Government of Canada
Department of Communications

Gouvernement du Canada
Ministère des Communications

EVALUATION ASSESSMENT
OF THE
DIRECT-TO-HOME SATELLITE BROADCASTING

Evaluation Design
Devis de recherche

PROGRAM EVALUATION · DIVISION · DE L'EVALUATION DES PROGRAMMES

EVALUATION ASSESSMENT
OF THE
DIRECT-TO-HOME SATELLITE BROADCASTING

JANUARY 4, 1985

DOC

PROGRAM EVALUATION SERIES

This Assessment Study was conducted by Teega Research Consultants Inc. for the Program Evaluation Division of the Department of Communications, Canada.

The views expressed herein are those of the author and do not necessarily represent the views or policies of the Department of Communications.

Certain passages have been severed under the Access to Information Act to protect third party confidentiality.

DIRECT-TO-HOME SATELLITE BROADCASTING: A PROGRAM EVALUATION ASSESSMENT

Submitted to
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Department of Communications

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January 4, 1985

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EXECUTIVE SUMMARY

The following report presents the findings of an evaluation assessment study of the Direct Broadcasting Satellites (DBS) program. The study has determined that the program's activities are generally consistent with its mandate, the program is adequately defined, and the relationships between its activities and its intended results are plausible enough to allow a meaningful evaluation to be carried out.

The evaluation alternative recommended is intended to provide answers to questions about the success or failure of the program. Specifically, the following evaluation issues have been discussed in the assessment, particularly in terms of relevance for an evaluation study:

1. What is the demand for direct-to-home broadcasting service?
2. Is the program strategy valid?
3. Has the program proved the technical feasibility of DBS?
4. To what extent has the program resulted in new regulations governing DBS systems and services?
5. To what extent have the program sub-components achieved their stated objectives?
6. To what extent have the program's activities, outputs and impacts/effects contributed to achieving the federal government's broadcasting objectives?
7. What has been the role of the DBS program in contributing to a viable Canadian space manufacturing industry?
8. Should the government now promote the development of DBS systems and services by providing subsidy funds and/or front-end capital financing? Are there other financial mechanisms (e.g. tax incentives) which would be more appropriate and effective?
9. Is it sufficient to restrict the role of government to coordinating industry initiatives and planning for the 1990s?
10. To what extent has the DBS Studies Program achieved its objectives?
11. Has the DBS Studies Program resulted in studies of good quality, in the various areas examined? To what extent did DOC get value for money spent on the DBS Studies Program?

SOMMAIRE-RECOMMANDATIONS

Le présent rapport présente les conclusions d'une étude préparatoire à l'évaluation du programme de radiodiffusion directe par satellite (RDS). Cette étude montre que les activités du programme sont en général conformes au mandat établi, que le programme est bien défini et que les relations entre ses activités et les résultats escomptés sont suffisamment pertinentes pour permettre l'exécution d'une évaluation valable.

La formule d'évaluation recommandée vise à répondre à certaines questions destinées à établir si les objectifs du programme ont été atteints ou non. En particulier, l'étude examine les points suivants, notamment du point de vue de leur pertinence pour une étude d'évaluation :

1. Quelle est la demande de services de radiodiffusion directe par satellite (RDS)?
2. La stratégie du programme est-elle valable?
3. Le programme a-t-il prouvé la faisabilité technique de la RDS?
4. Dans quelle mesure le programme a-t-il donné lieu à l'établissement de nouvelles dispositions réglementaires régissant les systèmes et services de RDS?
5. Dans quelle mesure les éléments secondaires du programme ont-ils atteint leurs objectifs?
6. Dans quelle mesure les activités, les extrants et les effets du programme ont-ils contribué à la réalisation des objectifs du gouvernement fédéral en matière de radiodiffusion?
7. Quel rôle le programme de RDS a-t-il joué dans le développement d'une industrie canadienne viable dans le domaine de la fabrication d'équipement spatial?
8. Le gouvernement devrait-il maintenant encourager la mise au point de systèmes et de services de RDS au moyen de subventions et/ou de capitaux d'amorçage? Pourrait-il recourir à d'autres mécanismes (par ex. mesures fiscales) plus pertinents et plus efficaces?
9. Suffit-il de limiter le rôle du gouvernement à la coordination des initiatives de l'industrie et à la planification des services des années 1990?
10. Dans quelle mesure le Programme d'études en RDS a-t-il atteint ses objectifs?
11. Le Programme d'études en RDS a-t-il permis de réaliser des études de bonne qualité dans les divers domaines examinés? Dans quelle mesure procure-t-il au MDC des avantages proportionnés aux fonds engagés?

CHAPTER I. INTRODUCTION

The Program Evaluation Division, Department of Communications, retained TEEGA Research Consultants to undertake an evaluation assessment of the Direct Broadcasting Satellites (DBS) program.(1) The following report presents the findings of the assessment study. "Evaluation assessments" of federal government programs are carried out following specific guidelines laid out by the Office of Comptroller General.(2) An assessment is intended to determine program issues, recommend appropriate evaluation approaches, and specify information requirements and sources for a subsequent evaluation study. In the first place, however, the assessment should provide a description of the program and the environment in which it is operating, should resolve whether the program can be evaluated, and should determine the usefulness and purposes of the evaluation study.

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(1) During the past decade DOC has been involved in various activities aimed at studying DBS implementation in Canada. Section 1.4 below provides a discussion of what the DBS "program" is. Definition: Although the terms "DBS" and "direct-to-home broadcasting" are often used interchangeably in the literature, they denote technically different applications as defined by the International Telecommunications Union (ITU). A DBS service uses high-power satellites, assigned to specific orbital slots, which deliver signals in the 12.2-12.7 GHz band to small receiving antennas with a diameter of one metre or less. A direct-to-home satellite broadcasting service uses medium-power satellites to deliver signals to antennas with a diameter of 1.2 to 1.8 metres. In this assessment report "DBS" and "direct-to-home broadcasting" are used interchangeably. This is to avoid confusion in citing various references which have themselves used these terms interchangeably.

(2) See Guide on the Program Evaluation Function, Office of the Comptroller General of Canada, Ottawa, 1981.

1.1 Background: Canadian DBS Experiments and Trials

The first Canadian experiments in direct broadcasting using high power communications satellites were implemented in 1976 with Hermes. Hermes was the first satellite in the world designed to use the high 14/12 gigahertz (GHz) frequency bands.(1) The Department of Communications developed Hermes at its Communications Research Centre in Ottawa. Hermes was jointly owned with the United States. Canada contributed $63 million to the project and the United States contributed $11.4 million.(2) Canada designed, built and operated the spacecraft, while the U.S. provided the high-power tube for the satellite transponder,(3) test and launch services for the spacecraft, and the launch rocket. Use of the satellite was shared equally between the two countries.

DOC was responsible for developing the Canadian portion of the Hermes program. CRC, in particular, was responsible for systems engineering and for management of the program from initial concept through design and manufacture of spacecraft to its use in field experiments and demonstrations.

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(1) The Hermes satellite was originally called the "Communications Technology Satellite." In May 21, 1976, during in-orbit inauguration ceremonies, it was renamed "Hermes" by the Honourable Jeanne Sauve, then Minister of Communications.
(2) See Treasury Board submission TB 723671, November 9, 1973.
(3) A "transponder" is a device on the satellite that is used to receive a communications signal from earth, translate the signal to a new frequency, and transmit the signal back to earth.

The Hermes' use of the 14/12 GHz frequency bands allowed the undertaking of a series of social and technical communications projects designed to utilize relatively small sized, portable ground stations and high-powered transponders. These projects included experiments sponsored by federal and provincial government departments, universities, industry and native organizations. DOC produced a series of earth terminals to be used by experimenters to carry out their projects. In turn, the experimenters were to evaluate their projects and present reports to DOC on the results.(1) Although DOC provided the satellite time and ground terminals free of charge, the experimenters were "responsible for core funding and the development, implementation and evaluation of the experiments."(2)

In all, the Canadian Hermes program included 15 technical and 22 social experiments conducted by over 20 Canadian organizations. These included direct-to-home television and radio broadcasting, tele-education, telemedicine, community interaction and administrative and community services. Hermes was also used for a variety of short-term demonstrations.(3)

The DBS component of Hermes started in mid-1976. A CBC experiment was designed to evaluate the quality of direct-to-home reception of TV, using terminals located in rooftops of

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(1) D.H. Jelly. A Report on the Process of Implementation of Hermes Experiments, Department of Communications, Ottawa, July 1978.
(2) See Appendix 1 of Treasury Board submission TB 740026, November 12, 1975.
(3) Spacebound, Department of Communications, Ottawa, 1982.

three large cities: Montreal, Toronto and Ottawa. This first Canadian DBS experiment demonstrated that Hermes could reliably provide TV pictures of very good quality for either community or individual home services.

Two other Hermes experiments which involved DBS system trials were as follows:

- The Canadian Broadcasting Corporation (CBC) Northern Service was transmitted during evening hours to 3 communities in Labrador: Makkovik, Postville and Hopedale.

