Industry, Trade and Commerce

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An Evaluability Assessment of the Defence Industry Productivity Program (DIPP)

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AN EVALUABILITY ASSESSMENT OF THE DEFENCE INDUSTRY PRODUCTIVITY PROGRAM (DIPP)

Prepared by:

The DIPP Evaluability Team

Prepared for:

Department of
Industry, Trade, and Commerce

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EXECUTIVE SUMMARY*

Objective of the Evaluability Assessment

The purpose of this project was to assess the evaluability of the DIPP program, and create alternative evaluation designs for the program.

Project Structure

The project consisted of four IT&C personnel, one full-time secretary-clerk, two consultants from Peat Marwick and Partners, with one serving as team leader, one IT&C officer serving as project director, and two outside consultants serving as project advisors. Sub-teams were established to address certain evaluability and design issues.

Results

The evaluability assessment of DIPP indicates that the program is basically evaluable, i.e., clear and measurable indicators exist for the program objectives, and the underlying program structure (i.e., the cause and effect linkages of program components, immediate outputs, intermediate objectives and effects, and ultimate objectives) is logical.

A number of important evaluation issues were identified in the evaluability assessment. These issues, which form the background for future evaluation work, can be grouped into the following categories:

- Program objectives. How well have the program objectives historically been met, and how do they relate to each other?

- Criteria and priorities. What criteria and priorities have been used in the past, and which should be incorporated into the future program to maximize program effectiveness?

- Program rationale. How valid are the rationales of matching foreign government support, risk-sharing, and freedom from countervail, and how can they be better incorporated into program delivery?

- Specificity of funding. How do company accounting methods and bidding rules influence the use of DIPP funds for particular projects versus overall corporate funding, and how can the program instruments best direct the money to intended goals?

- Marketing environment. What has been the historical marketing success of DIPP-funded projects, and what have been the reasons for the success or failure? Also, where do the best future marketing opportunities exist, and what changes to the program or external institutions and agreements should be pursued to best meet these objectives?

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* A copy of this Executive Summary is available in French upon request.

- Program delivery system. How well has the DIPP delivery system been performing in terms of effectiveness, efficiency, and control (following program requirements), and what changes are required to optimize the delivery of the program?

Evaluation Designs

Six methodologies have been identified to address these issues, and five have been selected by management for the evaluation phase. This design will be comprehensive in the sense of addressing each major issue. The methodologies to be employed in the evaluation are as follows:

- A statistically valid, broadly-based survey of users of DIPP funds.

- A statistical model relating project success to possible determinants of success and failure.

- Detailed corporate and project analyses (case studies), including economic studies, marketing analyses, technological and defence impacts of funding, and program delivery examinations.

- Expert panels, investigating the technological and defence impacts of DIPP, and the future marketing requirements.

- Journalistic evaluations, including interviews, literature reviews, and file searches.

Expected Results

At the end of the evaluation phase, the following results are expected to be available:

- Historical measurement of how well program objectives were met, and how the meeting of one objective (e.g., support high technology) influences the satisfaction of other objectives (e.g., economic efficiency).

- Proposed improvements to program effectiveness by incorporating evaluation fundings into program criteria and priorities.

- Measurement of the validity of the program rationales, and recommendations for changes to the program which will best meet the validated rationales. The measurement of risk in projects, and the relationship of risk to project payoff, will be central here.

- Knowledge regarding the effect of company accounting systems and bidding rules on the use of DIPP funds, and options for programs instrument changes which will allow the fundings to be most effectively utilized according to program objectives.

- Estimation of future market demands and historical reasons for success and failure, with recommendations regarding future DIPP emphasis and monitoring and control requirements.

- Measurement and recommended improvements for program delivery effectiveness, efficiency, and control.

Future Work

The schedules and workplan for the evaluation phase are shown in Appendix VI. Commencement of work on October 16, 1979, should allow the work to be completed by March 31, 1980.

I - INTRODUCTION

Purpose of this Study

The objective of this project was to do an evaluability assessment and create alternative evaluation designs for the Defence Industries Productivity Program (DIPP).

The purpose of an evaluability assessment is to determine whether or to what extent a program can be evaluated. The criteria by which this assessment is made are the following:

- Objectives. The program objectives must be clear and capable of being measured.

- Program Structure. The underlying structure of the program must be sound in the sense that program components, immediate outputs, and effects and objectives are linked with logical cause-effect relationships.

The evaluation designs are alternative ways of evaluating the program, assuming that it is evaluable. The alternative designs will vary in required resources, precision and reliability of results, and breadth of coverage of evaluation questions. These designs will examine "summative" evaluation issues, i.e., issues which go beyond the operation of the program per se, and relate to the setting of the program among a host of institutions, other actual and potential programs, and varying societal and governmental objectives.

It should be emphasized that the result of this study is not a program evaluation. It is, rather, a presentation of alternative designs and methodologies by which management can address various evaluation-related issues.

Project Structure

The basic project team consisted of four IT&C personnel, one full-time secretary-clerk, two consultants from Peat Marwick and Partners, with one serving as team leader, two outside consultants serving as project advisors, and one ITC officer serving as project director. The Program Review Committee in the Department gave overall guidance to the project.

Weekly progress meetings were held throughout the project, involving members from all relevant groups within the Department. Interviews were conducted with officials in all branches and divisions of the Department which are involved with DIPP, and with relevant personnel in the Department of Defence and private industry. Previous evaluations of DIPP were examined, and close attention was paid to the historical evolution of the program (particularly with regard to the shifting of objectives). Continuous contact was maintained with the departmental study of offset and high technology.

The DIPP project team was broken up into several sub-teams concentrating on particular areas of the program. The following areas were looked at by individual sub-teams:

- history of the DIPP program
- other granting mechanisms, and their relation to DIPP
- the DIPP marketing and bidding environment
- DIPP criteria and decision-making
- DIPP management control
- DIPP information systems.
- DIPP objectives

Structure of the Report

The report's structure follows the thinking and work sequence of the project team. The purpose of the study has been outlined in the preceding section. The next chapter examines the history of the DIPP program; such historical information served as the starting point for the project team in observing previous and current objectives of the program, and the evolution of the program's structure.

After gaining basic historical data concerning the DIPP program, interviews and meetings with involved governmental and corporate personnel were carried out. Central issues related to the justification and operations of the program were identified. These serve as the background and underlying structure for the evaluability report, and are discussed in Chapter III.

Having identified the key evaluation issues, work was undertaken to create methodologies by which these issues could be addressed. Six such methodologies have been identified, and are described in Chapter IV.

After identifying the designs which could be used for evaluating the DIPP program, the project team looked closely at the advantages and disadvantages, and expected outputs of each. These results were presented to senior management, who agreed to adopt five of the six methodologies. Chapter V documents the characteristics of these methodologies and describes in detail the expected conclusions from the evaluation design selected by management.

Chapter VI summarizes the findings of the evaluability study, and outlines the future work required to carry out the comprehensive DIPP evaluation plans.

II. DEFENCE INDUSTRY PRODUCTIVITY PROGRAM: AN OVERVIEW

A brief overview of the DIPP program is outlined in this section. For a more comprehensive discussion, Appendix I should be consulted.

DIPP is an industrial assistance program operated by IT&C. It is perhaps the oldest program of the Department, having arrived via the Department of Industry from the Department of Defence Production where it started in 1959. It is one of the largest contribution programs of IT&C at $45 million/year, and has provided some two-thirds of a billion dollars of assistance to industry over 20 years. Compared to the U.S. Department of Defense's annual expenditures for Research, Development, Test and Evaluation of $13 billion, the IT&C and Department of National Defence (DND) combined R&D budget approximates less than one-half of one per cent of the U.S. government spending on defense and defense-related research and development.

The current program directive opens with the sentence "The DIP Program operates in support of Canadian international defence co-operative agreements for research, development and production". The objective is to develop and sustain the technological capability of the Canadian defence industry for the purpose of generating economically viable defence exports and related civil exports. The program comprises three principal sections: innovation project development (new products for export); capital assistance (the upgrading of Canadian manufacturing equipment in defence-related companies); and source establishment (the helping of Canadian companies to absorb non-recurring front end contract costs, when competing against the U.S. defense industry). The innovation section accounts for 75% of dollar funding, is generally high technology, and is roughly 50:50 defence to civil projects. Capital Assistance is half loan/half contribution, the loan portion being repayable. Source establishment is a non-repayable contribution, but is only payable to the company if they win the contract.

The impetus for DIPP came from the cancellation of the AVRO "Arrow" fighter program in 1959, when the then Conservative government made a conscious decision to end domestic development of major weapon systems. To maintain the defense technology base, and to support the Canada/U.S. Defence Production Sharing Arrangements, it was deemed necessary to provide an industrial assistance instrument to replace the DND weapon development programs, and the Product Research and Development program was established. Later, a Capital Assistance program was instituted, followed by Source Establishment. With the signing of the Canada/U.S. Defense Development Sharing Agreement in 1963, the supporting institutional environment for the defense research and development was significantly strengthened; this led to two of the most widely quoted projects developed by Canada - the Doppler navigation system for aircraft and the army GRC-103 radio system - both from Canadian Marconi Co.

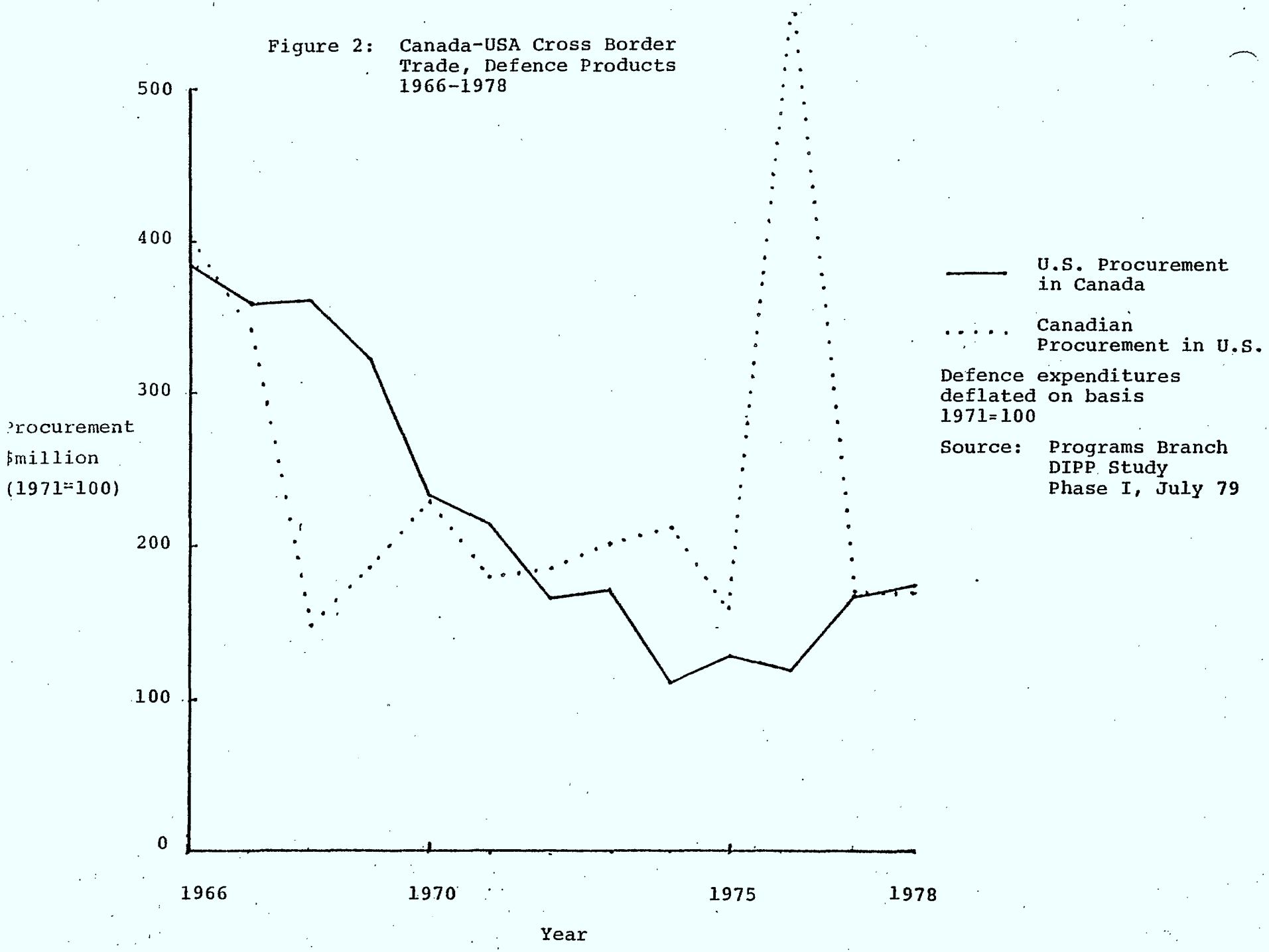
Originally, the Department of Defense Production (DDP) was selected to operate the programs which were to evolve into DIPP. The first major change came in 1968, when DDP was disbanded. The program was transferred to the Department of Industry (DOI), together with the program operators, the IDPB (International Defense Programs Branch). While the objectives did not alter,

the atmosphere surrounding DIPP did. No longer did DIPP operate in a department dedicated to the defense environment. DOI was responsible for all Canadian industry. The various program elements, which had been operated independently, were combined into a single program for the first time. Concurrently, certain specific industrial development opportunities in aerospace led to DOI recommending that the program be expanded to include defence related civil high technology. By mid-1968, Cabinet approved the amalgamation of the program elements into DIPP and the expansion of the terms of reference to include "civil-related" technologies. This expansion into "civil-related" technology was consistent with the Liberal Government's decision to emphasize social goals and to de-emphasize defense. Canada's defense expenditures, which had been rising, were reduced in real terms in the 1967-73 period. Commitments to NATO were reduced, re-equipment of the services was deferred, and government started to become increasingly critical of U.S. intervention in Vietnam. It has been suggested that these governmental positions may have led to promising projects, equivalent to the Doppler navigation or the radio relay, no longer appearing on the DDSA lists for Canadian navigation, in spite of the increasing need for U.S. defense material for Vietnam.

The next major change to the DIPP environment came within a year. DOI was merged with the Department of Trade and Commerce to form the Department of Industry, Trade and Commerce (IT&C) and the program became part of the new department. Again, the basic objectives of DIPP remained unchanged, while the environment around it altered; again the International Defence Programs Branch retained a major role with regard to the program. Not only did IDPB negotiate bilateral Defence Production treaties with other countries, but they had a major involvement in project selection with product marketing through their overseas liaison officers, a mini-Trade Commissioner Service (TCS). The value of projects funded had risen rapidly from just under $2 million in 1959/60 to just under $50 million in 1969/70. In the sense of resources available to the program, DIPP was at its zenith.

The present decade has seen a number of changes impacting the defense market, the Canadian defense position, and the position of DIPP within IT&C. Internationally, Canada's defense cutbacks and lack of re-equipment were being criticized by both Europe and the U.S.A. Sales of defense products (adjusted to constant dollars) to the U.S.A. fell 50% between 1966 to 1973 (see Exhibit 1). Canada's defense spending, as a member of NATO, exceeded only Luxembourg's when expressed as a percentage of GNP. Canada still criticized the U.S. Vietnam adventure, but the war was coming to an end. Acceptable projects for Canada/U.S.A. DDSA joint development were still hard to find. Within IT&C, the IDPB's role in the administration and management of DIPP was declining. There was a substantial reduction in the resources dedicated to the gathering of defense-related market intelligence and to the winning of foreign military contracts where overseas liaison officers were merged with the more generalist Trade Commission Service. The ISBs dominated the industrial and product development role. The responsibilities for the administration of DIPP, as well as other major industrial development programs, was accorded to Enterprise Development. The DIPP Directive was rewritten in 1977, strengthening the financial analysis of projects and placing the policy base in the Programs and ISB functions. The departmental marketing function, which

Figure 2: Canada-USA Cross Border Trade, Defence Products 1966-1978



came with the program from DDP to DOI to ITC (and is in the hands of the DPB) became limited to the role of marketing advisor.

In 1971, the years of deferred defense re-equipment came to an end. As DND began to re-equip, with trucks, tanks, armoured cars, patrol aircraft, so did defense exports to the U.S. rise - not to the levels of the mid-1960's perhaps, but certainly above the lows of the mid-1970's. DIPP funding, which had peaked (in real terms) in 1969/70, began to decline in absolute terms; this, coupled with accelerating inflation, left the program in 1978 with a little over half of its 1969/70 purchasing power. There is presently pressure from a number of areas to increase the level of funding to accommodate more and a larger number of projects.

III - PRINCIPAL FINDINGS

The analysis of the DIPP evaluability study, based on interviews and an examination of the history and current operations of the program, led to several major findings regarding DIPP. These findings constitute a background in which more specific evaluation questions must be set. In other words, when the advantages of different evaluation designs are examined, consideration must be given to the way in which each design addresses the major issues identified in this section.

This chapter is made up of three distinct sections. The first one is concerned with the assessment of program evaluability, in which a judgement is made regarding whether the program's objectives and structure allow meaningful evaluations to be undertaken.

The second section deals with major questions or issues to be resolved in the evaluation phase. These can be grouped into the following categories:

- the structure of program objectives
- program criteria and priorities
- program rationale
- specificity of funds
- marketing environment
- the program delivery system

The third section comments on the DIPP information system. This system forms the backbone of the evaluation, and hence knowledge of its structure and limitations is of paramount importance.

Evaluability Assessment

In order to assess the evaluability of a program, a program evaluability model was created. This model relates program components, immediate outputs, intermediate objectives and effects, and ultimate objectives with assumed cause-effect linkages.

The model for DIPP is shown in Exhibit 2. It was initially developed from published documents (particularly the DIPP Directive), and then refined by discussions with managers of the program, as well as participants in the administration and delivery of the program.

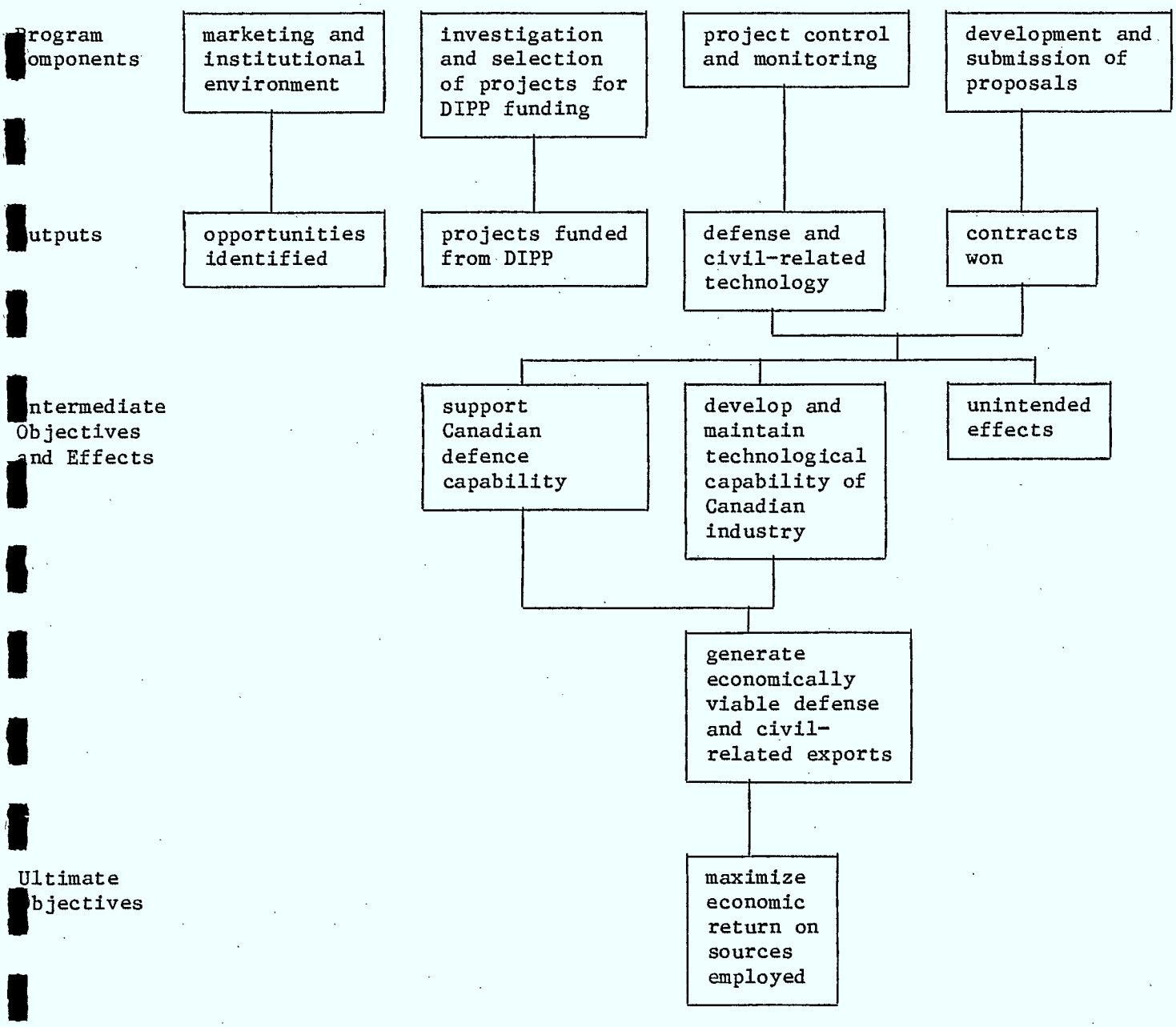
This model was used as the basis for the evaluability assessment. Based on the model and the criteria heretofore discussed (clarity and measurability of the objectives, and logic of the program), it was judged that the program is evaluable. There are, however, some problems with the structure of the objectives which must be considered in the evaluation. These will be discussed in the next section.

Program Objectives

There are three components to the objective of the program - technology, defense, and economics. While there is general acceptance that all three have

EXHIBIT 2

DIPP EVALUABILITY MODEL



been objectives of DIPP, there are major differences in the views of different groups within IT&C regarding how these goals should be structured in relation to each other.

The DIPP Evaluability Model, shown in Exhibit 2, illustrates one structure for the three types of objectives. In this case, developing and maintaining the technological and defense capabilities of Canadian industry are intermediate goals. In other words, they are means to achieving one ultimate end - generating economically viable exports in order to maximize economic returns to Canadian resources.

Two other structures have been identified in interviews with IT&C officials, and are shown in Exhibit 3. The first indicates that all three areas are ultimate objectives. This does not necessarily imply equal importance to technology, economics and defence, but it does mean that DIPP might, for example, attempt to support projects with low economic return, if their technological or defense effects were significant.

A third structure, shown on the bottom of Exhibit 3, has the economic and defense sides as the ultimate objectives. In other words, the technology supported by DIPP is not justified as an end in itself, but only insofar as it leads to exports (with an implied significant economic rate of return) and maintaining of a defense capability. This structure seems to be the one which existed at the time DIPP commenced (1959), but the defense aspect appears to have either been dropped or relegated to a means to attain economic success. The goal structure now accepted by senior management is the one shown in the evaluability model (Exhibit 2).

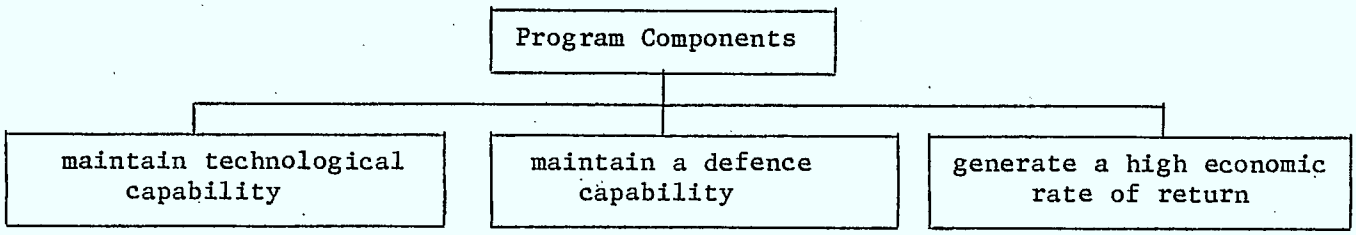
Because DIPP has, historically, incorporated all three types of objectives, any evaluation of the program must look at how well each of the objectives has been met, regardless of which model is accepted. However, because senior management wishes the evaluation of DIPP to focus on identifying how the program can be structured to make a maximum contribution to effective economic growth and development in the future, the forward-looking aspect of the evaluation (i.e., the part that deals with what should be done, as opposed to what has been done), will concentrate on the structure shown in Exhibit 2. That is, the central element in studying the linkages between objectives is what kinds of technology (high or low, defense or civil-oriented, etc.) yield the best economic payoff.

In assessing the evaluability of the DIPP program, it has been judged that the objectives can be meaningfully measured. This does not mean that the available proxies serving as measurable indicators for these objectives are complete descriptions of the objective, nor will they satisfy everyone. For example, technology will be assessed by objective indicators like research and development intensity and percentage of scientists and engineers employed. Subjective indicators will be based on ratings given by unbiased experts in the field. The objective indicators certainly fail to capture all aspects of technological capability, and the subjective opinions may be unstable, i.e., depend on the panel of experts. Thus, although these indicators give us a handle on the objective, they do have deficiencies which seem to be impossible to overcome.

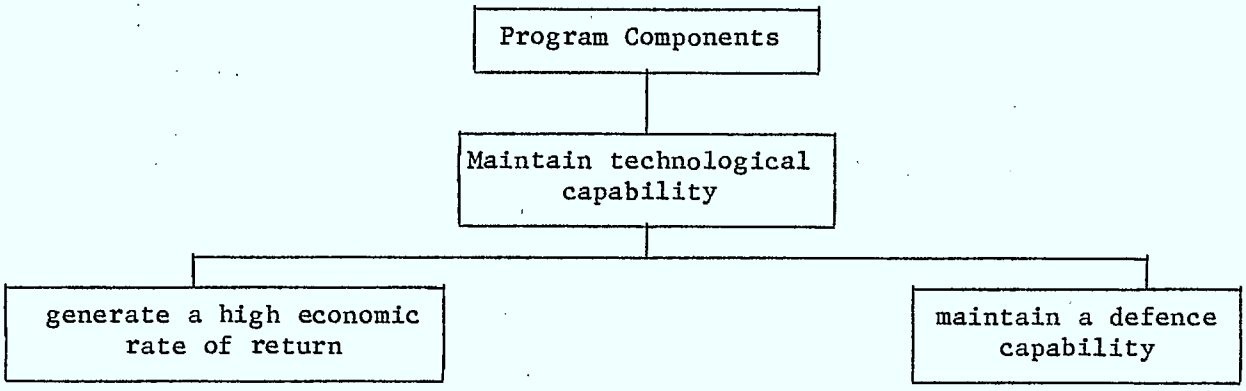
EXHIBIT 3

STRUCTURE FOR DIPP OBJECTIVES

(a) Three Ultimate Objectives



(b) Two Ultimate Objectives



The incrementality question is central to an effectiveness evaluation and to any proposed program structure in the future. Technically, it is an extremely difficult factor to assess. It is relatively easy to estimate the economic benefits associated with a DIPP project. However, it is much more difficult to estimate the incremental impact of DIPP on the project and the corporation, i.e., the difference in benefits between what did occur and what would have occurred without DIPP. Although ways of measuring incrementality have been formulated (see Appendix II), the final estimates will involve subjective professional judgement. This judgement will, however, be based on objective data, organized within a disciplined framework of corporate and cost-benefit analysis.

