	38	38	38	38	38
TOTAL EXPENSES	7588	7588	7588	7588	7588	7588	7588	7588	7588	7588
NET	-1047	-537	35	680	1410	2240	3188	6106	7966	10021
NPV AT 12 P.C.	-1047	-1527	-1498	-1014	-118	1154	2768	5531	8748	12362
INTERNAL RATE OF RETURN	-100.00	-100.00	-99.00	-26.48	9.31	29.25	40.93	50.49	56.06	59.48

A P P E N D I X "C"

SUPERSTATION ANALYSIS

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SUPERSTATIUN PESS. SCENARIU
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DETAILED STATEMENT OF EARNINGS (CONT"D)

CAT:A

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL											
*************											
PUT.AUD.(1/4 HR.AV.)	78	375	597	834	870	911	954	1002	1051	1100	1130
RATING	11	4.00	8.00	13.00	18.00	24.00	24.00	24.00	24.00	24.00	24.00
AUDIENCE	83	15	48	108	157	219	229	240	252	264	271
COMMERCIAL COST											
****************											
CPM($)	16	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	83	15	48	108	157	219	229	240	252	264	271
30 SEC. SPOT	88	41	131	298	430	601	630	661	694	726	746
DAILY UP. REVENUE											
*****************											
TOT. 30 SEC. OCCASIONS	93	108	108	108	108	108	108	108	108	108	108
PERCENT BOOKING	21	5	10	25	40	55	75	75	75	75	75
AV.DAILY UP.REV.	98	.223	1.419	8.046	18.594	35.718	51.010	53.546	56.198	58.783	60.424
**********											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. UP.REV.	103	76	484	2746	6346	12191	17410	18275	19180	20063	20623

CAT:B

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL											
**************											
PUT. AUD.(1/4 HR. AV.)	79	187	299	417	435	456	477	501	526	550	565
RATING	12	1.00	2.50	4.00	5.50	7.00	7.00	7.00	7.00	7.00	7.00
AUDIENCE	84	2	7	17	24	32	33	35	37	38	40
COMMERCIAL COST											
****************											
CPM($)	17	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	84	2	7	17	24	32	33	35	37	38	40
30 SEC. SPOT	89	5	21	46	66	88	92	96	101	106	109
DAILY UP. REVENUE											
*****************											
TOT. 30 SEC. OCASIONS	94	144	144	144	144	144	144	144	144	144	144
PERCENT BOOKING	22	5	10	20	30	40	50	50	50	50	50
AV. DAILY OP. REV.	99	.037	.296	1.320	2.841	5.051	6.612	6.941	7.285	7.620	7.833
**************											
PERC. SUMMER DROP UFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. UP. REV.	104	13	101	451	970	1724	2257	2369	2486	2601	2673

DETAILED STATEMENT OF EARNINGS (CONT"D)
CAT:C

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL											
*************											
POT. AUD.(1/4 HR. AV.)	80	150	239	333	348	364	382	401	420	440	452
RATING	13	1,00	2,50	4,00	6,00	8,00	8,00	8,00	8,00	8,00	8,00
AUDIENCE	85	1	6	13	21	29	31	32	34	35	36
COMMERCIAL COST											
****************											
CPM($)	18	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75
AUDIENCE(000)	85	1	6	13	21	29	31	32	34	35	36
30 SEC. SPOT	90	4	16	37	57	80	84	88	93	97	99
DAILY OP. REVENUE											
****************											
TOT. 30 SEC. OCCASIONS	95	36	36	36	36	36	36	36	36	36	36
PERCENT BOOKING	23	5	10	20	30	40	50	50	50	50	50
AV. DAILY OP. REV.	100	.007	.059	.264	.620	1.155	1.511	1.587	1.665	1.742	1.790
*************											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP.REV.	105	3	20	90	212	394	516	541	568	594	611

DETAILED STATEMENT OF EARNINGS ,(CONT"D)

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SALE OF ADV. TIME											
****************											
AAA	101	639	3055	11369	22829	39142	45548	47812	50179	52488	53953
AA	102	25	161	676	1587	2955	3869	4061	4262	4458	4583
A	103	76	484	2746	6346	12191	17410	18275	19180	20063	20623
B	104	13	101	451	970	1724	2257	2369	2486	2601	2673
C	105	3	20	90	212	394	516	541	568	594	611
TOTAL REVENUE FROM SALE OF ADV. TIME	106	755	3822	15332	31943	56406	69599	73059	76677	80204	82443
PROD. AND OTHER REV.											
*********************											
PRODUCTION AND SYND.	26	-750	-780	-811	-844	-877	-912	-949	-987	-1026	-1067
OTHER	28	0	0	0	0	0	0	0	0	0	0
TOT. PROD. AND OTHER REVENUE	170	-750	-780	-811	-844	-877	-912	-949	-987	-1026	-1067
SUBSCRIBER REVENUE											
******************											
CABLED HSHLDS	29	2418	2569	2689	2805	2939	3078	3231	3391	3547	3646
PENETRATION	31	50	75	100	100	100	100	100	100	100	100
MONTHLY TARIFF/SUBS.	32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOT. ANNUAL SUBS. REV.	107	0	0	0	0	0	0	0	0	0	0
TOTAL OPERATING REV.	108	5	3042	14521	31100	55528	68687	72110	75690	79178	81375

DETAILED STATEMENT OF EXPENSES

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
PROGRAMMING EXPENSES											
STEP UP FEES	36	13875	14430	15007	15607	16232	16881	17556	18259	18989	19748
SUB-TOT, PROG.EXPENSES	109	13875	14430	15007	15607	16232	16881	17556	18259	18989	19748
CARRAIGE EXPENSES											
MICROWAVE FEED	38	0	0	0	0	0	0	0	0	0	0
SPACE SEGMENT	39	0	0	0	0	0	0	0	0	0	0
UPLINK CHARGES	40	0	0	0	0	0	0	0	0	0	0
OTHER	41	0	0	0	0	0	0	0	0	0	0
OTHER	42	0	0	0	0	0	0	0	0	0	0
SUB-TOT, CARR. EXPENSES	110	0	0	0	0	0	0	0	0	0	0
DEPARTMENTAL EXPENSES											
PROMOTION	43	3000	2000	1500	1500	1500	1500	1500	1500	1500	1500
TECHNICAL	44	0	0	0	0	0	0	0	0	0	0
COMMISSION	45	189	955	3833	7986	14101	17400	18265	19169	20051	20611
ADMINISTRATION	46	60	306	1227	2555	4512	5568	5845	6134	6416	6595
SUB-TOT, DEPART. EXPENSES	111	3249	3261	6560	12041	20114	24468	25609	26803	27967	28706
TOTAL OPERATING EXPENSES	112	17124	17691	21567	27649	36346	41349	43166	45062	46956	48455