- The educational programs of the Ontario Education Communications Authority (OECA) were transmitted during regular school hours to schools in 4 remote communities in northwestern Ontario: Summer Beaver, Slate Falls, Mine Centre and South Bay Mine.(1)

These two experiments took place between January 1 and June 30, 1979, when time on Hermes was dedicated solely for direct broadcasting to communities and individuals. The objective of these experiments was to evaluate how acceptable viewers would find the quality of TV reception, as well as how reliably the small earth terminals would perform when used by unskilled persons in different climatic conditions.(2)

In addition to the above experiments, three notable DBS demonstrations using Hermes were as follows:

- In May 1978 a demonstration of direct broadcasting was arranged for an international meeting in Peru.

- In August 1979 demonstrations of TV reception in 50 locations in eastern Australia were conducted as

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(1) Ibid.
(2) Ibid.

part of Canada's participation in a joint satellite-communications workshop held in Australia.

- The extensive Hermes demonstration in Australia stimulated a request from Papua, New Guinea, for a demonstration of direct-to-home television reception, which took place at Port Moresby on September 4 and 5, 1979.

The Hermes DBS experiments and demonstrations were not designed to assess economic viability, market and institutional considerations. They were primarily intended to demonstrate the technical feasibility of DBS broadcasting using a powerful 200 watt satellite transponder, with small, economical terminals -- and the potential use of lower powers with signals delivered to larger earth terminals.(1)

To advance the knowledge and experience gained through Hermes, DOC followed up by leasing for two years the 14/12 GHz channels on Telesat's Anik B satellite, launched in December 15, 1978.(2) A new two-year program of pilot projects was started. As part of this Anik B program, DOC made available satellite time and provided equipment, technical advice and other assistance to several project sponsors, including public, private, community and special interest groups. During 1979 and 1980, 16 pilot projects were carried out using Anik B. These included projects in distribution of broadcast

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(1) The experiments were generally successful in demonstrating the use of high and low powers (see pages 7 and 8 below).
(2) Anik B was the world's first hybrid satellite, carrying 12 channels in the 6/4 GHz band and six in the 14/12 GHz band. It served both as a commercial satellite and as an experimental vehicle following up the Hermes experiments.

programming, community communications, tele-education, tele-medicine, advanced technology, and government and business applications.

In February 1981, DOC renewed for two more years its lease of Anik B's 14/12 GHz capacity. Thus a second phase of the Anik B program began. Phase II was comprised of 19 pilot projects. These projects involved further development of some Phase I achievements, and exploration of new areas such as the gathering and distribution of news and the technical evaluation of ground terminals to be used with Anik C.(1)

The main DBS related components of the two-phase Anik B program, included the following projects:

- Program delivery pilot project: Direct-to-home TV broadcasting, bringing CBC and BCTV programs to homes and communities in remote areas of British Columbia, the Yukon, and NWT. Among this project's aims were the provision of alternate TV program service to the participants and communities involved, acquisition of first-hand experience with the use of satellites and evaluation of the reliability of the satellite-delivered TV signal and the quality of reception in varying weather and atmospheric conditions. The sponsors of this project were the CBC, BCTV, and the governments of British Columbia, Yukon and Northwest Territories.

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(1) Anik B Program - Phase II: Fact Sheet. Department of Communications, Ottawa, January 1982.

- Northern Ontario hybrid direct broadcast operational trial: Direct-to-home TV broadcasting, bringing TVOntario programs to remote homes and communities. This project was devised to explore economic and practical ways of fulfilling TVOntario's mandate to use the electronic media in providing new learning opportunities for Ontarians. Earth stations were installed for different modes of reception by individual homes, cable TV systems, low-cost television rebroadcast transmitters, recreation centres, schools and motels. The sponsors for this project were TVOntario (TVO) and Ontario's Ministries of Transportation and Communications, and Northern Affairs, Culture and Recreation.(1)

Of the many Anik B projects the above two are the most relevant as trials for DBS. For these projects, DOC purchased 100 low-cost earth terminals from SED Systems of Saskatoon, half for use in British Columbia, the Yukon and Northwest Territories, and half for Ontario. In the west, 112 hours a week of programming came from the CBC and 154 hours a week from BCTV. In Ontario, programming was supplied by TVOntario for 94 hours a week.(2)

The Hermes DBS experiments had demonstrated, at an early stage of that satellite's operational life (in 1976), the technical feasibility of using the 14/12 GHz frequencies for carrying

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(1) Ibid. and Anik B, a brochure published by Department of Communications, Ottawa, April 1982.
(2) Ibid.

out direct broadcasting by satellite. An advantage of these higher frequency bands is that they are allocated primarily for satellite communications, and thus interference with terrestrial services is minimal. This permits the transmission of higher-power signals, and use of smaller, cheaper receiving antennas.

The later experiments with Hermes (in 1979) demonstrated that good reception could be achieved using lower transponder power than had originally been expected. Hermes' operational life came to an end in November 24, 1979. The experimental work however, as mentioned above, continued with the pilot projects of Anik B. The projects of the Anik B program which specifically dealt with television direct broadcasting demonstrated the technical feasibility of DBS using medium power.

In September 1982, DOC's second lease of the Anik B 14/12 GHz television capacity expired, and the DBS field projects were concluded. Broadcasters are now using Anik C and D satellites to relay their signals to terrestrial distribution stations. These satellite broadcasts, however, are not intended for direct home reception. The list of Canadian broadcasters using satellite communications include the CBC,

the LaSette network of Quebec; the educational service of TVOntario and Knowledge Network of the West (KNOW); Canadian Satellite Communications Inc. (CANCOM); and the pay-TV services.

1.2 Background: DBS and Broadcasting Policy in Canada

During the period since 1976 when DOC and other federal and provincial departments, private, public, community and special interest groups were involved in DBS experiments and field trials, and other studies, four important reviews of Canada's broadcasting policies took place. These reviews were conducted for the following: (a) the 1978 Consultative Committee on the Implications of Telecommunications for Canadian Sovereignty (the Clyne Committee); (b) the 1980 Committee on Extension of Service to Northern and Remote Communities (the Therrien Committee); (c) the 1980 Federal Cultural Policy Review Committee (the Applebaum-Hebert Committee); and (d) the Broadcasting Strategy announced by the Minister of Communications in March 1983.(1)

While the mandate of these policy reviews covered a broad spectrum of issues, they all dealt from different perspectives

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(1) References to reports prepared for (a) to (d) above are indicated in the following pages.

and to different degrees with issues related to satellite broadcasting in Canada. The Clyne committee in its report to the Minister of Communications devoted a chapter to satellite communications. It drew attention to the importance of the developments in satellite technology and one of its recommendations was as follows:

> RECOMMENDATION 20:
> The Committee's view is that the Canadian satellites could be more fully used in the distribution of Canadian TV to all parts of the country. The federal government should, as a matter of urgency, initiate detailed studies, in consultation with the governments of the provinces, to determine the best means of establishing and financing a satellite transmission package that would provide alternatives to existing CBC programming ... as widely as possible throughout the country.(1)

The Therrien Committee also devoted a chapter on communications satellites, with a special section on DBS, in its report to the CRTC. In recognition of DBS developments that were underway the Committee argued that while

> ...the Anik satellites will help to solve the immediate problem of extension of services to all but the smallest communities, there will remain thousands of people scattered throughout Canada who could not afford the relatively large dishes required to receive the 4 GHz signals. To meet their needs, satellites using higher power will have to be used, so that the

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(1) Telecommunications and Canada. Report of the Consultative Committee on the Implications of Telecommunications for Canadian Sovereignty, Department of Communications, Ottawa, March 1979.

> signals can be received on smaller and cheaper dishes.(1)

The Therrien Committee furthermore recommended that adequate preparation should take place for the 1983 ITU Regional Administrative Radio Conference, which was concerned with planning satellite broadcasting services in the Western Hemisphere (Region 2).(2) Canada had to be prepared to negotiate orbital positions and frequency allocations for DBS. In this regard the Therrien Committee pointed to the necessity for early consultation with broadcasters and other potential DBS users.(3)

The Applebaum-Hebert Committee in its report to the Minister of Communications, devoted a chapter to broadcasting and the implications of new technologies for broadcasting. The Committee observed that

> ...if Canada is to retain a programming presence in its own broadcasting and telecommunications system, it must use all its technological and creative resources to provide Canadian programs and services that Canadians want to see and hear.... (4)

Concerning DBS, the Applebaum-Hebert Committee said that

> ...when Canada launches Anik C ... this country will move to the forefront of new satellite tech-

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(1) The 1980s: A Decade of Diversity. Report of the Committee on Extension of Service to Northern and Remote Communities, Canadian Radio-Television and Telecommunications Commission, Ottawa, July 1980, page 9.
(2) Ibid., p. 10.
(3) Ibid.
(4) Report of the Federal Cultural Policy Review Committee. Department of Communications, Ottawa, January 1982, p. 285.