Program Criteria and Priorities

Concerns have been expressed during the evaluability assessment regarding the types of criteria used for funding projects, and the lack of procedures for establishing priorities. The need for establishing priorities will become even more pressing if, as expected, the climate of fiscal restraint persists.

In terms of the evaluation, the rationale for criteria and priority-setting must be based on objectives. The extent to which a project is expected to satisfy technological, defense, and economic objectives (with, as indicated in the previous chapter, emphases on the latter), will indicate the extent to which that project merits DIPP funding. Effectiveness questions to be addressed in the evaluation, and whose resolution will affect the criteria and priority procedures for DIPP funding, include the following:

- behaviour of Canadian-based firms as opposed to foreign-controlled multinational corporations
- the influence of company and grant size on the success of the project
- the effectiveness of different types of funding (research and development, capital assistance, source establishment, and nominated projects)
- the relationship between different levels of research and development (e.g., basic research as opposed to development) and commercial success
- effectiveness of "seed money" versus sustained support
- the relationship between perceived financial, technical and marketing risk and the eventual success of the project
- the types of technology which yield the best economic payoff
- the relationship between the market forecasts and final project success
- the nature of the competition in various markets, including the extent to which particular technologies are being subsidized
- the factors leading to true incrementality.

By answering these questions, both through statistical and qualitative ways (as shown in the next chapter), decision-making and the setting of criteria and priorities can be greatly strengthened. In other words, if it were discovered that capital assistance to small Canadian-owned firms has twice the expected economic payoff as the same R&D assistance to large multinational enterprises, capital assistance to the small Canadian firms would be given preference in the granting of DIPP funds. It is anticipated

that the importance of each identified factor will be established by the end of the evaluation.

Program Rationale

In the evaluability assessment phase, several important issues related to the rationale for having a program like DIPP arose. The two most important are matching the industrial supports of other countries, and the need for government risk-sharing.

a) Matching Subsidies

One portion of the DIPP evaluation will have to be concerned with the matching subsidy issue. Questions to be resolved include the following:

- What types of support and to what extent is support being given in countries which produce technology and manufacturing facilities competitive to those funded by DIPP?

- Is this support uniform within a country (and among countries) or does the support differ markedly by product type?

- How well does DIPP actually match these supports?

The second question, examining the variations of support among product-types, has important implications in the funding process for DIPP. If large variations in support do exist, it may be that a flexible funding instrument is required, which would tailor the amount of funding to the extent of governmental support given to competitive companies (as well as other factors affecting the competitiveness of Canadian operations).

b) Risk

A second rationale for the DIPP program relates to the notion of governmental risk-sharing. It is often assumed that Canadian companies tend to be risk-aversive. If "risky" projects are to be undertaken by firms, the element of risk from the company's standpoint must therefore be reduced. Otherwise, the firm will choose less risky projects or will be unable to raise the necessary finances under reasonable terms and conditions. One way to achieve this is for the government to incorporate some of the risk itself, thus reducing the amount shouldered by the company.

In examining this question, several ancillary issues must be looked at. First of all, what are the different meanings of risk, and their implications for the program? Secondly, the question of whether risky projects lead to the attainment of program objectives must be resolved.

In the context of a funding program like DIPP, risk involves three components - technical, financial and marketing. For each of these components, there are different approaches to the definitions of risk.

One way of looking at risk is from the standpoint of variability in possible outcomes. If, for example, a project has a significant probability of being quite successful, but also a reasonable chance of being disastrous, we would say the project is risky, i.e., the variation in possible outcomes is extremely large. If, by disaster, we mean the bankruptcy of the company, we are then concerned with financial risk. If by disaster it is meant that few or no sales flow from the given project, then marketing risk is being considered. If disaster means a lack of technical success, then it is clearly technical risk which is being addressed.

Using this notion of risk, a case for governmental risk-sharing can be made. As an illustrative example, consider the individual decision to purchase automobile insurance. Two relevant outcomes are possible in driving a car (say for a year). In the first case, you are not involved in an accident, so your outcome is the cost of your premium. In the second case, you are involved in an accident, and your liability may come to hundreds of thousands of dollars. However, by purchasing an insurance policy, this large potential loss is absorbed by the insurance company. Although such a loss would be calamitous for an individual, a large insurance company easily withstands such costs, and usually ends up as a profitable institution. This is a classic case of risk-sharing between an individual and a large company.

A similar case can be made for the DIPP program. Projects which may be disastrous to a company can, in a sense, be insured by the government, so that their potential loss becomes manageable. The government, having a large number of "clients" and larger assets, can withstand individual failures, and can thus act as insurance broker to the companies. In the evaluation of DIPP, this model should be examined by answering the following questions:

- Are funding decisions being made on this basis? If so, how are such risk factors being measured and used?

- To what extent is risk actually being encouraged, and with what results?

- Why should high-risk projects be encouraged, i.e., is the set of DIPP grants (the DIPP "portfolio") profitable for Canada as a whole?

- How should risk be treated in funding (based on answers to the previous questions)? For example, should a sliding scale of funding based on risk be considered?

A second notion of risk, which is often used in theoretical studies, is concerned with the "expected" loss or gain from a project. A risky project may then be considered one with either a significant loss or a minimal gain, depending on the context of the project. Thus a company contemplating a project with an expected rate of return of 6% may consider the project "risky", even if they are certain they will achieve that figure. In other words, even though there is little variability in

the outcomes, the project is deemed "risky" because of the minimal expected benefit from it. The role of the government might then be to increase the expected benefit to the private company through funding, and thus cause the project to be undertaken. This implies that the rate of return required for the country as a whole for economic efficiency is less than what is required for a private company.

The evaluation phase should also test and examine the implications of this model, i.e., consider the questions of whether decisions are being made (and should be made) on this notion of risk, to what extent such risk-sharing has actually occurred, why such projects should be supported, and ways of possibly incorporating this idea into the formal decision-making process.

c) Why Risk

Underlying the notion of a risk-sharing program is the question of why should high-risk projects be encouraged. One rationale proposed by some IT&C personnel is that high technology support is an objective of the program, that projects resulting in high technology are risky, and that governmental support is therefore required for these projects to be brought to fruition.

The DIPP evaluation must examine several aspects and implications of this kind of argument. First of all, the relationship between technology and risk must be examined. Does high risk necessarily imply a major impact to Canada's technological capability? Are there other types of projects yielding the same or better technological results? Secondly, the accepted program model (Exhibit 1) does not assume technology as an ultimate objective that can override all other considerations. Thus, the economic impact of projects differing in risk-levels must be examined. For example, high technical-risk projects may only be successful 10% of the time, but when they are successful, yield such tremendous economic results that their support is warranted on the economic basis alone. Thus the relationship between all types and definitions of risk must be considered in the evaluation, and used in formulating changes to the funding process.

The effect of risk on project incrementality must also be examined. In other words, does DIPP enable particular risky projects to proceed which otherwise would not have because the firm is unwilling to risk its available resources on the project or because the required resources cannot be raised in the financial markets under reasonable terms and conditions.

d) Freedom from Countervail

A following section examines the marketing environment and the effects of certain agreements, particularly the Defence Production Sharing Arrangements (DPSA), and the Defense Development Sharing Arrangement (DDSA), on this environment. One justification or rationale for the DIPP support system is that it supports the types of products which can enter

the U.S. duty-free, and thus makes inherent economic sense. There is also a feeling among some people connected with the program that when the technology developed under DIPP is applied to civil products, there will be less chance of U.S. countervail than if the project had other support (e.g., through EDP). The basis for this latter assumption, and the relative economic success of funding technologies to produce DPSA products, all must be addressed in the evaluation.

What is Being Supported?

Because DIPP funds are granted on a project basis, there is an assumption in the program design that project support is the best means to achieve the program objectives. There are several issues arising from this assumption, however, which merit examination.

The evaluability assessment has established that corporate or sector support was often considered the intermediate objective of the program. In other words, support of certain companies or industrial sectors was considered to be the means to achieving the technological, defense, and economic objectives of the program, and less consideration was (or perhaps should be) given to the individual project itself.

Related to this was the finding that, in at least some cases, company accounting conventions and the rules for bidding on Canadian and foreign contracts require that a substantial portion of DIPP funding go into company overhead, rather than toward the specific project itself. As a result, DIPP support is sometimes divided between the DIPP projects and corporate activity. More generally, it was recognized that the DIPP support can have the effect of reducing the company's need to make trade-offs between competing opportunities because of lack of financial resources.

The evaluation of DIPP must bear these issues in mind, and examine what, operationally, is being supported by DIPP funding, what the effects of DIPP have been on the project, company, and sector levels separately, and what type of support therefore leads to the optimal results.

The Marketing Environment

One, totally unambiguous, goal of the DIPP program is the promotion of export sales. Such sales occur in a complicated milieu of competitive companies, rapidly changing demand requirements, governmental support programs, complex bidding rules, tariffs and national content requirements, political and industrial lobbying, and political institutions and agreements. As part of the summative evaluation of the DIPP program, it is necessary to critically examine this market environment (see Appendix III for a more complete review of this issue).

It is envisaged that this phase of the evaluation will be divided into two parts. The first is an examination of historical patterns and the present situation, and the second is an examination of future potentials and possibilities. The reasons for success and failure in the past, the

effects of institutions and agreements (e.g., the DPSA, DDSA, MOU's), the requirements to understand and seriously enter the U.S. bidding scheme, the appropriate time to enter the research and development cycle, and the role of Canadian government resources in the identification and winning of foreign defense contracts will all be part of the historical evaluation.

The value of the DPSA (Defense Production Sharing Arrangement) and the DDSA (Defence Development Sharing Arrangement) was a controversial issue in our evaluability assessment, and one that requires extensive further analysis. The DPSA is an umbrella by which Canadian industry is allowed to bid on U.S. defence contracts on an equivalent basis to U.S. companies (with some restrictions). There is no requirement for these products to be the result of DIPP-funded projects.

The DDSA is a means for capturing U.S. contracts by sharing research and development between governments. Proponents of both of these agreements claim Canadian technology is being maintained by them, and these have led to significant economic benefits. These claims require a detached analysis.

Both DIPP and the DPSA and DDSA provide a military cover for technology development. One justification for the agreement and the structure of the DIPP program, as previously mentioned, is that when the developed technology is applied to such products, there will be less chance of U.S. countervail than in the case of a straight commercial development under the present EDP program.

The second aspect of the study will be future-oriented. It will examine expected changes in the market demands, the expected effects of political and tariff changes, the nature of future competition, etc. The result from this phase will be an understanding of the expected market success resulting from support and encouragement of different types of technology or technology-related products.

The Program Delivery System

The delivery system for the DIPP program has been and continues to be large and complex, involving a diverse set of people and groups. The system has been dynamic, with large changes in resource levels (e.g., the substantial decrease in DPB personnel) and organizational structures (e.g., the creation of Enterprise Development).

Any evaluation of a large program like DIPP requires a detailed examination of the workings of the delivery system. The evaluability study divided the delivery system into two major areas - project selection and decision making, and project management control (see Appendix IV for a comprehensive discussion).

The decision-making process is critical to the operations of DIPP, and requires a careful exmaination of the role and performance of various groups and the criteria used. For example, what is the performance and

role of the advisors (financial, marketing, and machinery)? How does the DIPP Committee make their decisions? What are the responsibilities of the ISBs, and how are they handling them? What kind of data are incorporated in the project and corporate submissions? How are they being used? Are the data complete, redundant, necessary, etc.? Are the stated criteria being followed? Are unstated criteria being used?

A set of similar questions need to be resolved for the project management control area. The role and performance of Treasury Board, the IT&C Senior Management Committee, the relevant ADMs, the Program Branch, DIPP Committee, Advisory Sub-groups, the DPB, the Machinery and Financial Services Branch, Department of Supply and Services, Canada Commercial Corporations, the Technology Branch, Department of National Defense, the Industry Sector Branches, and Legal Services must all be critically examined. The project-monitoring instruments must be carefully analyzed, both for their purpose and their actual effects. For example, are the SOWs (Statements of Work) a satisfactory basis for project control and monitoring? What is the purpose and impact of the Project Review Groups (PRGs), the ISB Progress Reports, and the Status Reports? Are management programs systems like CPM (critical path methods) being established and followed? What type of performance indicators are being used? What has been the nature and effect of the project evaluations on the design and operation of DIPP? Resolving such questions will significantly improve the process of running and delivering the DIPP program.

DIPP Information System

Program data form the backbone of any evaluation exercises. During the evaluability phase, sources and deficiencies of relevant data (see Appendix V), have been documented. Assessment of this information indicates that there are extensive data gaps within IT&C which will require completion by means of user surveys. For example, the Transportation ISB does not keep track of sales from DIPP-supported projects, and the Machinery ISB stopped recording sales when the DIPP Office stopped (1976). Data compilation will also be complicated. For example, total sales figures outside the 1971-75 period will have to be collected by going through individual project files in the FSB.

Summary

The principal findings of the DIPP evaluability project are the following:

- the program is evaluable.
- the major issues to be addressed in the DIPP evaluation relate to the structure and effectiveness in meeting program objectives, program rationale, specificity of funding, the marketing environment, and the program delivery system.
- Sizeable gaps exist in the DIPP information system.

The remaining part of the report concerns itself with the evalaution issues raised in this chapter. The types of methodologies required to address these questions is the topic of the next chapter. Chapter V will them summarize the expected outputs from these methodologies, illustrating what types of answers can be expected to the issues and questions raised in this section.

IV - METHODOLOGIES FOR THE EVALUATION OF DIPP

The DIPP project team has prepared a set of evaluation methodologies which address the issues identified in the evaluability assessment. Short descriptions of the methodologies, indicating their expected results and how these resolve the issues of the previous chapter, follow below. More detailed workplans are given in Appendix VI. Exhibit 4 indicates the extent to which each methodology addresses the previously-discussed issues.

Representative Survey of DIPP Projects

A broadly-based, representative user and file survey of projects and companies is recommended as a central component of the DIPP evaluation. Such a survey will yield objective estimates of the non-incremental impacts of DIPP funding on the technological, defense, and economic objectives (e.g., R&D intensity of projects, total sales, etc.). A very basic measure of incremental economic success will also be output from this survey. Because the survey will be based on a probability sample, estimates for the overall impact of DIPP will be statistically valid.

As well as yielding indicators for the satisfaction of the program's objective, this survey will address the risk and marketing issues. Estimates of financial, technical and marketing risk will come from the project files, as well as being addressed directly in the user survey (although responses here may be biased, they may at least serve as one indicator of the company's perception of risk). Comparison of actual and forecasted market volumes flowing from this survey will measure the accuracy of companies' market research. This will impinge on the program and entire decision-making process, since poor results here would indicate little credence for using such forecasts in decision-making, or indicate stiffer requirements for the actual market research work.

The final result from the survey will be a set of data which can be used in an explanatory statistical model. This model, to be discussed later, will examine determinants of project success (and incrementality), and thus address the question of what type of criteria should be used and what importance should be attached to each. The survey will yield data about the company (e.g., size, ownership, etc.), the grant (e.g., size, type, etc.), product (e.g., type of technology), and market estimates. These will be related to other survey data (e.g., sales, jobs created) and imputed incrementality to understand the types of factors which determine project success.

Case Studies

Detailed analyses of an estimated six projects and six companies are planned in order to address many of the identified issues (for the program delivery analysis, case studies will be much simpler, and approximately fifty such studies are planned). The cases will be selected from different DIPP programs (capital assistance, source establishment, research and development, and nominated projects), different sizes, and different success results. The studies will proceed along a number of different streams.

EXHIBIT 4

RESULTS OF METHODOLOGIES

Methodologies	Program Objectives	Criteria	Rationale			What is being Supported	Marketing	Delivery
			Subsidies	Risk	Countervail			
Survey	M	L	O	M	O	O	L	O
Case Studies	H	M	O	H	O	H	M	H
Statistical Model	O	H	O	H	O	O	O	O
Expert Opinion	H	O	O	M	O	O	M	O
Journalistic Evaluation	L	M	H	L	H	O	H	M
Controlled Experimentation	H	M	O	M	O	O	O	O

H: High
M: Medium
L: Low
O: Not Addressed

a) Objectives

- economic: our major and most reliable estimate of the incremental economic effects of DIPP will come from the case studies. Appendix II describes the discounted social cash flow model which will serve as the basis for these estimates
- technological and defence: the impact of DIPP funding on the defence and technological capability of companies and sectors will be examined using this methodology. Based on interviews and financial historical patterns in the company, estimates, albeit subjective ones, will be made regarding patterns of company and sector development without DIPP funding

b) Risk

More reliable measures of financial, marketing, and technical risk will come from these case studies. These will again come from the examinations of the financial data and history of the company at the time of DIPP funding.

c) Specificity of Funds

Part of the case studies will involve a detailed examination of the accounting systems of companies and the bidding regulations under which they operate. It will thus be possible to estimate the extent to which DIPP funds specifically impacted on project support.

d) Marketing

A marketing analysis of the DIPP case studies will examine the reasons for success and failure, and how these could be used in future marketing endeavors. Interviews with the appropriate company officials are paramount here. The project will be traced comprehensively from inception to final marketing, and the shifts in market demand, contact with external contractors, submissions, etc. will be examined to understand the causes of success and failure.

e) Program Delivery

The basic evaluation of the DIPP program delivery system will come from detailed case studies. It would be impossible to answer the questions posed previously regarding the decision-making and control process with a large survey, so only detailed assessments of a few select projects and companies can shed light on the effectiveness and efficiency of the program delivery system. These will centre about interviews, file reviews, and examination of Committee minutes.

f) Criteria

The examination of the reasons for success and failure of projects, and the specificity of funding will provide detailed guidance relating to the

appropriate criteria for achieving the DIPP goals. The relative impacts of "seed money" as opposed to sustained corporate support will also be borne in mind when analyzing and comparing case studies of companies representing each of these types of funding.

Statistical Model

Statistical models, based on a regression or discriminant formulation, will be constructed. The purpose of this is to relate measures of success (particularly economic) to variables which might explain this success. Thus the effect of factors like company size, grant size, company ownership, type of technology, market focus, intensity of research and development, extent of risk, degree of innovativeness and incrementality can all be examined for their effect on project success. The results can then be used for establishing criteria and priorizing projects for future funding. The risk rationale for the DIPP program will also be addressed by this model. In other words, how does risk relate to the DIPP objectives (particularly economic), and should, for example, high-risk projects be encouraged as a means for achieving these objectives?

The risk and incrementality relationship is of paramount importance here. The statistical analyses will look at "types" of projects and their economic payoffs. If certain types have a consistent success pattern, they are not "risky" in the probabilistic sense previously discussed. These may therefore be little reason for supporting them. If, however, certain types of projects have large variations in their outcomes, and are hence "risky", they may merit DIPP funding if their expected economic payoff is large. These statistical analyses will be thus addressing the incrementaltiy question, since risk is at the heart of this issue - i.e., large risk is likely the major deterrent to the undertaking of projects whose expected payoff is large, and thus the major incremental impact should be aimed at these projects.

Expert Opinion

Because of the difficulty in specifying the defence and technological objectives by objective indicators, a rating scale based on expert opinion is recommended. Using a panel of experts who are not related to the DIPP program, a set of independent measurements on the effects of DIPP on its objectives will be collected. These will serve as another evaluation perspective. This methodology might also yield relevant information regarding the importance of different indicators (such as risk, research and development intensity, innovativeness, etc.) as determinants of the high-technology and project success.

As part of the marketing issue, it is suggested that predictions regarding future changes and trends in the technology market be collected. Such information may best be gathered from a different set of people, but should follow similar, structured questionnaires.

Journalistic Evaluations

Journalistic evaluations are non-quantitative approaches to program evaluation. They tend to be concentrated on published literature reviews and interviews. Although the interviews will, naturally, be with knowledgeable people, there is not usually an attempt to assemble a group with clearly-defined expertise in one area. The interviews tend to be more open-ended and unstructured than that proposed for the expert opinions, with minimal attempts at formal or systematic quantification. The evaluations are subjective in nature, and depend on the ability of the interview-analyst to assemble and filter the information to achieve a logical and coherent resolution. Some of the work done in case studies will be this type of evaluation, but in general this technique considers more general units of analysis than the project or corporation.

One major area which will be examined by these evaluations will be the marketing one. Future demands for different types and intensity of technology, political trends, the effects of DPSA, DDSA and MOUs in the past and in the future, changes to tariffs and national content requirements, etc., will all have to be assessed in this non-quantitative manner. Knowledge about marketing in the current environment, i.e., what it takes to sell to foreign, particularly U.S., defense and defense-related clients, will have to be obtained in this non-quantitative fashion, and will involve interviewing company personnel, post officers, marketing experts (particularly in the United States), and foreign contractors.

The program rationale of matching subsidies will have to be examined, to some extent, by these methods. Although analysis of current and historical data will shed light on the extent to which this rationale is justified, future changes to the governmental support programs will have to be considered in the evaluations using qualitative assessments. The question of possibly using competitive subsidies as a basis for determining the level of DIPP funding will also be addressed in this context.

This component of the evaluation will include a comparison of the effects and operation of DIPP with other subsidy programs. No attempt to evaluate these other programs (e.g., E.D.P.) will be made. However, based on interviews, published results and file reviews, economic results and delivery processes will be compared, so that alternative improved systems for DIPP can be considered.

The ability of DIPP technology to produce civil-related products which avoid countervail (one possible rationale for the program) will also be considered in this element of the evaluation.

It is also recommended that the effects of various explanatory hypotheses regarding project success be considered using this methodology (as previous indicated, they will also be quantitatively tested in the statistical model). The reasons for addressing these hypotheses here as well as in a quantitative manner are twofold. First of all, some of the possible determinants are difficult to quantify (e.g., "seed money" versus "chosen instrument", or competitive effects, are difficult to capture in a statistical model).

Secondly, the types of data to be collected in the survey will, by necessity, have to be based on the narrow range of interviews and literature searches done in the evaluability phase. These are a large number of knowledgeable people who have not yet been consulted, but will be as part of the journalistic evaluation. It could be extremely useful to probe their informed opinion regarding the determinants of project success, and their possible use as decision-making criteria.

Through the journalistic evaluation, we will also get some estimate of the unintended effects of the program. Based mainly on interviews and published data, we will look at the following:

- DIPP's impact on the Canadian impage, both in Canada and internationally.
- The effect of DIPP on the labour market (e.g., keeping scientists and engineers from leaving the country),
- Effects on regional development.

Controlled Experimentation

From an analytic perspective, the best estimate of economic incrementality would come from a controlled experiment. Using appropriate experimental designs, DIPP funding would be allocated on a randomized basis. Comparisons of economic results between the two types of projects, with other variables being controlled in the analysis, would yield an unbiased estimate of economic incrementality. The practical difficulties of such experimentation are, however, immense, particularly from a political point of view.

Summary

Six methodologies have been identified which can address the major issues of the effectiveness and structure of DIPP objectives, the rationale of the program, the specificity of DIPP funding, the marketing environment, and the program delivery systems. These methodologies, or, more precisely, sets of methodologies, can be classified as follows:

- user and file survey
- case studies
- statistical modelling
- expert opinions
- journalistic evaluations
- controlled experimentation.

The next chapter looks more closely at the expected results from these methodologies, and recommends the appropriate set of methodologies best suited to answer the important evaluation questions.

EXHIBIT 5
METHODOLOGY SUMMARY

Methodology	Outputs	Advantages	Disadvantages	Resourcing
Project Survey	Objective indicators for the technology, defence, and economic goals Estimate of risk Accuracy of market research. Data for model.	Measures effectiveness in objective fashion Results are statistically generalizable Feeds into statistical model	Incrementality addressed only for economic goals, and very primitively. Risk estimation will depend largely on company response, which is likely biased. No explanatory work here.	12 person weeks
Statistical Model	Importance of variables like company and grant size, company ownership, technology type, market focus, R&D intensity, risk, and innovativeness on success, particularly economic. Measurement of characteristics related to risk.	Can scientifically test importance of factors on project success. Can be used to establish criteria and priorities.	Ignores non-quantifiable explanations for project success (or factors where data are missing)	24 person weeks
Case Studies	Estimates economic, technological and defence impacts of DIPP. Measures risk, and its relation to project success. Estimates extent to which DIPP funds go directly toward projects. Analysis of historical determinants of marketing success. Analysis of the program delivery system, including management control procedures, data requirements, etc. Examines types of stated or unstated criteria which have been or would be used "seed money" compared to "chosen instrument"	In-depth analysis of objectives, risk, marketing determinants, and the program delivery system. Addresses in a fairly rigorous way the incrementality question.	Small sample, so impossible to examine a representative selection of different types of projects and companies. Results cannot be statistically generalized. No hypotheses can be quantitatively tested.	150 person weeks

EXHIBIT 5
METHODOLOGY SUMMARY

Methodology	Outputs	Advantages	Disadvantages	Resourcing
Expert Opinion	Measures technological and defence objectives. Measures and relates risk, R&D intensity, and innovativeness to technological goal, and economic success. Estimates future market trends.	Measures hard-to-quantify aspects of technology and defence. Measures the objective indicators of technology and defence for relative importance. Feeds statistical model. Results can be statistically generalized.	Dependent on experts used. Results may be difficult to explain.	17 person weeks
Journalistic Evaluations	Estimates future marketing potential in terms of demands for different types of technological, political trends, effects of political agreements, changes to tariffs and national content requirements. Analysis of requirements for selling in current defence markets. Analysis of program rationale. Comparison of DIPP with other programs. Relating company and project characteristics to success.	Can achieve broad coverage of issues. Addresses non-quantifiable questions. Uses many different viewpoints.	Subjective evaluation. Results cannot be scientifically validated and generalized.	57 person weeks

V - THE EVALUATION DESIGN

Exhibits 4 and 5 summarize the various methodologies, along with their expected results, advantages and disadvantages, and an approximate estimate of required resources. The methodologies listed in Exhibits 4 and 5 are basically cumulative. The most basic design is methodology 1 - the project survey. The second most basic design would be methodologies 1 and 2 combined, i.e., it would make little sense to select methodology 2 without methodology 1. This cumulative characteristic of the exhibited methodologies is far from absolute, and obviously open to management discretion, but it is recommended that the selection of any methodology should lead to most or all methodologies listed prior to it in Exhibits 4 and 5.

Although, for analysis purposes, the methodologies are treated separately, there are obvious links among them, and all project plans will have to treat the methodologies simultaneously. For example, survey data and expert opinion are required before the statistical model can be calibrated. Thus, the needs of the model (e.g., the hypotheses to be examined), must first be identified, used in the survey design, and the survey results are then fed into the statistical model. Similarly, estimating technological and defense incremental effects makes little sense until economic incrementality is established.

Expected Results

Management has chosen an evaluation design incorporating the first five methodologies, i.e., all but controlled experimentation. Based on the previous description of the issues and methodologies, and examining Exhibits 4 and 5, the expected output from this design can be summarized.

The most basic effectiveness question is exactly how well have the program objectives been met? An estimate of the overall effectiveness of the program, based on a well-controlled statistical survey, will serve as a benchmark here. A deeper, but less broad, measure of the program's effectiveness will flow from the case studies and expert opinion. At the end of the evaluation phase, a set of indicators, objective and subjective, broad and deep, measuring the effectiveness of the DIPP program in meeting its objectives from different perspectives, will be available.