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SUPERSTATION PESS. SCENARIO
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STATEMENT OF EARNINGS AND EXPENSES

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
OPERATING REVENUES											
******************											
SALE OF ADV. TIME	106	755	3822	15332	31943	56406	69599	73059	76677	80204	82443
PRODUCTION/OTHER	170	-750	-780	-811	-844	-877	-912	-949	-987	-1026	-1067
SUBSCRIBER REV.	107	0	0	0	0	0	0	0	0	0	0
TOT. OP. REV.	108	5	3042	14521	31100	55528	68687	72110	75690	79178	81375
OPERATING EXPENSES											
******************											
PROGRAMMING	109	13875	14430	15007	15607	16232	16881	17556	18259	18989	19748
CARRAIGE	110	0	0	0	0	0	0	0	0	0	0
DEPARTMENTAL	111	3249	3261	6560	12041	20114	24468	25609	26803	27967	28706
TOT. OP. EXPENSES	112	17124	17691	21567	27649	36346	41349	43166	45062	46956	48455
INCOME BEFORE DEP. INT. AND TAXES	113	-17119	-14649	-7046	3451	19183	27338	28944	30628	32221	32921
DEPRECIATION	142	0	0	0	0	0	0	0	0	0	0
EARNINGS BEF. INT.	143	-17119	-14649	-7046	3451	19183	27338	28944	30628	32221	32921
INTEREST PAID	144	1027	2707	2251	1724	1724	948	0	0	0	0
INTEREST RECEIVED	145	0	30	15	119	1062	1598	1752	1853	1948	1990
NET INTEREST	146	1027	2677	2236	1606	662	-650	-1752	-1853	-1948	-1990
EARNINGS BEF. INCOME TAXES	147	-18146	-17326	-9282	1845	18521	27988	30696	32481	34170	34911
CURRENT TAXES	148	0	0	0	923	9260	13994	15348	16240	17085	17455
DEFERRED TAXES	149	0	0	0	0	0	0	0	0	0	0
NET EARNINGS	152	-18146	-17326	-9282	923	9260	13994	15348	16240	17085	17455

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SUPERSTATION PESS. SCENARIO
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SOURCES AND USES OF FUNDS

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SOURCES OF FUNDS											
NET REVENUE	152	-18146	-17326	-9282	923	9260	13994	15348	16240	17085	17455
DEPRECIATION	142	0	0	0	0	0	0	0	0	0	0
DEFERRED TAXES	149	0	0	0	0	0	0	0	0	0	0
INCR. IN L.T. DEBT	153	14369	0	0	0	0	0	0	0	0	0
ISSUE OF SHARES	154	3592	17610	10600	967	0	0	0	0	0	0
INCR. MTHLY TARIFF/SUBS.	155	0	0	0	0	0	0	0	0	0	0
TOTAL USES OF FUNDS	171	-184	284	1319	1890	9260	13994	15348	16240	17085	17455
USES OF FUNDS											
AQUISITION OFASSETS	131	0	0	0	0	0	0	0	0	0	0
DECREASE IN L.T. DEBT	65	0	0	0	0	0	0	0	0	0	0
OTHER REIMBOURSE. OF DEBT	156	0	0	0	0	6468	7902	0	0	0	0
PROGRAMMING FUND	74	0	0	0	0	0	4598	14974	15850	16706	17226
DIVIDENTS	157	0	0	0	0	0	0	0	0	0	0
INCR. IN W.K.	158	-184	284	1319	1890	2793	1495	373	391	379	230
W.K. BEGINNING	159	0	-184	99	1418	3308	6101	7595	7969	8359	8739
W.K. END	160	-184	99	1418	3308	6101	7595	7969	8359	8739	8968

BALANCE SHEET

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
ASSETS											
CURRENT											
CASH	161	500	250	250	250	250	250	250	250	250	250
ACC. RECEIV.	55	1	426	2033	4354	7774	9616	10095	10597	11085	11393
PREPD. EXPSES	56	1370	1415	1725	2212	2908	3308	3453	3605	3757	3876
INVENTORY	57	0	177	216	276	363	413	432	451	470	485
TOTAL CURRENT ASSETS	162	1871	2268	4224	7092	11295	13588	14230	14902	15561	16003
NET FIXED ASSETS	141	0	0	0	0	0	0	0	0	0	0
TOTAL ASSETS	163	1871	2268	4224	7092	11295	13588	14230	14902	15561	16003
LIABILITIES											
CURRENT											
ACC. PAYABLE	58	2055	2123	2588	3318	4361	4962	5180	5407	5635	5815
UNEARNED FEES	59	0	46	218	466	833	1030	1082	1135	1188	1221
OTHER	60	0	0	0	0	0	0	0	0	0	0
TOTAL CURRENT LIABILITIES	54	2055	2169	2806	3784	5194	5992	6262	6543	6822	7035
LONG TERM											
L.T. DEBT	164	14369	14369	14369	14369	7902	0	0	0	0	0
DEFERRED TAXES	165	0	0	0	0	0	0	0	0	0	0
CAPITAL STOCK	166	3592	21202	31802	32770	32770	32770	32770	32770	32770	32770
RETAINED EARNINGS	167	-18146	-35472	-44754	-43831	-34571	-25174	-24801	-24410	-24031	-23802
TOTAL STOCKHOLDER EQUITY	50	-14554	-14270	-12951	-11061	-1801	7595	7969	8359	8739	8968
TOTAL LIABILITIES	51	1871	2268	4224	7092	11295	13588	14230	14902	15561	16003

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SUPERSTATION PESS. SCENARIO
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		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
RETURN ON INVESTMENT											
*******************											
CASH FLOW	70	-16935	-14903	-8350	757	8192	13448	14974	15850	16706	17226
N.P.V. 6 P.C.	68	41	131	298	430	601	630	661	694	726	746
N.P.V. 12 P.C.	69	-16935	-30241	-36897	-36358	-31152	-23522	-15935	-8766	-2018	4193
R.O.I.	71	-100	-100	-100	-99	-99	-14	-2	6	11	14

