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EVALUATION FRAMEWORK OF

THE SATELLITE SERVICE APPLICATIONS PROGRAM

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This evaluation framework was prepared 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.

EVALUATION FRAMEWORK OF THE SATELLITE SERVICE APPLICATIONS PROGRAM

Submitted to
Program Evaluation Division
Department of Communications

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SUMMARY

The following report presents the findings of an examination of the evaluation requirements for the Satellite Service Applications 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 questions have been identified:

1. Does Canada require new satellite service applications?

2. Is there a need for a program to stimulate new satellite service applications?

3. Is the Satellite Service Applications program strategy valid?

4. Has the program led to any new DOC activities (projects/programs) which are specifically focused on implementation of new satellite applications? How successful have these activities been?

5. Has the program resulted in appropriate long term plans for DOC's involvement in the development of satellite services in Canada?

6. Has the program resulted in reliable assessments of market prospects and forecasts of needs for new satellite service applications?

7. Was the program responsible for identifying additional R&D support to industry and has this support been provided?

8. Has the product line for satellite systems applications been expanded, and if so to what extent can this expansion be attributed to the program?

9. Did the program result in more exports of Canadian satellite applications products?

10. Has the program resulted in increased use of Canada's domestic satellite systems by contributing to the development of new satellite applications?

11. Has the stimulation of new satellite applications by the program contributed to improved communications services in Canada?

12. Was the level of funding appropriate?

13. Would the addition or deletion of program activities have improved the program?

14. What other programs were aimed at the development of new satellite applications?

An evaluation assessment and study for this broader context are scheduled to be conducted by the Program Evaluation Division during 1985-1986.

Other options considered in this report were (i) "no evaluation of the program" and (ii) "conducting a separate evaluation of the program" which addresses all of the issues listed above. These options were rejected in favour of the recommended alternative.

RÉSUMÉ

Le rapport ci-après énonce les conclusions auxquelles on est parvenu aux termes d'un examen de la nécessité de l'évaluation du programme d'applications des services par satellite. L'examen en question a permis de déterminer que les activités du programme sont de façon général conformes à ces objets, que le programme est suffisamment bien défini, et que les relations entre ces activités et les résultats qui en sont escomptés sont suffisamment plausibles pour permettre de mener une évaluation significative.

La formule d'évaluation recommandée, est censée fournir une réponse aux questions posées à propos de la réussite ou de l'échec du programme. Pour les fins d'évaluation, les questions ci-après ont été établies :

1. Le Canada a-t-il besoin de nouvelles applications des services par satellite?

2. Est-il nécessaire d'établir un programme afin de stimuler de nouvelles applications des services par satellite?

3. La stratégie du programmes d'applications des services satellite est-elle valable?

4. Le programme a-t-il donné lieu à de nouvelles activités du MDC (projets/programmes) spécifiquement axées sur la mise en oeuvre de nouvelles applications des services par satellite? Dans quelle mesure les objectifs de ces activités ont-ils été atteints?

5. Le programme a-t-il donné lieu à l'élaboration de plan à long terme approprié pour ce qui est de la participation du MDC au développement des services par satellite au Canada?

6. Le programme a-t-il donné lieu à des évaluations fiables des perspectives du marché et des prévisions des besoins en ce qui a trait aux nouvelles applications des services par satellite?

7. Le programme avait-il pour objet de déterminer l'aide supplémentaire à la R&D à fournir à l'industrie et cette aide a-t-elle été fournie?

8. La famille des produits relatifs aux applications des systèmes à satellites a-t-elle été élargie et dans l'affirmative dans quelle mesure cet élargissement peut-il être attribué au programme?

9. Le programme a-t-il donné lieu à une augmentation des exportations de produits canadiens relatifs aux applications des services par satellite?

10. Le programme a-t-il donné lieu à une utilisation accrue des systèmes à satellites canadiens en contribuant à la mise en oeuvre de nouvelles applications des services par satellite?

11. En stimulant de nouvelles applications des services par satellite, le programme a-t-il contribué à améliorer les services aux télécommunications au Canada?

12. Le niveau de financement a-t-il été suffisant?

13. L'addition ou la suppression de certaines activités du programme aurait-elle amélioré le programme lui-même?

14. Quels sont les autres programmes qui étaient axés sur le développement de nouvelles applications des services par satellite?