The analysis of objectives will also yield information regarding the relationship between goals. For example, the cause-effect links between support of various types of technology and economic payoff will have been analyzed, so that the relationship between various technologies, intensity of technology, etc., and economic results will be clear, and can be used in setting directions for DIPP funding.

The evaluation will indicate the appropriate criteria to be used in granting funds under DIPP. Priorities for granting funds for different types of projects, different companies, etc., based on optimal program effectiveness, will be developed in the evaluation. In other words, reasons for project success and ways of increasing success will have been analyzed and tied into program criteria.

Related to the criteria question is the program rationale issue. The extent to which DIPP matches the subsidization in other countries will have been estimated, and thus its logical use in decision-making (e.g, differing levels of funding depending on competitors' level of subsidization) will be known by the end of the evaluation.

The extent to which risk is being supported by DIPP, will be measured, and the relationship between risk and program effectiveness analyzed. It will be understood by the end of the evaluation whether risk-support is a necessary component of the DIPP program, and how it should be used in funding (e.g., sliding scales of funding based on risk).

A third rationale for the DIPP program, namely freedom from countervail, will also have been examined in the evaluation. The extent to which all three program rationales - risk-sharing, matching subsidies, and freedom from countervail - are justified will be known, and can thus be used by management in policy decisions for continuing, eliminating, or improving the program.

Based on the examination of the company accounting systems and bidding rules, the extent of project specificity in the DIPP funding can be estimated. This knowledge can be used in modifying company requirement for DIPP funding in order to re-direct funding, and this will thus have serious implications for increasing value for money.

The examination of the marketing environment will aid management in guiding DIPP funding into optimal directions. Reasonable predictions concerning where the best opportunities are, and how best to meet these opportunies, will be available. There will therefore be implications to criteria for granting funds (are the projects going toward the best market), and project-monitoring (are companies and government doing what is required to market their product as and after it is being developed).

The examination of the program delivery system will concentrate on three issues - efficiency, effectiveness, and control. The central question concerns itself with whether responsible government officials in the DIPP program are doing what they re supposed to according to the program Directive. Answering the efficiency question will indicate whether these required actions are being handled in the most efficient manner. The effectivness issue will be concerned with whether the required actions are the most effective ways of delivering the program and, if not, how they could be changed. The evaluation of the program delivery system will, in summary, indicate how efficient and effective the program has been, and how well it follows its own requirements. It will also identify appropriate ways of strengthening weaknesses in these three areas.

VI - CONCLUSIONS

The evaluability assessment of the DIPP program has been concluded. The program has been judged to be evaluable, i.e., measurable indicators exist for the program objectives, and the underlying program structure is logical.

Evaluation methodologies have been identified to do the following:

- measure how well program objectives have historically been met, and how the meeting of one objective relates to the satisfaction of other objectives;
- improve program effectiveness by incorporating analytical cause-effect findings into the criteria and priorities of the program;
- measure the validity of program rationales, and recommend changes to the program to best meet the validated rationales;
- examine the way DIPP funds are handled by companies' accounting systems and options for maximizing DIPP effectivness through accounting requirements;
- estimating future market demands and historical reasons for success and failure, with recommendations regarding future DIPP emphasis and monitoring and control requirements;
- measuring and recommending ways of improving program delivery effectivness, efficiency, and control.

The final result of the evaluation will be a recommendation regarding the continuance of the DIPP program, and the manner in which the value for money resulting from the program can be maximized. By following the workplans and schedules outlined in Appendix VI, these results will be available to management by March 31, 1980.

DEFENCE INDUSTRY PRODUCTIVITY PROGRAM

HISTORICAL PROFILE

BACKGROUND

After World War II and through the 1950 decade, Canada, like other NATO nations, placed considerable emphasis on national defence. As part of that emphasis, Canada included the domestic design and development of weapon systems, at the same time maintaining a defence production sharing arrangement with the U.S.A. Examples of Department of National Defence (DND) design and development programs included platforms such as the AVRO "Arrow" fighter (air force), "Bobcat" armoured vehicle (army), and "Bras d'Or" hydrofoil (navy). By the late 1950's and early 1960's the extent of these three technical challenges became evident by the size of their cost overruns and their program time delays: as their unit prices increased, their domestic acquisition and export marketability probabilities decreased.

In 1959, the Conservative Government cancelled the "Arrow", the other programs survived a little longer. The government, to minimise the breakup and loss of the industrial technology teams built up by the companies, decided to strengthen existing assistance programs or instituted new assistance programs through the Department of Defence Production (DDP). First, the Act establishing DDP had provision for loans or advances to industry for the .."construction, acquisition, extension or improvement of capital equipment" which led to the program for Industry Modernisation for Defence Export (IMDE). Second, DDP created a new assistance program to cover the contract start up costs (source establishment) of those companies successful in winning US defence contracts in advanced technologies, specifically "..aeronautical, electronic, and armament production". Third, Parliament voted funds to support an R & D program to be DDP administered. These three separate elements were eventually to become the Defence Industry Productivity Program (DIPP).

A fourth component, cancelled in 1975, was an applied research program, the "Defence Industrial Research" (DIR) Program: while this never became part of DIPP, several of its promising offspring later qualified as DIPP development projects.

In 1967, the three individual components were transferred from DDP to the Department of Industry (DOI), where in 1968 these components were consolidated into a single program called the Defence Industry Productivity Program (DIPP). At the same time, Cabinet gave approval to the inclusion in DIPP of high technology civil projects. Almost immediately, early in 1969, DOI was merged with the Department of Trade and Commerce to form the Department of Industry, Trade and Commerce (ITC). Withing ITC, DOI became the Industry Sector Branches (ISB'S), while the International Defence Program Branch (IDPB) became part of the trade sector. Overnight, ITC inherited a variety of assistance programs to industry with and ad hoc organisation structure: a typical example being program policy reporting to one ADM, with program management and program user (ISB's) reporting to a second ADM - (not dissimilar to the

production manager deciding his own quality control): in the case of DIPP, policy was perceived to be the prerogative of the Interdepartmental Committee. The results of these various organisational and policy changes were incorporated in a revision of the DIPP directive early 1973. (In the maze of all these changes, the historic DDP contract responsibilities became separated and ended up with the Department of Supply and Services (DSS) and the Canadian Commercial Corporation (CCC).

Treasury Board had maintained a general dissatisfaction with overall ITC assistance program management, but these where resolved to a certain extent in 1976-77 with the arrival at ITC of a new ADM, a new DM, and a new Minister, all from Treasury Board. Further reorganisation and more program changes took place in ITC: program management was separated from the user, integrated with policy, strengthened under the ADM Enterprise Development, with increased emphasis on financial analysis and evaluation; the ADM Industry and Commerce remained the DIPP Marketing Adviser, with the responsibility for export marketing of defence products through the Defence Program Branch. The current DIPP Policy and Administrative directive, reflecting these changes, was issued June 1977.

The Change in DIPP Objectives

A review of the stated DIPP objectives, form 1959 to the present day, indicates a shift form a broad defence technology including weapons and armaments, to a limited defence technology, to a mixed defence and related civil high technology orientation. It should be noted that even at the start, DIPP had a practical approach. While the phrase R & D is used, the emphasis was on product development rather than pure research, with approval criteria related to potential sales arising from the projects.

1959-60

This early time frame was close to the Korean War era and only a decade and a half after World War II. Canada's NATO commitment was strong. The Department of Defence Production (DDP) objectives, organisation and criteria for DIPP were consistent with DDP objectives and simply stated:

Objectives: To foster a sound Canadian industrial R & D base....
To participate in US defence development and production....
To participate in Canadian development for which there will likely be a US defence market.

At the outset, the program was to be controlled by an Interdepartmental Committee of which the principal members were DDP, DND, Defence Research Board, and Treasury Board. Staff support was provided by 3 advisory working groups entitled Aeronautics, Electronics, and Weapons, who were to select and monitor projects. The criteria were oriented to US defence needs, with production sharing potential: Canadian military interest ranked fifth. In this respect Canada, within the context of government policy, moved from a traditional defence procurement system to an almost barter and contract weapon sales system to the U.S.A. The hope was that the sale of defence materiel to the U.S.A. would cover the principal costs of imported weapon systems.

We are not aware of another country that specifically funds military materiel projects for the prime benefit of export sales, without a prime domestic requirement. We are aware of countries, (eg. U.K.) that modify their domestic military materiel needs to make them more acceptable for export markets.

1968

The purely military orientation of DIPP was modified by the addition of defence related civil high technology projects at the time DDP was disbanded, when DIPP was transferred to the Department of Industry (DOI), which had a mandate for all industry, not just the defence industry.

In 1967, D. Mundy, then ADM in DDP, had commented on the lack of worthwhile projects being received by Canada under the Canada-US DPSA. About the same time, de Havilland encountered problems with a major civil sub-contract for the U.S.A. S. Reisman, DM, Department of Industry, proposed to Cabinet the broadening of DIPP criteria to include civil high technology projects, and the establishment of Douglas Aircraft Canada (DACAN) to take over the de Havilland contract. Both proposals were approved by Cabinet 1 May 1968.

There is a perception by some that the civil related DIPP projects exist by means of an ambiguous connection under the high technology umbrella. This is not so: the authority was formally approved by Cabinet in session.

1970

A review of DIPP objectives and organisation was carried out in 1970 by the then Division Chief, J. Mitchell. By this time the Department of Industry and Department of Trade and Commerce had been merged, and if the new department had yet to define its mandate in practical terms, DIPP had no such problem since it still perceived itself as deriving its mandate from the Interdepartmental Committee.

Objective: To develop and sustanin technological capability of Canadian industry for defence export sales or civil export sales arising form that capability.

Sub-goals: To minimize cost of acquisition of equipment to DND

To retain in Canada defence industrial capability to service and maintain advanced DND equipment

To maximize industrial benefit from advanced technology and management techniques inherent in defence research, development and production.

Organisationally, the DIPP relationship between the delivery mechanism and program administration remained similar to its organisation in DOI: that is, the ADM who managed the Industry Sector Branches also managed program administration; policy was influenced by the Interdepartmental Committee; with marketing and bilateral DPSA management through the International Defence Programs Branch and their foreign defence liaison officer service (a dedicated, military oriented, mini-Trade Commissioner Service).

The Canadian Commercial Corporation (CCC) remained available to negotiate government-to-government contracts, and DSS retained contract administration (as opposed to the ISBS, who were responsible for project management).

The overall structure of the Interdepartmental Committee with three advisory groups remained, with one subtle change in title: the Weapons Advisory Group was re-named the General Technology Advisory Group. This reflected a diminished attitude within the country to defence, and a reality to the projects in the program.

Within DIPP itself there were three major, and one minor, components:

- R & D, or innovation projects. These originated from several sources, but ultimately depend on a company technical capability and a company commercial interest to develop the project. Most commonly, these originate as direct company proposal/applications to ITC. Some are generated through DPSA mechanisms as "nominated projects". A few may have originated out of domestic need. All R & D innovation projects are approved by the Interdepartmental Committee.

- Industry Modernisation for Defence Export - Capital Equipment. Originate through ISBs, for companies desiring to upgrade production capabilities to produce defence and defence related equipment. For example, as part of many DOD contracts in USA, government provides machines and special tooling and this is a Canadian equivalent to remain competitive. Approval by Departmental Committee.

- Source Extablishment. To provide start-up costs to Canadian companies bidding on U.S. DOD contracts. This covers test and other equipment or services that may be contract related, available form DOD to u.s. companies but not Canadian. Again, this mechanism is to enable Canadian companies to remain competitive. These funds are only paid if the Canadian bidder secures the contract.

- Bid support. To assist cover the expenses of costly bid prparation.

1973

In January 1973, the DIPP Directives were re-written:

Major Objective: As stated in the 1970 review, word for word.

Sub-Goals: Not stated clearly, but implied as follows:

To minimise costs of acquisition to DND

To enable Canadian industry to sell defence and defence related civil products

To enable Canadian industry to maintain/advance their technological skills and industrial capability.

The organisation and program elements remain as in the 1970 review, but the general program criteria reflect a more commercial note: there is a requirement for definition of product need, technological forecast, and market access. In all, the "proposal shall make good business sense".

1977

In 1975-6, ITC received a major addition of senior management from Treasury Board Secretariat, where there had been general criticism of ITC programs. Within a short space of time, program policy and management was clearly separated under the ADM Enterprise Development; program delivery remained with the ISBs under the ADM Industry and Commerce Development; defence sales and bilateral defence production sharing treaties remained with Defence Programs Branch under the ADM TCS and International Marketing, while commercial product sales remained with the ISBs.

The division of responsiblities became more formal, a basic "challenge" mechanism was established, and greater emphasis was placed on financial analysis. The DIPP Policy and Administrative Directives were re-written and re-issued June 1977. The 1977 Directive opens with the following sentence: "The DIPP operates in support of Canadian international defence cooperative agreements for research, development and production". This is a clear statement of direction, which is then broken down into the following objective and sub-goals:

Objective: To develop and sustain the technological capability of the Canadian defence industry for the purpose of generating economically viable defence exports and related civil exports.

Sub-Goals: To meet objectives of international defence development and production sharing arrangement

To support industry sector strategic objectives

To maximize economic return on resources employed.

Again, there is a shift in program emphasis: research and defense have less prominence, while industry sector objectives and return-on-investment are emphasised. DIPP is gradually being aligned with ITC overall objectives, rather than existing as an entity in itself.

1979

The DIPP Policy and Administrative Directives are again under review.

Comment

While the changes in the objective appear minor, the perceptions on international defense and the situation of the Canadian industrial defense and the situation of the Canadian industrial base have changed the environment within which DIPP operates. In 1959, government, the nation and industry were more defense oriented than today. This changed in the mid 1960's with a move to social development rather than military and economic development. Today, there is a return to economic development with ITC developing industrial sector strategies with which industry assistance programs must be consistent. This is a situation that did not exist 20 years ago, when the mandate of the Department of Defense Production was clearly narrower and more definitive.

These limits were broadened when DIPP moved to Department of Industry - because DOI was responsible for all industry, not just the defence industry. With the creation of ITC, the overall responsibility again broadened to include international trade. If there are problems in understanding the program objectives against todays departmental mandate, one perception may be that DIPP remained fairly constant in an environment that changed significantly around it, and the type of technology DIPP supported became more complex and harder to understand both in itself and in its implications.

It is noteworthy that DIPP proponents describe the objectives as "flexible" whereas DIPP questionners or opponents describe the objectives as "ambiguous". Since DIPP has some in the latter category, it will be necessary to address many perceptions to maintain credibility of the eventual evaluation.

CANADIAN DEFENCE INDUSTRY PROFILE

Definition (1977 DIPP Directive)

"Defence Industry" for the purposes of the Program is defined as those companies or elements thereof which have or clearly demonstrate the intent to develop a defence oriented capability or capacity employing advanced management, engineering and technology directed to defence export sales and related civil sales.

Others have different definitions of the defence industry; these include any company in high technology and aerospace; or any company that sells to a defence buyer products that may be high or low technology. It is clear that the defence industry universe varies significantly depending on which definition is selected, and that the definition varies on the perception of the user who may be in ITC, DSS, DND, External Affairs (EA), industry or elsewhere.

What may be as important as - or perhaps more so than - the definition of the defence industry, is the reaction within government to a program and an industry that is defence related. There is no question that DIPP on the one hand presents difficulty to some through its high technology association, and on the other hand arouses negative reaction because of its defence orientation.

Ratio Civil to Defence Sales

Using Canadian company sales as the measure, Program Office data indicate that in the first decade of DIPP, to 1970-1 civil sales accounted for 40% and defence sales for 60%. This is interesting because it recognises that while DIPP was defence oriented until 1968, substantial civil exports had been occurring. Five years later, to 1975-6, there had been a minor change in that civil sales accounted for 42% and defence sales for 58%. In this time period, gross accumulated sales increased for $2.7 billion (1970-1) to $5.7 billion (1975-6).

This raises the question as to how defence/civil sales are defined, and relates back to the definition of the Canadian defence industry.

Company Ownership

To 1970-1, the universe of 153 companies that had generated the $2.7 billion in sales were 51% Canadian owned and 49% foreign owned. However, all the largest 5 companies and two-thirds of the medium 12 companies were foreign owned: only in the group comprising the smaller companies (less than 200 employees) did Canadian owned enterprises exceed foreign subsidiaries.

By 1975-6, the universe had increased to 206 companies generating $5.7 billion sales, and there had been a slight shift in favour of Canadian ownership to 56% with foreign ownership declining to 44%. Since the corporations were not specified by name, no direct comparison may be made, but examples of the change might include the transfer to Canadian ownership of Canadair and de Havilland as well an increase in the number of smaller companies.

Company Size Related to Crown Investment and Sales Revenue

Overall parameters are described in the following table:

Table 1: Company size vs. Crown Expenditures and Product Sales to 1976

Employees	NO.	(%)	EXPENDITURE	(%)	SALES	(%)	RATIO SALES divided by EXPENDITURE
2000-5000	6	(6)	$192 M	(53)	$3,800 M	(67)	19.8
200-2000	25	(12)	$125 M	(34)	$1,460 M	(25)	11.7
0- 200	175	(85)	$ 45 M	(13)	$ 410 M	(8)	9.1
	206	(100)	$326 M	(100)	$5,670 M	(100)	

The above table indicates that the larger the company, the more efficient it is as a multiplier of input funding relative to sales. The reasons for this efficiency are unkown, but may be related to size, multinational relationships, experience, higher marketing and management capability, and other factors.

DIPP Success Rate to 1976

Overall data is given in the following table:

Table 2: DIPP Expenditures on Successful vs. Failed Projects (to 1976)

Successful Projects	349	(83%)	Expenditures	$315 million	(87%)
Failed Projects	70	(17%)	Expenditures	$ 47 million	(13%)
	419	(100%)		$362 million	(100%)

The criteria (economic, defence capability, technical spin-off, etc.) are neither defined nor verified. The above figures hardly indicate DIPP as a risk program.

Canadian Capability to Meet Export Requirements

Because DIPP is oriented to defence and defence related exports, it is essentially responsive to other country needs rather than Canadian needs, and successes in export may not be followed up by domestic DND purchase: two examples are the CMC doppler navigation that became standard fitment on early Lockhead C-130 transport aircraft, and the CL-89 reconnaissance drone. Conversely, the lack of Canadian government purchase of DIPP products is a negative market aspect which DIPP companies find hard to overcome.

This requires Canadian corporations to not only closely match capabilities to foreign needs, but also to establish appropriate levels of credibility - this is examined in more depth in the review of the U.S. military industrial defence base.

No inventory or major analysis is made of the Canadian capability at this point, but certain questions are noted relating to the industry structure.

- the bias of DIPP, once the large company recipients are removed.

- the relationship between company products lines: some have few products with many derivatives of each product (Pratt & Whitney), others have a variety of disparate projects (CMC).

- the corporate relationship, good or bad, of a subsidiary with its parent allowing access to product transfer, technology transfer, and the capability to synergize product technology between domestic and foreign affiliates (Litton Systems Canada has an open relationship with its parent: CMC does not and this may have contributed to reduced success rates).

- The analytical marketing skills of the industry, permitting accurate identification of opportunities, on a level consistent with their technical capability.

- the marketing capability of the industry, permitting it to capitalise on the technical capability by means of appropriate strategy.

- the technical capability to develop systems as a prime, rather than to develop components as a subcontractor.

The overall needs are to possess a basic technical capability, a detection capability for opportunities, and a marketing capability to realise the benefits of the resources committed to the project.

Beyond this there may be a need to examine what should be done, if anything, for the companies to remain in the high technology environment. For example, Prat & Whitney Canada is pre-eminent in small turbopropeller engines for the general aviation market - but all its significant general airframe customers are in the U.S.A. In the U.S.A., there are significant pressures against P&WC: there are three U.S. competitors: Congress exerts sufficient leverage to force P&WC to assemble engines in the U.S.A. for government buys in spite of the DPSA: the U.S. Department of Justice forces P&WC to abandon a joint development with Rolls Royce (U.K.) because the results may be competitively prejudicial to its three U.S. competitors: certain DOD development contracts in small engine R & D may only be available to U.S. companies. The long term iterative effect of such non-tariff barriers is unknown, in terms of continual DIPP funding inputs to Canadian corporations that enjoy significant market share of sections of the U.S. economy.

GOVERNMENT MECHANISMS RELATED TO DIPP

The principal mechanisms discussed here are the Defence Programs Branch, with the mandate of marketing Canadian defence products, and the Defence Production Sharing Program.

Defence Programs Branch

The Defence Programs Branch serves ITC as the focus for export marketing of defence products, the management of bilateral agreements to support this thrust, and the function of marketing adviser to DIPP.

Through its histroy with DDP and DOI, DPB operated its own overseas maketing posts in key countries, principally Europe, Iran and the U.S.A. The rationale lay in the way other nations managed their military materiel acquisitions - it needs a military industrial specialist to talk the same language as the buyer. At the same time, a dedicated marketing service could be provided to the Canadian defence exporter under the umbrella of government, since most defence products are purchased by government directly or indirectly. DPB became staffed with officers of a military-high technology industry background, who became familiar with both the system and the domestic defence industry, and this expertise was portable and grew as they rotated between Canada and overseas.

In the past decade, two factors influenced this marketing channel. First, the funding of civil high technology products under DIPP: DPB specialised in defence product marketing, the ISBs were responsible for commercial marketing, the dividing line at times being unclear leading to some jurisdictional conflict. Second, the integration in 1974 of the DPB "foreign service officers" with the ITC Trade Commissioner Service; this was perceived on the

one hand to dilute the specialist skills of DPB with the generalist skills of the Trade Commissioner, on the other hand to add a much wider marketing channel for defence products.

The function of Marketing Adviser to DIPP operates at two levels. First, there is a quick response capability to serve smaller projects and capital equipment acquisition: this is generally based on DPB specialist knowledge supplemented by information from overseas posts. Second, there is an in-depth market analysis capability for the more complex innovation projects provided by the Market Reasearch & Analysis Division (MRAD); this is based on an independent assessment of the markets identified by the applicant company.

Currently there is a proposal to use DND military liaison officers overseas in a more active role to promote Canadian defence products sales. Previously, this role did not exist with DND, though it has been part of the role of the military of other nations. Some controversy has been reported over this suggestion.

Defence R & D Bilateral Arrangements

With the elimination of major domestic platform or weapon system development, there was reduced Canadian control over prime and sub-system product development. Greater emphasis and greater hopes were placed on the bilateral US-Canadian Defense Production Sharing Program, to be supported by joint US-Canadian development projects. The first item, the Defence Production Sharing Arrangements (DPSA) is a memorandum of understanding (MOU), open to some interpretation by both sides. The second item, the Defence Development Sharing Agreement (DDSA), while also a memorandum of understanding is incorporated into the U.S. Department of Defense (DOD) purchase regulations. This gives much greater formality and security to the Canadian position, but does not alter conflicting perceptions for R & D: the U.S. DOD does extensive R & D for the sake of technology development in pursuit of national security - a long term view; Canada seeks the development of defence products saleable to DOD - a short term view. The formal bilateral agreement with the U.S. was followed by seven others: Germany (1964), France (1967), Netherlands (1970), Italy (1972), U.K. (1974), Sweden (1975), Norway (1977). Mechanisms were established to decide policy, propose projects, and carry out joint development. The international Defence Programs Branch were selected to manage these bilateral programs, and approved projects were to be funded by DIPP. A listing of these agreements is provided below.

U.S.A.	Defence Production Sharing Agreements (DPSA): 1950's.
	Defence Development Sharing Agreement (DDSA): Nov. 1963. Incorporated in US DOD DAR 6507.
	- duty free sales to US military - avoid Buy America Act
U.S.A.	- joint development of projects - access to US data - no countervailing duties

- Canada funds through DIPP
- policy decided by annual "Steering Committee" meeting, e.g. US exclusion of Canadian participation by security, encryption, nuclear hardening, etc.
- Mechanics by annual Working Groups. Up to 1978, this comprised only USAF: since March 1979, an Army Working group was established: the USN remains hit-and-miss, but trying to formalise.

GERMANY	An exchange of letters occurred in 1962/63, but the formal MOU was signed Oct. 1964. However, the mechanism did not function until a Steering Group was formed in 1970.
FRANCE	MOU signed November 1967 in Paris. The French, as a major armaments developer and exporter, have had more interest in selling to Canada than joint projects.
NETHERLANDS	An exchange of diplomatic notes took place in Ottawa June 1970.
ITALY	MOU signed Rome in May 1972.
UK	MOU signed London February 1974. Other agreements had existed with the UK since the 1950's, such as the ABCA standardisation agreement. Joint projects have been initiated such as the CL-89 Drone.
SWEDEN	MOU signed Stockholm, Feb. 1975.
NORWAY	MOU signed Oslo, July 1977.

The above non-US bilateral MOUs relate to Research and Development Procuremet (RDP) Agreements, and the annual meetings are also governed by Steering Committee meetings to decide policy. The operational guidelines and management is provided by the Defence Programs Branch in ITC.

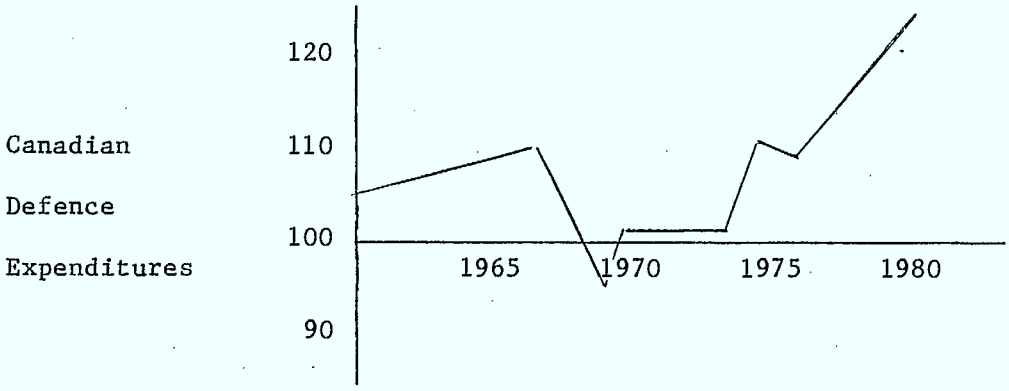
In terms of DIPP projects, review might be by:

- bilateral policy on technology areas, acceptable projects
- numbers of projects proposed, projects entered into, value of input
- success/failure of projects, production arising, value of output
- analysis of projects, program
- revisions arising therefrom.

CANADIAN DEFENCE EXPENDITURES

Some international perspective may be in order, relating to Canadian defence expenditures over the past 20 years, and their position relevant to other nations.

Fig. I: Canadian Defence Expenditures, indexed 1970 = 100



Source: The Military Balance, 1978-9

As shown, defence spending increased to 1967, declined between 1967 and 1973, then increased again. In the 1967-73 period, government emphasised social programs. The military was integrated and reduced in size, commitments to NATO were correspondingly reduced, re-equipment was deferred, and Canada was critical of US military intervention Vietnam. The market base for pure military sales was impacted. This reduction was noticed and criticised in turn by Canada's allies: in NATO's 14 nations, Canada's spending on defence, as a percentage of GNP, exceeded only Luxembourg. From 1974 on DND aircraft, armoured cars; currently new fighter aircraft and ships are under consideration. But the magnitude of these purchases exceeded the existing balance of trade flow in defence sales and a new mechanism, offset acquisition from Canada, was instituted. Offsets were sought in military and civil incremental export production though not always in high technology. There exists real concern that the domestic manufacturing base may have difficulty in meeting offsets.