ASSETS AND DEPRECIATION

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
ASSETS											
*******											
UP-LINK STATION	134	0	0	0	0	0	0	0	0	0	0
MICROWAVE FEED	135	0	0	0	0	0	0	0	0	0	0
PROP. PLANT AND EQUIP.	136	0	0	0	0	0	0	0	0	0	0
OTHER	137	0	0	0	0	0	0	0	0	0	0
TOTAL ASSETS	141	0	0	0	0	0	0	0	0	0	0
DEPRECIATION											
************											
UP-LINK STATION	114	0	0	0	0	0	0	0	0	0	0
MICROWAVE FEED	115	0	0	0	0	0	0	0	0	0	0
PROP. PLANT AND EQUIP.	116	0	0	0	0	0	0	0	0	0	0
OTHER	117	0	0	0	0	0	0	0	0	0	0
TOTAL DEPRECIATION	142	0	0	0	0	0	0	0	0	0	0

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SUPERSTATION PROB. SCENARIO
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		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
						CABLE SUBSCRIBER DATA					
TOTAL HSHLDS EXCLUDING NORMAL COVERAGE AREA	1	2418	2569	2689	2805	2939	3078	3231	3391	3547	3646
******************											
PERCENT PENETRATION	31	50	75	100	100	100	100	100	100	100	100
MEDIAN HSHLD SIZE	30	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
NATIONAL AUDIENCE EXCL. NORMAL COVERAGE AREA	75	3748	5973	8336	8695	9111	9542	10016	10512	10996	11303
VIEWING LEVELS											
****************											
AAA(PRIME)	4	37	37	37	37	37	37	37	37	37	37
AA (FRINGE)	5	20	20	20	20	20	20	20	20	20	20
A (NOON-4:30PM)	6	10	10	10	10	10	10	10	10	10	10
B (SIGN ON-NOON)	7	5	5	5	5	5	5	5	5	5	5
C (MDNT-SIGN OFF)	8	4	4	4	4	4	4	4	4	4	4
1/4 HR. AV. AUDIENCE											
********************											
AAA	76	1387	2210	3084	3217	3371	3530	3706	3889	4068	4182
AA	77	750	1195	1667	1739	1822	1908	2003	2102	2199	2261
A	78	375	597	834	870	911	954	1002	1051	1100	1130
B	79	187	299	417	435	456	477	501	526	550	565
C	80	150	239	333	348	364	382	401	420	440	452

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SUPERSTATION PROB. SCENARIO
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DETAILED STATEMENT OF EARNINGS

CAT:AAA

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL ***********											
PUT. AUD.(1/4 HR. AV.)	76	1387	2210	3084	3217	3371	3530	3706	3889	4068	4182
RATING	9	4.00	8.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
AUDIENCE	81	55	177	432	450	472	494	519	545	570	585
COMMERCIAL COST ***************											
CPM ($)	14	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
AUDIENCE (000)	81	55	177	432	450	472	494	519	545	570	585
30 SEC. SPOT	86	139	442	1079	1126	1180	1236	1297	1361	1424	1464
DAILY OP. REVENUE *****************											
TOT. 30 SEC. OCCASIONS	91	108	108	108	108	108	108	108	108	108	108
PERCENT BOOKING	19	25	30	50	70	90	100	100	100	100	100
AV. DAILY OP. REV.	96	3.744	14.321	58.293	85.131	114.683	133.452	140.085	147.022	153.786	158.078
*************											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN.OP.REV.	101	1278	4888	19896	29055	39142	45548	47812	50179	52488	53953

CAT:AA

TUNING LEVEL ************											
PUT. AUD.(1/4 HR.AV.)	77	750	1195	1667	1739	1822	1908	2003	2102	2199	2261
RATING	10	2.00	4.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
AUDIENCE	82	15	48	100	104	109	115	120	126	132	136
COMMERCIAL COSTS ****************											
CPM($)	15	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	82	15	48	100	104	109	115	120	126	132	136
30 SEC. SPOT	87	41	131	275	287	301	315	331	347	363	373
DAILY OP. REVENUE ******************											
TOT.30 SEC. OCCASIONS	92	72	72	72	72	72	72	72	72	72	72
PERCENT BOOKING	20	5	10	20	30	40	50	50	50	50	50
AV. DAILY OP.REV.	97	.148	.946	3.961	6.198	8.659	11.336	11.899	12.488	13.063	13.427
**********											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP. REV.	102	51	323	1352	2115	2955	3869	4061	4262	4458	4583

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SUPERSTATION PROB. SCENARIO
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DETAILED STATEMENT OF EARNINGS (CONT"D)

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
CAT:A											
TUNING LEVEL											
*************											
PUT.AUD.(1/4 HR.AV.)	78	375	597	834	870	911	954	1002	1051	1100	1130
RATING	11	8.00	16.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
AUDIENCE	83	30	96	200	209	219	229	240	252	264	271
COMMERCIAL COST											
****************											
CPM($)	16	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	83	30	96	200	209	219	229	240	252	264	271
30 SEC. SPOT	88	82	263	550	574	601	630	661	694	726	746
DAILY OP. REVENUE											
*****************											
TOT. 30 SEC. OCCASIONS	93	108	108	108	108	108	108	108	108	108	108
PERCENT BOOKING	21	5	10	25	40	55	75	75	75	75	75
AV.DAILY OP.REV.	98	.445	2,838	14,855	24,793	35,718	51,010	53,546	56,198	58,783	60,424
**********											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP.REV.	103	152	969	5070	8462	12191	17410	18275	19180	20063	20623
CAT:B											
TUNING LEVEL											
**************											
PUT. AUD.(1/4 HR. AV.)	79	187	299	417	435	456	477	501	526	550	565
RATING	12	2.00	4.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
AUDIENCE	84	4	12	29	30	32	33	35	37	38	40
COMMERCIAL COST											
****************											
CPM($)	17	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	84	4	12	29	30	32	33	35	37	38	40
30 SEC. SPOT	89	10	33	80	84	88	92	96	101	106	109
DAILY OP. REVENUE											
*****************											
TOT. 30 SEC. OCASIONS	94	144	144	144	144	144	144	144	144	144	144
PERCENT BOOKING	22	5	10	20	30	40	50	50	50	50	50
AV. DAILY OP. REV.	99	.074	.473	2.311	3.616	5.051	6.612	6.941	7.285	7.620	7,833
**************											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP. REV.	104	25	161	789	1234	1724	2257	2369	2486	2601	2673