> nology, making it possible to offer, among other new services, the economical transmission of broadcasts directly to individual homes.(1)

Consequently

> ...government policies must be flexible enough to allow for considerable individual initiative ... it is important not to retard such new developments as satellite systems, nor single out any one system as being the "preferred" system of program and service delivery.(2)

To fill what was by now an obvious gap in Canadian broadcasting policy, as a result of new technologies and a changing environment, the federal government made public in March 1, 1983 its directions towards a new national broadcasting policy.(3) As part of this policy, an intention to abolish satellite dish licensing requirements for individuals and certain commercial establishments was announced. The rationale for this was to encourage the extension of broadcasting services to underserved communities in rural and remote areas, using satellite technology. Amendments to the Broadcasting Act to allow for this aspect of the new broadcasting policy were introduced as part of Bill C-20, which went through first reading in Parliament in February 1984.

Against the above backdrop of policy reviews in recent years,

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(1) Ibid., p. 305.
(2) Ibid., p. 306.
(3) Towards a New National Broadcasting Policy. Department of Communications, Ottawa, March 1983.

DOC officials were involved in various activities aimed at studying the implications of DBS implementation in Canada. In April 1981, DOC undertook a comprehensive studies program "to conduct planning studies relating to the feasibility of, and mechanisms for, introducing DBS systems in Canada, with the total program cost of $1,544,000." (1) This program included studies of DBS system requirements, as well as socio-economic, institutional, policy, regulatory and technical issues. This multi-disciplinary program was concluded in March 1983.(2)

Drawing on the various studies conducted under the program, DOC prepared an information report consolidating the results and presenting alternative institutional models for the introduction of DBS in Canada. This report was published in June 1983.(3) The government's intention in publishing the report was "to stimulate public comment that will assist [the government] in formulating a policy for direct broadcasting by satellite in Canada."(4)

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(1) Treasury Board Submission Number 779458, Department of Communications, October 30, 1983.
(2) The DBS Studies Program will be described in more detail in subsequent sections of this report.
(3) Direct-to-Home Satellite Broadcasting for Canada. Department of Communications, Ottawa, June 1983.
(4) Ibid., p. iii.

Subsequent to the publishing of the consolidated DBS report, a notice was published in the Canada Gazette of October 15, 1983, to call upon interested parties to express their views regarding the implementation of DBS in Canada. The notice specifically asked for public comment on options for using existing satellites for delivering broadcasting services to the underserved portion of the Canadian population. Some two dozen responses to this request were received by DOC from broadcasters, the cable industry, telecommunications common carriers, and several provincial governments.

An internal DOC working group was formed to study follow-up strategy. This group, called the Working Group on Direct-to-Home Satellite Broadcasting for Canada, was led by the Broadcasting and Content Services Policy branch of DOC and included members from the following branches of DOC: Technology and Policy Assessment, National Telecommunications, Federal/Provincial Relations, Space Technology and Applications, Strategy and Plans, International Relations, and Legal Services.(1)

In June 1984, the working group published a report containing recommendations to the Minister of Communications. In preparing this report, the working group drew on much of the information provided in the written submissions received by DOC in

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(1) A list of individual participants in the working group is appended to the group's final report: Report of the Working Group on Direct-to-Home Satellite Broadcasting for Canada. Department of Communications, Ottawa, June 1984.

response to the Gazette notice. Additional details subsequently provided to DOC officials, by some of the organizations which had prepared submissions, were also taken into account. The working group report analyzed "the potential for development of direct-to-home satellite broadcasting services in the context of the government's broadcasting strategy, with particular regard to the equalization of services thrust in that strategy."(1) The Minister acted upon the recommendations of the working group and issued a news release on June 29, 1984.(2) The Minister's news release contained the following policy positions:

1. The Minister asked the CBC to examine the possibility of delivering its services directly to homes by satellite.

2. He also indicated that he was considering seeking the Cabinet's approval for Telesat Canada to form a subsidiary to participate in the financing and operation of a direct-to-home satellite broadcasting service.

3. He also indicated that he had written to the Chairman of the CRTC to inform him of the results of the working groups study and to request that he take appropriate regulatory action.

4. The Minister also stated he had asked DOC officials to co-ordinate a planning process to work with Telesat, the CRTC and broadcasters, to advise on the design of the next series of Canadian satellites.

With the working group's completion of its report and the Minister's news release, the job of the working group has for

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(1) Ibid.
(2) "Fox favors early development of a commercial Canadian direct-to-home satellite broadcasting service," Minister's News Release, Department of Communications, June 29, 1984.

now been completed. DOC policy with regard to DBS, at least for the short term, has evolved and been articulated via a consultative process involving the private and public sectors, and drawing on the extensive knowledge and experience which the Department has acquired over the years since the first DBS experiments with Hermes in 1976.

1.3 Policy Highlights: Current DOC Position

The highlights of DOC's current policy position are as follows(1):

- The role of direct-to-home broadcasting services should be defined as complementary to existing broadcasting delivery systems, and in particular, as an effective vehicle for delivering broadcast programming to households which are currently underserved.

- The focus of direct-to-home satellite broadcasting should be to deliver existing broadcast programming to [the underserved] market, as opposed to generating new programming.

- Since the underserved market is relatively small, geographically remote and dispersed, difficult to access, and costly to service, a single service provider aimed at this market seems the most likely option to succeed. To this end, DOC supports Telesat's proposal of forming a consortium company, to package existing programming for delivery of direct-to-home broadcasting.

- With regard to a direct-to-home broadcasting service prior to 1990, ... the Anik C series of 14/12 GHz satellites would be the better alternative for delivery .... Further extension of services using 6/4 GHz satellites is possible through further development of small community broadcasting undertakings.

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(1) These highlights are extracted from Report of the Working Group, op. cit., and Minister's News Release, op. cit.

- [The CRTC should clarify its] regulatory stance on who may provide direct-to-home satellite broadcasting services, and under what regulatory and licensing requirements.(1)

- Regulatory and policy issues relative to the sale of U.S.-based subscription DBS services to Canadian homes ... will require bilateral discussions with the U.S. DBS developments in the U.S. are not, however, a new threat to the Canadian broadcasting system and to cultural sovereignty, but rather a volume addition to the existing threat posed by the extensive availability of American programming.

- The government should seek to foster the introduction of a direct-to-home broadcasting service by co-ordinating planning activities among interested parties, as opposed to playing a role financially in the establishment or maintenance of such a service.

- The government should ... undertake a liaison role between Telesat and broadcasters in considering the question of an effective direct-to-home broadcasting capability in the design for the next generation of communications satellites, to be launched between 1990 and 1992.

Further development with regard to DBS in Canada awaits the response of those parties directly involved,(2) such as the CBC and Telesat for commercial direct-to-home broadcasting, and CRTC for regulatory matters. Moreover, at this point, as of September 19, 1984, it is not clear how the results of the Canadian federal election, and the announced changes in Cabinet, will impact on DOC's policy directions with regard to direct-to-home broadcasting.

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(1) Since an earlier draft of this report was written the CRTC announced that broadcasters already delivering programmming by satellite will not need regulatory approval for direct-to-home satellite delivery. Moreover, CRTC will not take any regulatory decisions on high power DBS at this time, because of possible technological or market developments which may rapidly render such decisions obsolete.

(2) The response, that is, to the Minister's announcement of June 29, 1984, op. cit.

1.4 Defining The DBS "Program"

One of the pre-conditions for conducting an evaluation of a program is to be certain that everyone is referring to the same set of activities when applying a label to that program. The Office of Comptroller General defines a program as:

> "a group of activities -- usually a subset of one Estimates program -- which:
>
> - has a common objective (or set of related objectives) established at the level of concern of deputy heads;
> - contributes to the department's long-term objectives; and
> - is of appropriate size and importance to be a focus of and support for program decision-making at the departmental level." (1)

It is not possible to attribute results to a program unless, to begin with, a reasonably coherent definition of the program is made. In this section of the report an interpretation of the DBS program is presented, in keeping with OCG's definition of a program.

When government programs are directly involved in technological pioneering,(2) it is not surprising that these programs

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(1) Principles for the Evaluation of Programs, Office of the Comptroller General of Canada, Ottawa, September 1981.
(2) For example, the experimental work carried out by CRC over the past decade or so has been in the forefront of communications technology.

could gradually evolve into new directions with altered objectives, expand suddenly or end abruptly. The nature of the advanced technologies being tested could lead these technologies to rapid and widespread use (with or without government intervention), to slow diffusion in some segments of society, to very specialized and limited applications, or even to quick obsolescence. Thus, a mandate for an innovative program (dealing with new technologies) to "wing it" may be rationalized, at least in the earlier stages of the program's life, because of the experimental nature of the activities involved, and because of the need to take some risk in the hope of future benefits.(1) Such a mandate, however, makes the program evaluator's job more difficult than usual, since the definition and objectives of the innovative program may change significantly several times during its lifetime.(2) A first task of the evaluator becomes to identify program turning points and to identify separate program

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(1) For example, when serious planning for the Canadian Hermes experiments began, in late 1972, the program was recognized as a high-risk endeavour, with many unsolved technical problems and no back-up spacecraft in the event of failure during launch or orbit (see Spacebound, op. cit., p. 139). However, the hope of future benefits for solving Canadian communications needs, and advancing broadcasting objectives, outweighed the risks and justified federal government support.