Table 3, attached, lists defence expenditures for selected NATO/European nations, to provide an indication of Canada's position in relation to these countries.

Figure 2, attached, shows the Canada/US cross border trade in defence procurement. This has also been indexed, to see if any relationship exists between overall defence expenditures and the cross border trade. It appears that some relationship exists, with the major increase in Canadian purchases form the U.S.A. likely attributable to the purchase of the patrol aircraft in 1976.

DIPP EXPENDITURES

Over its twenty year history, DIPP will have channelled close to two thirds of a billion dollars into high technology development at a current annual rate of $40 - $50 million. To provide military perspective, a single major US weapon system will likely cost several hundred million dollars in R & D: the US DOD spends $10-13 billion every year on Research, Development, Test and Evaluation (RDTE). By comparison with the US, Canadian defence product development approximates 0.5% from all sources.

Table 3: 1977 DEFENCE INDICATORS SELECTED NATO/EUROPEAN NATIONS

COUNTRY	POPULATION (millions)	DEFENCE SPENDING INDICATORS ($ billion)	Ê 54+½B- v	(% of GNP)	
USA	220	104.0	480	6.0	All types: missiles, armaments, aircraft, ships, vehicles, electronics
GERMANY	63	17.1	270	3.4	Most platforms, armaments, control systems, communications
UK	57	12.1	215	5.0	As above
ITALY	57	4.7	85	2.4	As above
FRANCE	54	13.7	255	3.6	As above
CANADA	24	3.3	145	1.8	Indigenous: drones, simulators, sonar, ships, communications. Modified: missile, armoured car, radar, small arms
NETHERLANDS	14	3.7	265	3.6	Ships, aircraft, APCs communications, radar, sonar, fire control simulators
*AUSTRIA	8	0.5	70	1.1	Armoured vehicles, small arms
*SWEDEN	8	2.8	340	3.4	Ships, aircraft, armoured vehicles, missiles, guns, radar, fire control
*SWITZERLAND	6	1.2	170	1.9	Armoured vehicles, guns simulators,
*NORWAY	4	1.1	240	3.1	Ships, missiles, guns, fire control, communications
LUXEMBOURG	0.036	0.03	80	1.1	Nil

NOTES:
1. *Non- NATO countries. The other NATO countries are Belgium, Denmark, Greece, Portugal, Turkey.
2. Canada is 6 in population, 7 indefence spending (gross), 9 in defence spending (per capital), 10 in defence spending (% GNP). Within NATO, Canada's defence spending as % GNP exceeds only Luxembourg.
3. "Platforms" comprise ships, aircraft, vehicles (armoured & otherwise) on which subsytems such as armaments, fire control, communications, navigation etc are mounted.

JULY 1979

SOURCES: THE MILITARY BALANCE 1978-79
JANES WEAPON SYSTEMS

Figure 2: Canada-USA Cross Border Trade, Defence Products 1966-1978

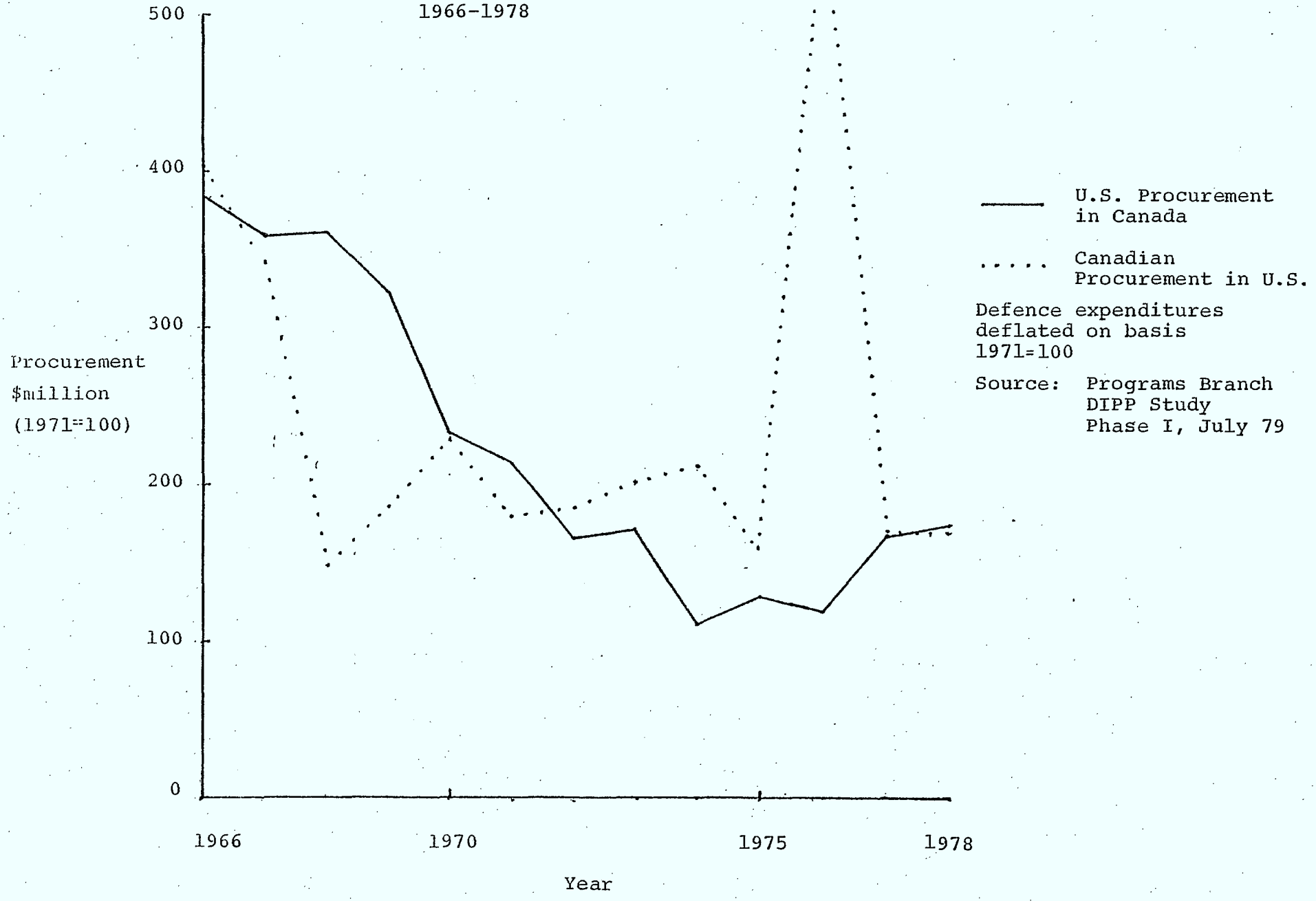


Table 4: DIPP Expenditures (Actual) by Program Element by Fiscal Year 1959-1978.

Year	Capital Assistance $ million	Source Establishment $ million	R & D Innovation $ million	Total $ million
1959/60	-	-	1.815	1.815
1960/1	-	-	2.902	2.902
1961/2	-	-	4.420	4.420
1962/3	-	-	8.000	8.000
1963/4	-	-	19.000	19.000
1964/5	0.394	0.080	20.500	20.974
1965/6	2.378	0.062	23.898	26.338
1966/7	7.626	9.374	22.626	30.626
1967/8	10.215	0.367	22.903	33.485
1968/9	5.425	2.925	21.237	29.587
1969/70	6.114	18.562	23.832	48.499
1970/1	6.656	12.952	25.578	45.186
1971/2	9.407	7.523	31.870	48.800
1972/3	5.582	13.022	29.721	48.325
1973/4	7.502	5.655	44.346	57.503
1974/5	6.865	5.832	35.733	48.430
1975/6	5.938	2.167	30.895	39.000
1976/7	5.509	2.273	37.118	44.900
1977/8	4.305	6.972	31.933	43.210
TOTAL	83.916 (14%)	78.766 (13%)	438.327 (73%)	601.000

Source: Program Office

For comparative purposes, the Dipp investments were adjusted to constant dollars, taking 1971=100 with the results plotted in Figure 3. This indicated that funding was relatively constant over the 1969/70 - 1973/4 time zone, then declined substantially thereafter. Adjusting for this deflation in funding, and maintaining the real value at the 1969/70 - 1973/4 levels would give a present day funding around $80 million.

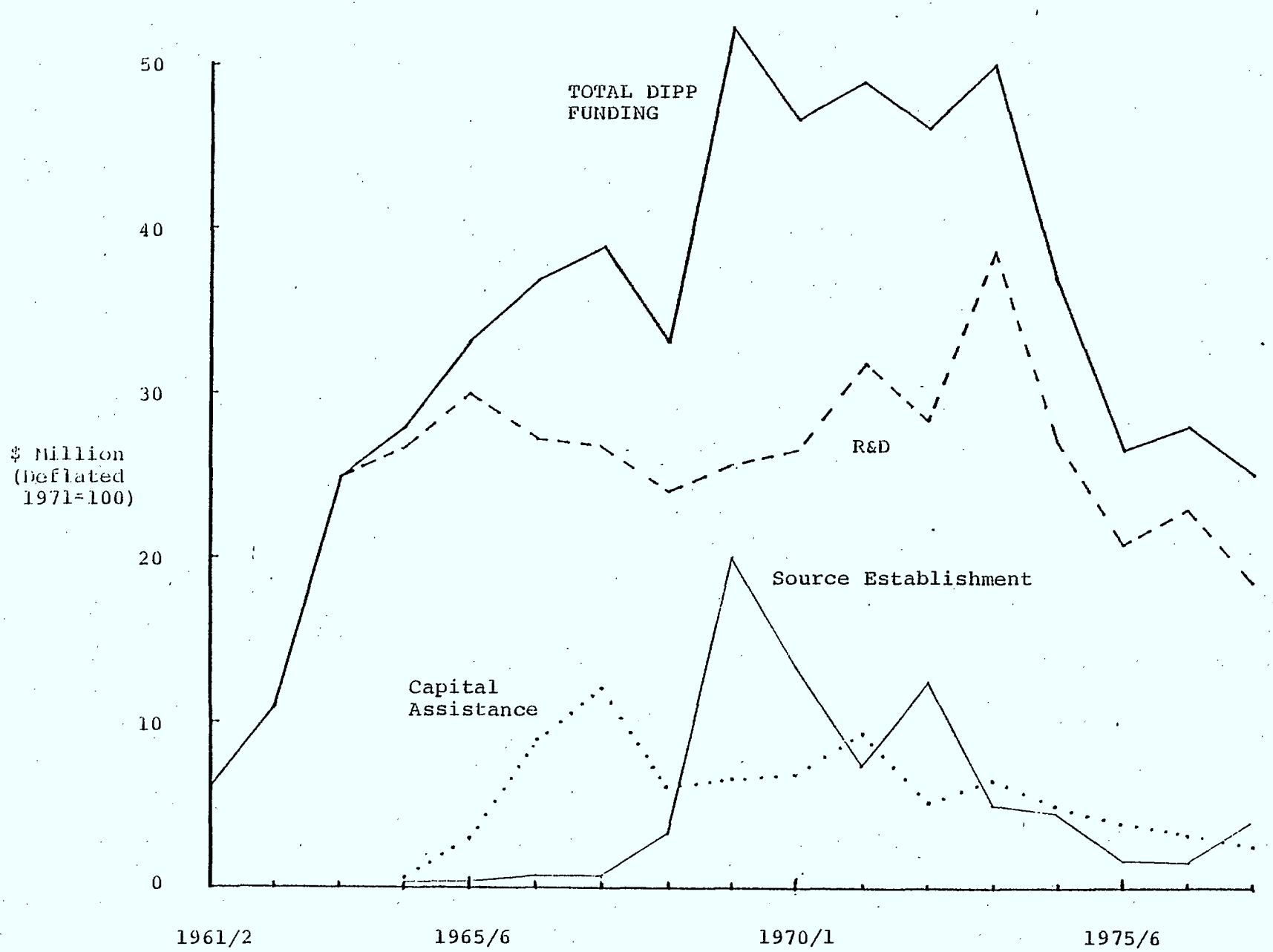


Figure 3: DIPP Expenditures by Program Element by Year

Source: Program Office

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Source: Program Office

ANNUAL FINANCIAL STATUS - DIP PROGRAM (FY 1978/79)
(EXPRESSED IN MILLIONS OF DOLLARS)

COMMITTEE APPROVALS (FY 1978/79)

ASSISTANCE	No. of Companies (1)	No. of Projects (2)	Funds Approved by DIP Committee
Research & Development	15	22	$ 31,401
Capital Assistance	42	49	$ 32,536
Source Establishment	19	21	$ 17,818
TOTAL (DIP PROGRAM)	76	92	$ 70,755

TOTAL DIP PROGRAM ACTIVITY (1978/79)

ASSISTANCE	Total Carry-over from FY 1977/78	Approved by Committee FY 1978/79	Wastage (cancellations & Reductions in Funding Requirements) 1978/79	Net Program Fl 1978/79	(1978/79) Future Year	Total	Expenditure FY 1978/79(3)	Carryover to FY 1979/80
Research & Development	$ 82,190	$ 31,401	$ 6,021	$ 40,283	$ 67,287	$107,570	$ 32,926	$ 74,644
Capital Assistance	$ 12,936	$ 21,536	$ 11	$ 9,512	$ 24,949	$ 34,461	$ 6,278	$ 28,183
Source Establishment	$ 10,708	$ 17,818	$ 814	$ 15,885	$ 11,827	$ 27,712	$ 12,712	$ 14,716
TOTAL (DIP PROGRAM)	$105,834	$ 70,755	$ 6,846	$ 65,680	$104,063	$169,743	$ 52,200	$117,543
	$176,589							

NOTES:
1. In the total count, a company is included only once, for each Research and Development and Capital Assistance and Source Establishment project activities regardless of the number of projects approved on its behalf by the Committee
2. Allied Research and Development, Capital Assistance and Source Establishment proposals are included as a single project only.
3. Expenditure in FY 1978/79 is $52,200 i.e. $12,000 over our allocation of $40,000.

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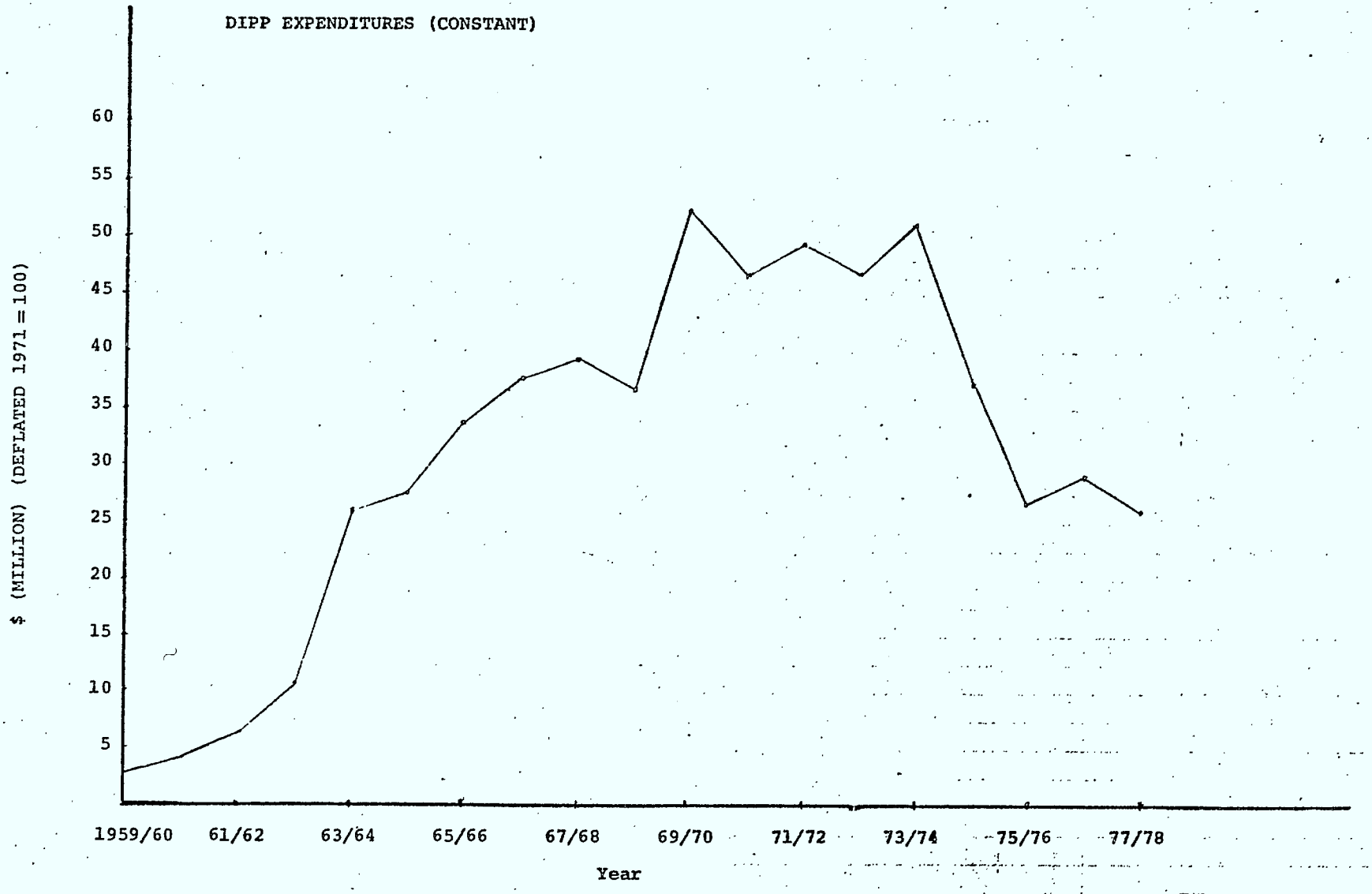
SOURCES: THE MILITARY BALANCE 1978-79
JANES WEAPON SYSTEMS

APPENDIX I


DIPP EXPENDITURES (CONSTANT)
$ (MILLION) (DEFLATED 1971 = 100)
60
55
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10
5
1959/60
61/62
63/64
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71/72
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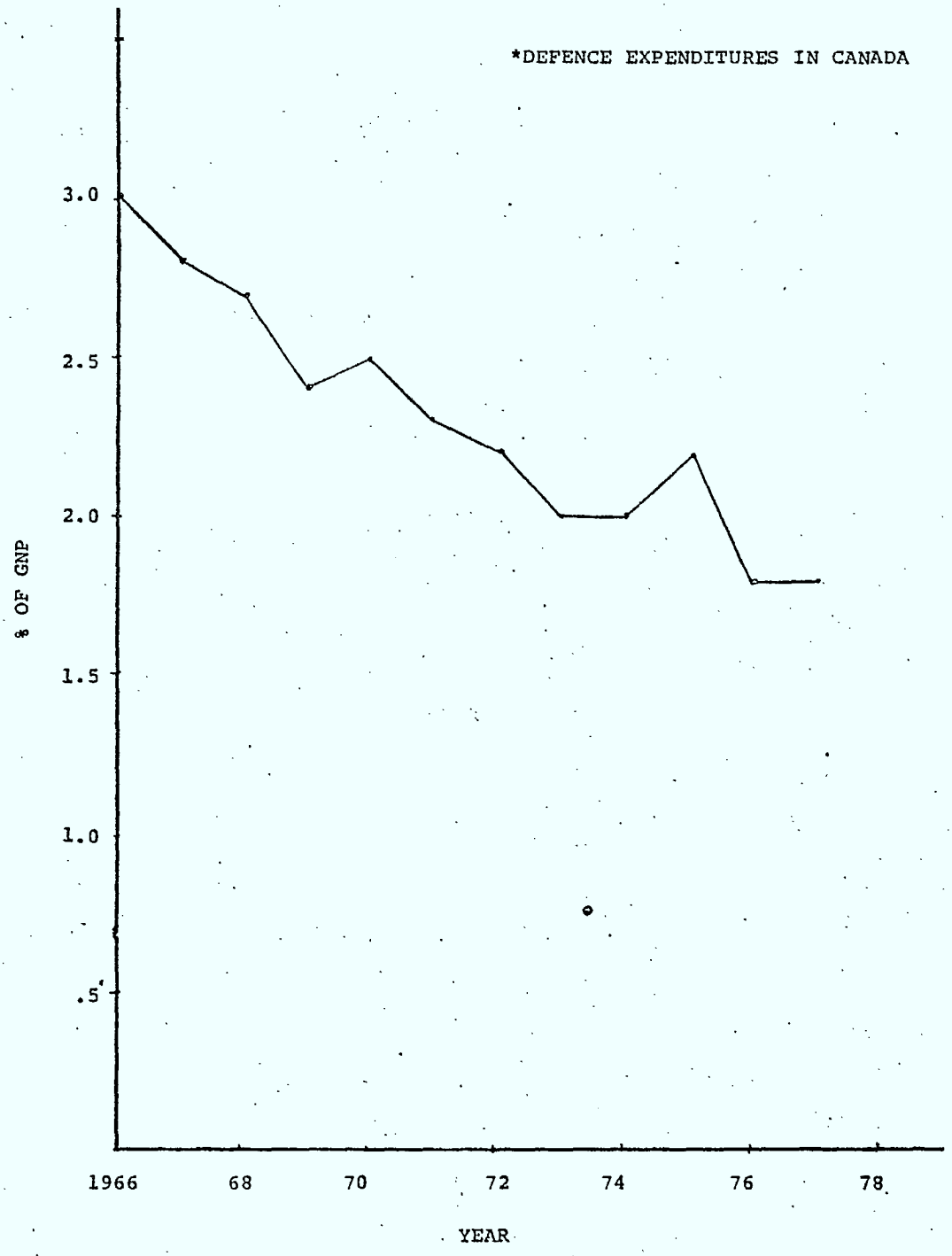
75/76
77/78
Year

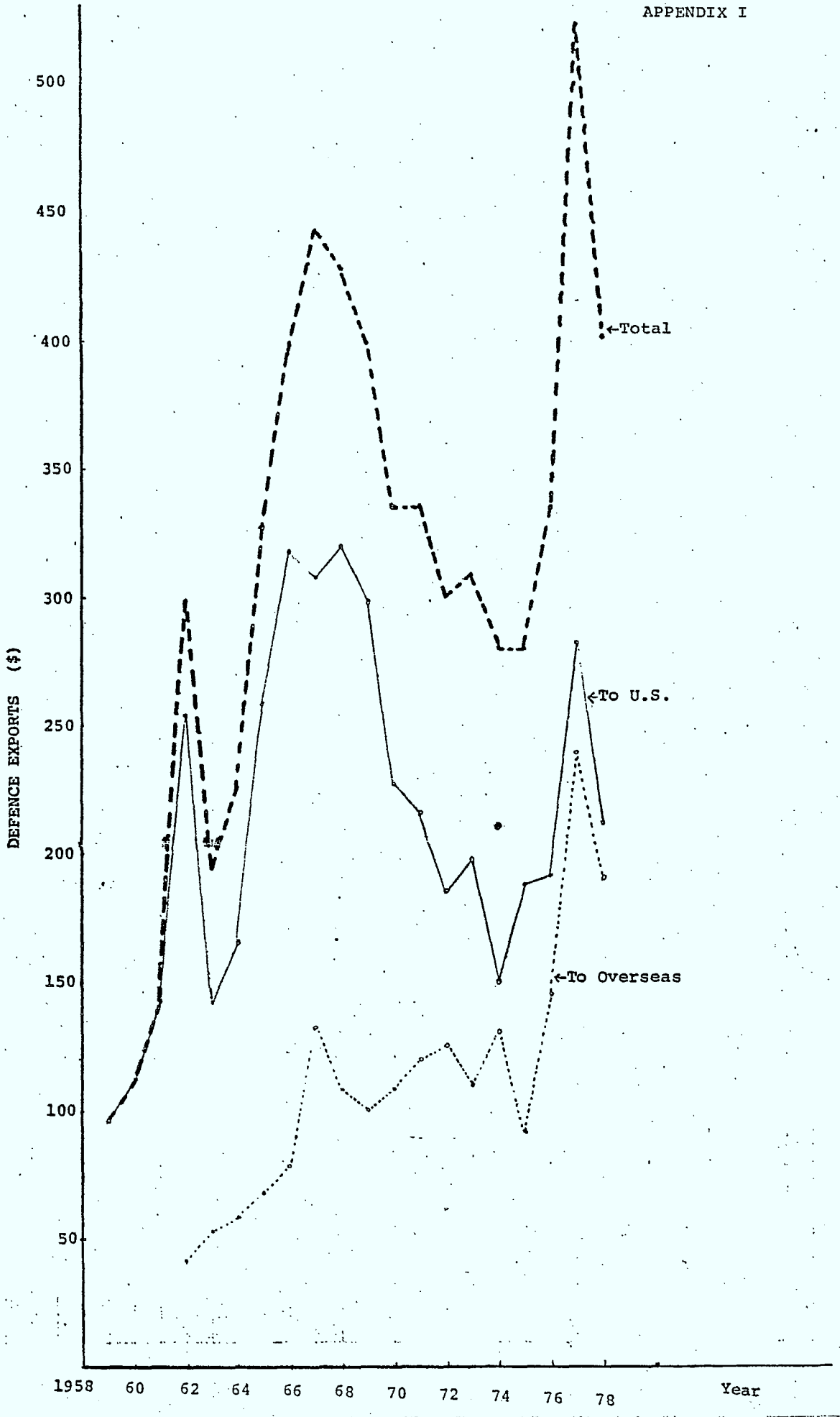
APPENDIX I

*DEFENCE EXPENDITURES IN CANADA



*SOURCE: THE MILITARY BALANCE

APPENDIX I


DEFENCE EXPORTS ($)
500
450
400
350
300
250
200
150
100
50
←Total
←To U.S.
←To Overseas
1958
60
62
64
66
68
70
72
74
76
78
Year

APPENDIX I

CANADIAN DEFENCE EXPORTS

1959-1978

Year	To the United States	To Overseas Countries	TOTAL
1959	96.3	N/A	96.3
1960	112.7	N/A	112.7
1961	142.6	N/A	142.6
1962	254.3	45.1	299.4
1963	142.0	53.2	195.2
1964	166.8	59.8	226.6
1965	259.5	67.7	327.2
1966	317.1	78.3	395.4
1967	307.7	133.5	441.2
1968	320.0	109.1	429.1
1969	299.8	100.1	399.9
1970	226.5	109.7	336.2
1971	216.3	120.2	336.5
1972	175.0	125.4	300.4
1973	198.8	110.4	309.2
1974	150.0	130.5	280.5
1975	188.5	92.3	280.8
1976	191.1	145.0	336.1
1977	283.7	239.9	523.6
1978	212.4	190.1	402.5
TOTAL	4,261.1	1,910.3	6,171.4