SUPERSTATION PROB. SCENARIO

DETAILED STATEMENT OF EARNINGS (CONT"D)

CAT:C

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL											
POT. AUD.(1/4 HR. AV.)	80	150	239	333	348	364	382	401	420	440	452
RATING	13	3.00	5.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
AUDIENCE	85	4	12	27	28	29	31	32	34	35	36
COMMERCIAL COST											
CPM($)	18	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	85	4	12	27	28	29	31	32	34	35	36
30 SEC. SPOT	90	12	33	73	77	80	84	88	93	97	99
DAILY OP. REVENUE											
TOT. 30 SEC. OCCASIONS	95	36	36	36	36	36	36	36	36	36	36
PERCENT BOOKING	23	5	10	20	30	40	50	50	50	50	50
AV. DAILY OP. REV.	100	.022	.118	.528	.826	1.155	1.511	1.587	1.665	1.742	1.790
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP.REV.	105	8	40	180	282	394	516	541	568	594	611

DETAILED STATEMENT OF EARNINGS ,(CONT'D)

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SALE OF ADV. TIME											
AAA	101	1278	4888	19896	29055	39142	45548	47812	50179	52488	53953
AA	102	51	323	1352	2115	2955	3869	4061	4262	4458	4583
A	103	152	969	5070	8462	12191	17410	18275	19180	20063	20623
B	104	25	161	789	1234	1724	2257	2369	2486	2601	2673
C	105	8	40	180	282	394	516	541	568	594	611
TOTAL REVENUE FROM SALE OF ADV. TIME	106	1513	6381	27286	41149	56406	69599	73059	76677	80204	82443
PROD. AND OTHER REV.											
PRODUCTION AND SYND.	26	-750	-780	-811	-844	-877	-912	-949	-987	-1026	-1067
OTHER	28	0	0	0	0	0	0	0	0	0	0
TOT. PROD. AND OTHER REVENUE	170	-750	-780	-811	-844	-877	-912	-949	-987	-1026	-1067
SUBSCRIBER REVENUE											
CABLED HSHLDS	29	2418	2569	2689	2805	2939	3078	3231	3391	3547	3646
PENETRATION	31	50	75	100	100	100	100	100	100	100	100
MONTHLY TARIFF/SUBS.	32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOT. ANNUAL SUBS. REV.	107	0	0	0	0	0	0	0	0	0	0
TOTAL OPERATING REV.	108	763	5601	26475	40305	55528	68687	72110	75690	79178	81375

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SUPERSTATION PROB. SCENARIO
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DETAILED STATEMENT OF EXPENSES

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
PROGRAMMING EXPENSES											
STEP UP FEES	36	13875	14430	15007	15607	16232	16881	17556	18259	18989	19748
SUB-TOT. PROG.EXPENSES	109	13875	14430	15007	15607	16232	16881	17556	18259	18989	19748
CARRAIGE EXPENSES											
MICROWAVE FEED	38	0	0	0	0	0	0	0	0	0	0
SPACE SEGMENT	39	0	0	0	0	0	0	0	0	0	0
UPLINK CHARGES	40	0	0	0	0	0	0	0	0	0	0
OTHER	41	0	0	0	0	0	0	0	0	0	0
OTHER	42	0	0	0	0	0	0	0	0	0	0
SUB-TOT. CARR. EXPENSES	110	0	0	0	0	0	0	0	0	0	0
DEPARTMENTAL EXPENSES											
PROMOTION	43	3000	2000	1500	1500	1500	1500	1500	1500	1500	1500
TECHNICAL	44	0	0	0	0	0	0	0	0	0	0
COMMISSION	45	378	1595	6822	10287	14101	17400	18265	19169	20051	20611
ADMINISTRATION	46	121	510	2183	3292	4512	5568	5845	6134	6416	6595
SUB-TOT. DEPART. EXPENSES	111	3499	4106	10505	15079	20114	24468	25609	26803	27967	28706
TOTAL OPERATING EXPENSES	112	17374	18536	25512	30687	36346	41349	43166	45062	46956	48455

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SUPERSTATION PROB. SCENARIO
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STATEMENT OF EARNINGS AND EXPENSES

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
OPERATING REVENUES											
******************											
SALE OF ADV. TIME	106	1513	6381	27286	41149	56406	69599	73059	76677	80204	82443
PRODUCTION/OTHER	170	-750	-780	-811	-844	-877	-912	-949	-987	-1026	-1067
SUBSCRIBER REV.	107	0	0	0	0	0	0	0	0	0	0
TOT. OP. REV.	108	763	5601	26475	40305	55528	68687	72110	75690	79178	81375
OPERATING EXPENSES											
******************											
PROGRAMMING	109	13875	14430	15007	15607	16232	16881	17556	18259	18989	19748
CARRAIGE	110	0	0	0	0	0	0	0	0	0	0
DEPARTMENTAL	111	3499	4106	10505	15079	20114	24468	25609	26803	27967	28706
TOT. OP. EXPENSES	112	17374	18536	25512	30687	36346	41349	43166	45062	46956	48455
INCOME BEFORE DEP. INT. AND TAXES	113	-16611	-12935	963	9619	19183	27338	28944	30628	32221	32921
DEPRECIATION	142	0	0	0	0	0	0	0	0	0	0
EARNINGS BEF. INT.	143	-16611	-12935	963	9619	19183	27338	28944	30628	32221	32921
INTEREST PAID	144	997	2558	1724	1681	1364	438	0	0	0	0
INTEREST RECEIVED	145	0	30	15	491	1084	1629	1752	1853	1948	1990
NET INTEREST	146	997	2528	1709	1190	280	-1191	-1752	-1853	-1948	-1990
EARNINGS BEF. INCOME TAXES	147	-17608	-15462	-745	8429	18903	28529	30696	32481	34170	34911
CURRENT TAXES	148	0	0	0	4215	9451	14265	15348	16240	17085	17455
DEFERRED TAXES	149	0	0	0	0	0	0	0	0	0	0
NET EARNINGS	152	-17608	-15462	-745	4215	9451	14265	15348	16240	17085	17455