(2) Most of the current literature on evaluation research emphasizes the need for a clear definition of program objectives, if a program is to be deemed evaluable.

sub-components perhaps with different stated objectives. An exclusive focus on stated objectives, however, is not adequate for an evaluation. A second task of the evaluator then becomes to identify those latent objectives which may provide the links between the sub-components. These latent objectives also become reference points against which to measure the effectiveness of the overall program and its individual sub-components.

The DBS program can be characterized by five distinct sub-components with discrete turning points:

1. Experimental phase of direct broadcasting, using Hermes (1976-1979).

2. Direct broadcasting field projects, using Anik B (1979-1982).

3. Comprehensive and multi-disciplinary socio-economic, institutional, policy, regulatory and technical studies (1981-1983).(1)

4. Policy development (ongoing, particularly since 1983).(2)

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(1) Detailed discussion of sub-components 1 and 2 was provided in Section 1.1 above. Sub-component 3, which is called the DBS Studies Program, will be discussed in more detail in Chapter II.
(2) While policy considerations with respect to DBS were examined by DOC on an ongoing basis since the early stages in the mid-1970s, it is not until March 1983 that DOC articulated the government's national broadcasting policy in the document Towards a New National Broadcasting Policy, op. cit. An official broadcasting policy reference framework for DBS in the 1980s had not been put together up to that point. The policy review work of the Working Group on Direct-to-Home Broadcasting is characteristic of this sub-component.

5. Planning for the new generation of communications satellites to be launched during the 1990s (ongoing, particularly as of 1984).(1)

Each of these sub-components is characterized by specific objectives, but there have also been underlying themes linking the sub-components. The specific objectives of the sub-components will be presented in Chapter II. In this section the underlying themes are introduced.

Since the space age began, Canada has recognized the suitability of space techniques for solving some of our country's needs. We were the third nation to launch an extra-terrestrial body and now space applications are a routine part of our lives. Initially, the space program was the responsibility of the Department of National Defence. The civil applications of space technology, specifically those related to communications, were transferred to the Department of Communications when it was formed in 1969. Since then two of the underlying themes of the Department have been important in the context of DBS.

The first of these themes is the general theme of exploiting

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(1) This planning sub-component refers specifically to that function of DOC which has succeeded the experimental and study phases of DBS development, particularly with reference to the recommendation of the Minister of Communications in his news release of June 29, 1984, op. cit. - i.e., that DOC should co-ordinate a planning process to work with Telesat, the CRTC and broadcasters, to advise on the design of the next series of Canadian satellites.

space technology to advance Canada's broadcasting objectives.(1) The second theme is the ongoing committment of DOC to support the development of a Canadian space industry in Canada.(2)

The first theme is exemplified by the Department's activities related to DBS. The aims behind DBS development at DOC have been guided mainly by the contribution it can make to the advancement of Canada's broadcasting objectives: first, through the extension of services to underserved areas; second, by making available additional channels of programming to Canadians, thus helping to equalize the level of services in both French and English; third, by helping to create new markets available to broadcasters and thereby stimulating new industry initiatives; and fourth, by complementing and enhancing existing terrestrial systems, for example through delivery of programming via satellite to terrestrial cable distribution centres.(3)

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(1) References to this general theme abound in various DOC documents. See for example DOC submissions to Treasury Board TB 723671, November 9, 1973 (Hermes); TB 755571, March 2, 1978 (Anik B); TB 773520, October 1, 1980 (Anik B); and TB 779458, October 2, 1981 (DBS Studies Program). Also see various DOC annual and multi-year operational plans; and more specifically see Towards a New National Broadcasting Policy, op. cit., and Direct-to-Home Satellite Broadcasting, op. cit.

(2) There are many references to this theme in DOC documents. See for example Report to Treasury Board - Canadian Space Program TB 761256, November 22, 1978; and Space Program - Five Year Plan (1983/84-1987/88).

(3) Extension of services to underserved areas, equalization of services in English and French, supporting new industry initiatives, and complementing existing broadcasting systems are themes articulated in the Broadcasting Act (Section 3) and in the strategy paper of March 1983, Towards a New National Broadcasting Policy, op. cit. They are also discussed in Direct-to-Home Satellite Broadcasting for Canada, op. cit., and Report of the Working Group on Direct-to-Home Satellite Broadcasting, op. cit.

The second underlying theme, supporting the development of a Canadian space industry, is also a part of the rationale for DOC's involvement with DBS related activities. Direct broadcasting represents a complementary element for fostering and improving Canada's industrial capability to design and manufacture spacecraft and space subsystems, for domestic use and for export.(1)

In addition to the above two important underlying themes, a third theme is that DBS has been seen as an aid in preserving Canadian national identity and culture - mainly by providing a made-in-Canada direct broadcasting service as an alternative to the U.S. DBS signals received in Canada.(2)

The interpretation of the DBS program presented above covers the various stages of DOC's activities, since 1976, which relate to the development of direct-to-home broadcasting - including experimentation in field projects; socio-economic, institutional, policy, regulatory and technical studies; and planning and policy development. The pervading DOC themes identified above provide the underlying rationale for DOC's activities aimed at developing direct-to-home broadcasting in Canada. The DBS program, as interpreted in this section of the assessment report, will be described according to OCG guidelines in Chapter II.

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(1) See DOC submissions to Treasury Board TB 723671, November 9, 1973 (Hermes), page 2: "... the Communications Technology Satellite [Hermes] continues to be essential to Canadian industry, for the maintenance of their work force, and the development of new products." Also see DOC submission to Treasury Board TB 779458, October 2, 1981 (DBS Studies Program), page 5.

(2) See Direct-to-Home Satellite Broadcasting, op. cit., page 11. Also see DOC submissions to Treasury Board TB 779458, October 2, 1981 (DBS Studies Program), page 4.

1.5 Previous Evaluations

The experiments conducted under the Hermes program, including those for direct broadcasting, were evaluated individually by the experimenters. A useful source for evaluations of Hermes experiments is the Royal Society of Canada Symposium of 1977.(1) The proceedings of the symposium include detailed papers on the major Canadian and U.S. experiments conducted in 1976-1977. Furthermore, results of individual evaluations of experiments were provided to DOC as part of the committment by experimenters. In addition, an evaluative report was published by DOC in July 1978, focusing on the process of implementing Hermes experiments as seen from the points of view of both the experimenters and DOC.(2) This report is based mainly on debriefings by the experimenters. Four issue areas were covered in this report: administration of the program, technical problems, interactive systems, and the conduct for evaluation of experiments.

Other accounts of the Hermes experience can be found in a variety of published articles, DOC publications, and papers presented to national and international symposia.(3) Finally, as part of a comprehensive evaluation of Anik B by

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(1) I. Paghis (ed.), Hermes (the Communications Technology Satellite) - Its performance and applications. 3 vols. Royal Society of Canada, Ottawa 1977.
(2) A Report on the Process of Implementation of Hermes Experiments, by D.H. Jelly, Department of Communications:CRC, Ottawa, July 1978.
(3) For example, "Experience in Satellite Broadcasting Applications with CTS/Hermes", by R.W. Huck and J.W.B. Day, XI International Symposium, Montreux, May 27 - June 1, 1979.

DPA Consulting Ltd., a review of the Hermes experience was included as Appendix A of the evaluation report.(1) None of the evaluative work on Hermes, however, can be characterised as a formal evaluation of the program, at least not in the OCG sense.

As mentioned above, DPA completed an evaluation of the Anik B program. This evaluation was done for the Space Sector of DOC. The focus of this work was mainly on Phase I of Anik B (1979-1980). Phase II (1981-1982) was later evaluated by CPER Management Consulting Inc.(2) The DPA report on the evaluation of Anik B devoted many pages to setting up an evaluation framework and identifying issues. The program objectives and issues were identified from a variety of perspectives of parties involved: DOC Space Sector senior management, sponsors, experimenters, program managers, etc. The actual evaluation portion of this study focused on design, delivery and management aspects of the Anik B program. In addition, performance of space and earth segment hardware was assessed. Some of the information contained in this report is concerned with the DBS portion of Anik B as a field project sub-component aimed at testing

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(1) An Evaluation of the Anik B Communications Program, DPA Consulting Ltd. for the Department of Communications, Ottawa, May 1980.
(2) Evaluation of the Anik-B Communications Program, CPER Management Consulting Inc. for Department of Communications, 3 volumes, Ottawa, July 1983.

direct broadcasting systems. However, the evaluation framework and environment, as identified by DPA in 1980, is understandably different than that laid out in this current assessment of mid-1984.