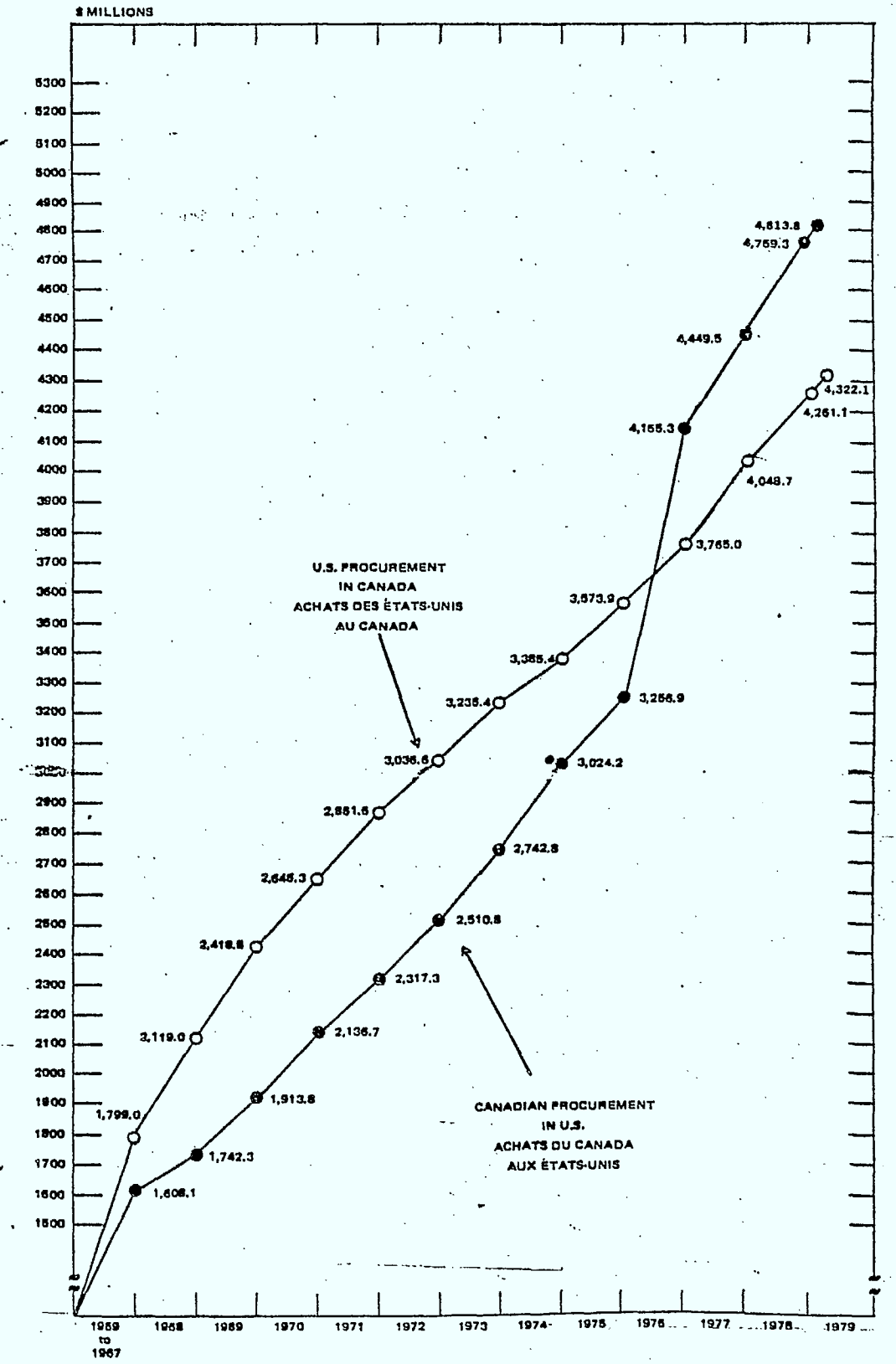
February, 1979

APPENDIX I

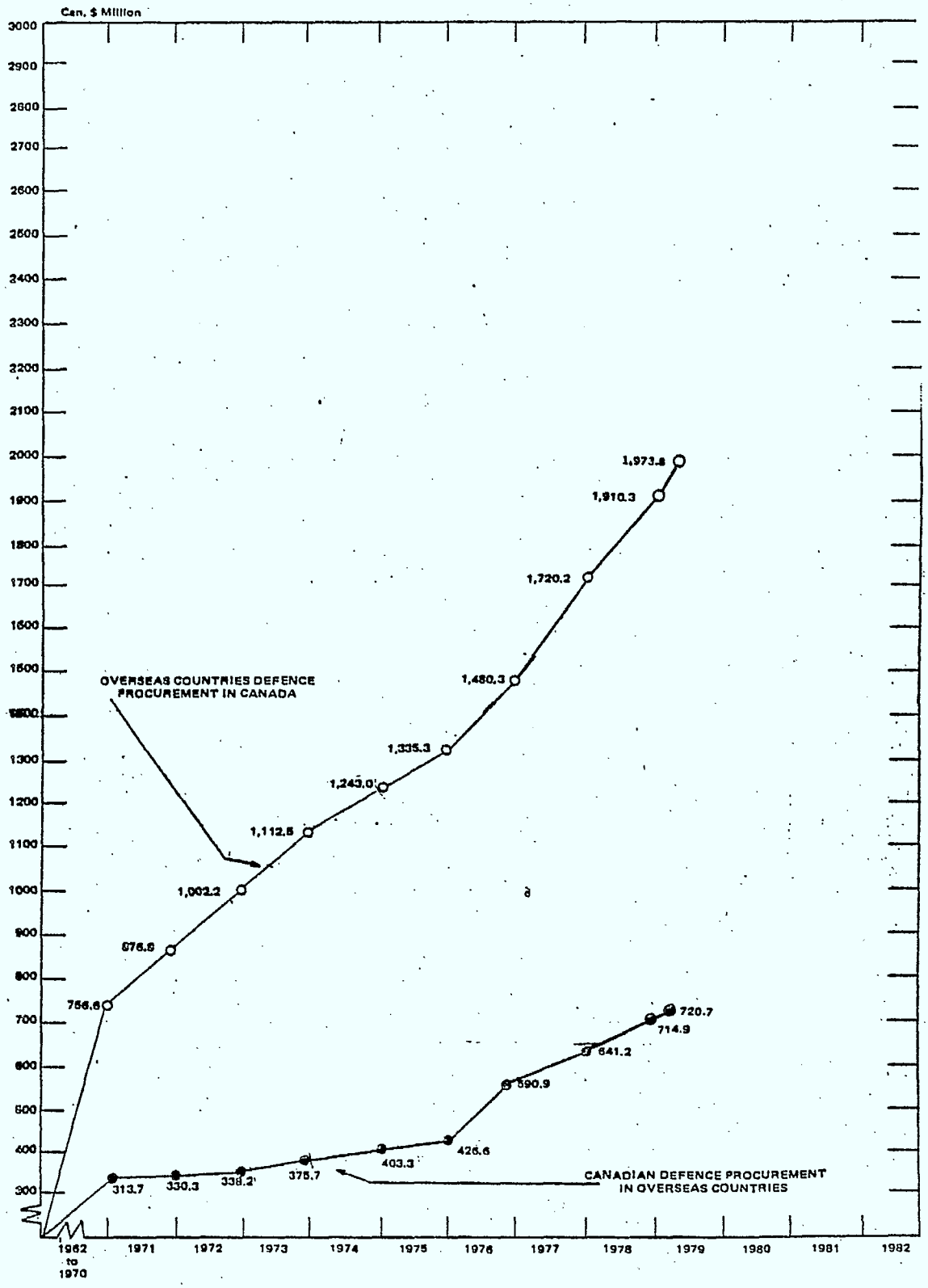
FOR OFFICIAL USE ONLY

CANADA – UNITED STATES
DEFENCE PRODUCTION SHARING
CUMULATIVE CROSS BORDER CONTRACTING
JANUARY 1, 1959 – MARCH 31, 1979

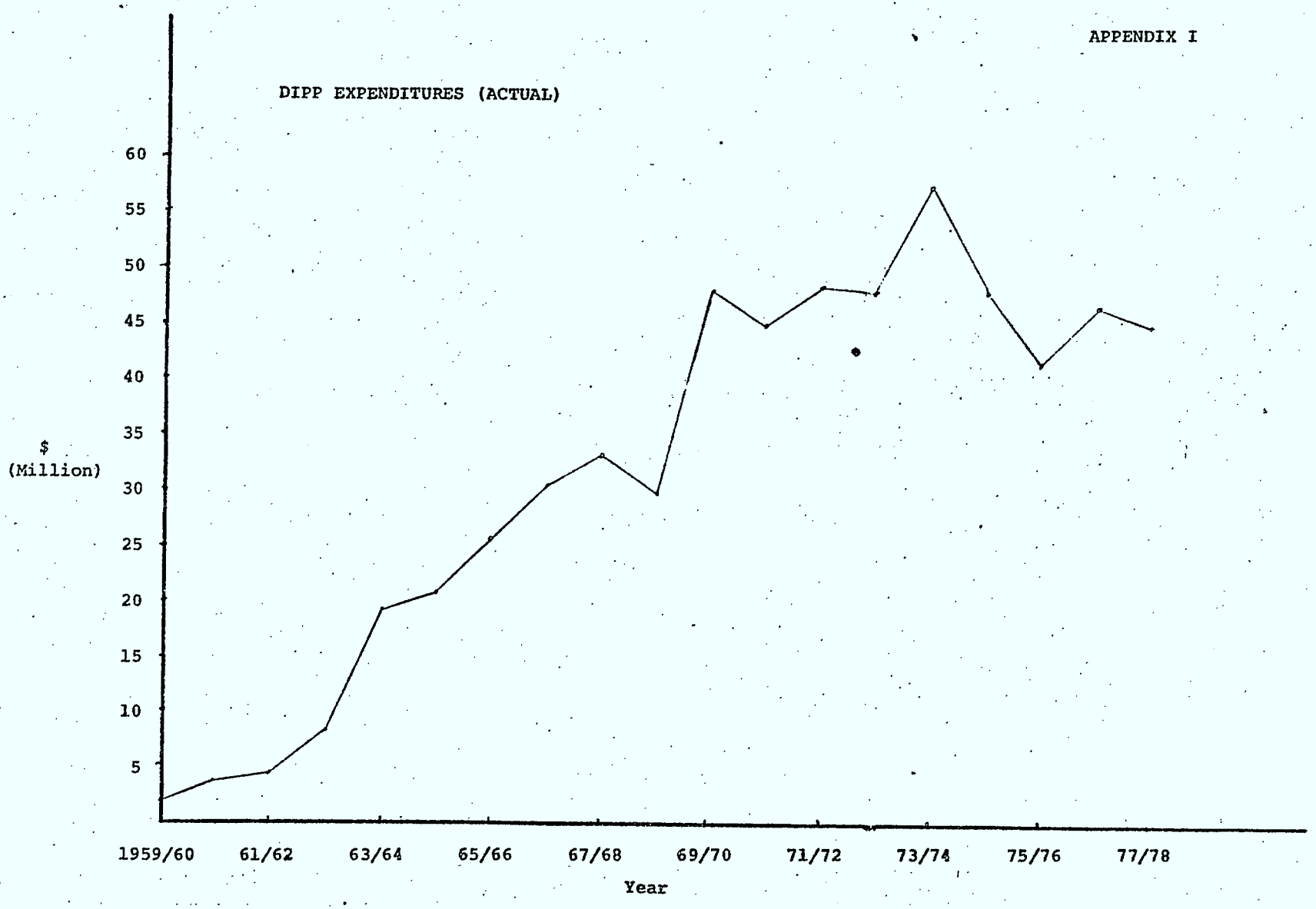
PARTAGE DE LA PRODUCTION DE DÉFENSE
ENTRE LE CANADA ET LES ÉTATS-UNIS
TOTAL DES CONTRATS ENTRE LES DEUX PAYS
DU 1ER JANVIER, 1959 AU 31 MARS, 1979



CANADA – OVERSEAS
DEFENCE PRODUCTION SHARING
CUMULATIVE CROSS-OCEAN CONTRACTING
JANUARY 1, 1962 – MARCH 31, 1979



APPENDIX I


DIPP EXPENDITURES (ACTUAL)
$
(Million)
60
55
50
45
40
35
30
25
20
15
10
5
1959/60
61/62
63/64
65/66
67/68
69/70
71/72
73/74
75/76
77/78
Year

APPENDIX I

DIPP EXPENDITURES

ACTUAL	YEAR	CONSTANT (1971 = 100)
1.815	1959/60	2.50
2.902	1960/61	4.00
4.420	1961/62	6.10
8.000	1962/63	10.9
19.000	1963/64	25.4
20.974	1964/65	27.4
26.338	1965/66	33.3
30.626	1966/67	37.0
33.485	1967/68	38.9
29.587	1968/69	33.4
48.499	1969/70	52.4
45.186	1970/71	46.6
48.800	1971/72	48.8
48.325	1972/73	46.0
57.503	1973/74	50.2
48.430	1974/75	36.7
39.000	1975/76	26.7
44.900	1976/77	28.0
43.210	1977/78	25.2
601.000		579.50

ECONOMIC EFFICIENCY

All projects are undertaken by private corporations. The goal of a program such as the DIPP is to influence the actions of these corporations ie, cause them to do things and to undertake projects which, in the absence of the program they would not have undertaken. Because the modern corporation is a complex organism, has its own corporate strategy which is separate and distinct from the strategy of the Government, and reacts to external stimuli and constraints in its own best interest it is essential that an analysis of a program for economic efficiency impacts take account of the corporate context in which the individual projects are funded.

It may be, that where preliminary analysis indicates that DIPP assistance has been the predominant factor in the corporations growth and development, the corporation itself rather than the individual project is the appropriate unit of analysis. Even in cases where the unit being analyzed is the individual project the analysis must be done in an overall corporate context; it must take full account of the firms business strategy, constraints placed on the firm by ownership on external rules, and other opportunities that the firm might have available. Any methodology which does not explicitly consider the corporate decision making process runs the risk of misinterpreting the process which has actually taken place (ie, cause and effect). The results of any such analysis will be less than ideal.

There are several possible methods for measuring economic efficiency but only one definition (this ignores technical differences, of interest to economists and of great importance in doing calculations, but which are irrelevant to a general understanding of the concept). The economic efficiency of a specific project can be judged by comparing the actual direct productivity of the resources used in the project with the benefits they would have produced if they were employed in alternative uses. Alternative uses are defined as the investment of an equal amount of capital in a "normal" private endeavour which yields an "average" rate of return to society and the use of labour involved in this project compared to the use that appears most likely in the absence of the project.

Two things should be noted about the above statement:

1. it is the rate of return in all the resources employed in a project which is relevant - not simply those supplied by the government. If the project is a result of a government grant (i.e. would not have taken place without the grant - the incrementality issue which can be dealt with in a business policy evaluation), then all the costs and benefits upon all the resources employed in the project are relevant.

2. the standard of comparison is the use the resources employed in the project would have been put to had they not been employed in the given project. For the capital employed in the project, the evaluation must take account of the opportunity cost. For the project to make a net positive contribution to the level of Canadian income (i.e. if rate of

return on resources employed is to be maximized), the government induced project must produce a rate of benefits which is at least equal to the benefits which would have been generated if the capital had been left to its alternative uses in the private sector. This has been calculated in earlier work done by the Department as a 10% real social rate of return. Therefore, any project induced by the government which shows a negative net present value when discounted at a rate of 10% is not maximizing the return in the resources employed in the project.

If the economy were free of distortions and if all costs and benefits which relate to a project accrued to the project, the allocation of resources according to market prices would lead to the maximization of profits for each producer, the maximization of utility for each consumer, full employment of all resources, a maximum level of production and a set of market prices that reflect real economic costs and benefits. In such a situation, there would be no economic justification for government intervention to induce projects as by definition those projects which maximize economic return on resources would be undertaken by the private sector. In such a circumstance, the most a government induced project could hope to achieve would be to equal the rate of return obtainable if the resources were left in private hands.

However, since no such economic system exists, the prices generated in the market will not be the same as those required to guide producers and consumers to a social optimum. The following are some of the general factors which give rise to discrepancies and which may justify government intervention in the system:

1. The assumption of perfect competition among producers is rarely if ever, met. If it is not, prices bare some monopoly element. Even if there is an approximation of the conditions of perfect competition, prices may be determined by non-market factors. Government regulations and union power may influence and determine prices and wages. Minimum wage legislation and maximum price controls are two common examples of government intervention.

2. Market prices also will diverge from social prices if there are external economies or diseconomies, which are costs or benefits created by, but not accruing to, the project.

3. Taxes and subsidies are a further element, causing a divergence between social and market prices.

Given the existence of such distortions, a project that is beneficial for society may not be so for a firm or vice versa. For example, if there is a 10% sales tax on output, then the social benefit, measured by the price consumers are willing to pay, will be 10% above the price realized by the manufacturer. If the social costs are not very different from private costs, then the project may be socially beneficial, but the manufacturer may be unable to make a profit because the tax drives his price below the consumer price.

Conversely, if the manufacturer receives a subsidized input, say subsidized energy, a project may be profitable to the manufacturer but not to society.

The following is a list of the externalities noted in a previous evaluation of a DIPP project (the DHC-7):

1. The existence of the de Havilland operation required an airstrip and therefore, necessitated the present DND strip at Downsview being maintained as an airstrip. The property was valued at $125,000/acre.

2. Municipal Taxes - These taxes represent an economic cost only if they are equivalent to the marginal real demands of the firm on the community.

3. Shadow Price of Foreign Exchange - If a project under consideration generates foreign exchange, it is necessary for an economic efficiency evaluation to value the foreign exchange in terms of domestic currency. The value of the net increase in imports (i.e. the net increase in exports less induced increases in intermediate inputs) is represented by what Canadians are willing to pay for them - inclusive of a representation tariff and sales tax. In an undistorted foreign exchange market, the social valuation of foreign exchange is most appropriately measured by the market exchange rate. However, in the presence of distortions such as tariffs, sales taxes and subsidies, a gap exists between the market determined exchange rate and the appropriate "social exchange" rate. In work done for the Department, the social value of foreign exchange was placed at 13% above the market rate, i.e. if for each $ of foreign sale the company realized only $1, the nation benefited by $1.13. The result is a social benefit to the nation which is not captured by the project itself.

4. Cost of Financing Foreign Sales - Aircraft sales financed through the Export Development Corporation at real rates of interest (net of inflation) less than the social opportunity costs of these funds, imposes on Canadians an economic cost not carried by the project. The low real rates of interest charged to foreigners results in a transfer of real resources from the Canadian lenders to the foreign customers.

5. Sales Tax on Domestic Sales - Consistent with the willingness to pay principle, benefits and costs must be valued gross of all relevant taxes. Therefore, these are a benefit to the project.

6. Incremental Benefits to Workers - The social cost of labour is in essence its opportunity cost:

i.e., the value of its labour in its next best use. That use could be in employment elsewhere or in unemployment. The project, on the other hand, must pay the market rate for labour which may be influenced by such things as union agreements and minimum wage legislation. The difference between the two represents a social benefit of the project.

Calculation of Net Economy Efficiency

The calculation of overall project efficiency is a combination of the private and social aspects of the project. For the DHC-7, the calculation was of the following nature.

Year	Company Profit Before Interest and Taxes	Physical Assets Opportunity Costs	Purchased Fixed Assets	Depreciation	Municipal Taxes Paid	Foreign Exchange Premium	Cost of Financing Foreign Sales	Labour Benefits	Total Social Cash Flow
1975	xxx	(xxxx)	(xxx)	xxx	xxx	xxx	(xxxx)	xxx	xxx
1976	xxx		(xxx)	xxx	xxx	xxx	(xxx)	xxx	xxx
1977	xxx		(xxxx)	xxx	xxx	xxx	(xxx)	xxx	xxx
1978	xxx		(xxx)	xxx	xxx	xxx	(xxx)	xxx	xxx
1979	xxx		(xxx)	xxx	xxx	xxx	(xxx)	xxx	xxx
.	.		.	.	.	.	.	.	.
.	.		.	.	.	.	.	.	.
.	.		.	.	.	.	.	.	.
.	.		.	.	.	.	.	.	.

to termination of project and any spinoffs which can be reasonably related to it.

- all items are denoted in constant 1975 dollars and net efficiency is determined by discounting the total social cash flow to 1975 using the social discount rate of 10% - a positive value indicates the project has increased the economic efficiency of resource use while a negative figure indicates economic efficiency has suffered.

Program Efficiency

The above represents the calculation of economic efficiency for a single project. In theory, program efficiency represents a summation of similar calculations for all projects undertaken by the program. The calculations would to the extent possible, account for the economic benefits from technological spinoffs and other related benefits. These would be taken into account as far as forecasting is permitted. Practical considerations, however, dictate that not every project funded by the program can be evaluated in this manner.

Evaluation Methodologies

1. Description from a survey of Associated Benefits: For the large projects funded by DIPP and a statistical sample of smaller projects, describe the incremental jobs created, foreign exchange generated, profits earned investment stimulated and value added. This could be done via a survey of the respective firms. The rationale for this approach in terms of the above discussion of economic efficiency is that the associated benefits serve as proxies for the more difficult to calculate overall economic efficiency and that they are of themselves of interest to decision makers.

   Date Requirements: a) a listing of DIPP funded projects, b) an opinion from the firm as to whether or not the project was incremental, c) from the firms, details of jobs created, export sales, profits earned, investment stimulated and value added from DIPP projects.
   Expected Outputs: The major output would be a listing for the individual projects surveyed of the associated benefits generated by the DIPP along with an opinion from the firm as to whether or not the project was incremental. In addition, if the sample were sufficiently large to be statistically valid, the results could be extrapolated to the program as a whole. In addition, analysis of the results could be expected to produce some qualitative statements regarding the ability of the program to stimulate associated benefits.

   Resources Required: To design the survey, mail it out, do follow-ups, etc. would take a survey methodologist approximately two months. Resources required for analysis would depend upon the analysis the Department wishes to undertaken given the quality of the data. This is difficult to quantify in advance but an economist could probably do some analysis in the area of relating associated benefits to type of grant, type of firm, type of project, etc. that would be useful. This could be expected to take a couple of months.

   Advantages: 1) the methodology permits coverage of the whole program, 2) the results are generally understood (i.e. exports or jobs are much more widely understood than is the concept of economic efficiency), 3) provides insights into the relative merits of different types of assistance to different types of firms for different types of projects.

   Disadvantages: 1) the methodology measures proxies for economic efficiency only. The relationship of these proxies to overall efficiency cannot be already defined nor is there any method for weighing the relative values of the proxies (i.e. how many exports equals one job and vice versa), 2) the survey method is not particularly effective at determining project incrementality. Respondents have a tendency to overstate the effects of the grant in order to ensure continuance of the program.

2. Econometric/Statistical Evaluations: This would involve statistical studies to test how participants in the program differ in their economic behaviour from non-participants (such things as exports and research and development. This would involve developing hypotheses about expected behaviour and testing the hypotheses.

Date Requirements: Data must be obtained from both participants and non-participants in the program so that comparisons can be made. The data must include firm data such as sales, profits, exports, research and development expenditures, ownership, depreciation expense and cost flows. There are three possible sources for such data: a) surveys, b) Revenue Canada, c) Statistics Canada. With Revenue Canada and Statistics Canada, there are confidentiality problems although it is possible that arrangements can be made with Statistics Canada to do the required work without releasing individual company data. With the survey technique, there is likely to be a response problem since both firms which have received grants and those which have not must be surveyed.
Expected Outputs: The output would be a series of statistical estimations as to the effectiveness of DIPP grants in stimulating desirable economic behaviour. This could be done for such variables as exports and research and development.

Resources Required: The amount of resources required would depend upon the number of hypotheses the Department wished to test and upon the data source employed. If a survey approach were used, the use of a survey methodologist for approximately six weeks must be allowed for. If access to Statistics Canada or Revenue Canada data is obtained, the time must be allowed to obtain and code the data. This could take one clerk supervised half of the time by an officer up to a month to transcribe the data.

The analysis of the data would take two individuals (an economist/ statistician and a computer programmer) up to several months depending upon the number of hypotheses tested and the degree of sophistication (the Howe/McFelteridge study took approximately three man years). In addition, a substantial computer budget must be provided.

Advantages: 1) This methodology is capable of making statements about the entire program regarding the program's effect in such economic indicators as exports and research and development; 2) it is capable of distinguishing results between types of grants, types of projects, types of companies, etc. (e.g. do the grants stimulate more exports in multinationals than they do in Canadian-owed firms), 3) because the methodology compares performance between participants and non-participants in the program, it deals with the question of incrementality.
Disadvantages: 1) data problems as discussed above, 2) the methodology deals with proxies only and provides no measure of overall economic efficiency, 3) the methodology and the interpretation of the results is not standardized and as a result, resource requirements would be high to achieve significant results.

3. Project Appraisal/Case Studies: This involves the examination of a selected number of cases from both the private and public sector perspective in order to: a) make an assessment as to whether or not the project would have been an economic proposition from the individual firm's point of view without government assistance (or if other factors such as size of the project compared to the size of the company or project risk, etc., would have inhibited the firm from going ahead on its own) or if the assistance was necessary and b) if the assistance was necessary and was the determining factor in the project going ahead whether or not the project has contributed to economic efficiency as discussed above when all externalities are accounted for. When the approach is applied to a program, it is hoped that a series of in-depth appraisals will yield meaningful evidence as to the overall effect of the program on economic efficiency.

   The approach can be applied to either individual projects or if it is determined that DIPP assistance has been crucial to the survival and development of a company, it can be applied to the company as a whole.

   A business policy/commercial viability analysis of the project/company is done first because the data gathered from this analysis forms the basis for the economic analysis. This analysis takes the format of financial revenue and cost streams for the project and a review of the corporations' strategy. From these, a cash flow and discounted cash flow analysis can be made. Based upon the results of this quantifiable aspect, and in a subjective analysis of risk, corporate strategy and other factors, the question of the possible requirement of government assistance for the firm can be addressed.

   The economic appraisal, which is based upon the cash flow data developed by the commercial viability analysis is designed to measure the direct and indirect net benefits to the national economy which result from the project. It takes the form discussed above under economic efficiency.

   Data Requirements: The data requirements for such an analysis are major. They include for the cases selected for examination: a) actual and forecast sales of the product split into foreign and domestic components, b) valuation of the physical plant and equipment used to produce the product, c) cost data, d) labour force data on the individuals involved in the project and on their likely alternatives in the absence of the project, (e) access to senior company officials, f) general industry intelligence.

   Expected Outputs: The output from such a case study would be answers to the two questions: 1) would the project have been undertaken (or the company exist) in the absence of DIPP?, and 2) did DIPP's intervention in the market place result in an increase or a decrease in the overall efficiency of Canadian resouce use? In order to answer these two questions, the study would also provide information regarding incremental exports, jobs created, etc.

Resources Required: To prepare a case study requires individuals skilled in finance, economics, business policy and the interaction between the three disciplines. The amount of time required to do each case study depends on several factors: 1) the amount of already existing data on a company or project (as exists on Canadair, de Havilland and Pratt and Whitney), 2) whether or not company market forecasts, cost estimates are to be independently validated (in the case of completed projects, this is obviously not necessary), 3) the degree of precision desired in estimating the economic externalities, particularly labour (labour benefits for skilled labour in Toronto or Montreal are never major and could be estimated using rough order data), 4) the degree to which projects selected for analysis overlap in industry locations, etc.

Complete case studies including independent market verification, independent review of cost estimates and precise estimates of the labour externality have in the past taken one to one and one-half man-years. If, however, only limited independent verification of costs and markets were done and order of magnitude estimates for labour benefits accepted, an individual case could probably be completed in two to three man-months. It must be recognized that the quality of the results does depend upon the amount and quality of the resources used to obtain them.