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SUPERSTATION PROB. SCENARIO
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SOURCES AND USES OF FUNDS

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SOURCES OF FUNDS											
*****************											
NET REVENUE	152	-17608	-15462	-745	4215	9451	14265	15348	16240	17085	17455
DEPRECIATION	142	0	0	0	0	0	0	0	0	0	0
DEFERRED TAXES	149	0	0	0	0	0	0	0	0	0	0
INCR. IN L.T. DEBT	153	14006	0	0	0	0	0	0	0	0	0
ISSUE OF SHARES	154	3502	15956	3145	0	0	0	0	0	0	0
INCR. MTHLY TARIFF/SUBS.	155	0	0	0	0	0	0	0	0	0	0
TOTAL USES OF FUNDS	171	-100	494	2400	4215	9451	14265	15348	16240	17085	17455
USES OF FUNDS											
*************											
AQUISITION OFASSETS	131	0	0	0	0	0	0	0	0	0	0
DECREASE IN L.T. DEBT	65	0	0	0	0	0	0	0	0	0	0
OTHER REIMBOURSE. OF DEBT	156	0	0	0	2641	7718	3647	0	0	0	0
PROGRAMMING FUND	74	0	0	0	0	0	9123	14974	15850	16706	17226
DIVIDENTS	157	0	0	0	0	0	0	0	0	0	0
INCR. IN W.K.	158	-100	494	2400	1573	1733	1495	373	391	379	230
W.K. BEGINNING	159	0	-100	394	2794	4368	6101	7595	7969	8359	8739
W.K. END	160	-100	394	2794	4368	6101	7595	7969	8359	8739	8968

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SUPERSTATION PROB. SCENARIO
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BALANCE SHEET

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
ASSETS											
******											
CURRENT											
******											
CASH	161	500	250	250	250	250	250	250	250	250	250
ACC. RECEIV.	55	107	784	3707	5643	7774	9616	10095	10597	11085	11393
PREPD. EXPSES	56	1390	1483	2041	2455	2908	3308	3453	3605	3757	3876
INVENTORY	57	0	185	255	307	363	413	432	451	470	485
TOTAL CURRENT ASSETS	162	1997	2702	6253	8655	11295	13588	14230	14902	15561	16003
NET FIXED ASSETS	141	0	0	0	0	0	0	0	0	0	0
TOTAL ASSETS	163	1997	2702	6253	8655	11295	13588	14230	14902	15561	16003
LIABILITIES											
************											
CURRENT											
*******											
ACC. PAYABLE	58	2085	2224	3061	3682	4361	4962	5180	5407	5635	5815
UNEARNED FEES	59	11	84	397	605	833	1030	1082	1135	1188	1221
OTHER	60	0	0	0	0	0	0	0	0	0	0
TOTAL CURRENT LIABILITIES	54	2096	2308	3459	4287	5194	5992	6262	6543	6822	7035
LONG TERM											
*********											
L.T. DEBT	164	14006	14006	14006	11365	3647	0	0	0	0	0
DEFERRED TAXES	165	0	0	0	0	0	0	0	0	0	0
CAPITAL STOCK	166	3502	19458	22603	22603	22603	22603	22603	22603	22603	22603
RETAINED EARNINGS	167	-17608	-33070	-33815	-29601	-20149	-15007	-14634	-14244	-13864	-13635
TOTAL STOCKHOLDER EQUITY	50	-14106	-13612	-11212	-6998	2454	7595	7969	8359	8739	8968
TOTAL LIABILITIES	51	1997	2702	6253	8655	11295	13588	14230	14902	15561	16003

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SUPERSTATION PROB. SCENARIO
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		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
RETURN ON INVESTMENT											
********************											
CASH FLOW	70	-16511	-13398	-1421	4322	9082	13208	14974	15850	16706	17226
N.P.V. 6 P.C.	88	82	263	550	574	601	630	661	694	726	746
N.P.V. 12 P.C.	69	-16511	-28474	-29607	-26531	-20759	-13265	-5678	1491	8238	14450
R.O.I.	71	-100	-100	-100	-99	-24	-4	7	13	17	20

ASSETS AND DEPRECIATION

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
ASSETS											
*******											
UP-LINK STATION	134	0	0	0	0	0	0	0	0	0	0
MICROWAVE FEED	135	0	0	0	0	0	0	0	0	0	0
PROP. PLANT AND EQUIP.	136	0	0	0	0	0	0	0	0	0	0
OTHER	137	0	0	0	0	0	0	0	0	0	0
TOTAL ASSETS	141	0	0	0	0	0	0	0	0	0	0
DEPRECIATION											
************											
UP-LINK STATION	114	0	0	0	0	0	0	0	0	0	0
MICROWAVE FEED	115	0	0	0	0	0	0	0	0	0	0
PROP. PLANT AND EQUIP.	116	0	0	0	0	0	0	0	0	0	0
OTHER	117	0	0	0	0	0	0	0	0	0	0
TOTAL DEPRECIATION	142	0	0	0	0	0	0	0	0	0	0

..ION OPT. SCENARIO

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
CABLE SUBSCRIBER DATA											
TOTAL HSHLDS EXCLUDING NORMAL COVERAGE AREA	1	2418	2569	2689	2805	2939	3078	3231	3391	3547	3646
PERCENT PENETRATION	31	50	75	100	100	100	100	100	100	100	100
MEDIAN HSHLD SIZE	30	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
NATIONAL AUDIENCE EXCL. NORMAL COVERAGE AREA	75	3748	5973	8336	8695	9111	9542	10016	10512	10996	11303
VIEWING LEVELS											
AAA(PRIME)	4	37	37	37	37	37	37	37	37	37	37
AA (FRINGE)	5	20	20	20	20	20	20	20	20	20	20
A (NOON-4:30PM)	6	10	10	10	10	10	10	10	10	10	10
B (SIGN ON-NOON)	7	5	5	5	5	5	5	5	5	5	5
C (MONT-SIGN OFF)	8	4	4	4	4	4	4	4	4	4	4
1/4 HR. AV. AUDIENCE											
AAA	76	1387	2210	3084	3217	3371	3530	3706	3889	4068	4182
AA	77	750	1195	1667	1739	1822	1908	2003	2102	2199	2261
A	78	375	597	834	870	911	954	1002	1051	1100	1130
B	79	187	299	417	435	456	477	501	526	550	565
C	80	150	239	333	348	364	382	401	420	440	452