Une étude préparatoire à l'évaluation est une évaluation proprement dite sera menée conformément à ce cadre élargi par la Division de l'évaluation des programmes pendant l'année financière 1985-1986.

Les autres possibilités envisagées dans ce rapport étaient les suivantes : (i) "ne pas évaluer le programme" et (ii) "effectuer une évaluation distincte du programme", axées sur toutes les questions énumérées ci-dessus. Les solutions ont été rejetées et l'on a retenu que la formule qui a été recommandée.

I. PROFILE OF THE SATELLITE SERVICE APPLICATIONS PROGRAM

A. BACKGROUND

Objectives

The general objective of the program is to stimulate the development of new service applications of satellite communications technologies.(1) The development of new applications is expected to contribute to the implicit objectives of the program of increasing the use of Canada's domestic satellite systems and improving communications services.

Description

During the 1970s and early 1980s, DOC was extensively involved in major satellite programs such as Hermes and Anik-B. These programs involved a substantial increase in industrial support for satellite communications, and played an important role in the implementation of new satellite systems in Canada. They were also the main factors in keeping Canadian industry at the forefront of satellite communications technology and in establishing Canada internationally as a leader in satellite communications.

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(1) Space Program Plan: 1984/85-1986/87, Minister of State for Science and Technology, February 15, 1984 (with appended Discussion Paper MOSST-01-84DP, Space Program Strategy).

DOC over the years has established a close working relationship with the space industry in defining and carrying out space programs that have contributed to Canada's success in this field. To follow-up on past successes, existing and new satellite systems can be used to develop the basis for new satellite service applications. New applications of satellite communication technology are possible, for example, using Anik-C and Anik-D series satellites, and will be possible in the future using, for example, LSAT-1 (ESA) and ACTS (NASA).

The intent of the Satellite Service Applications Program is to follow-up on the major accomplishments of the past decade, and to help maintain Canada's position as a leader in the development of satellite communications systems. This involves on-going activities in the exploration of new applications which exploit satellite communications technology. Specifically, the Satellite Service Applications Program involves systematic identification, analysis, and evaluation of trends relating to requirements for new satellite service applications.

Mandate

The general mandate of the Satellite Service Applications Program is derived through the Department of Communications

Act (1970). Under Section 4 of the Act, the Minister of Communications is responsible for:

> "the development and utilization generally of communication undertakings, facilities, systems and services for Canada."

Under Section 5 of the Act the Minister, in exercising his powers and carrying out his duties and functions, "coordinate[s], promote[s] and recommend[s] national policies and programs with respect to communications services for Canada ...."

Resources

The proposal for the Satellite Service Applications Program was originally submitted to Cabinet as part of the 1984/1985 -- 1986/1987 Space Plan. The proposal requested resources for the program as follows:

	1984/85	1985/86	1986/87	1987/88	1988/89
Funds	0.7	1.6	1.7	1.8	1.9
Person years	1	2	2	2	2

Relations to 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 Satellite Service Applications Program derives its legislative mandate through the Communications Program, which appears in the Main Estimates under Section 3, Communications.

B. ACTIVITIES, OUTPUTS, AND EXPECTED IMPACTS

In order to determine whether a program can or should be evaluated it is important to first know what the program does and what its expected results are. The following identifies activities, outputs, and expected impacts of the Satellite Service Applications Program.

Activities

- identification, analysis and evaluation of long term trends regarding satellite applications
- forecasting of requirements for new satellite applications
- development of approaches to new satellite communications applications via, for example, field trials and demonstrations
- identification of areas where additional research and technology development are required
- feasibility studies for implementing new applications.

Outputs

- forecasts of requirements for new satellite applications and assessments of market prospects of these new applications
- reports recommending approaches and strategies for developing new satellite applications
- field trial and demonstration study results and recommendations

- recommendations on policy, regulatory, and standards factors involved in new applications
- reports identifying and recommending priorities for R&D
- identification of needs, priorities, and strategies for new industry programs
- long term plans.

Expected Impacts

- better targetting of DOC's industry support in areas of maximum long term strategic advantage
- stimulation of additional research and technology development as may be required
- expanded Canadian product line for satellite systems applications
- new opportunities in the export market.