Advantages: 1) For the individual case investigated, this method provides the best answer of all the possible methods to the questions regarding incrementality and overall economic efficiency, 2) other valuable information regarding such economic indicators as exports and jobs are produced, 3) the approach can be integrated with case studies designed to provide information for defence, technology and marketing. For any project for which the incrementality question is answered for economic purposes, it is also answered for other purposes. 4) The approach addresses the question of economic efficiency in the corporate context and takes account of corporate strategies.

Disadvantages: 1) resource cost, 2) difficulties in deriving generalities regarding the entire program from a limited number of case studies, 3) requires extensive co-operation from recipient firms.

Summary Points re Economic Efficiency Evaluation:

1. In theoretical terms, the measure produced by the case study approach is without doubt the superior measure. If resources and time were not constraints, the best measure of overall program efficiency from an economic point of view would be obtained by completing a case study for each project funded by DIPP: This is not, however, practical.

2. Because the program splits rather definitely into a few large recipients (over the life of the program, six companies have received over sixty percent of the grants) and many small

recipients, a combination of methodologies is probably most appropriate. This could take the form of a survey as discussed under methodology one, supplemented by five or six case studies of major projects and/or major recipients.

MARKETING

DEFENCE PRODUCTS MARKET

INTRODUCTION

Because of the limited time available, this report will concentrate only on the United States Military and Civil related markets. There is little doubt that the United States represents the most complex, competitive and demanding market atmosphere in the world and, therefore, an appreciation of that country will provide a springboard to view DIPP and its relationship to other world markets.

STRUCTURE OF THE U.S. MILITARY INDUSTRIAL SECTOR

The Period 1950 - 1977

Indications are that the Military Industrial Sector in the U.S. has changed very little in its characteristics and structure during the period from 1960 to the present. During the decade 1950-60, 90% by value of the aggregate military contracts were awarded to U.S. business for performance in the U.S. Only 6% went to American and foreign firms for work outside the U.S.

In 1960, 73% of the value of prime contracts went to 100 companies and institutions. Within this amount, seven major industry groups accounted for 90% of the value of prime awards - aircraft, electrical and electronic equipment, oil refining automobiles, construction, rubber, and ship building in that order. A review of FY77 contracting activity shows a similar type of distribution. (See below)

Certain characteristics of the defence market should be mentioned which, in turn, have affected the structure of the industrial base. In the early 1950s, approximately 75% of the military budget was devoted to operating costs and only about 25% to capital outlays, R&D and construction. By 1960 the portion of the budget involved with procurement had risen to 50% and R&D expenditures were 14% as opposed to 4% in 1951. Indications are that this is approximately the percentages in effect in 1977.

The composition of military purchase has changed from conventional weapons (guns, artillery, etc.) in the 1950s to aircraft, missile and space hardware. A growing percentage of military purchases are in electronics, propulsion and advances structures. This has had an effect on the position of companies in the American military economy. During the period 1950-53 (Korean War), General Motors Corporation (major producer of tanks and trucks) was the number one military contractor in terms of size of orders received. In 1960 it was in 20th place. On the other hand, the General Dynamics Company - a product of successive mergers of the Electric Board Company, Consolidated Vultee Aircraft Company, Stromberg Carlson Co., and other firms had risen to first place primarily because of its aircraft and missile work. Again the trend continues to the present day. Of additional interest is the product diversification of major companies, e.g. aircraft companies into electronics.

There is a strong company relationship between "growth" industries and those which are military suppliers. Over the years there has been a significant shift in the geographical distribution of the production of military products with the growth of the west-coast industries being the most striking. The relative decline in the military orders to the automobile industry in the upper mid-west has been less dramatic but significant. Automobile firms have also diversified into electronics, e.g. Philco/Ford, GM/Delco.

Beginning in the 1950s, four major trends began which had a dramatic impact on the defence industry. These were:

Acceleration of Technology - Three major developments of World War II had a marked effect on industry - atomic energy, rocketry (propulsion) and computer concepts. Other technologies followed, such as transistors and semi-conductors in electronics. These concepts and others have led to aircraft fire control systems, ballistic missiles, early warning detection systems, anti-ballistic missiles, manned and unmanned space programs. The range of technical alternatives is large and the costs astronomical.

Changes in Product Mix - Because of changing technology and the possible alternatives regarding which systems may produce the desired performance, the number of possible solutions to operational problems is multiplying. This complicates the R&D situation because of the risk element involved in pursuing paths which turn out to be non-productive.

Heightened Competition in the Defence Industry - More companies have entered the defence market since it ensures a stabilizing effect on company operations in that it provides a balance to the business fluctuations inherent in certain portions of the commercial market. In addition, the technology acquired for defence contracts (fully funded by DOD) may be vital to a company's corporate future and may also be a key to survival in commercial markets.

Greater Risks - Higher risks stem from greater competition and changing weapons mix. Which system will ultimately win out? Longer lead times also increase the risk factor.

The following are considered the major characteristics of the U.S. defence market:

- One customer (military services) but many contracting officers;
- Price not only factor in award of contract;
- Scientific achievement a major requirement;
- Rapidly changing market requirement;
- Price negotiated with selected suppliers;
- Specialized skills and facilities;
- New companies entering market;
- Redundant capacity;
- Transfer of technology-military-to-commercial and in some cases also management techniques;
- Long product cycles;

- Product obsolescence;
- Trend toward fewer and larger companies.

THE SITUATION IN 1977

Size of Market

- Total U.S. Defence Expenditures approximately $100Bn in FY77 Annual growth rate 3.4% 1967-77 in current dollars.

- Expenditure breakdown (as applicable to DIPP development market) in FY77:
  - Total Procurement* $50Bn approximately - Canadian share less than 1%
  - Total RDT&E $10Bn approximately - Canadian share much less than 1% ($4.05Mn)

Competition

In FY77, a review of the volume of procurement contracts in the U.S. to the top 100 defence contractors reveals the following:

- The top 100 contractors accounted for 68% of the total procurement (note that it was 73% in 1960);

- the top 10 companies received 30% of the total business;

- All were aircraft companies - most with a diversified product base;

- The only foreign market penetration (by company) in the top 100 was in the petroleum industry (Royal Dutch Shell Group, British Petroleum). This opinion is based on a cursory check and would have to be confirmed by a company by company analysis to determine if there is any foreign involvement. As mentioned above, considering Canada as one company would place it approximately 38th in ranking;

- North American Philips was in the top 100, however, this is a subsidiary operation of a European company.

In the same period, the following comments apply to the R&D contracts:

- Canada's total sales ranked 141st in the top 500 contractors;

- Of the top 10 contractors, 8 were aerospace and 2 electronics. The same companies were evident as appeared in the procurement list, but in a somewhat different order of ranking. The conclusion would be that R&D and Procurement go together;

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*Research & Development, services, construction and supplies & equipment.

- The concentration of high technology companies is obvious - the top 20 companies were distributed as follows: aerospace (10); electronics (7); vehicles (1); ships (2).

- The only foreign companies to appear on the top 500 - in addition to Canada - were Redifon Flight Simulator (U.K.), (a recognized company in its field) - ranked 202nd and a Norwegian Company ranked 370th.

The above observations appear to indicate a general trend which has been evident in DOD purchases for some time.

Risk Elements in High Technology Development

Briefly, the risk elements associated with High Technology development include the technical problems inherent in pushing "state-of-the-art" technology, long lead times involved in dealing with technical unknowns and the difficulty in calculating the costs associated with the solution to unique problems. In a marketing sense, the difficulties are those of forseeing demand and acceptable cost for a product some three-to-five years hence and the changing operational requirements and technical solutions associated with product design. Associated with these problems are those of production techniques and specialized machinery utilization and the high development cost/sales ratio implicit in this type of development.

Canada's Position Relative to the U.S. Market

Because the sales volume of the type of high technology product developed under the DIP Program is small in the U.S., it is difficult to assess the impact on an overall market basis. Instead, it would be preferable to view Canadian capability in terms of product specialization as applied to particular market segments. When viewed in this fashion, the "Canadian Presence" can become quite significant. Examples of this:

Pratt and Whitney - leader in the field of small aircraft turboprop engines.

Canadian Marconi Company - major company in aircraft navigation and display systems and radio relay equipment.

Leigh Instruments - leading company in crash position indicators, flight recorders, and aircraft diagnostic equipment.

Computing Devices Company - experts in signal processing and airborne display equipment.

De Havilland Aircraft - major company in small-to-medium civil and military short takeoff and landing aircraft.

These companies plus others - Canadair, Litton, McDonnel Douglas, etc. have areas of product and market specialization.

It is entirely feasible, therefore, to evaluate DIPP and its effectiveness on market penetration from the following aspects:

(i) A detailed analysis of the market segments within which DIPP products are sold with a view to determining the percentage of market capture,

reasons for success or failure and what impact DIPP had on the product and company market position.

(ii) Assess the effect of DIPP from the point of view of the market positions of individual companies through a "Case Study" of related products.

(iii) Determine the effectiveness of DIPP in relation to the various risk elements inherent in high technology development production and marketing.

This approach should yield information on both the strengths and weaknesses of DIPP relative to certain questions viz:

a) Considering the methods of funding and providing equipment in the U.S., is the DIPP method of support effective in ensuring that Canadian companies are competitive?

b) DIPP proposals for funding are based on the assumption that the company is knowledgeable on the requirement for the product in the market place and also that a suitable strategy can be developed by the company to effect an adequate sales level. Is this a valid assumption in light of historical data? If it is not, should the basis for DIPP be modified in some fashion to make funding more competitive.

c) One of the prime methods of initiating a DIPP proposal is through joint development. In view of the very difficult method of administering the R&D activity in the two countries (see Appendix "A" for the very structured DOD approach) is it logical to assume that the Canadian and American systems can mesh together? Historical data would appear to indicate both a lack of significant projects and also volume production. Is this because the U.S. system is essentially Research and Development with a <u>possible</u> product development while DIPP is oriented toward a product having economic viability in the export market? The objectives would appear to be different and may be mutually exclusive. This should be examined.

d) If it is decided to pursue the joint development policy, a study of DOD's management of R&D projects is necessary. Some of the points to be examined are:

(i) At what point during the research cycle is it necessary for a company to become involved in order to benefit from the production contract (if any)? Case studies could be developed to examine this area.

(ii) What risk is involved in the early stages of R&D for a Canadian company and the government?

(iii) Should criteria be developed to assess the desirability of participating in joint R&D, e.g. do factors such as patent

rights and loss of program management control outweigh the benefits derived?

e) In view of the limited procurement in percentage terms by DOD "off shore", an examination should be made of the make up of the purchases and their impact on the type of development being performed under DIPP. What percentage are we getting of the available market and what is the historical trend in this regard? Can any conclusions be drawn regarding the type of product which should or should not be funded under DIPP?

f) Although the U.S. market has been commented upon in some detail, other world markets are also very important. The complexity of the market forces tend to be somewhat less, however, other problems become evident, such as national content requirements, export permits, policies on support of domestic industry, and differing product requirements - particularly in third-world areas. In view of a shortage of statistical data in many markets, it would be preferable to use the case study method to supplement this deficiency. The method of approach in studying DIPP and its impact would be similar to that used for the U.S.

g) In general, the effect of DPSA, DDSA and the various MOUs used to enhance Canada's position relative to international markets should be examined. How is DIPP related to these various instruments and what has been the overall result? How do they compare with the methods used by other countries, in attempting to accomplish similar objectives in terms of effectiveness?

APPENDIX "A"

The following is a definition of Research and Development Categories (Refer ASPR Section 4, Part 2):

1. RESEARCH - Includes all effort directed toward increased knowledge of natural phenomena and environment and efforts directed toward solution of problems in the physical, behavioral and social sciences that have no clear direct military application. It would, by definition, include all basic research and, in addition, that applied research directed toward the expansion of knowledge in various scientific areas. It does not include efforts directed to prove the feasibility of solution of problems of immediate military importance or time-oriented investigations and developments.

2. EXPLORATORY DEVELOPMENT - Includes all effort directed toward the solution of specific military problems, short of major development projects. This type of effort may vary from fairly fundamental applied research to quite sophisticated breadboard hardware, study, programming and planning efforts. It would thus include studies, investigations and minor development effort. The dominant characteristic of this category of effort is that it be pointed toward specific military problem areas with a view toward developing and evaluating the feasibility and practicability of proposed solutions and determining their parameters.

3. ADVANCED DEVELOPMENT - Includes all effort directed toward projects which have moved into the development of hardware for experimental or operational test. It is characterized by line item projects, and program control is exercised on a project basis. A further descriptive characteristic lies in the design of such items being directed toward hardware for test or experimentation as opposed to items designed and engineered for eventual Service use.

4. ENGINEERING DEVELOPMENT - Includes all effort directed toward those development programs being engineered for Service use but which have not yet been approved for procurement or operation. This area is characterized by major line item projects and program control is exercised by review of individual projects.

5. MANAGEMENT AND SUPPORT - Includes all effort directed toward support of installations or operations required for general research and development use. Included would be military construction of a general nature unrelated to specific programs, maintenance support of laboratories, operation and maintenance of test ranges, and maintenance of aircraft and ships. Cost of laboratory personnel, either in-house or contract-operated, would be assigned to appropriate projects or as line items in the Research, Exploratory Development, or Advanced Development Program areas, as appropriate. Military construction costs directly related to a major development program will be included in the appropriate element.

An example of DOD's method of overall coding of an R&D Program is as follows:

DOD PROGRAM ELEMENT CODE SYSTEM

Example: 62201F AEROSPACE FLIGHT DYNAMICS

DERIVATION	62201F
DOD PROGRAM	6
R&D CATEGORY	2
BUDGET ACTIVITY	2
SERIAL NUMBER	01
SERVICE	F

DOD PROGRAM

1. Strategic Forces
2. General Purpose Forces
3. Intelligence & Communications
4. Airlift/Sealift
5. Guard & Reserve Forces
6. Research & Development
7. Central Supply & Maintenance
8. Training, Medical & Other General Personnel Activities
9. Administration & Associated Activities
10. Support of Other Nations

BUDGET ACTIVITY

1. Military Sciences
2. Aircraft & Related Equipment
3. Missiles & Related Equipment
4. Military Astronautics & Related Equipment
5. Ships, Small Craft & Related Equipment
6. Ordnance, Combat Vehicles & Related Equipment
7. Other Equipment
8. Programwide Management and Support

R&D CATEGORY

1. Research
2. Exploratory Development
3. Advanced Development
4. Engineering Development
5. Management & Support.

SERIAL NUMBER

"AEROSPACE FLIGHT DYNAMICS"

SERVICE

A	Army
B	Defense Mapping Agency
C	Defense Civil Preparedness Agency
D	Department of Defense (OSD & OASD)
E	Defense Advanced Research
H	Defense Nuclear Agency
J	Joint Chiefs of Staff
K	Defense Communications Agency
L	Defense Intelligence Agency
M	Marine Corps

Products Agency
F Air Force
G National Security Agency
N Navy
R Defense Contract Audit Agency
S Defense Supply Agency

DEFENSE MARKET
THE DEFENCE SPACE MARKET ENVIRONMENT
IN THE UNITED STATES

INTRODUCTION

Market analysis in Defence Space is central to the process of defining products for development funding under the DIP Program. It is essentially "forward looking" due to the emphasis on "state-of-the-art" development and performance requirements of a special kind. It involves a team effort on the part of companies - planning staff, engineering, production, marketing and finance. It must be oriented to sales (which provides guidance on near term developments), applications engineering (analysis of changes in technology and product to meet changing mission requirements), and be responsive to customer needs. It is a volatile process requiring frequent review and update. Assumed by the company is a capability to understand fully the customer's policy decision process involving operational, technical, procurement, budget, defence position, foreign policy and political factors.

Essential to the process of being "tuned in" to the market is a close relationship to the potential customer. This requires frequent contact and considerable participation with the development of performance and product requirements. It also involves an attempt to work with the customer on study contracts and feasibility studies in order to understand the characteristics of the required product when a formal Request for Proposal is issued. This "front-end" effort is vital to being in right marketing position to respond to contract requirements. The results of such participation are:

- Establishment of a "need to know" relevant information on the project, on the part of the participating company;
- Face-to-face contact with the customer and an increased confidence in company capability as the project progresses;
- A thorough understanding of the customer requirements as reflected in the Request for Proposal.

Long-range planning is essential in this market atmosphere. The long development period for products requires the committing of financial, facility and manpower resources on a long-term basis. For this reason, the Defence Space market has pioneered the requirement for long-range planning. Ten to fifteen year forecasts are not uncommon in this market. Some of the factors which must be assessed on a "rolling forecast" basis as the project proceeds:

- technological change and its implication;
- social, political and economic forces: both national and international;
- government spending patterns;
- competitive factors;
- evolving customer requirements.

The breadth of market analysis responsibility is complex and extensive. It includes:

- information on customer technical objectives;
- specifications of equipment and systems requirements;
- determination of the amount of funds allocated to research, development and equipment procurement;
- information on the competitive situation as indicated by the number of companies and the amount and kinds of experience of competitors who are likely to propose on particular products;
- identification of industry capability and technical approach which most likely corresponds to customer requirements;
- understanding the steps involved in procurement (who does what and when).

For a more detailed description of the market analysis topics to be investigated, refer to Appendix "B", "General Outline of a Market Plan". This document is provided to companies by DITC as guidance to the type of marketing data required for DIPP submissions. The technique of performing market analysis consists of utilizing all available information and assembling it in a cohesive fashion in an attempt to answer the questions raised in this document.

Information Sources

There are essentially two types of information sources used in market analysis - primary and secondary.

Primary Sources

- Internal Company Data - May be examined to determine the relevance of historical sales information to the product being proposed for DIPP funding. Other internal planning documents may be analyzed as well as previous proposals and sales reports. Company personnel including foreign sales representatives provide a valuable source of information to assist in analyzing need for the product.

- Customer - Close liaison with the potential customer is necessary to ensure that the proposed product fits "real world" requirements. A test survey may be an advantage to determine product characteristics.

- Government Representatives - The Canadian government provides extensive representation in Ottawa and throughout the world to provide support to Canadian business. This is a valuable source of market information for planning purposes and for follow-on sales activities.

Secondary Sources

U.S. Government

- Department of Defense:

  - Defense Documentation Centre - responsible for distribution of DOD sponsored scientific and technical documents resulting from research and development programs. Available to government and industry.

- Defense Information Analysis Centre - network of centres available to authorized users. Centres are listed under various technological specialties.

- Interagency Data Exchange Program (IDEP) - designed to prevent duplication in testing by designers, developers and producers of military components and materials. Test reports available free of charge.

- General Government Services

  - Clearing Houses for Federal Scientific and Technical Information

    - U.S. Government Research and Development Reports.

    - Government-Wide Index to Federal Research and Development Reports.

    - Fast Announcement Service.

    - Technical Translations.

    - Research and Development Selected Reviews.

    - Federal Regional Technical Report Centres

    - Department of Commerce Publications

  - National Aeronautics and Space Administration (NASA)

    - Scientific and Technical Aerospace Reports (STAR)

    - International Aerospace Abstracts (IAA)

    - Bibliographies

    - Technical and Scientific Publications

    - Regional Dissemination Centres

  - Atomic Energy Commission Information Resources (unclassified)

  - National Referral Services for Science and Technology

    - referral advice to other organizations or individuals having required knowledge

    - Smithsonian Institute Information Resources

    - Government Patent Office Information Services

Private Services

- Technical Publication - magazines, periodicals, reports, etc.

- Trade Associations

- Market Intelligence Services - e.g., Defense Marketing Services (DMS), Frost and Sullivan, Auerbach Information Inc., etc.

This listing is not all inclusive but is meant to illustrate the breadth of available data and the necessity for thorough research in determining market requirements.

U.S. Government Procurement - Understanding the Customer

Methods

Two methods of procurement are normally used to solicit business with the U.S. Government:

- Advertised procurement - IFB (Invitation for Bid) may be received in two ways:

  - if on procurement agencies' Bidders Mailing List, solicitation automatic;
  - if information on IFB gained through Commerce Business Daily, request copy of bid from procuring agency.

- Negotiated Procurement - used if advertised procurement inappropriate. May be as much as 90% of entire monies awarded in contract year. If negotiated procurement is used, decision must be justified by filing a Determination and Findings (D&F) report. The D&F is a very detailed document which cites Armed Services Procurement Regulations (ASPR) and Federal Procurement Regulations (FPR) to support this method of procurement. Negotiated procurement is more complex than the IFM method and includes:

  - submitting a detailed proposal;
  - screening of proposal to ensure compliance;
  - preliminary fact finding;
  - Government Audit;
  - negotiation.

  It should be emphasized that negotiated procurement is competitive.

- Techniques of Submitting Bids

  - Invitation for Bids (IFBs)
  - Request for Proposals (RFPs)
  - Sole Source Procurement
  - Request for Quotations (RFQs)
  - Two-step Advertised Procurement
  - Qualified Product Lists (QPL) in conjunction with IFBs.

- Regulations Affecting Bids

  - ASPR - Armed Services Procurement Regulations
  - FPR - Federal Procurement Regulations (not normally used by DOD)
  - FPMR - Federal Property Management Regulations

- Proposals may be:

  - Solicited - those prepared in response to a procurement invitation sent to a company by a government department or agency.
  - Unsolicited - those prepared and submitted on a company's own volition.

  The above is a very brief description of the mechanisms used by the U.S. government in procuring equipment and services. Determining the level of understanding by Canadian companies in the specific requirements under each general heading could be measured through Case Studies.

How Equipment Requirements are Initiated in the U.S. Military

Requirements for equipment to satisfy military needs are initiated in a very structured fashion. Unlike the consumer market, it is the customer (military agency) which establishes the need for the product, specifies the performance characteristics, inititates a schedule for product development, reviews progress as the program proceeds and provides funding to ensure that a finished product is available when required. The organization required to perform this function is complex and efficiently organized. Basically, development normally proceeds through the following phases:

- Conceptual - Analysis of operational justification for the equipment and design of experimental hardware.

- Validation - Verify preliminary design, analyze "trade-offs". Prototypes may be used to clarify cost, environmental impact, human factors, etc.

- Full-Sale Development - System fully developed and engineered, fabricated, tested and decision made to enter the equipment in inventory.

- Production and Deployment Phase - Operational units are trained, equipment is procured and distributed and logistical support provided.

There are a number of points to be understood by the contractor in dealing with the U.S. military:

- There is little or no flexibility in determining what job is to be done - the customer decides and also sets the pace of development.

- The major flexibility open to the manufacturer is the technique to be used to accomplish the job - particularly in the early stages of R&D.

- The contractor must understand fully the system of development/procurement used by the military.

How Projects Enter the DIP Program

The DIP Program includes four elements which are described in Appendix 'A' (extract from the DIPP Directive).

The most important element in terms of funding is Development Assistance (consumes approximately three-quarters of the total yearly allocation). Projects submitted for development funding generally originate as follows:

From the Company

- Company establishes need for product development through market analysis and internal business review.

- Development proposed may be:

  - product improvements on current products required as a result of changing market conditions;
  - new products required to diversify product line;
  - spin-off of products previously developed. May be required to broaden market base and applications;
  - products acquired through license manufacture or joint venture may require further development;
  - technology transfer from outside the company provides basis for applied development;
  - transfer of technology from Research to Development within the company.

From Shared Development

- Projects selected are in advanced stage of development - U.S. research and development categories 6.3 - Advanced Development or 6.4 Engineering Development;

- Attempt to select projects having production potential;

- Various committees (Canada/U.S.) meet periodically to attempt to find suitable projects.

The following general comments are made relative to the two methods:

- Company generated products tend to be conservative in nature; i.e. "more of the same but somewhat better". There are a number of reasons for this. DIPP itself appears to be a program where extreme risk is not encouraged. The qualification applied to the program that the product must have export potential assumes that the market for the product is demonstrable. This is a problem to achieve for products which are truly innovative since market analysis is difficult to perform due to lack of suitable indicators, i.e. demand must be stimulated. The company itself is more comfortable with a known product application since the marketing expertise and technical capability is available "in house". This reduces the risk element considerably. The tendency, therefore, is to utilize the

"product improvement" approach to a very large extent in applying for DIPP funding. Innovation is far down the list in terms of priority.

- The result of this conservative approach is a reduction in innovation. Yet if DIPP is truly to take advantage of "Shared Development" innovation is a requirement. Certain current shared development programs illustrate this:

  - Guidar - a shared development project with the U.S.A.F. using a technique pioneered by the Computing Devices Company.

  - Explosafe - again with the U.S.A.F. - a unique approach to a particular problem involved with explosions in aircraft fuel tanks - developed by the Vulcan Company.

  - Thrust Computing - also U.S.A.F. - an innovation by the Computing Devices Company which offers promise in diagnosing aircraft engine performance.

Unfortunately, this type of project is the exception rather than the rule under DIPP.

- Are Canadian Companies sufficiently "tuned in" to requirements in the U.S. military? As noted above, one of the prime means of achieving market intelligence and establishing company credibility is to participate in R&D projects of the feasibility or study type. This type of project appears to be discouraged under DIPP, therefore, it is difficult for companies to establish a "need to know" with military agencies. It is not a simple matter to assess this particular problem due to the high risk factor involved in funding "front end" R&D projects, i.e., a careful choice must be made of those projects which appear to offer the best possibility of "pay back". Nevertheless, it would appear essential to participate in high risk programs in order to experience long term benefits.

- Certain companies appear to be more prominent than others in shared development projects, e.g. Computing Devices has received 9 projects since the program's inception (over 12% of the total number - much above the average). Why is the company more successful than others in receiving this type of project? On the other hand, Canadian Marconi Company has only been involved with one project in the early 1960s. This was a tremendous success - the equipment is still selling in volume and is a standard item with the U.S. Army. Yet the company has not received any other shared development contract. Why? Some companies have never participated in shard development. Obviously, the area requires further investigation.

- In general, it would appear that company-initiated projects are much more successful than shared development in terms of production. There are probably a variety of reasons for this which could be determined by means of Case Studies.

- Risk Factors - At present, development funding under the DIP Program is allocated normally on a 50/50 shared (DITC/Company) basis. Is this a logical approach? Another method which bears investigation is to allocte monies on a flexible basis, depending on the risk factors. For instance, a project which is a product improvement of an existing product will probably involve less risk in a technical, marketing, and financial sense than will a product which is truly innovative. An innovative product may require technical solutions to unique problems, a knowledge of unfamiliar markets, and the possibility of cost over-runs. Obviously, the risk element is considerably greater and the percentage of support should be much higher, possibly 100%.

  It is proposed to examine a sliding scale of support in which the risk element could be determined by the DIPP advisors (marketing, technical, financial) and a recommendation made to the committee regarding the percentage of funding to be supplied. This method would, of course, have to be thoroughly investigated before implementation to determine the effect on company operations.

  A corollary to this approval should be to encourage the innovative type of project due to the higher level of funding with a consequent increase in Canadian specialist expertise.

Capital Assistance - Source Establishment - Non-Recoverable Support Costs

This type of assistance is provided to Canadian manufacturers in order to ensure that they are competitive in the market place and that they receive the same benefits available to their counterparts in the U.S. or other foreign suppliers. Loans and contributions are available under Capital Assistance to modernize plan facilities, Source Establishment provides funding for Canadian companies to be classified as qualified suppliers of defence products and Non-Recoverable Costs Support ensures that Canadian companies are not at a disadvantage because of advantages enjoyed by foreign competitors such as amortized development costs, and other forms of government support.