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SUPERSTATION OPT. SCENARIO

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DETAILED STATEMENT OF EARNINGS

CAT:AAA

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL											
***********											
POT. AUD.(1/4 HR. AV.)	76	1387	2210	3084	3217	3371	3530	3706	3889	4068	4182
RATING	9	7.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
AUDIENCE	81	97	309	432	450	472	494	519	545	570	585
COMMERCIAL COST											
***************											
CPM ($)	14	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
AUDIENCE (000)	81	97	309	432	450	472	494	519	545	570	585
30 SEC. SPOT	86	243	773	1079	1126	1180	1236	1297	1361	1424	1464
DAILY OP. REVENUE											
*****************											
TOT. 30 SEC. OCCASIONS	91	108	108	108	108	108	108	108	108	108	108
PERCENT BOOKING	19	25	30	50	70	90	100	100	100	100	100
AV. DAILY OP. REV.	96	6.552	25.061	58.293	85.131	114.683	133.452	140.085	147.022	153.786	158.078
*************											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN.OP.REV.	101	2236	8553	19896	29055	39142	45548	47812	50179	52488	53953

CAT:AA

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL											
************											
POT. AUD.(1/4 HR.AV.)	77	750	1195	1667	1739	1822	1908	2003	2102	2199	2261
RATING	10	3.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
AUDIENCE	82	22	72	100	104	109	115	120	126	132	136
COMMERCIAL COSTS											
****************											
CPM($)	15	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	82	22	72	100	104	109	115	120	126	132	136
30 SEC. SPOT	87	62	197	275	287	301	315	331	347	363	373
DAILY OP. REVENUE											
*****************											
TOT.30 SEC. OCCASIONS	92	72	72	72	72	72	72	72	72	72	72
PERCENT BOOKING	20	5	10	20	30	40	50	50	50	50	50
AV. DAILY OP.REV.	97	.223	1.419	3.961	6.198	8.659	11.336	11.899	12.488	13.063	13.427
**********											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP. REV.	102	76	484	1352	2115	2955	3869	4061	4262	4458	4583

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SUPERSTATION OPT. SCENARIO

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DETAILED STATEMENT OF EARNINGS (CONT'D)

CAT:A

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL											
*************											
POT.AUD.(1/4 HR,AV.)	78	375	597	834	870	911	954	1002	1051	1100	1130
RATING	11	12.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
AUDIENCE	83	45	143	200	209	219	229	240	252	264	271
COMMERCIAL COST											
****************											
CPM($)	16	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	83	45	143	200	209	219	229	240	252	264	271
30 SEC. SPOT	88	124	394	550	574	601	630	661	694	726	746
DAILY OP. REVENUE											
*****************											
TOT. 30 SEC. OCCASIONS	93	108	108	108	108	108	108	108	108	108	108
PERCENT BOOKING	21	5	10	25	40	55	75	75	75	75	75
AV.DAILY OP.REV.	98	.668	4.258	14.855	24.793	35.718	51.010	53.546	56.198	58.783	60.424
**********											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP.REV.	103	228	1453	5070	8462	12191	17410	18275	19180	20063	20623

CAT:B

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL											
**************											
POT. AUD.(1/4 HR, AV.)	79	187	299	417	435	456	477	501	526	550	565
RATING	12	3.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
AUDIENCE	84	6	21	29	30	32	33	35	37	38	40
COMMERCIAL COST											
****************											
CPM($)	17	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	84	6	21	29	30	32	33	35	37	38	40
30 SEC. SPOT	89	15	57	80	84	88	92	96	101	106	109
DAILY OP. REVENUE											
*****************											
TOT. 30 SEC. OCASIONS	94	144	144	144	144	144	144	144	144	144	144
PERCENT BOOKING	22	5	10	20	30	40	50	50	50	50	50
AV. DAILY OP. REV.	99	.111	.828	2.311	3.616	5.051	6.612	6.941	7.285	7.620	7.833
**************											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP. REV.	104	38	283	789	1234	1724	2257	2369	2486	2601	2673

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SUPERSTATION OPT. SCENARIO
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DETAILED STATEMENT OF EARNINGS (CONT'D)
CATIC

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TUNING LEVEL											
*************											
POT. AUD.(1/4 HR. AV.)	80	150	239	333	348	364	382	401	420	440	452
RATING	13	4.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
AUDIENCE	85	6	19	27	28	29	31	32	34	35	36
COMMERCIAL COST											
****************											
CPM($)	18	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	85	6	19	27	28	29	31	32	34	35	36
30 SEC. SPOT	90	16	53	73	77	80	84	88	93	97	99
DAILY OP. REVENUE											
***************											
TOT. 30 SEC. OCCASIONS	95	36	36	36	36	36	36	36	36	36	36
PERCENT BOOKING	23	5	10	20	30	40	50	50	50	50	50
AV. DAILY OP. REV.	100	.030	.189	.528	.826	1.155	1.511	1.587	1.665	1.742	1.790
*************											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP.REV.	105	10	65	180	282	394	516	541	568	594	611

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SUPERSTATION OPT. SCENARIO

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DETAILED STATEMENT OF EARNINGS .(CONT"D)

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SALE OF ADV. TIME											
AAA	101	2236	8553	19896	29055	39142	45548	47812	50179	52488	53953
AA	102	76	484	1352	2115	2955	3869	4061	4262	4458	4583
A	103	228	1453	5070	8462	12191	17410	18275	19180	20063	20623
B	104	38	283	789	1234	1724	2257	2369	2486	2601	2673
C	105	10	65	180	282	394	516	541	568	594	611
TOTAL REVENUE FROM SALE OF ADV. TIME	106	2588	10838	27286	41149	56406	69599	73059	76677	80204	82443
PROD. AND OTHER REV.											
PRODUCTION AND SYND.	26	-750	-780	-811	-844	-877	-912	-949	-987	-1026	-1067
OTHER	28	0	0	0	0	0	0	0	0	0	0
TOT. PROD. AND OTHER REVENUE	170	-750	-780	-811	-844	-877	-912	-949	-987	-1026	-1067
SUBSCRIBER REVENUE											
CABLED HSHLDS	29	2418	2569	2689	2805	2939	3078	3231	3391	3547	3646
PENETRATION	31	50	75	100	100	100	100	100	100	100	100
MONTHLY TARIFF/SUBS.	32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOT. ANNUAL SUBS. REV.	107	0	0	0	0	0	0	0	0	0	0
TOTAL OPERATING REV.	108	1838	10058	26475	40305	55528	68687	72110	75690	79178	81375