Phase II of Anik B, was evaluated by CPER Management Consulting Inc. in 1982-1983 for the Space Sector of DOC. The purpose of this study was to "evaluate the manufacturing and earth segment industry development part of the Program; and, assess the extent to which the overall service development goal of the Anik-B communications program had been achieved."(1) This evaluation consisted of three tasks:

1. an evaluation of the individual Phase Two pilot projects and aggregated activities;
2. an evaluation of the industrial benefits resulting from the Program;
3. a review of the effectiveness of three particular processes of the Program (the weaning of subsidized experiments, involvement of the private sector and identification and resolution of policy issues).(2)

Again, as in the DPA study, the CPER report identifies an evaluation framework and environment, for the Anik B program, from a different perspective than that of this current assessment. Neither study was conducted in accordance with OCG's approach for evaluation studies.

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(1) Ibid., Vol. 1, p. 4.
(2) Ibid.

The Program Delivery Pilot Project was evaluated by DOC in 1981.(1) This study "describes the pilot project, documents the technical results obtained, summarizes the reaction of the participants, including members of the general public, and draws conclusions regarding the implementation of future direct broadcasting satellite systems."(2)

The DBS Studies Program has not been evaluated.

1.6 The Assessment Process

The assessment process leading to this report involved a series of interviews with several DOC managers, including some members of the Working Group on Direct-to-Home Satellite Broadcasting, and other DOC technical and professional staff. These interviews focused on gaining an understanding of DOC activities related to DBS, program issues and sources of information. In addition, various documents on DBS were reviewed. These included submissions by DOC to Treasury Board, Canadian and foreign articles and reports prepared by specialists in broadcasting satellite technology, previous evaluation studies on DBS related government activities, and various government publications with respect to broadcasting policy and satellite developments in Canada and other countries (see the Bibliography).

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(1) Anik B Program Delivery Pilot Project: A 12 Month Performance Assessment, by I.Bischof, J.W.B. Day, R.W. Huck, W.T. Kerr, and N.G. Davies, Department of Communications: CRC, Ottawa, December 1981.
(2) Ibid., p. 1.

CHAPTER II. PROGRAM PROFILE

2.1 Background

Mandate

The general mandate of the DBS program is derived through the Department of Communications Act (1970). Under Section 5 of the Act, the Minister of Communications is responsible for:

- promoting the establishment, development and efficiency of communication systems and facilities for Canada; and
- assisting Canadian communication systems and facilities to adjust to changing domestic and international conditions.

Funds for DBS related activities of the Department of Communications were approved by Treasury Board through successive decisions over the years. A comprehensive list of Treasury Board submissions related to DBS, with descriptors, reference numbers and dates, is included in Annex B.

Objectives

Over the years, various wordings of objectives related to DBS development have been presented in successive DOC documents, such as Five-Year Space Plans, Strategic Plans, Operational Plans, Cabinet and Treasury Board submissions, policy papers, etc. In these documents, however, an essential general theme, underlying the Department's activities for DBS development,

has always been the exploitation of space technologies for the achievement of Canada's broadcasting objectives.(1)

Thus, intervention by DOC in the development of DBS systems and services has been guided by the expected contribution direct satellite broadcasting can make to the following objectives:

- extending broadcasting services to underserved areas;
- helping to equalize services in both French and English by making available additional channels of programming to Canadians;
- supporting industry initiatives by helping to create new markets for broadcasters;
- complementing and enhancing existing terrestrial systems, for example through delivery of programming via satellite to terrestrial cable distribution centres.(2)

A second theme underlying DOC's activities for DBS development, is the ongoing committment of the Department to support the

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(1) References to this general theme abound in various DOC documents. See for example DOC submissions to Treasury Board TB 723671, November 9, 1973 (Hermes); TB 755571, March 2, 1978 (Anik B); TB 773520, October 1, 1980 (Anik B); and TB 779458, October 2, 1981 (DBS Studies Program). Also see various DOC annual and multi-year operational plans; and more specifically see Towards a New National Broadcasting Policy, op. cit., and Direct-to-Home Satellite Broadcasting, op. cit.

(2) Extensions of services to underserved areas, equalization of services in English and French, supporting new industry initiatives, and complementing existing broadcasting systems are themes articulated in the Broadcasting Act (Section 3) and in the strategy paper of March 1983, Towards a New National Broadcasting Policy, op. cit. They are also discussed in Direct-to-Home Satellite Broadcasting for Canada, op. cit., and Report of the Working Group on Direct-to-Home Satellite Broadcasting, op. cit.

development of a Canadian space industry.(1) Thus, intervention by DOC to develop DBS systems and services has also been guided by the expected contribution this intervention would make towards the following objective:

- complementing other programs aimed at fostering and improving Canada's industrial capability to design and manufacture spacecraft and space subsystems for domestic use and for export.(2)

In addition to the above two important underlying themes, a third theme is that DBS has been seen as an aid in preserving Canadian national identity and culture - mainly by providing a made-in-Canada direct broadcasting service, as an alternative to the U.S. DBS signals received in Canada.(3)

Program Strategy

To achieve the above stated overall objectives, the strategy that evolved at DOC, since the first DBS experiments in 1976, is as follows:

- conduct experiments to test and evaluate DBS systems using 14/12 GHz frequency bands and high, low, and medium transponder power, using Hermes and Anik B;

- develop and provide DBS equipment (e.g., earth stations), technical advice, and other assistance to DBS project experimenters and sponsors in the public and private domains;

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(1) There are many references to this theme in DOC documents. See for example Report to Treasury Board - Canadian Space Program TB 761256, November 22, 1978; and Space Program - Five Year Plan (1983/84-1987/88).

(2) See DOC submissions to Treasury Board TB 723671, November 9, 1973 (Hermes), page 2: "... the Communications Technology Satellite [Hermes] continues to be essential to Canadian industry, for the maintenance of their work force, and the development of new products." Also see DOC submission to Treasury Board TB 779458, October 2, 1981 (DBS Studies Program), page 5.

(3) See Direct-to-Home Satellite Broadcasting, op. cit., page 11. Also see DOC submissions to Treasury Board TB 779458, October 2, 1981 (DBS Studies Program), page 4.

- conduct field projects to evaluate the performance of DBS systems and services both from the technical and social sides (e.g., quality of service and acceptability by users, respectively);

- participate in international negotiations and technical groups concerned with planning satellite broadcasting services and with the allocation of spectrum and orbit positions (e.g., WARC and RARC);

- conduct demonstrations of Canadian DBS systems and services using Hermes and Anik B satellites, to respond effectively to domestic and export requirements and opportunities;

- undertake comprehensive, multi-disciplinary studies to investigate DBS system requirements and the implications of DBS for socio-economic, institutional, policy and regulatory matters;

- consult with broadcasters, the cable industry, the common carriers, provincial governments, other federal government departments, the space industry in Canada, and special interest groups, to get their views regarding direct-to-home applications in the short and long terms.

Program Sub-Components

The DBS program can be characterized by five distinct sub-components with discrete turning points and sub-objectives:

1. Experimental phase of direct broadcasting, using Hermes (1976-1979).

   Objective:
   - to demonstrate and evaluate the technical performance and acceptability of direct TV broadcasting systems using high and low power transponders and 14/12 frequency bands for community and individual home services.(1)

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(1) While the Hermes program in general had other objectives, these are not included here since the emphasis provided in this assessment study is specifically on the direct-to-home broadcasting component. See Treasury Board submission TB 723671, op. cit.

5. Planning for the new generation of DBS satellites to be launched during the 1990s (ongoing, particularly since 1983).(1)

   Objectives:
   - to include in Canada's next generation of satellites a permanent capability for direct satellite-to-home delivery of broadcasting services.(2)

Sub-components 1 and 2 were discussed in Section 1.1 of this assessment report. Sub-components 4 and 5 were discussed in Sections 1.2 and 1.3, pages 14-17. Sub-component 3, the DBS Studies Program is outlined below.

The DBS Studies Program was a comprehensive examination of "all of the aspects of introducing direct broadcasting satellite service for meeting Canadian requirements."(3) This consisted of:

(A) Socio-Economic Studies as follows:

1. Television Service Availability in Rural and Remote Areas
2. Rural Demand Survey
3. Requirements for Non-TV Service for Delivery via a DBS
4. Impact of a DBS on the Broadcasting Industry
5. Potential Impact of U.S. DBS Services on Canada
6. Economic Feasibility of DBS Programming
7. Economic Analysis of System Alternatives for Television Delivery
8. Engineering Economic Analysis of Optimized System Model
9. DBS Penetration into Urban Areas
10. Industrial Impact of a DBS Program

(B) Technical Studies as follows:

1. System Engineering Modelling
2. Use of Anik C for Interim DBS Service
3. Supporting Technical Studies
4. Phase A System Study

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(1) See footnote 1 on page 21.
(2) Minister's News Release, op. cit., page 2.
(3) Treasury Board submission TB 779458, op. cit., page 6.