Because of the various forms of government support available under DIPP, it may be classified as a very flexible program. Theoretically, it guarantees that Canadian companies are at least on an equal level with other competitors in bidding on foreign contracts. Is this true? Case Studies can be developed to examine this area in order to determine whether the type of support is in fact effective.

ADDENDUM

Civil Related Products

The provision of DIPP funding for projects which are considered "civil related" has been a contentious issue. Civil related products fall generally into three categories:

Spin-Offs - The original development is aimed primarily at the defense market with possible "spin-off" products which could be sold commercially.

Mainly Commercial - The product to be developed is for the commercial market with potential military applications.

Totally Commercial - The market is commercial but the technology is considered applicable to defense products.

It is the last category which appears to offer the greatest area for debate. Examples of projects which fall under this heading are the de Havilland DHC-7, Pratt and Whitney small turboprop and turbofan engines (although there is a small military market for these products) and Douglas Canada Aircraft wings (source establishment/capital assistance). There are similar products in the electronics area but costs are less.

The subject of DIPP support of civil related products has been investigated in depth recently.[1] Assuming that the Program will continue to support this civil related type of project, the following additional comments are considered applicable:

- The techniques required to perform market analysis for commercial products are not the same as those in the military sector. The market forces are in many ways, more complex and product design and selling strategy assume a different capability on the part of companies submitting proposals.

- DITC, in order to analyse the proposal effectively, must possess an "in-house" capability for in-depth research. Indications are that resources within the Department to perform this function are very marginal and it is recommended that this topic be considered for evaluation. The amount of funding allocated to commercial products would indicate that such a capability is essential to perform project review.

[1] Study of the Defence Industry Productivity Program, Phase I - Programs Branch, Department of Industry, Trade and Commerce - July 1979

Summary of Topics to be Evaluated

Topic	Method of Evaluation
Canadian products developed under DIPP are sold in narrow market segments. What is the market volume for these products and how successful are Canadians in penetrating the market?	General Market Analysis supplemented by Case Studies.
How well do Canadian companies perform market analysis in establishing the sales levels for DIPP products?	Case Studies.
At what stage in the U.S. R&D cycle must Canadian companies become involved in order to benefit from follow-on production?	Market Analysis of typical U.S. defence products which have proceeded from R&D to production.
How is the risk element assessed for a Canadian company in the early stages of R&D?	Case Studies of U.S. R&D projects.
How much of the U.S. market is available to Canadian suppliers and how do DIPP products match the market requirements? What is the historical trend?	Analysis of U.S. "off-shore buying patterns.
What is the effect of policies such as national content requirements, export permits, policies on support of domestic industry and differing product requirements (applies to world markets)?	General Market Analysis supplemented by Case Studies.
What has been the effect of various instruments such as DPSA, DDSA and MOUs on the market position for products developed under DIPP?	Case Studies.
Is innovation encouraged under DIPP or is the program too conservative?	Case Studies.
Why are some companies more prominent in shared development than others? Is there any relationship to success in the market place?	Case Studies.
Should projects under DIPP be funded on a sliding scale according to risk?	Company Discussions and Case Studies.
Are Capital Assistance, Source Establishment and Non-Recoverable Support Costs effective as instruments in ensuring that Canadian Companies are competitive in the defence market?	Case Studies.

Note: Refer to two papers: "The Defence Space Market Environment" and "Defence Products Market" for a more complete explanation of the rationale related to the above topics.

SECTION C

ASSISTANCE AVAILABLE

1.0 Types of Assistance

1.1 Development Assistance

Contributions may be provided to share acceptable costs related to applied research and development activities for defence and defence-related products.

1.2 Capital Assistance

Contributions and loans may be provided to support modernization projects to acquire advanced capital equipment intended to upgrade manufacturing capability for defence and defence-related products. Examples of acceptable types of equipment are:

(a) advanced machine tools, other machines and equipment which increase production rates, lower costs and/or increase quality levels;

(b) test and quality assurance equipment necessary for production of items to quality levels demanded by new defence technology; and

(c) data handling equipment for mechanization of inventory and production control functions, data collection, data analysis and engineering design computation.

1.3 Source Establishment Assistance

Contributions may be provided to share acceptable costs associated with the establishment of a Canadian company as a qualified supplier of defence or defence-related products. Reference should be made to sub-section 3.0 (Acceptable Costs) for clarification on the nature of Source Establishment Assistance.

1.4 Non-Recoverable Costs Support (NRCS)

Contributions to share acceptable non-recoverable and non-recurring costs related to a request for a development or production project by a foreign government may be provided when it can be substantiated that the assistance will offset adverse cost conditions unique to the Canadian suppliers, or to offset costs which foreign competitors have already amortized, or to offset foreign government support to competing firms.

2.0 Amount of Assistance Provided

For Development, Sources Establishment and Non-Recoverable Costs Support (NRCS) projects, the Department normally provides contributions of 50% of the cost. Contributions in excess of 50% may be provided when there are special circumstances or unusual risks to justify an

increased contribution. For Capital Assistance projects, the Program finances the full acquisition cost of the equipment on the basis of a 50% loan and 50% contribution. The loan is interest free and title to the equipment remains with the Government until the loan is repaid. In general, it is expected that the company will invest in its modernization program an amount equal to the cost of the capital equipment supported under the Program. This investment by the company may include both capital and non-capital expenditures but should be additional investment to the ongoing capital replacement requirements of the company.

3.0 Acceptable Costs

3.1 Development, Sources Establishment and NRCS Projects

Individual cost elements of a particular project will be determined in conformity with the Department of Supply and Services costing policies and practices. Generally, allowable costs for each of these elements of the program are:

(a) Development Assistance

- Research and development, test, evaluation, together with the building of prototypes and such special equipment as may be required to conduct these activities.

(b) Source Establishment

- Pre-production expenses, including costs of engineering and manufacturing studies, prototypes, samples, drawings, engineering services, travel, technical assistance fees, experimental production, evaluation and qualification testing, and associated laboratory work.
- Cost of non-recurring tests requiring specialized facilities not otherwise available to the contractor without charge.
- Cost of items such as the following which by their design and purpose are peculiar to the manufacture of the product being considered: dies, fixtures, gauges, jigs, moulds, patterns, templates, special test and inspection equipment.
- Cost of manufacture of test batches or prototypes required for qualification approval.

(c) Non-Recoverable Costs Support (NRCS)

- Special production tooling including dies, fixtures, aguges, jigs, moulds, patterns, templates and other items of a likely nature which, by their design and purpose, are peculiar to the manufacture of a given defence article or components thereof.
- Machine attachments and accessories and cutting tools which have been altered so as to make them an item peculiar to the manufacture of a given defence article or component thereof.
- Pre-production expenses including the cost of drawings, engineering data, specifications, engineering personnel

assistance, licensing fees, and special testing, etc.
- Unrecovered costs associated with research and development, test, and evaluation.

3.2 Capital Assistance

The acquisition cost of the equipment, including shipping expenses, tariffs and federal sales tax, are generally acceptable. Provincial sales tax is not an acceptable cost. Where it is deemed necessary that erection or reassembly be performed by the supplier's personnel, such costs may be considered for specific inclusion under the contract. The following costs will not be allowed:

- Installation, including machine foundations, off-loading costs, purchaser's installation personnel and their expenses; service feeders connecting equipment to mains; air conditioning for process control; compressed air systems and equipment; chemical and water lines; special fire protection equipment;
- Construction and/or alternation of plant facilities;
- Personnel training and plant re-arrangement resulting from acquisition of new equipment;
- General and administrative overhead expenses.

APPENDIX "B"

GENERAL OUTLINE OF A MARKET PLAN

THE PRODUCT

1. Define the baseline product: hardware, software, price. How much interfacing does the product require to adapt to each application?

2. What product development programs are foreseen?

THE MARKET

1. Identify the market segment[1] being addressed. What is the market potential for your product in this market segment? What are the growth trends and what factors will influence growth? For example, government regulations, changing customer requirements etc. What is your sales forecast, domestic and export over the product life, by calendar year?

2. What is the identification and classification of customers who make up the segment and what are their buying habits? For example, who do they buy from - agent, direct, etc.? What factors influence their buying habits?

3. Do your potential customers require any special services, product support or sales program? If so, what? Can you fill their requirement?

4. Have you sold in this market before and if not, how do you propose to establish your position? How would you evaluate your strengths/weaknesses in relation to the market?

5. What major marketing or technological changes have taken place in the past few years which would place you in an advantageous or disadvantageous position? What are the likely marketing or technological trends over the next five years and their effects on your product? For example, will product improvement be necessary? Is it necessary to broaden your product line?

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1 Market segment refers to the "positioning" of your product in the market and is usually equated to price. As an example in the automobile industry, a low priced economy car attracts a different customer than a high priced luxury car and therefore has a different market potential to draw upon. This "positions" the two types of vehicles in the market and helps to define customer needs, attitudes, competition, etc.

COMPETITION

1. Who are your competitors and what are their strengths/weaknesses?* What products and features do they offer? At what prices? How much have they sold and to whom? Have you bid against the competition and what were the results?

2. Are the number of competitors increasing? Name the companies most likely to enter the market and their strengths/weaknesses.* (see footnote for 3)

3. What do you intend to do to keep the product competitive (e.g. value engineering)?

MARKETING STRATEGY

1. How do you plan to sell your product: e.g. direct sales, agent, etc.? What arrangements with whom have been formalized to date for a sales network, and what further arrangements are planned over what time scale? What are the areas of responsibility? Are train personnel available? What have been the results to date?

2. What sales promotion programs, e.g. demonstrations, exhibitions, do you intend to implement? How? What prospects exist for product evaluations by government agencies, potential customers, and what time frame?

3. What are the product support requirements and how do you intend to perform this function? Is this the normal method of product support in this market and how does it compare with your competition? Are changes necessary? How will changes be implemented?

4. Are there any other products in the company product lines which can be used to influence the sale of this product? How?

5. What is the cost of sales necessary to penetrate the market? Are funds budgeted?

6. As a result of your analysis of your competitive position, how do you intend to emphasize your strong points in your selling campaign? How long to you feel your advantages will last?

7. What are the delivery requirements ARO and can the company respond? What are the inventory requirements and what is the company policy regarding inventory build up?

8. Will further Crown funding be necessary in order to complete the project, and if so, what for and how much?

9. Can key marketing milestones be identified and if so, what are they?

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* Strengths/Weaknesses should include, for example: price, product design distribution network, product support, sales programs. It would be useful to rate your company against the competition in these categories.

Development and Submission of Bid Proposals in the United States

Background

The United States Government (USG) solicits interest from qualified companies in obtaining contracts through a number of means which will be described in detail in succeeding paragraphs. The USG system of contracting is based on the procurement principle, i.e. the Government determines a need for an item of equipment or service and requests responses from companies in reference to that need.

Canadian companies can bid (respond to) solicitations from USG agencies or prime contractors for Defence equipment. Under the terms of the Defence Production Sharing Program, Canadian companies are considered on the same basis (with certain exceptions - see Appendix "A") as American companies and are, therefore, subject to similar competitive pressures - price, delivery, quality, adherence to specifications. Under the Program, a wide range of good may enter the U.S. duty free. Goods are designated under the Federal Supply Classification and a listing is contained in the publication "Production Sharing Duty Free Products" issued by the Defence Programs Branch, Department of Industry, Trade and Commerce.

Methods of Soliciting Business in Canada

Key Canadian Government Agencies

In addition to the responding companies, a number of Canadian government agencies play a key role in administering the solicitation of U.S. Defence contracts in Canada. They are:

Canadian Commercial Corporation (CCC) - CCC is a Crown Corporation which is managed, staffed and operated by the Department of Supply and Services. The Corporation sub-contracts to a Canadian company whose bid has been accepted by a U.S. procurement agency. CCC locates, solicits and receives "Bid Sets" relating to U.S. military requirements. These bid sets, originated by the Military Procurement Agencies, are normally mailed direct to Canadian firms which appear on the Bidders Mailing List. A Bidders Mailing List is maintained for each commodity. A Canadian company wishing to be placed on the Bidders Mailing List notifies CCC, which requests information on the company's engineering, manufacturing and financial capabilities.

Bid Sets received by CCC are subjected to general screening criteria to ensure that they are suitable for bidding by Canadian suppliers. If considered suitable, the administration of the potential contract becomes the responsibility of a CCC Enquiry Officer.

The above system applied only to prime contracts. Sub-contracting is performed on a company-to-company basis without government involvement.

Defence Programs Branch (DPB) - Department of Industry, Trade and Commerce

The Defence Programs Branch is responsible for administering the Defence Production Sharing Program in Canada. Liaison Officers located at various strategic locations in the U.S. are prepared to assist Canadian business in identifying business opportunities and establishing contacts with major buyers who are interested in the specific capabilities of the company.

Key U.S. Contracting Agencies

In general, procurement is performed by agencies of each of the three U.S. military services - Army, Navy, and Air Force. In addition, the Defence Supply Agency (DSA) has been formed to administer contracts for what might be termed "common items", i.e. those not peculiar to each of the three services. Regional centres of the DSA have been established to deal with different commodity areas.

Sales Representation

Companies expecting to perform a large volume of business in the U.S. find it advisable to establish sales representatives. These representatives should be capable of maintaining continuous contact with key U.S. procurement agencies in order to ensure that the represented company receives bid solicitations or preferably advance notice of such solicitations and that the company name is given suitable publicity in reference to particular contract opportunities.

Structure of Bid Proposals

Proposals are crucial in selling the capability of a company to perform a particular function relative to a customer's specific requirement. They must convince the customer that the company has the technical and managerial competence necessary to provide the service or product desired. A proposal is a complex document involving the pulling together of the total resources of a company into a cohesive, well-balanced and readable document. In spite of the importance of proposals to the acquisition of business, companies do not perform well in producing this type of document. U.S. Government procurement people have estimated that 75% of proposals received are either inadequate or non-responsive, 15% are just barely adequate, leaving 10% as potential winners. Considering the resources expended in the preparation of proposals, this percentage would appear to be a poor batting average. The most salient characteristics of winning proposals are that they present in clear, concise and logical terms what is being proposed, and establish a confidence in the organization behind the proposal.

The major components of a proposal are:

Technical Information - what is being proposed and how the proposed project will be performed.

Management Information - the proposed method of managing the project, and supporting information required to establish your management capability.

Pricing Information - contains the actual bid and the proposed contractual terms and conditions.

How U.S. Government Procurement Works

The procurement system is very simple in theory. A government agency recognizes a requirement for a product or service and develops a description of its requirements. This description is then forwarded to a procurement specialist who initiates a procurement invitation and then issues the invitation to the market place. Depending on the nature of the requirement, the invitation will be issued as either an advertised or negotiated procurement.

Advertised Procurement

The rules governing advertised procurement are well defined. The government procurement officer is only able to exercise a limited degree of personal discretion.

The basic means of soliciting procurement is the Invitation for Bid (IFB) - this is a formal solicitation for a proposal and supporting bid. An IFB may be received in one of two methods:

- if the company has filed a formal application to be included on the Bidders Mailing List, a copy will automatically be received.
- if an awareness of the bid is gained through the Commerce Business Daily, a copy of the IFB may be obtained directly from the procuring agency.

Once the bids have been opened, proposals cannot be changed and the low bid (provided it is responsive) is awarded the contract.

Negotiated Procurement

This type of procurement is by far the most common method (as high as 90% of contracts are negotiated). In negotiated procurement, the contracting officer can exercise much more personal discretion than with advertised procurement. The Request for Proposal (RFP) is the most common means of initiating negotiated procurement.

The major difference between an IFB and an RFP is that an RFP can be altered after the proposal is submitted. Price is not final, major changes may occur, and further proposals may be requested from offerors. Many RFPs encourage the submission of alternate proposals in addition to responding to the original requirement.

Essentially, negotiated procurement is favoured since it allows the contracting officer a flexibility in issuing contracts not available through other means. The importance of this flexibility is perhaps best illustrated by the "Four-Step" method of negotiation. Briefly, this type of contract involves the following stages:

(i) Submission and evaluation of the offerors technical proposal.

(ii) Submission and evaluation of offerors cost proposal.

(iii) Establishment of competitive range and selection of the apparent successful offeror.

(iv) Negotiation of a definitive contract.

This method is applicable to research and development contracts and as will be noted, allows the contracting officer to escalate negotiations through various phases in order to obtain the best contract response. (Refer ASPR 4-107 for complete description of the process.)

Procurement Techniques

Techniques used by the Federal Government in soliciting business:

Invitation for Bids (IFBs) - described above.

Request for Proposals (RFPs) - described above.

Sole-Source Procurement - In general, this method of procurement is discouraged. A situation necessitating this type of procurement would be for a company to be the only manufacturer of a particular product or service. Although such procurements are often negotiated, the government is at an obvious disadvantage.

Request for Quotations (RFQs) - This procedure is rarely used in sophisticated procurement and generally applies to a case where the procurement officer is not aware of the products available on the market to satisfy a requirement. The general rules for RFPs also apply to RFQs.

Two-Step Advertised Procurement - The procurement agency first announces an interest in receiving unpriced proposals and will then issue IFBs to the offerors who submitted acceptable proposals. Frequently, the agency will base the IFB on one particular proposal which in turn favours the company which submitted the proposal.

Four-Step Procurement - described above.

Industrial Preparedness Production Planning Program - Although technically not part of the procurement process, participation by a company in the Program can place it in an advantageous position to receive defence business. The U.S. Department of Defence (DOD) appraises on a continual basis the capability of companies to supply quantities of certain types of material in the event of emergency. Companies designated as having a capability in this regard are known as Planned Producers and are guaranteed an opportunity to complete on

procurement of relevant equipment. A negotiated agreement between CCC and DOD allows Canadian companies to participate as Planned Producers and could result in significant business opportunities.

Possible Areas of Evaluation

- How well do Canadian companies understand the U.S. system of procurement? This topic is capable of evaluation through discussion with companies and U.S. post officers (DPB) in reference to response to bids, and by Case Studies.

- How successful/unsuccessful have Canadian companies been in securing business in the U.S.? What are the reasons for success/failure? Statistics are maintained in CCC of bids received, responded to and success rate. This information could be supplemented by date obtained through company and post interviews and by Case Studies.

Due to the similar nature of the information required to analyze these topics, it would probably be advantageous to investigate both areas concurrently.

APPENDIX "A"

Limitations to the Defence Production Sharing Program

Canadian companies may compete on an equal basis against their American counterparts with certain exceptions. These exceptions are briefly described below:

Berry Amendment - restricts purchases of food, clothing and fabrics.

Specialty Metals - rider to Berry Amendment. Funds may not be used to purchase articles containing steel (of certain composition), metal alloys, titanium and zirconium not made in the U.S.

Byrnes and Tollefron Amendments - restricts purchase of naval vessels or major components thereof.

Small Business Set-Aside - business (in whole or in part) may be restricted to U.S. small business concerns. Canadian firms may compete for sub-contracts even though prime contractor is U.S. small business.

Labour Surplus Set Aside - business directed to area of high unemployment.

Minority Groups Owned Business Set Aside - states minority groups to be given every opportunity to be placed on source lists.

Depressed Industries - direction of business to industries classified as "depressed".

Military Assistance Program - may include only 50% foreign content in end article.

Construction Contracts - Buy America Act applies to construction materials.

No Foreign - disclosure of certain technological data is not permitted by U.S. government policy. Examples - military spacecraft, electronic warfare, etc.

Balance of Payments - restricts purchases of goods for overseas destination. Some latitude is allowed to Canadian firms to sub-contract.

PROGRAM DELIVERY

DIPP EVALUABILITY MODEL

MODULE: ITC MANAGEMENT CONTROL OVER DIPP RESEARCH & DEVELOPMENT, PRODUCTION

GENERAL

This module relates to ITC project management controls - monitoring, review, evaluation, feedback and improvement to optimise efficiency, economy and effectiveness at the building block level of the program, namely the project. In general, the same organisational structure as for project selection, review and approval is used for monitoring and control. This module starts with the issuance of the ITC/company contract and ends with the completion (or termination) of the contract - but there exist links to the initial Market Research and Development Module and the subsequent Development and Submission of Proposals Module.

Three levels of monitoring and control are discussed. First, the project level, which is essentially managed by the Industry Sector Branch (ISB). Second, the roll-up monitoring and control of projects within a given ISB, the efficiency of the program/project administrative mechanism, and the effectiveness of DIPP and its component projects to the industry sector for which the ISB is responsible. Third, the overall program monitoring, control and evaluation by the Program Branch and the mechanisms established to operate the program and investigate its functioning.

In principle, the program is perceived as an ongoing process. It is a tool for ISBs and DPB to execute part of their mandate. Policy and administrative directives lie in one ITC ADM area: implementation is by projects in a second ITC ADM area, some of which support bilateral treaties which lie in a third ITC ADM area: therefore monitoring, analysis, evaluation and a strong communication and review channel are mandatory to enable appropriate feedback to maintain or improve the program within its defined objectives (or lead to a change in objectives).

Lack of effective monitoring and control will lead to a lack of evidence, or a low quality of evidence, thereby impeding ITC's ability to manage the program. Good monitoring and control will enable management to adjust the program to meet changing external markets, technologies, opportunities and constraints; to minimize abuse and inefficiency; to optimise results.

General Background on Grants, Loans, Contributions in ITC

The 1977-78 ITC budget approved by Parliament approximates $275 million of which $170 million (60%) were grants, loans and contributions. ITC had 2400 PY of which 300 PY (12½%) are used for program delivery: some are dedicated personnel (Programs Branch, Programs Divisions in ISBs), some are not. DIPP is the second largest G&C program in ITC (Ship Program #1 at $60-65 million; DIPP #2 at $40-45 million; Enterprise Development Program EDP #3 at $30 million), and the oldest assistance program. The officers who deliver DIPP often deliver other ITC GLC programs.

Within the ISBs, from 1976-7 onwards, there has been an overall reduction of personyears (PY). There has been a similar reduction in resources available for program management, though the workload has not proportionately decreased. In some areas, it has been noted that resources are weighted, for reasons of workload, to the front end of programs, i.e. towards project approval at the expense of ongoing project monitoring, control and evaluation. How much this affects DIPP projects is not known.

1. PROJECT MONITORING AND CONTROL

This occurs at the ISB level where program delivery is exercised through two separate mechanisms, depending on the ISB. One group of ISBs deliver programs to industry through their Commodity Officer; that is, the officer handles industry sector, company, and all phases of project administration. This group handles the largest amount of DIPP funding and includes Transportation Industries Branch, and Electrical and Electronics Branch. The second group of ISBs have Commodity Divisions, like the first group, but separates and concentrates program/project administration in a distinct Program Division: efficiency is gained by specialisation but this gain can be negated by poor communication between Commodity and Program Division. This group includes Resource Industries Branch.

Directive Requirements

The DIPP Directive specifies (Section F.3) monitoring will be accomplished through a Project Review Group (PRG) meeting not more than every 6 months and reporting progress to the Advisory Group. Subsequently the ISB must report to the DIPP Committee by means of Progress Reports and Status Reports.

The Statement of Work (Appendix C, pages 6-8) is the key control document for the project. It is part of the contract, and is described as the basis for monitoring and control. It may only be changed by DIPP Committee approved amendments. The SOW emphasises:

- Performance Targets (which are technical, and specific)
- Major Tasks. This includes technical problem areas, market and pre-production studies
- Schedules, or time objectives
- Progress Reports and Monitoring Arrangements

The PRG is selected by the Chairman of the Advisory Group and chaired by an ISB Commodity Officer. The objective of the PRG is to ensure the projects proceed in accordance with the contract Statement of Work (SOW); to monitor achievement; costs and disbursements; changes in technical, marketing direction and changes from the SOW. Further, prior to the PRG meeting, the company is to report to the PRG members enabling the meeting to concentrate on matters needing attention.

The Progress Report specified in the Directive is to provide decision makers with summary project information on an exception basis, emphasising technical achievement/cost and disbursements/market changes, project changes with conclusions and recommendations. Project Reports will be made at not more than 12 months intervals, will be reviewed by the Advisory Group, and then

passed to the DIPP Committee. They cease when disbursements cease.

The Status Reports start when disbursements cease. The intent is to capture subsequent statistics relating to incremental costs and benefits. No time limit is specified.

No requirement for end-of-project evaluation is stated.

Potential Areas for Review

Statement of work (SOW)

The principal elements are the technical, financial, marketing, and time elements of the project, plus the requirements for ongoing monitoring and control.

Technical Performance Targets and tasks are discussed in detail, with a requirement that they be identified against customer needs.

Milestones and Schedule Targets are discussed.

Requirements for base financial and marketing targets are less clearly identified. For example, evaluability phase interviews have indicated some concern in the quality of initial analytical marketing. It may be appropriate to strengthen the marketing section in the SOW to provide an improved base to track performance during the progress of the project. Sales are not generally expected during technical development, but the market may change during the technical development phase and market strategy needs to be better defined so that when the project ends, the product meets customer needs and the marketing structure is in place.

Progress Reports and Monitoring Arrangements. With a stronger set of targets and milestones in place, it is then easier for the company and the department to more readily compare performance against plans, and to identify variances, risks, solutions, and perhaps changes.

There is no call for an end-of-project evaluation, vis-à-vis the project's success potential for meeting project/program objectives.

The needs for SOW where DDSA is involved ("nominated projects"), where U.S. objectives may not be totally in line with ITC objectives, should be examined (e.g. US/DOD is technology oriented not market oriented).

Claims - The mechanism for handling claims through ITC, DSS needs examination. Also, the reconciliation of Program Branch records of expenditures and commitments vis-à-vis the ITC computer information system.

Progress Reports, PRGs - To review how will these relate back to project targets, and how will the system operate within the different mechanisms of ISB program delivery, and what impact this has on Program Management at the Program Branch and DIPP Committee.

Status Reports - To review to what extent these capture the post-project statistical data, needed by ITC, to provide ongoing project evaluation against program objectives.

The program emphasises the revenue incrementality of the project to the company, and that it fits into corporate long term plans. Because of the risk element in innovation programs, it may be more appropriate to analyse the project as a cost centre in its own right, since the project will only contribute to corporate revenue it successful. Also the impact of other elements of DIPP, namely Capital Assistance and Source Establishment, may be easier to evaluate if they also become part of the project if it is a separate Cost Centre.

The other DIPP elements, Capital Assistance and Source Establishment, may be similarly evaluated. However, they may not be as complex as development projects. Since they account for 25% of DIPP funding, the resources required may be less. However, there is concern in some areas that Capital Assistance program effectiveness is difficult to evaluate, due to Revenue Canada not allowing depreciation of the machine as a capital asset, and DSS refusing to allow machine costs in their purchases - this may prevent proper equipment depreciation permitting companies to build up assets, to purchase replacement equipment at their own costs, and the companies get into a half-price machine treadmill situation.

2. INDUSTRY SECTOR BRANCH PROGRAM MONITORING AND CONTROL

If the DIPP Directive is explicit about monitoring and control at the project and overall program level, it is less so or non-existent at the individual ISB level. Preliminary data suggests that ISBs do not monitor projects or programs relative to their industry section. Different industry sectors with different company profiles, program usage and success rates may require analysis at a lower level than the total program but at a higher level than the project. This intermediate level analysis might best be achieved by the ISBs with their specialist skills relating the program benefits to their own sectors for which they have been developing sector profits and strategies.