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SUPERSTATION OPT. SCENARIO
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DETAILED STATEMENT OF EXPENSES

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
PROGRAMMING EXPENSES											
*********************											
STEP UP FEES	36	13875	14430	15007	15607	16232	16881	17556	18259	18989	19748
SUB-TOT. PROG.EXPENSES	109	13875	14430	15007	15607	16232	16881	17556	18259	18989	19748
CARRAIGE EXPENSES											
*****************											
MICROWAVE FEED	38	0	0	0	0	0	0	0	0	0	0
SPACE SEGMENT	39	0	0	0	0	0	0	0	0	0	0
UPLINK CHARGES	40	0	0	0	0	0	0	0	0	0	0
OTHER	41	0	0	0	0	0	0	0	0	0	0
OTHER	42	0	0	0	0	0	0	0	0	0	0
SUB-TOT. CARR. EXPENSES	110	0	0	0	0	0	0	0	0	0	0
DEPARTMENTAL EXPENSES											
**********************											
PROMOTION	43	3000	2000	1500	1500	1500	1500	1500	1500	1500	1500
TECHNICAL	44	0	0	0	0	0	0	0	0	0	0
COMMISSION	45	647	2710	6822	10287	14101	17400	18265	19169	20051	20611
ADMINISTRATION	46	207	867	2183	3292	4512	5568	5845	6134	6416	6595
SUB-TOT. DEPART. EXPENSES	111	3854	5577	10505	15079	20114	24468	25609	26803	27967	28706
TOTAL OPERATING EXPENSES	112	17729	20007	25512	30687	36346	41349	43166	45062	46956	48455

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SUPERSTATION OPT. SCENARIO
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STATEMENT OF EARNINGS AND EXPENSES

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
OPERATING REVENUES											
SALE OF ADV. TIME	106	2588	10838	27286	41149	56406	69599	73059	76677	80204	82443
PRODUCTION/OTHER	170	-750	-780	-811	-844	-877	-912	-949	-987	-1026	-1067
SUBSCRIBER REV.	107	0	0	0	0	0	0	0	0	0	0
TOT. OP. REV.	108	1838	10058	26475	40305	55528	68687	72110	75690	79178	81375
OPERATING EXPENSES											
PROGRAMMING	109	13875	14430	15007	15607	16232	16881	17556	18259	18989	19748
CARRAIGE	110	0	0	0	0	0	0	0	0	0	0
DEPARTMENTAL	111	3854	5577	10505	15079	20114	24468	25609	26803	27967	28706
TOT. OP. EXPENSES	112	17729	20007	25512	30687	36346	41349	43166	45062	46956	48455
INCOME BEFORE DEP. INT. AND TAXES	113	-15891	-9948	963	9619	19183	27338	28944	30628	32221	32921
DEPRECIATION	142	0	0	0	0	0	0	0	0	0	0
EARNINGS BEF. INT.	143	-15891	-9948	963	9619	19183	27338	28944	30628	32221	32921
INTEREST PAID	144	953	2313	1658	1619	1298	368	0	0	0	0
INTEREST RECEIVED	145	0	30	15	495	1088	1633	1752	1853	1948	1990
NET INTEREST	146	953	2283	1643	1124	210	-1265	-1752	-1853	-1948	-1990
EARNINGS BEF. INCOME TAXES	147	-16844	-12232	-680	8494	18973	28603	30696	32481	34170	34911
CURRENT TAXES	148	0	0	0	4247	9486	14302	15348	16240	17085	17455
DEFERRED TAXES	149	0	0	0	0	0	0	0	0	0	0
NET EARNINGS	152	-16844	-12232	-680	4247	9486	14302	15348	16240	17085	17455

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SUPERSTATION OPT. SCENARIO

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SOURCES AND USES OF FUNDS

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
SOURCES OF FUNDS											
*****************											
NET REVENUE	152	-16844	-12232	-680	4247	9486	14302	15348	16240	17085	17455
DEPRECIATION	142	0	0	0	0	0	0	0	0	0	0
DEFERRED TAXES	149	0	0	0	0	0	0	0	0	0	0
INCR. IN L.T. DEBT	153	13492	0	0	0	0	0	0	0	0	0
ISSUE OF SHARES	154	3373	13118	2567	0	0	0	0	0	0	0
INCR. MTHLY TARIFF/SUBS.	155	0	0	0	0	0	0	0	0	0	0
TOTAL USES OF FUNDS	171	21	886	1887	4247	9486	14302	15348	16240	17085	17455
USES OF FUNDS											
*************											
AQUISITION OFASSETS	131	0	0	0	0	0	0	0	0	0	0
DECREASE IN L.T. DEBT	165	0	0	0	0	0	0	0	0	0	0
OTHER REIMBOURSE. OF DEBT	156	0	0	0	2674	7753	3065	0	0	0	0
PROGRAMMING FUND	74	0	0	0	0	0	9742	14974	15850	16706	17226
DIVIDENTS	157	0	0	0	0	0	0	0	0	0	0
INCR. IN W.K.	158	21	886	1887	1573	1733	1495	373	391	379	230
W.K. BEGINNING	159	0	21	907	2794	4368	6101	7595	7969	8359	8739
W.K. END	160	21	907	2794	4368	6101	7595	7969	8359	8739	8968

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SUPERSTATION OPT. SCENARIO
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BALANCE SHEET