(C) Policy Studies as follows:

1. Regulatory Implications of a DBS System
2. Options for Institutional Arrangements
3. Legal Questions (1)

Finally, the DBS Studies Program involved the

- preparation of a report for public comment using the results of all studies carried out above, describing a possible DBS system for Canada and the factors and issues involved in its implementation.(2)

The DBS Studies Program was carried out during 1981-1983 by the Space Program Planning Directorate (which has since been re-organized) and the Communications Research Centre, using extensive contract assistance. Technical support was provided by CRC personnel. This program also involved extensive consultation with all organizations and agencies affected by the introduction of DBS services. Briefings and consultations were conducted with such organizations as the CRTC, provincial communication and educational authorities, the CBC, private broadcasters, Telesat and other carriers, cable and broadcasting industry associations, and potential DBS equipment manufacturers.

Estimates Program

DOC reports to Parliament through the Minister of Communications. Funds are made available to DOC to support its programs through the Estimates. The DBS program derives its legislative mandate through the Communications Program, which appears in the Main Estimates under Section 3, Communications.

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(1) See Appendix 1, Direct-to-Home Satellite Broadcasting for Canada, op. cit., for a description of each study listed above.
(2) This report is Direct-to-Home Satellite Broadcasting for Canada, op. cit.

Resources

The resources which were available to the DBS Studies Program are shown in Table 1.

TABLE 1 RESOURCES: DBS STUDIES PROGRAM

YEAR	CAPITAL RESOURCES* ($ millions)	OPERATING EXPENDITURES* ($ millions)
1981-1982	.750	.685
1982-1983	.794	.739
TOTAL	1.544	1.424

Source: Treasury Board submission TB 779458, October 2, 1981 (approved by Treasury Board on October 15, 1981).

* Nota bene: For Tables 1 to 4, the reader should see the referenced Treasury Board submission(s) for items included in the cost estimates, since these items differ from one submission to the other.

The total resources which were available to the Hermes and Anik B programs are shown in Tables 2, 3, and 4. Both Hermes and Anik B programs included a variety of applications, including telemedecine, tele-education, radio broadcasting, community communications, and government and business applications. Because these various applications involved shared activities and shared expenditures on satellite and terrestrial hardware, for Hermes and Anik B respectively, it was not possible to provide separate and reliable estimates of the resources expended for only the direct television broadcasting components of these programs.

TABLE 2 RESOURCES: HERMES PROGRAM (PRE-LAUNCH)

YEAR	CAPITAL RESOURCES*
	($ millions)
1970-1971	1.3
1971-1972	5.1
1972-1973	13.2
1973-1974	17.5
1974-1975	16.5
1975-1976	9.6
TOTAL	63.2

Source: Treasury Board submission TB 723671, November 9, 1973 (approved by Treasury Board on November 29, 1973).

* Nota bene: For Tables 1 to 4, the reader should see the referenced Treasury Board submission(s) for items included in the cost estimates, since these items differ from one submission to the other.

TABLE 3 RESOURCES: HERMES PROGRAM (POST-LAUNCH)

YEAR	CAPITAL RESOURCES*	SATELLITE GROUND CONTROL*
	($ millions)	($ millions)
1976-1977	.750	.329
1977-1978	.984	.213
1978-1979	.900 (1)	.113 (1)
1979-1980	.844 (2)	.088 (2)
TOTAL	3.478	.743

(1) Treasury Board submission 752989, October 25, 1977 (extension for third year approved by Treasury Board on November 10, 1977).
(2) Treasury Board submission TB 760865, November 2, 1978 (fourth year operations were approved in principle by Treasury Board on November 30, 1978, but DOC was instructed to find internally any funding required for a full or partial fourth year program. The $844,000 and $88,000 indicated here are the original estimates for 1979-1980 as submitted to Treaury Board).

TABLE 4 RESOURCES: ANIK B PROGRAM

YEAR	CAPITAL RESOURCES*		
	Support Services to Experimenters	Provision of Earth Stations and DOC Experiments and Testing	Purchase of Satellite Communications Services From Telesat Canada
	($ millions)		($ millions)
1977-1978		.195 (1)	9.00 (2)
1978-1979	.430 (2)	1.780 (1)	21.10 (2)
1979-1980	.590 (3)	.450 (1)	3.10 (2)
1980-1981	.365 (3)	.180 (1)	.80 (2)
1981-1982	1.262 (4)		2.70 (4)
1982-1983	.586 (4)		1.25 (4)
TOTAL	5.408		37.95

(1) Treasury Board submission TB 740026, November 12, 1975 (approved by Treasury Board on December 1, 1975).
(2) Treasury Board submission TB 755571, March 2, 1978 (approved by Treasury Board on April 6, 1978).
(3) Treasury Board submission TB 760863, November 2, 1978 (approved by Treasury Board on November 23, 1978).
(4) Treasury Board submission TB 773520, October 1, 1980 (approved by Treasury Board on October 16, 1980).

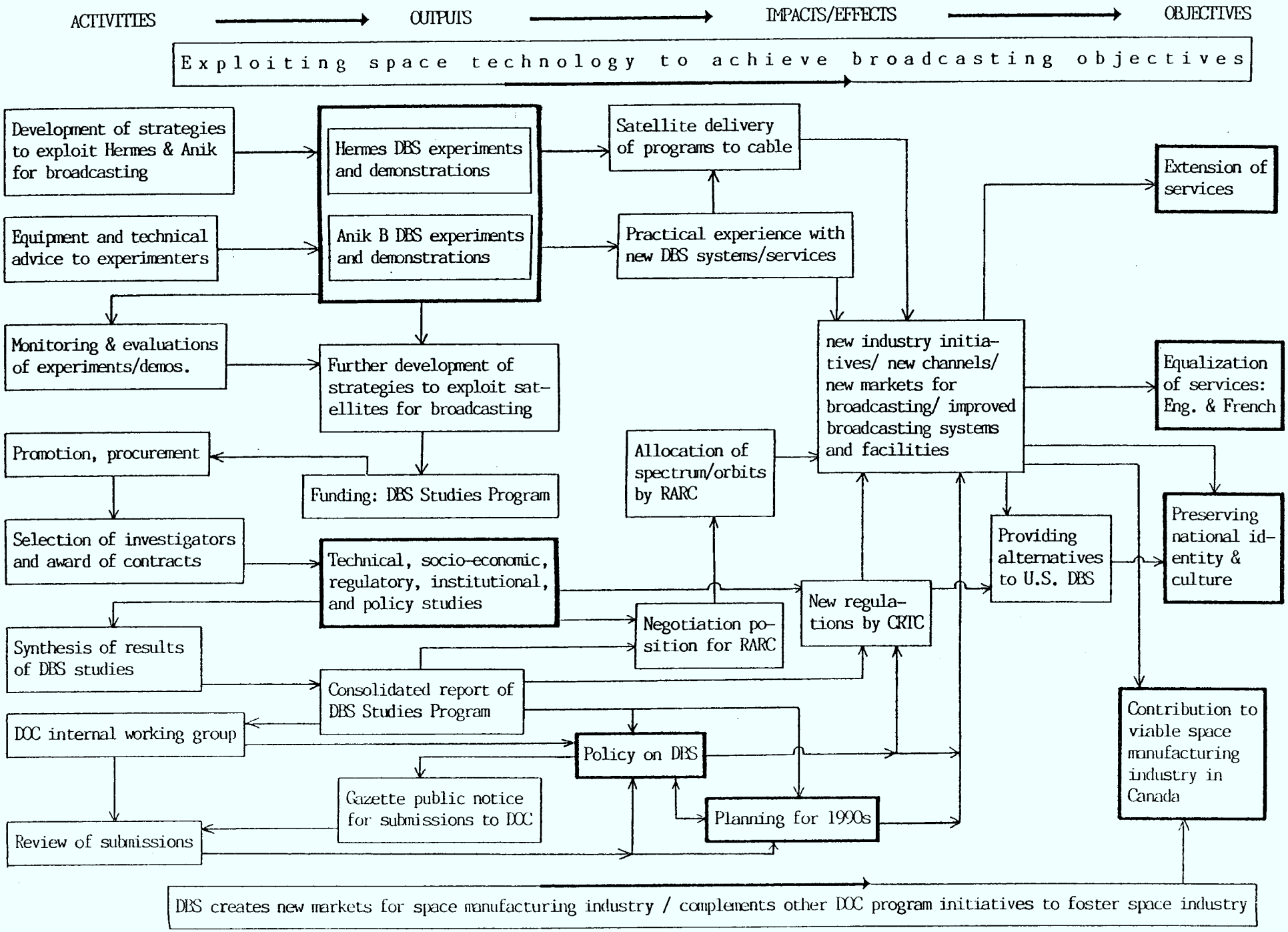
2.2 Program Structure

The DBS program component structure is presented in Exhibit A. This model captures the intended linkages between the program's major activities, outputs, impacts and effects and objectives. The activities are the major tasks performed or administered by DOC staff. The outputs are the products or outcomes directly controlled by DOC staff and distributed outside DOC. The impacts and effects, as well as the ultimate objectives of the program are the consequences resulting from the program's outputs. The linkages shown in this model serve as the basis for the discussion of evaluation issues in Chapter III.