It is anticipated that the activities and outputs of the Satellite Service Applications Program would lead to establishment of a sound basis for DOC's support to the space industry, with the intent of increasing the use of Canada's domestic satellite systems and of improving communications services for the Canadian business community and the general public.

C. PROGRAM STRUCTURE

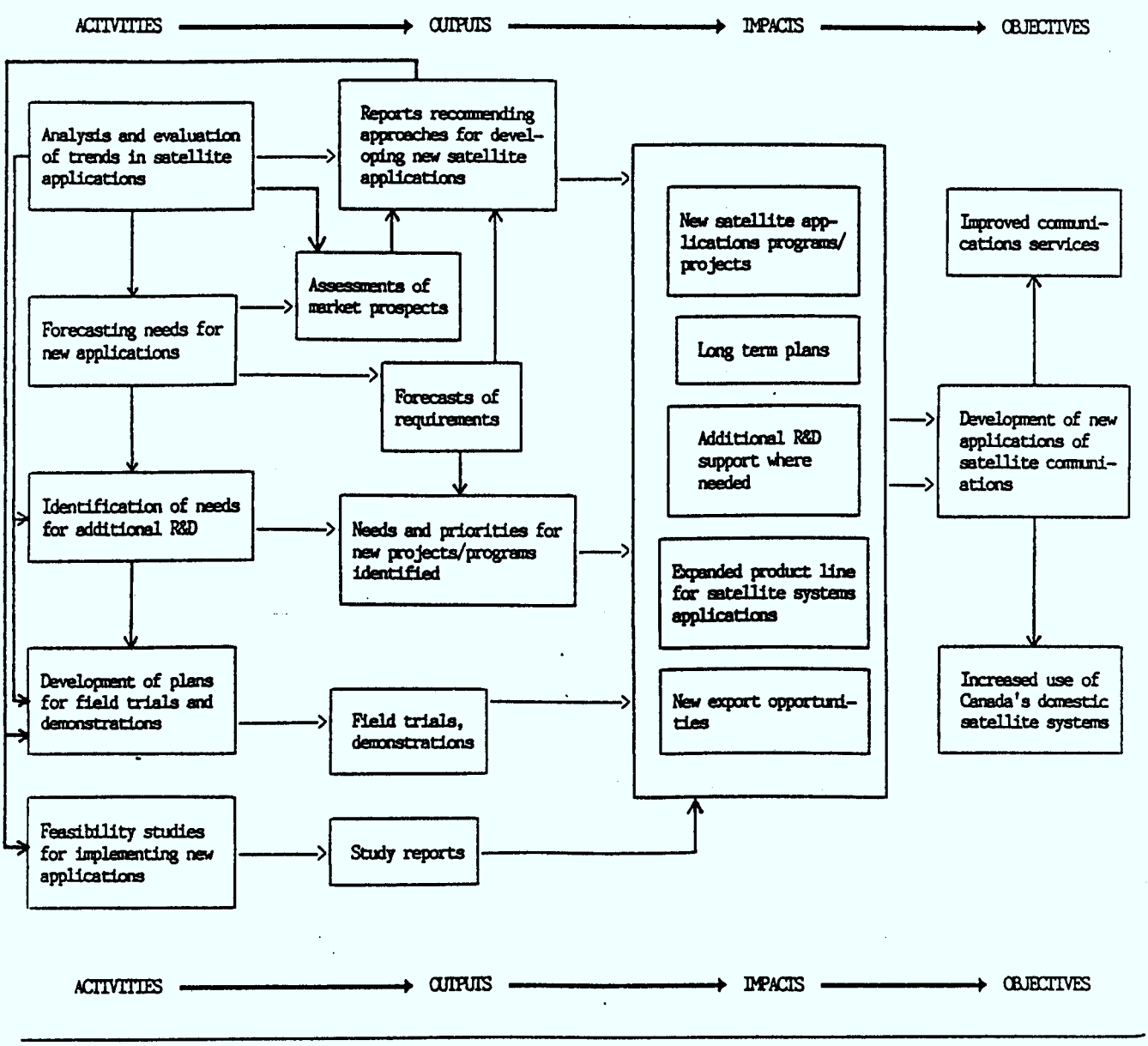
Before conducting an evaluation of a program, in addition to knowing what the program does and what its expected results are, it is necessary to assess the plausibility of the relationships between the program activities and their intended outcomes. If an evaluation of a program is to be effective in achieving its purpose, the causal reasoning underlying the program should 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 1 depicts the causal reasoning underlying the Satellite Service Applications Program. The assumption is that program activities will lead to a chain of appropriate outputs and impacts resulting in the accomplishment of the program's ultimate objectives. For example, forecasting the needs for new applications, if carried out using appropriate methodologies and with sufficient rigour, could lead to better targetting of government support to industry and to the implementation of appropriate new satellite applications projects or programs. This in turn could reasonably be expected to result in the achievement of DOC's