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
ASSETS											
******											
CURRENT											
******											
CASH	161	500	250	250	250	250	250	250	250	250	250
ACC. RECEIV.	55	257	1408	3707	5643	7774	9616	10095	10597	11085	11393
PREPD. EXPSES	56	1418	1601	2041	2455	2908	3308	3453	3605	3757	3876
INVENTORY	57	0	200	255	307	363	413	432	451	470	485
TOTAL CURRENT ASSETS	162	2176	3459	6253	8655	11295	13588	14230	14902	15561	16003
NET FIXED ASSETS	141	0	0	0	0	0	0	0	0	0	0
TOTAL ASSETS	163	2176	3459	6253	8655	11295	13588	14230	14902	15561	16003
LIABILITIES											
************											
CURRENT											
*******											
ACC. PAYABLE	58	2127	2401	3061	3682	4361	4962	5180	5407	5635	5815
UNEARNED FEES	59	28	151	397	605	833	1030	1082	1135	1188	1221
OTHER	60	0	0	0	0	0	0	0	0	0	0
TOTAL CURRENT LIABILITIES	54	2155	2552	3459	4287	5194	5992	6262	6543	6822	7035
LONG TERM											
*********											
L.T. DEBT	164	13492	13492	13492	10818	3065	0	0	0	0	0
DEFERRED TAXES	165	0	0	0	0	0	0	0	0	0	0
CAPITAL STOCK	166	3373	16491	19058	19058	19058	19058	19058	19058	19058	19058
RETAINED EARNINGS	167	-16844	-29076	-29756	-25508	-16022	-11462	-11089	-10698	-10319	-10090
TOTAL STOCKHOLDER EQUITY	50	-13471	-12585	-10698	-6451	3036	7595	7969	8359	8739	8968
TOTAL LIABILITIES	51	2176	3459	6253	8655	11295	13588	14230	14902	15561	16003

RETURN ON INVESTMENT

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
CASH FLOW	70	-15911	-10805	-908	4293	9051	13175	14974	15850	16706	17226
N.P.V. 6 P.C.	88	124	394	550	574	601	630	661	694	726	746
N.P.V. 12 P.C.	69	-15911	-25559	-26283	-23227	-17475	-9999	-2413	4757	11504	17716
R.O.I.	71	-100	-100	-100	-99	-20	-1	10	16	20	23

ASSETS AND DEPRECIATION

ASSETS

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
UP-LINK STATION	134	0	0	0	0	0	0	0	0	0	0
MICROWAVE FEED	135	0	0	0	0	0	0	0	0	0	0
PROP. PLANT AND EQUIP.	136	0	0	0	0	0	0	0	0	0	0
OTHER	137	0	0	0	0	0	0	0	0	0	0
TOTAL ASSETS	141	0	0	0	0	0	0	0	0	0	0

DEPRECIATION

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
UP-LINK STATION	114	0	0	0	0	0	0	0	0	0	0
MICROWAVE FEED	115	0	0	0	0	0	0	0	0	0	0
PROP. PLANT AND EQUIP.	116	0	0	0	0	0	0	0	0	0	0
OTHER	117	0	0	0	0	0	0	0	0	0	0
TOTAL DEPRECIATION	142	0	0	0	0	0	0	0	0	0	0

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SUPERSTATION PESS. SCENARIO
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		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
					CABLE SUBSCRIBER DATA						
TOTAL HSHLDS EXCLUDING NORMAL COVERAGE AREA	1	2418	2569	2689	2805	2939	3078	3231	3391	3547	3646
******************											
PERCENT PENETRATION	31	50	75	100	100	100	100	100	100	100	100
MEDIAN HSHLD SIZE	30	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
NATIONAL AUDIENCE EXCL. NORMAL COVERAGE AREA	75	3748	5973	8336	8695	9111	9542	10016	10512	10996	11303
VIEWING LEVELS											
*****************											
AAA(PRIME)	4	37	37	37	37	37	37	37	37	37	37
AA (FRINGE)	5	20	20	20	20	20	20	20	20	20	20
A (NOON-4:30PM)	6	10	10	10	10	10	10	10	10	10	10
B (SIGN ON-NOON)	7	5	5	5	5	5	5	5	5	5	5
C (MDNT-SIGN OFF)	8	4	4	4	4	4	4	4	4	4	4
1/4 HR. AV. AUDIENCE											
*********************											
AAA	76	1387	2210	3084	3217	3371	3530	3706	3889	4068	4182
AA	77	750	1195	1667	1739	1822	1908	2003	2102	2199	2261
A	78	375	597	834	870	911	954	1002	1051	1100	1130
B	79	187	299	417	435	456	477	501	526	550	565
C	80	150	239	333	348	364	382	401	420	440	452

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SUPERSTATION PESS. SCENARIO
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DETAILED STATEMENT OF EARNINGS

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
CAT:AAA											
TUNING LEVEL											
***********											
POT. AUD.(1/4 HR. AV.)	76	1387	2210	3084	3217	3371	3530	3706	3889	4068	4182
RATING	9	2.00	5.00	8.00	11.00	14.00	14.00	14.00	14.00	14.00	14.00
AUDIENCE	81	28	110	247	354	472	494	519	545	570	585
COMMERCIAL COST											
***************											
CPM ($)	14	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
AUDIENCE (000)	81	28	110	247	354	472	494	519	545	570	585
30 SEC. SPOT	86	69	276	617	885	1180	1236	1297	1361	1424	1464
DAILY OP. REVENUE											
*****************											
TOT. 30 SEC. OCCASIONS	91	108	108	108	108	108	108	108	108	108	108
PERCENT BOOKING	19	25	30	50	70	90	100	100	100	100	100
AV. DAILY OP. REV.	96	1.872	8.950	33.310	66,888	114,683	133,452	140,085	147,022	153,786	158,078
*************											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN.OP.REV.	101	639	3055	11369	22829	39142	45548	47812	50179	52488	53953
CAT:AA											
TUNING LEVEL											
************											
POT. AUD.(1/4 HR.AV.)	77	750	1195	1667	1739	1822	1908	2003	2102	2199	2261
RATING	10	1.00	2.00	3.00	4.50	6.00	6.00	6.00	6.00	6.00	6.00
AUDIENCE	82	7	24	50	78	109	115	120	126	132	136
COMMERCIAL COSTS											
****************											
CPM($)	15	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
AUDIENCE(000)	82	7	24	50	78	109	115	120	126	132	136
30 SEC. SPOT	87	21	66	138	215	301	315	331	347	363	373
DAILY OP. REVENUE											
******************											
TOT.30 SEC. OCCASIONS	92	72	72	72	72	72	72	72	72	72	72
PERCENT BOOKING	20	5	10	20	30	40	50	50	50	50	50
AV. DAILY OP.REV.	97	.074	.473	1.981	4,649	8,659	11,336	11,899	12,488	13,063	13,427
**********											
PERC. SUMMER DROP OFF	25	25	25	25	25	25	25	25	25	25	25
ADJ. ANN. OP. REV.	102	25	161	676	1587	2955	3869	4061	4262	4458	4583