The sources consulted to prepare the model include the relevant Treasury Board submissions, a number of reports published by DOC, DOC annual and long term plans (Operational, Strategic, Space), fact sheets, news releases and other documents by DOC (see the Bibliography), and discussions with members of the Working Group on Direct-to-Home Satellite Broadcasting, and other DOC officials.

The consistency of the program activities with DOC's mandate and the plausibility of the linkages between program activities and their intended results are discussed in Sections 2.3 and 2.4, respectively.

EXHIBIT A PROGRAM MODEL: DIRECT-TO-HOME SATELLITE BROADCASTING



NOTE: Squares with dark borders on the right side of the diagram indicate objectives, and on the left and centre they indicate program sub-components.

2.3 Consistency of Program Activities With DOC's Mandate

Ascertaining the consistency of a program's activities with its mandate is an important first step towards an evaluation. If the program activities are clearly unrelated to its mandate, this then becomes the overriding evaluation issue and the option of not conducting the study is open to the Deputy Minister of DOC, until the program is redirected.

The mandate of DOC with respect to communications systems is indicated in Section 2.1 above. The strategy which evolved in DOC to pursue the DBS program objectives was also presented in Section 2.1 and is depicted in Exhibit A.

The program's activities are generally consistent with DOC's mandate. Examination of Exhibit A indicates that this is a reasonable conclusion.

2.4 Linkages of Program Activities to Intended Results

Another important first step towards the evaluation of a program is to assess the plausibility of the relationships between activities of the program and its intended results. Evaluation studies are usually costly and if they are to be effective in achieving their purposes, the causal reasoning underlying the program structure has to be plausible. If

plausibility of the relationships is not established, an evaluation could prove to be a waste of resources on a misdirected program.

Exhibit A depicts the causal reasoning underlying the program. The assumption is that program activities will lead to a chain of appropriate outputs, impacts and effects resulting in the accomplishment of the DBS program's ultimate objectives.(1) Exhibit A shows the relationships between the program's activities and its intended results. These relationships as depicted are plausible enough to allow a meaningful evaluation to be done.

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(1) For example, the equipment and technical advice which DOC provided to direct broadcasting experimenters, who used Hermes and Anik B, can reasonably be expected, in concert with other DOC activities, to lead to a chain of impacts which contribute to the achievement of DOC's objective of extending broadcast services to underserved areas. The reader should examine the model to trace other logical relationships depicted by arrows.

CHAPTER III. EVALUATION ISSUES

3.1 Focus on the Issues

The DBS program, as described in the previous two chapters, represents a variety of DOC activities which relate to two broader DOC contexts. First, the program is part of the broader context of space applications programs of DOC. Second, the program is part of the broader context of broadcasting responsibilities of DOC.(1)

Since direct-to-home satellite broadcasting occurs via a satellite in space orbit, the evolution of DBS has naturally been closely related to the space applications programs of DOC. Some of the evaluation issues identified in this chapter, therefore, more appropriately belong in an evaluation of the space applications programs. This is certainly true of applications using Hermes and Anik B. DBS represented only one set of a series of demonstrations and experiments using these satellites. As discussed in Chapter I, Section 1.5, these demonstrations and experiments have already been evaluated. The extent to which sub-component 1 (Hermes) and sub-component 2 (Anik B) have achieved their specific objectives(2) has also been evaluated, albeit in a different evaluation framework from OCG guidelines.(3)

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(1) DOC derives its mandate in the broadcasting area through Sections 5 (1)(b) and (c) of the Department of Communications Act (1970).
(2) See pages 31 and 32.
(3) See Chapter I.

DBS is one means for helping achieve Canada's broadcasting objectives. It constitutes one of many considerations in the formulation of federal government broadcasting policy. The decisions made with regards to DBS are intimately related to factors such as quantity and quality of programming, current broadcasting industry structure, available terrestrial cable networks, and current broadcasting regulations. Many of the issues identified below are therefore more appropriately evaluated as part of a broader evaluation of DOC activities as they relate to broadcasting in general. This is certainly true of issues which relate to sub-component 4 (policy development) and sub-component 5 (planning for the new generation of DBS satellites). The specific objectives of these sub-components(1) should not be evaluated in isolation of wider broadcasting considerations, since this would likely yield a meaningless exercise.

In this chapter, specific evaluation questions about the DBS program are grouped according to the basic program evaluation categories suggested by the Office of Comptroller General. Each question is accompanied by brief commentary. Those issues identified below which specifically relate to sub-component 3 (the DBS Studies Program) are listed separately.

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(1) See pages 32 and 33.

3.2 Program Rationale

1. What is the demand for direct-to-home broadcasting service?

An important feature of the rationale underlying the intervention of DOC to develop DBS in Canada, has been the conviction that there will be an adequate demand for direct-to-home broadcasting to sustain a viable national service. Several studies have been conducted by the private sector and by the DBS Studies Program to examine this question.(1) The real test of the demand for direct-to-home broadcasting, however, is in the market place. The experience with direct-to-home broadcasting over the next few years into the 1990s in Canada will more than likely provide the answer to this question. For the time being, the position of DOC, as articulated by the Working Group on Direct-to-Home Satellite Broadcasting, is that "the government should seek to foster the introduction of a direct-to-home broadcasting service by co-ordinating planning activities among interested parties, as opposed to playing a role financially in the establishment or maintenance of such a service."(2)

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(1) See, for example, An Analysis of the Demand for Improved Residential Television Service in Rural Canada, by Dr. Jacques C. Bourgeouis and Dr. Renaud de Camprieu, Demand Research Consultants Incorporated, Ottawa, Ontario, March 1982; and The DBS Market in Canada, by Colin Deane and John Moore, Woods Gordon Management Consultants, Toronto, Ontario, March 1983. Also see briefs presented to DOC in response to Gazette Notice No. DGBP-83-1.

(2) Report of the Working Group, page v.

2. Is the program strategy valid?

The program strategy was described in Chapter II. An assumption underlying DOC's strategy for development of DBS has been that once DBS was proven technically feasible, once the necessary regulations were in place, and once the appropriate institutional set-up for DBS delivery was formed, the service would evolve in the private sector with no financial intervention by the federal government. The current situation is that DBS has been proven to be technically feasible, CRTC and DOC are examining regulatory requirements,(1) and a particular institutional model has been recommended by the Minister of Communications and the Working Group on Direct-to-Home Satellite Broadcasting for Canada:

> "The government role in promoting development of a direct-to-home broadcasting should be generally in line with the institutional model number two outlined in Chapter 10 of Direct-to-Home Satellite Broadcasting for Canada." (2)

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(1) Minister's News Release, op. cit.
It should be noted that since an earlier draft of this report was written CRTC has announced that broadcasters already delivering programming by satellite will not need regulatory approval for direct-to-home satellite delivery. Moreover, CRTC will not take any regulatory decisions on high power DBS at this time, because of possible technological or market developments which may rapidly render such decisions obsolete.
(2) Report of the Working Group, op. cit., page v.

This model depends on voluntary committment of various organizations involved in broadcasting, such as Telesat and CBC. Specifically, DOC recommends that Telesat set up a consortium to oversee a venture using existing satellite facilities to develop a DBS service.

It is too early to evaluate whether DOC's strategy for developing DBS in Canada will be successful. The responses of the broadcasting industry(1) and consumers are crucial in the evaluation of this issue. It will not be for two or more years before the potentialities of direct-to-home broadcasting service can be fully assessed in the context of market place reaction.

3.3 Impacts

3. Has the program proved the technical feasibility of DBS?

Earlier evaluations of the demonstrations and experiments using Hermes and Anik B have dealt with this issue.(2) The results are that indeed DBS has proven to be technically feasible. The projects aimed at assessing transponder and frequency band performance have shown that DBS is a technically workable broadcasting quality medium.

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(1) Specifically meaning the response of the industry to the approach recommended by DOC.
(2) See Chapter I, Sections 1.1 and 1.5.

4. To what extent has the program resulted in new regulations governing DBS systems and services?

This is an issue which should be examined in the context of a broader evaluation of DOC activities related to the broadcasting area. The situation with respect to regulatory matters is summarized by the Working Group on Direct-to-Home Satellite Broadcasting as follows:

> "Regulatory and policy concerns center around the objective of extension of services, and the financial viability of entities which have been or may be licenced for this purpose. In addition, there is a need for clarification of the CRTC's regulatory stance on who may provide direct-to-home satellite broadcasting services, and under what regulatory and licensing requirements."(1)

3.4 Objectives Achievement

5. To what extent have the program sub-components achieved their stated objectives?

Objectives achievement of sub-components 1 (Hermes) and 2 (Anik B) have been evaluated.(2) It is too early to evaluate the achievements of sub-component 4 (policy development) and sub-component 5 (planning for the 1990s). Sub-component 3 (the DBS Studies Program) will be dealt with in Section 3.6 below.