objective of helping the space industry develop new applications which improve communications services and increase the use of Canada's domestic satellite systems.

The relationships depicted in Exhibit 1 are plausible enough to allow a meaningful evaluation to be done.

EXHIBIT 1 PROGRAM STRUCTURE OF THE SATELLITE SERVICE APPLICATIONS PROGRAM



II. EVALUATION ISSUES

An evaluation of the Satellite Service Applications Program should address the following general issue:

> Has the program contributed to the development of new satellite service applications in Canada?

This general issue has been broken down into specific questions about the program which are grouped below according to the four main program evaluation categories suggested by the Office of Comptroller General:

Rationale:	Does the program make sense?
Impacts and Effects:	What has happened as a result of the program?
Objectives Achievement:	Has the program achieved what was expected?
Alternatives:	Are there better ways of achieving the objectives?

A. RATIONALE

The Satellite Service Applications Program is intended to stimulate the development of new satellite applications. For this program to make sense the objectives would have to be relevant and the means of achieving the objectives

reasonable. The questions to be addressed in this context are:

1. Does Canada require new satellite service applications?

2. Is there a need for a program to stimulate new satellite service applications?

3. Is the Satellite Service Applications program strategy valid?

B. IMPACTS

An evaluation of the program should consider to what extent the program has been directly or indirectly responsible for the desired results towards advancing satellite applications in Canada. Evaluation questions to be answered here are as follows:

4. Has the program led to any new DOC activities (projects/programs) which are specifically focused on implementation of new satellite applications? How successful have these activities been?

5. Has the program resulted in appropriate long term plans for DOC's involvement in the development of satellite services in Canada?

6. Has the program resulted in reliable assessments of market prospects and forecasts of needs for new satellite service applications?

7. Was the program responsible for identifying additional R&D support to industry and has this support been provided?

8. Has the product line for satellite systems applications been expanded, and if so to what extent can this expansion be attributed to the program?

9. Did the program result in more exports of Canadian satellite applications products?

C. OBJECTIVES ACHIEVEMENT

Evaluating the extent of achievement of objectives is an important component of any evaluation. In addition, particular attention should be directed at determining whether it was the program itself which resulted in the achievement of the objectives or if this was due to other causes.

10. Has the program resulted in increased use of Canada's domestic satellite systems by contributing to the development of new satellite applications?

11. Has the stimulation of new satellite applications by the program contributed to improved communications services in Canada?

D. ALTERNATIVES

The appropriateness of the level of commitment by DOC to the program and the success (or failure) of the program to achieve its objectives, given its specified activities, should also be evaluated. Questions to be addressed in this context are:

12. Was the level of funding appropriate?

13. Would the addition or deletion of program activities have improved the program?

14. What other programs were aimed at the development of new satellite applications?

III. EVALUATION REQUIREMENTS

A. INDICATORS

Indicators which would be used in the evaluation to address the questions indentified in the previous section are listed in Table 1, alongside of the information sources. Briefly these indicators include:

- government and industry expert opinions on several of the issues raised
- results of program studies on forecasts of requirements and market prospects
- information provided in program records including descriptions of implementation projects/programs resulting from the program
- results of long term plans developed by DOC to address satellite service needs
- descriptions of R&D projects and support resulting from program activities
- type and volume of new satellite system products resulting from program activities
- type and volume of satellite system products exported before and after the program
- type and volume of products which were developed as a result of the program and which have been exported
- statistics on usage of new satellite service applications (eg, frequency, type, coverage) before and after the program
- comparison of communications services in Canada before and after the program