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(1) Report of the Working Group, op. cit. page ii.
It should be noted that since an earlier draft of this report was written CRTC has announced that broadcasters already delivering programming by satellite will not need regulatory approval for direct-to-home satellite delivery. Moreover, CRTC will not take any regulatory decisions on high power DBS at this time, because of possible technological or market developments which may rapidly render such decisions obsolete.
(2) See Chapter I, Sections 1.1 and 1.5.

6. To what extent have the program's activities, outputs, and impacts/effects contributed to achieving the government's broadcasting objectives?

It is premature to evaluate this issue. As in issue 2, it will not be for 2 or more years before the potentialities of direct-to-home broadcasting service can be assessed in the context of the broadcasting objectives of the federal government. This issue would be more appropriatly evaluated within a broader evaluation of DOC activities related to broadcasting.

7. What has been the role of the DBS program in contributing to a viable Canadian space manufacturing industry?

The industrial benefits of the Anik B program were evaluated in the CPER study.(1) The particular role of direct-to-home broadcasting for the space manufacturing industry, however, has not been evaluated. This is an issue to evaluate in the context of a broader space applications evaluation.

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(1) The CPER study was discussed in Section 1.5

3.5 Alternatives

8. Should the government now promote the development of DBS systems and services by providing subsidy funds and/or front-end capital financing? Are there other financial mechanisms (e.g. tax incentives) which would be more appropriate and effective?

9. Is it sufficient to restrict the role of government to coordinating industry initiatives and planning for the 1990s ?

These issues relate to sub-components 4 and 5 of the program. It is too early to evaluate these issues. The evaluation of these issues is closely linked to the rationale issues 1 and 2, and as discussed above the real test of DBS services in Canada is in the market place. The role of government in stimulating the broadcasting industry has already been articulated by the Working Group on Direct-to-Home Broadcasting for Canada. It is interesting to note that none of the major organizations who wrote submissions to DOC, as a response to Gazette Notice No. DGBP-83-1, have requested that government intervene with subsidy or incentive programs as an alternative to current government intervention strategy.

3.6 The DBS Studies Program

10. To what extent has the DBS Studies Program achieved its objectives?

The objectives of the DBS Studies Program were as follows:

> - to develop a strategic plan for the possible introduction of a DBS system for Canada;
>
> - to develop requirements, technical, economic, institutional, and policy information about a DBS system for Canada so that an informed decision could be taken regarding the implementation of DBS service; and
>
> - to document Canada's need for adequate spectrum for direct broadcasting for the 1983 Regional Administrative Radio Conference (RARC)....(1)

As a result of the 1983 Regional Administrative Radio Conference (RARC), Canada was allocated 6 satellite orbit positions dedicated for DBS service. This outcome can be attributed to the documentation of Canada's needs by the Studies Program. This program resulted in a series of comprehensive studies, including studies of DBS system requirements, as well as socio-economic, institutional, policy, regulatory and legal studies.(2) In addition, a consolidated report Direct-to-Home Satellite Broadcasting for Canada was published by DOC in June 1983. This consolidated report drew on the various studies funded by the

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(1) Treasury Board submission TB 779458, October 2, 1981.
(2) A list of these studies is provided on pages 33 and 34.

program. This report describes the current broadcasting environment in Canada; identifies critical issues affecting the design of DBS systems and their prospects for viability; points out some of the social, economic and regulatory implications of DBS; and presents some models for the introduction of DBS in Canada. The latter aspect of the report addresses the objective of developing a plan for the possible introduction of a DBS system for Canada.

11. Has this program resulted in studies of good quality, in the various areas examined? To what extent did DOC get value for money spent on the DBS Studies Program?

An evaluation of the quality, relevance, and impact of the studies funded by the DBS Studies Program is important to address the issue of value for money. Over $1.5 million have been spent by this program during 1981, 1982 and 1983. The product of this expenditure has been a series of comprehensive reports prepared for DOC, mostly by private consultants working under contract to the Department. The program was conducted in close consultation with all sectors of the communications industry (broadcasters, cable operators, carriers and manufacturers) as well as regulators and provincial governments. The opinions of these various participants should be part of any evaluation of the results of the studies.

CHAPTER IV. OPTIONS

This chapter outlines four studies which evaluate different aspects of direct-to-home broadcasting program activities of DOC. The recommended evaluation alternative is presented in Chapter V.

STUDY 1

Evaluation of the role of direct-to-home satellite broadcasting in helping to achieve DOC's broadcasting objectives, as part of a wider study of the policy sector for which an evaluation framework is scheduled for 1985-1986 fiscal year.

Coverage of Issues:

Issue 1 (demand for direct-to-home broadcasting);
Issue 2 (strategy of the program);
Issue 4 (regulatory matters);
Issue 5 (achievement of sub-component objectives);
Issue 6 (broadcasting objectives achievement);
Issues 8,9 (program alternatives).

Comments:

The role of direct-to-home satellite broadcasting in helping to achieve DOC's broadcasting objectives is an obvious and important focus for an evaluation of the DBS program. DBS, however, is not the only facet of DOC's broadcasting policy and program activities. The overall strategy of DOC in achieving its broadcasting objectives is not contingent only on direct-to-home satellite broadcasting. Considerable government funding since 1983 has been directed at the private

sector through, for example, the Canadian Broadcast Program Development Fund. Other DOC program activities aimed at "expanding" and "strengthening" Canadian broadcasting were outlined in the new broadcasting policy document of 1983.(1) This broader context of program activities provides an appropriate framework for evaluating direct-to-home broadcasting issues identified for this evaluation option.

STUDY 2

Evaluation of the role of direct-to-home broadcasting in contributing to a viable Canadian space manufacturing industry, as part of a wider examination of industry support for which an evaluation assessment and study are scheduled for 1985-1986.

Coverage of issues:

Issue 7 (role of direct broadcasting in helping to make the space industry viable).

Comments:

DOC is involved in many program activities which are partly aimed at fostering a viable space industry in Canada. DOC activities related to the Anik satellites, for example, have been or are partly rationalized by this general theme of supporting the space industry in Canada. One of the conclusions of the Anik C and D evaluation assessments, completed earlier this year, was that an evaluation of these

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(1) Towards a New National Broadcasting Policy, op. cit.

satellite programs should be part of a broader evaluation of the space program.(1) The evaluation of issue 7 on direct-to-home satellite broadcasting should also be part of such a broader context, since DBS is only one of the many space applications which contribute to space industry viability.

STUDY 3

Evaluation of the DBS Studies Program (1981-1983).

Coverage:

Issue 10	(achievement of DBS Studies Program objectives)
Issue 11	(quality of work produced and value for money)

Comments:

This study focusses on the DBS Studies Program - specifically on evaluating objectives achievement, quality of work produced and value obtained for money spent. Since the early 1970s, several DOC programs have evolved from research and development work conducted at the Communications Research Centre. Telidon and DBS are two notable examples of these programs aimed at encouraging the proliferation of the technologies developed in CRC laboratories. The DBS model of conducting a series of comprehensive studies to examine issues relating to the feasibility of, and mechanisms for, introducing DBS in Canada, is one approach to the study of technology transfer from government to the private sector.

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(1) See evaluation assessments of Anik C and D, Program Evaluation Division, Department of Communications, 1984.

This study represents a case study in a wider examination of technology and policy assessment, for which a framework study is scheduled for 1985-1986.

STUDY 4

Comprehensive evaluation of direct-to-home broadcasting activities of DOC (1976-1984).

Coverage:

All issues.

Comments

This study focusses on the issues discussed in Chapter III, to be evaluated in a separate comprehensive study - i.e., not as part of broader broadcasting, policy, or space program evaluations.

OPTIONS

The options for carrying out an evaluation study are as follows:

- Carry out Studies 1, 2 and 3 respectively as parts of broader evaluations whose feasibility and design will be studied by the Program Evaluation Division in fiscal year 1985-1986.

- Carry out Study 4, which covers all issues included in Studies 1, 2 and 3 but consists of a separate evaluation.

- Do not carry out any evaluation study.

ANNEX A

LIST OF PERSONS CONSULTED

G. Andrews	Director, Extension of Services Policy Division, Broadcasting and Social Policy Branch, DOC.
I. Bischof	Director, Policy Assessment and Planning, Technology and Policy Assessment Branch, DOC.
D. Black	Director, Program Evaluation Division, DOC.
J.G. Chambers	Director General, Space Technology and Applications Branch, DOC.
N. George Davies	Director, Space Applications, Space Technology and Applications Branch, DOC.
T.G. Hughes	Chief, Network Plans and Policy (West), National Telecommunications Branch, DOC.
D. McLean	Director General, Technology and Policy Assessment Branch, DOC.
C. McQueen	Senior Program Evaluation Manager, Program Evaluation Division, DOC.
E.D. Rainboth	Director, Social Policy, Cultural Policy and Programs Branch, DOC.
O.S. Roscoe	Director, Technology Assessment and Applications Planning, Technology and Policy Assessment Branch, DOC.
S. Serafini	Director General, Broadcasting and Content Services Policy Branch, DOC.

ANNEX B

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