TABLE 1 ISSUES, INDICATORS AND SOURCES OF INFORMATION

ISSUES	INDICATORS	SOURCES
RATIONALE		
1. Does Canada require new satellite service applications?	- opinions of experts in government and industry	- interviews
	- results of program studies on forecasts of requirements and market prospects	- program reports
2. Is there a need for a program to stimulate new satellite service applications?	- opinions of experts in government and industry	- interviews
3. Is the Satellite Service Applications program strategy valid?	- opinions of experts in government	- interviews
	- information provided in program records and results of analysis of other questions	- program records
IMPACTS		
4. Has the program led to any new DOC activities (projects/programs) which are specifically focused on implementation of new satellite applications? How successful have these activities been?	- descriptions of implementation projects/ programs resulting from the program	- program reports
	- review of results of these projects/programs with experts	- program reports, interviews
5. Has the program resulted in appropriate long term plans for DOC's involvement in the development of satellite services in Canada?	- review of long term plans developed by DOC to address satellite service needs	- results of program studies
	- assessment of extent to which these plans are being carried out	- results of program studies
	- opinions of experts	- interviews

TABLE 1 ISSUES, INDICATORS AND SOURCES OF INFORMATION

ISSUES	INDICATORS	SOURCES
6. Has the program resulted in reliable assessments of market prospects and forecasts of needs for new satellite service applications?	- government and industry expert opinions on reliability of assessments and forecasts	- interviews
7. Was the program responsible for identifying additional R&D support to industry and has this support been provided?	- descriptions of R&D projects resulting from program activities	- program reports
	- descriptions of R&D support provided to industry as a result of program activities	- program reports
8. Has the product line for satellite systems applications been expanded, and if so to what extent can this expansion be attributed to the program?	- type and volume of new satellite system products resulting from program activities	- survey of industry
9. Did the program result in more exports of Canadian satellite service products?	- type and volume of satellite system products exported before and after the program	- survey of industry
	- type and volume of products which were developed as a result of the program and which have been exported	- survey of industry
OBJECTIVES ACHIEVEMENT		
10. Has the program resulted in increased use of Canada's domestic satellite systems by contributing to the development of new satellite applications?	- statistics on usage of new satellite service applications (eg, frequency, type, coverage) before and after the program	- survey of industry

TABLE 1 ISSUES, INDICATORS AND SOURCES OF INFORMATION

ISSUES	INDICATORS	SOURCES
11. Has the stimulation of new satellite applications by the program contributed to improved communications services in Canada?	- opinions of industry and government experts and of users	- interviews
	- before and after comparison of communications services in Canada	- survey of industry and users
ALTERNATIVES		
12. Was the level of funding appropriate?	- opinions of government and industry experts	- interviews
	- other information emerging from analysis of other questions	
13. Would the addition or deletion of program activities have improved the program?	- opinions of government and industry experts	- interviews
	- other information emerging from analysis of other questions	
14. What other programs were aimed at the development of new satellite applications?	- information provided in reports on other government programs, and by government program managers	- program reports, interviews

B. METHODOLOGY

An evaluation of the Satellite Service Applications Program would involve several studies to obtain and analyze the information required to address the identified evaluation issues. These studies include:

Estimated Cost

1. A Review of Program Records and Reports ($5,000)

This study would primarily be focused on obtaining information related to:

(a) the rationale of the program and the validity of its strategy to achieve program objectives;

(b) the process by which program activities are carried out;

(c) other DOC activities in support of satellite applications;

(d) results of program studies on forecasts of satellite service requirements and market prospects;

(e) descriptions of projects/programs resulting from the program's activities and the outcomes of these projects/programs;

(f) descriptions of R&D projects and R&D support to industry resulting from program activities.

2. Interviews of Government Officials and Industry Representatives ($10,000)

These interviews would be intended to obtain expert opinions about the rationale of the program (e.g., the need for a government program to support the development of new satellite service applications); about the

effectiveness of the program in achieving its intended results; and about the appropriateness of the program's activities and the extent of DOC's commitment to satellite service applications development.

3. A Survey of the Industry ($5,000)

The purpose of this study would be to provide primary source information on types and volume of new satellite system products, exports of these products, and statistics on usage of new satellite service applications (such as frequency, type, and coverage). In addition, information which would be provided from this survey would be used in comparisons of satellite services and products before and after the program. This is not intended to be an intensive survey, but rather would involve a short questionnaire which would provide quantitative information to supplement the information obtained through the interviews in 2 above.

4. A Survey of Users of Satellite Services ($5,000)

The purpose of this survey would be to assess the impact of the program in improving communications services in Canada. The focus would be on new applications which resulted from activities of the program. The information obtained from this survey would supplement the

information provided from the interviews of experts.

5. A Review of Government Documents on Other Government Programs Aimed at Contributing to Satellite Service Applications ($3,000)

This review is intended to provide background information on other government programs involving the space industry, specifically those contributing to satellite applications. The type of information collected on these other programs includes objectives, resources, administration, methods of support, and results. This review is not intended to assess the impact of these programs, but rather to provide information which would be helpful in describing the environment in which the Satellite Service Applications Program operates.

C. OPTIONS

This Section outlines three options of which only Option 2 is a separate evaluation of the Satellite Service Applications Program. Option 1 suggests that an evaluation not be carried out. Option 3 suggests that a broader context, within which the Satellite Service Applications Program would be evaluated, is more appropriate. The selection of an option largely depends

on deciding which issues should be addressed, what the appropriate scope of an evaluation of the program should be, and what the credibility and validity of the findings of the evalaution are likely to be.

Option 1: No Evaluation

This option would be quite relevant if the perspective on the program was one limited to seeing it as primarily an exploratory analysis of trends in satellite applications and requirements. While the program is in many ways exploratory in nature, it does serve the higher objective of supporting the space industry by seeking to develop a sound basis for DOC's intervention strategies. Specifically, the results of the program are expected to be practical contributions to further the development of satellite communications applications in Canada. Long-term impacts on the future of satellite services in Canada and the expansion of Canadian product lines for satellite systems are expected outcomes of this program. Given this perspective, the option of not evaluating the program is not acceptable.

Option 2: Evaluate the Satellite Service Applications Program's Contribution to the Development of New Satellite Applications

Such an evaluation would address all the issues identified in Part II, and could be conducted by

undertaking studies 1 to 5 listed in the previous section at a cost of about $28,000.

This option is certainly practicable and recognizes that the scope of the program includes long-term impacts on the space industry. DOC's interventions in the satellite applications field certainly represent an appropriate context for a program evaluation. The disadvantage of this option, however, is that it is unlikely to show the effects of interactions among the various space industry support programs carried out by DOC. The particular contributions of other programs to satellite applications would be missed. Thus results of such an evaluation, focused mainly on the Satellite Service Applications Program, would likely be called into question, since systematic analysis of the effects of other programs would be excluded. Without this analysis it would be very difficult to attribute responsibility for successes (or failures) to this program.

Option 3: Evaluate the Satellite Service Applications Program as Part of a Broader Evaluation of Space Industry Support Programs of DOC

DOC is involved in many program activities which are aimed at fostering the space industry in Canada. DOC activities related to the Anik satellites, for example,

have been or are partly rationalized by the general theme of contributing to the viability of the space industry in Canada. One of the conclusions of the Anik C and D evaluation assessment, completed in 1984 by Program Evaluation Division, was that an evaluation of these satellite programs should be part of a broader evaluation of the Space Program. Similarly, the DBS evaluation assessment completed in January 1985 also concluded that the DBS program activities of DOC should be partly evaluated in this broader context, since DBS is only one of the many space applications which contribute to space industry viability.

Selection of this option is consistent with the view that it would be difficult to delineate the incremental effect of the Satellite Service Applications Program from the effects of other programs. It would be more appropriate to take a broader look at efforts to create a Canadian space products and services industry.

An evaluation of the industry support program activities of the Technology Applications and Industry Support Sector is proposed to be carried out during 1985-1986. Within this sector the space industry support programs make up an integral component which could be the focus of

a separate and comprehensive evaluation. Option 3 suggests that an evaluation of the Satellite Service Applications Program should be carried out in the context of such a comprehensive evaluation of the space industry support programs.

C. RECOMMENDATION

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