Typical elements for review might be:

- The extent of ISB program monitoring and control
- Whether a system of multiproject control exists, with performance indicators and periodic reporting mechnism
- Data collection and analysis (project applications, project terminations, success/failure)
- Preparation of program expenditure forecasts
- Review of administrative procedures to optimise economy, efficiency, effectiveness
- Review of interfaces within ITC, and externally
- Evaluation
- Feedback to the program by means of policy recommendations

In summary, DIPP is an industry tool to meet certain objectives and it is appropriate that the ISBs monitor and evaluate the operational mecahnism and impact.

If such a system were in place and operating, the requirement for overall periodic departmental evaluation might be simplified.

3. OVERALL ITC PROGRAM MONITORING AND CONTROL

General

The opening words of the June 1977 DIPP Directive are "The DIPP operates in support of Canadian international defence cooperative agreements for research, development and production".

If this is still true, then major responsibilities appear to lie with the ADM Enterprise Development (responsible for the Program Branch), the ADM Industry and Commerce Development (responsible for Sector Branches), and the ADM Trade Commissioner Service and International Marketing (responsible for Defence Programs Branch and the bilateral treaties like DPSA/DDSA). It seems Canada's bilateral treaties set the stage; government provides a tool in support; and industry responds with products. But does it work like this? Who does have control of the program and who provides the support? Does operations control policy, or does administration, or does some other area, and how do they relate?

Delegation of Treasury Board Authorities to ITC

The program is funded by inclusion in the government Main Estimates, which is voted on by Parliament. Within the federal civil service, central agency management over the program is exercised in preview by Treasury Board Secretariat, and in post review by the Comptroller General on behalf of government, and by the Auditor General on behalf of Parliament. When the program was formed in 1959, Treasury Board had a close association which remains to this day. Originally, the program was small and relatively simple: with the years it has grown larger and technologically and commercially more complex. There may be a need to examine the ITC program relationship with TBS; the TBS delegation of program authorities to ITC, the project dollar ceilings (present ITC project ceiling is $2 million - larger projects need TBS approval), the administrative mechanism within the department; and to determine the reporting/evaluation requirements that meet ITC operating needs without having to provide additional duplicative requirements to meet separate TBS needs. This is noted from the continual requirements for DIPP evaluations, and the fact that three years after an influx of senior TBS management and a Minister, and a revision of the program there are still separate ongoing evaluation requirements. Is there a frequent turnover of TBS program analysts dealing with this area of ITC?

Comparison with the Enterprise Development Program delegated authorities is in order.

ITC Organisational Responsibilities

The directive (section E.1.0) states that "General policy .... will be determined by the ADM Enterprise Development and the ADM Industry Development". There is no inclusion of the ADM TCS and International Marketing whose "Canadian international defence cooperative agreements" DIPP is to support. There is a major lack of a description of the mechanism, and no division of responsibilities, as to how general program policy is to be established, reviewed and amended between the appropriate ADMs.

Program Branch

The Program Branch (through the DIPP Office) is responsible for central administration (section E.2.2) and acts as Secretariat to the DIPP Committee, with responsibilities for:

- preparation and update of Program Administrative Directive for approval by the DIPP Committee and TBS
- control of financial commitments and expenditure estimates, and management of program expenditures
- recommendation of the encumbrance/disbursement of contract funds, and reports and their status to the DIPP Committee at "regular intervals"
- coordination of project data to ADM Economic and Policy Analysis for program evaluation (this is an area that has apparently been superceded, as the ADM Enterprise Development now plans program evaluation, for example the DIPP evaluation. However, the relationship of evaluations within the ADM sector and the overall requirements of the Comptroller General may need to be defined)
- provision of an annual report

(Note: the DIPP Program Office has other responsibilities - but these are the ones that relate to monitoring and control).

Provisional review of some of the accumulated and historic DIPP data indicates that it may be difficult to extract substantive analyses, without going deeper into the data base. Further, some of the older files may have been destroyed, due to age. There is a need to review how basic information should be accumulated for future analysis. The data presentation appears more oriented for informational purposes rather than analytical and operational purposes but this may be due to the limited information seen.

DIPP Committee

While the DIPP Committee's (an interdepartmental Committee comprising ITC, DND, DSS) main responsibility is described as the advising for approval of projects by the Deputy Minister or Treasury Board, there are also functions of monitoring and control at both project and program level. These include:

- policy and directive interpretation
- monitoring DIPP overall, ensuring compliance to directive, ITC policy, priorities, and budget
- reviewing progress of individual projects and directs implementation of remedial measures

- authorising amendments to project contracts, within scope of delegated TBS authority.

Points for review include comparison of DIPP Committee authority with the Enterprise Development Board: the necessity for the Advisory Sub-Groups: and the evaluation of any multiproject control mechanism, reporting and control systems, and the use made of them by the Committee relative to policy and operational improvement.

Advisory Sub-Groups

The function of the Advisory Sub-Group appears to parallel the DIPP Committee, though functioning closer to the working level, lacking authority, and acting more in the role of advisor to the DIPP Committee. The composition of the Advisory Sub-Groups is similar to that of the DIPP Committee.

The Advisory Sub-Groups appear as a filter between the ISBs and the DIPP Committee, as an intermediate review, monitoring and control body. Functions in monitoring and control include:

- advice to DIPP Committee on interdepartmental representation as PRGs, establish PRG terms of reference, review project progress reports prior to their submission to DIPP Committee
- coordinating liaison with U.S. and other allied military on cooperative development projects
- providing reports to DIPP Committee on Advisory Sub-Group activities

Review of the whole Advisory Sub-Group mechanism and effectiveness appears in order.

Industry Sector Branches

The ISBs are the departmental focus for interfacing with industry. The organisational responsibilities allocate the major detail monitoring and control function to the ISBs. Of the 11 itemised ISB responsibilities in the Directive, no less than 7 relate to monitoring and control. Yet this is the very area where, as stated earlier, ISBs are deploying fewer resources for reasons of staff cutbacks and other departmental work priority ratings. Within the whole framework of government constraint, resources may remain a problem, thereby putting a premium on reviews of program system and workload streamlining, work sharing with specialist resource groups, and professional development, with potential for freeing up ISB time for project management.

The monitoring and control functions responsibilities are to:

- monitor company progress by chairing the PRGs
- report to the DIPP Committee via the Advisory Groups
- prepare forecasts of expenditure
- verify claims and recommend disbursements in conjunction with other departmental and interdepartmental groups
- recommend amendments to contracts
- provide data for program evaluation

- provide information for the annual program report

Supply and Services Canada (DSS)

The separate role of DSS is under review and it is stated that cetain contracting workload has been re-assigned to ITC but not yet implemented. The monitoring and control functions include:

- preparation and administration of project contracts
- ensuring DIPP contracts are consistent with domestic and foreign defence contractual requirements
- audits (via Audit Services Bureau)
- inspection of Capital Assistance Projects

A possible significant area for review is their project management and contractual background with defence projects, and a comparison of non-defence contracts with the Enterprise Devlopment Program civil contracts - also, the nature, criteria, frequency, and impact of the audits.

Defence Programs Branch (DPB)

The main focus of this Branch is the international bilaterial defence production treaties, like the DPSA/DDSA, and the marketing of defence products. There exists, though it is not clear from the directive, a monitoring and control function specifically in the area of "nominated projects" which are under joint development. This is carried out partly through attendance in PRGs, and partly through their network of liaison officers at the principal DOD agencies and research centres which are responsible for say, the U.S. inputs to joint projects. Information is available through this channel either on a government-to-government basis which may not be available to the company, or as a second opinion to the company statements of the project position.

DPB has the responsibility, delegated by the ADM TCS and International Marketing, of Marketing Advisor to DIPP. Part of this function includes in-depth market analysis of development projects at the front-end of the process. These analyses are made independently of the company, with or without company discussions. The significance of these ITC analyses is that they may differ from the company market analysis, or challenge some of the company strategy requirements to succeed. As such, during the process of ongoing project monitoring and control they may provide an alternate scenario as the project unfolds. On some projects, the officers preparing these analyses have participated in the PRGs. This function lies in the Market Research and Analysis Division (MRAD) currently located in the Defence Programs Branch. Review of these MRAD analyses against project outcome would provide a measure of effectiveness of this function into DIPP.

Financial Services Branch

The function is to:

- ensure DIPP expenditures remain within allocations and commitments remain within limits agreed
- process claims and requisitions, ensuring compliance with the Financial Administration Act (FAA)
- advise DIPP Committee, Secretariat and ISBs regarding the FAA and Income Tax Act
- collect repayments to the Crown

Areas for review might include the process flow for claims and requisitions, commitment and decommitment procedures, reconciliation of FSB computer reports with any other financial information systems, and the management of repayments to the Crown.

Department of National Defence (DND)

DND appears to have an advisory capacity without clear involvement in monitoring and control. The extent of their impact needs to be determined. Frequently, DND will be represented on a PRG.

Legal Services Branch

Their input relates to legal aspects of contracts, data rights, amendments to contracts, and interpretation of contractual compliance. The Legal Officers within ITC are not ITC officers, but are provided by the Department of Justice. The extent of their role needs to be determined.

Machinery Branch

Their involvement appears mainly as a front-end advisor to IMDE (Capital Assistance) projects rather than a significant monitoring and control role. The extent of their role needs to be determined.

Office of Science and Technology (OST)

The directive describes OST as an advisor on research and development to the DIPP Committee, DIPP Secretariat, DPB and ISBs. In general, practical technical experience is vested in the ISB officer: wider and deeper technology perspectives are available from OST, NRC, and other specialist departments of Government such as Transport, Communications, etc.

EXCEPTIONS TO STANDARD MONITORING AND CONTROL

There are two major exceptions to regular project monitoring and control, and some minor deviations.

Dash-7 STOL: this had its own project office in Transportation Industries Branch, but activity is now winding down.

CL-289 Drone: this is controlled by an ITC/Germany policy group with mechanical contract execution sub-contracted to DSS for $5 million over 5 years.

Both of the above are large dollar projects, involving tens of millions of dollars. Some small dollar joint U.S./Canada projects have some deviation, related to the needs of meeting U.S. DOD requirements.

OTHER MONITORING AND CONTROL INFLUENCES

Other Audits and Studies

In addition to reviews requested by TBS, ITC, etc., there are other audits such as by the Auditor General, or Audit Services Bureau acting on behalf of DSS directly, or under previous contract to ITC for Internal Audit. Studies, such as the Butler Study, may need to be reviewed.

Program Monitoring Without Major Projects

The figures for DIPP seen so far roll-up all the project expenditure. It is well known that some of these are major projects, typical examples being the de Havilland Dash-7 aircraft, Pratt & Whitney gas turbine engines, Canadair CL-289. Not considered an example of major projects are those in Canadian Marconi Co.: while their gross receipts from DIPP are large, these receipts have been invested principally in a wide range of projects.

It is considered that the major projects be reviewed, and those meeting the criteria be removed from the data base to remove any distortions or bias to analysis of the data base. The single large projects should then be reviewed as independent cost centres.

Rights in Data

The rights in data question needs to be monitored, since apart from the value of ensuing production, the data rights may become a principal asset of the companies in the program.

Performance Indicators

Two sets of Performance Indicators may be considered. One group relates to the measurement of the project as it proceeds to its objectives. The second group relates to intangibles, and may for example include measures to assess project contribution to "defence capability".

Defence Programs Branch

The DPSA/DDSA are <u>not</u> part of DIPP: but because DIPP was created as an instrument to support DPSA, among other reasons, the value of DIPP to these agreements and the potential future of DPSA, etc., need to be considered in context.

Offsets

Concern has been expressed by TBS that double Crown investment may be related to companies benefiting from both offsets and DIPP projects where the two are joint. A mechanism to monitor and control this, prior to evaluation, may be needed.

High Technology and the Defence Industry

Concern has been expressed over the "ambiguous" projects of DIPP monitoring and control mechanisms need to distinguish between a missile navigation system and a military (?) bolt-and-chain system.

Program Delivery Skills and Training

It has been stated that in the U.S. system of defence project contracting, their contract officers are career personnel with business academic training - professionals as much as a pilot or ship captain. These are the officers we deal with on Canada/U.S. joint development projects. It has also been noted that 60% of ITC's budget is devoted to Grants, Loan, Contributions and that this is delivered by 13% of ITC human resources. This indicates a need to optimise the "channel" for assistance program delivery to industry. The quality of monitoring and control may be related to the professionalism of the ITC channel for all assistance programs, of which DIPP is but one.

EVALUATION

Monitoring and control mechanisms will detect the information needed for evaluation of efficiency, economy and effectiveness. The evaluation process in turn should review the monitoring and control mechanisms. During the DIPP evaluation, it is presumed that appropriate performance measurement indicators and review mechanism will be recommended, with feedback to projects at the micro level and the program at the macro level. A hierarchy of evaluations may be needed, at the project, ISB, and overall program levels.

EVALUATION AND SELECTION OF DIPP PROJECT PROPOSALS

Processing Procedures

The following are the procedural steps involved in the processing of DIPP project proposals as set out in the DIPP Administrative Directive:

1. Enquiry Report

The purpose of this Report is to aid in planning and budgeting by recording brief details of anticipated applications for support under the DIPP. The report is a way of alerting the various government officials involved in the evaluation process of a potential project proposal which will be forthcoming for consideration and approval. The document is based on enquiries received by the Industry Sector Branch (ISB) officers from companies for DIPP support. It indicates the potential timing, amount and probable disposition of applications for assistance.

2. Corporate Submission

The purpose of the Corporate Submission is to provide a complete perspective on a company which is seeking DIPP assistance; its present capabilities in terms of management, facilities, and technology; its overall financial performance and position; and a corporate strategy which is specific and realistic as a framework into which proposed projects should fit and against which they may be assessed. Normally, the submission will contain a three to five year forward plan which is consistent with the firm's strategy and indicates the prospects for the firm and the type, scope, and amount of potential projects or project areas which fall within the company's resources and strategy during the planning period.

Corporate submissions form the corporate context within which the individual project applications are considered. This document is a necessary prerequisite to realistic evaluation and assessment of the project submission. The submissions are prepared by the ISB officers and submitted via the DIP Secretariat to the DIP Committee and its advisors for review, comment and approval. The corporate submission is updated annually for each company for which a project is expected to be submitted to the DIPP Committee during the ensuing year.

3. Project Submission

A Project Submission is prepared for each proposal to be submitted to the DIPP Committee. This is a brief document but at the same time should provide sufficient data and information concerning the proposed project to enable the DIPP Committee to accept or reject the proposal.

The document includes an assessment of the technical feasibility of the project, a market evaluation and forecast of sales and incremental profits. In addition, it is to include a brief succinct technical description and statement of work, costs and sources of funding, a market

assessment and its relationship to the corporate strategy as outlined in the approved corporate submission.

In practice, there usually are two project submissions: an initial draft submission and a final submission. The draft document is usually prepared following initial consultations between the ISB officials and the DIPP Secretariat and the marketing, financial and machinery advisors. If these consultations indicate that the project is likely to receive favourable consideration, the draft submission is prepared.

Once the advisors receive the draft project submission, they make a detailed analysis and assessment of the project proposal. This includes the marketing and financial advisors plus the machinery advisor in the case of the CA projects. These advisors eventually submit memos of concurent (with qualifying notes if necessary). The DIPP Secretariat also analyzes the project and the Science Centre DSS considers the contractual aspects. On the basis of the comments received from the above advisors, the final project submission is prepared. This latter submission represents the formal request to the DIPP Committee for DIPP assistance.

4. Authorization Form

The Authorization Form is a multipurpose approval document for DIPP projects which must be signed off by all parties in the approval process. This formal document indicates the nature of the project, the amount, sources and timing of funding and the terms and conditions under which the proposal is being authorized. The form serves several purposes. It represents a Treasury Board submission, project approval document, commitment of funds, encumberance of funds and a requisition for contracting.

The document is executed on behalf of the Industry Section Branch (recommendation), the Deputy Minister (authorization or recommendation), Treasury Board (authorization and authority to contract), DIP Secretariat and Financial Services Branch (commitment and encumbrance of funds) and DSS (contract authority and award).

Evaluation Procedures

I Industry Sector Branch Officer (ISB)

The ISB officer who is also referred to as the Project Officer plays a major role in the preparation for a DIPP project submission and the associated corporate submission. In fact, this officer is responsible for the preparation of both these documents, working in cooperation with the company for whom the project proposal is being prepared. The initial enquiry from a company regarding DIPP assistance for a proposed project is made directly to or referred to the appropriate ISB based on the area of technology or product area involved. Through continuing liaison between the ISB and company, the nature and details of the project will be developed within the context of the eligibility requirements of DIPP. During this time, the ISB may also consult with the various advisors of

the program. When the officer feels that the project proposal has been sufficiently formulated, the draft project submission and a concurrent corporate submission is prepared.

The corporate submission is background material on the past performance of the company to assist in evaluating the viability of the proposed DIPP project. Its purpose is to provide a complete perspective on the company's past, its present capabilities in terms of management, facilities, and technology; its overall financial performance and position; and a corporate strategy which is specific and realistic as a framework into which proposed projects should fit and against which they may be assessed. The project submission outlines the proposed project and includes an assessment of technical feasibility, a market evaluation and forecast of sales and incremental profits. In addition, it is to include a brief, succinct technical description and statement of work, costs and sources of funding, a market assessment and its relation to the company's corporate strategy. As stated above, the ISB directs the formulation of the project proposal in relation to the eligibility requirements of DIPP. The criteria are contained in the administrative directive and are set out in the appendix of this report. Outlines of the corporate and project submissions are also included in the appendix and provide an indication of the type of information and data which the ISB must prepare on the company and the project and the relevant comments and opinions to be included. In the preparation of these documents, assistance may be obtained from the various program advisors, particularly from the financial advisor for the corporate submission. The project submission is first prepared as a draft. Following receipt of the formal comments from the various advisors, a final submission is then prepared for presentation to the DIPP Committee.

In the past administration of the DIP Program, very little has been done in the way of selecting between proposed projects or rating them on a priority basis. This applies to the ISB and other advisors and also the Committee. The main focus has been on ensuring that the project proposal is set up so that it will meet the DIPP eligibility criteria and thereby receive approval from the various advisory groups and DIPP Committee. If at any time the proposed or approved projects and their funding requirements have exceeded the available funds, the practice has been to delay the implementation or financing of some projects until additional funds are available.

II Financial Advisor

The financial advisory services are provided by the Corporate Analysis Branch of the Department. The main issues considered by this advisory is:

(a) whether the project can be considered economically viable through the demonstration of the potential for generating an acceptable incremental return on the total investment required by the company and the Crown; and
(b) acceptability of the corporate submission in terms of it being a reasonable presentation of the company's history and plans.

The types of information and data required for the financial evaluation are provided mainly by the applicant company. Most of this information, identified below, is included in the corporate and/or project submissions, although some supplementation may be required:

(a) financial history of the company's total operations of several years' duration for such items as sales, net profit, available funds, working capital and tangible net worth. Most of this data would be provided in the company's operating and balance sheet statements;
(b) financial projections for several years for the above same items;
(c) present term debt position of the company;
(d) a review of previous assistance provided to the company under the DIPP and under other IT&C programs;
(e) detailed cost data for the project for which funding assistance is being sought;
(f) if possible, profit data for individual major product lines;
(g) a breakdown between defence and commercial markets of the projected sales of the products forthcoming from the project being supported;
(h) information on key management personnel;
(i) detail on available production facilities in terms of plant and equipment and labour.

In making the financial evaluation from the types of data and information identified above, the financial advisor considers a host of factors such as the following:

(a) soundness of current financial position in terms of working capital position, debt equity ratio, profitability, trends, etc.;
(b) financial projection - is it realistic, consistent with historical performance, are projected sales supported by prospective customers' needs and projects, are the projected profit margins a reflection of current performance?
(c) corporate strategy evaluation - does it have internal consistency, consistent with environment and available resources, risk and uncertainty, are the time horizons reasonable, workability;
(d) management qualifications and capabilities;
(e) technological capabilities and competence;
(f) other factors such as marketing resources, comparison with competition, relationship with parent company, etc.

III Marketing Advisor

This function is performed by the Defence Programs Branch of the Department. The central issue considered at this stage is the viability of the project from a marketing standpoint in relation to the DIPP eligibility requirements. Based on the available information on the world markets for the product(s) being considered and the company's resources and capabilities, are the projected sales and resulting return on investment reasonably attainable?

The evaluation requires a broad range of information, much of it from the applicant company:

(a) a description of the company's current products and their markets in terms of sales, classified between defence and commercial, domestic and export. A five-year historical review on this basis is required with a similar five-year future projection;
(b) what are the target major market areas and specific customers for the future?;
(c) what is the company's present marketing organization and the marketing plan and strategy to achieve forecast sales?;
(d) what is the nature of the company's competition and the relative strengths and weaknesses?

In addition to the information obtained from the company, a number of other sources are utilized to examine the reasonableness of the company's market projections:

(a) trade commissioner service to obtain information on foreign markets;
(b) budget information of the U.S. military agencies;
(c) DND liaison officers and CRAD - the latter for information on R&D activities;
(d) industry contacts.

In some instances, government assistance provided by other programs may be examined from the aspect of whether there may be duplication involved. Also, whether competing companies may be receiving assistance in similar product areas when the size of the market does not justify the support of several companies.

IV Machinery Advisor

The Machinery Advisor is responsible to provide advice to the ISBs and the DIPP Committee for Capital Assistance (CA) projects under the DIPP. Generally the issues considered by this advisor are the following:

(a) the need for the new equipment and the obsolescence of present equipment;
(b) the state of the technical advancement and the suitability of the new equipment;
(c) the Canadian context of the new equipment and its availability in the Canadian market;
(d) the acceptability of the price of the new equipment.

The above issues are considered by the machinery advisor in the process of determining the viability of the project in terms of upgrading the company's manufacturing capability for defence and defence-related products. The types of information and data required, primarily from the company for the evaluation, are the following:

(a) a definition of the manufacturing problem which will indicate the need for the new equipment;
(b) specification of the performance and physical characteristics of the required equipment;

(c) price quotations and brochure material for the equipment from all suppliers solicited;
(d) comparison by the company of prices and equipment characteristics for the various solicited suppliers;
(e) comparison of productin times and costs between old and new equipment and resulting annual savings;
(f) the company rationale for selecting the equipment for which capital assistance is being sought.

As indicated above, the principal source of this information will be the company for which the funding assistance is being considered. This will be supplemented by the Machinery Branch's knowledge of the supply situation, potential suppliers and the technical aspects of the equipment. On occasion, related information may be obtained from potential suppliers.

V DIPP Committee

This committee is responsible for advising on the appropriateness, viability and terms and conditions of all proposals which are eventually recommended for approval by the Deputy Minister or Treasury Board. When a project proposal reaches the stage of having been evaluated by the various advisory groups and a final project submission has been written, the Committee then considers the submission. During their deliberation, the various advisory reports (memos of concurrence), qualifying remarks and differences of opinion are considered plus the comments of additional Committee members such as DND and DSS. These inputs are coordinated and assimilated and a final recommendation arrived at for the approval of the project. Usually any questionable aspects about the project have been resolved prior to the Committee meeting and the Committee recommends approval of the project to the Deputy Minister or Treasury Board.

In addition, the Committee attends to administrative details of the program. It establishes specific guidelines for the content of the project and company reports and submissions, ensures that interdepartmental interests for projects are appropriately coordinated, interprets policy and departmental directives established for the program, reviews the progress of individual projects and directs the implementation of remedial measures when appropriate, authorizes project amendments and generally monitors the overall performance of the DIP Program.

VI Other Committee Members

The membership of the DIPP Committee includes representatives from DND and DSS. The DND representative provides advice relevant to their departmental policy and defence procurement practices. This person ensures that the activities of the DIPP are consistent with DND policy, advises on defence procurement requirements and on the status and requirements for defence related R&D, and provides information concerning DND and allied government requirements for potential R&D projects which could involve Canadian defence industry participation.

The DSS representation pertains to contractual matters. The DSS contract officer prepares and administers the contract for an approved project, ensures that the contractual procedures are consistent with domestic defence contracts with the domestic defence industry, and audits project expenditures to ensure conformity with the terms of authorization and the appropriateness of the expenditures.

The Technology Branch of IT&C is also represented on the Committee with special responsibility for advice and guidance concerning R&D and related matters.

APPENDIX

DIPP Eligibility Criteria

(a) The company proposing the project must be established in Canada and must substantially undertake the project in Canada.

(b) The project must be compatible with the structure, resources and future potential of the company and its approved corporate strategy.

(c) The project must be directly related to defence export markets and/or related civil export markets which employ technology important to Canada's national defence.

(d) There must be attractive market opportunities in defence export markets and related civil export markets for the resultant product and reasonable prospects that the company can successfully market the resultant product. To determine the adequacy of the potential market, minimum ratios of expected sales to Program support are expected to be adhered to although other factors will also be taken into consideration. Examples are Canadian defence requirements, industrial development goals and objectives, incremental profits available to firms, etc.

Where an immediate market is apparent, the applicable ratio of sales to Program support should be 10 to 20 times of the Crown investment. The Canadian content of the expected product sales is the determining factor in the application of this ratio. Where the Canadian content is less than 50%, the ratio should approach 20 to 1: where the Canadian content is greater than 50%, the ratio may approach 10 to 1.

Where the market is in the future, projects should be evaluated by means of a technological forecast of the demand for the product coupled wherever possible with documented evidence of the market. In this connection it is important to establish that access to the export market will be possible when the product is ready for sale.

(e) The project must demonstrate the potential for generating an acceptable incremental return on the investment required to be made by the company and the Government. This return would normally take into account such factors as incremental export sales, import replacement, employment, profit, capacity utilization, etc.

Outline of Corporate Submissions

Background

Corporate history
Share structure and ownership
Past performance - financial and product data
Comparison with competition
Relationship with parent
Past government assistance

Resources

Key management - opinion of management
Marketing resources - opinion of marketing
Financial position - balance sheet
- opinion of financial position
Labour
Facilities - land, buildings, equipment, capacity
Technology

Prospects

Projected income statements
Projected balance sheets
Financial statistics
Plans for major programs and product lines
Appraisal of company's projections

Corporate Strategy

Concept of corporate strategy

- internal consistency, consistency with the environment, appropriateness in light of available resources, satisfactory degree of risk and uncertainty, appropriate time horizon, workability.

Outline of Project Submission

Project Description
Summary of Approved Corporate Submission
Technical Description of Project
Costs and Sources of Funding
Projections
  Company's projections
  Appraisal of projections
Basis of eligibility of the Project
Foreign Government Involvement
Consistency of Project with Corporate Strategy
Environmental Impact
Recommendations
Annex to Project Submission
  Statement of work for development project
    (purpose)
    performance targets
  Major tasks and methods of approval
  Schedule
  Progress reports and monitoring arrangements

Information Required by the Marketing Advisor in Regard to DIP Project Submission

The following are "guidelines" in regard to information required from the sponsoring Branch to permit the Marketing Advisor to fulfill responsibilities in accordance with the DIP directive, in particular Section E,2.5 and F,1.2. The rapidity, accuracy and thoroughness of the Marketing Advisor'a assessment of any DIP project submission, as described in Section C,1.1 - 1.4 is directly related to the extent that the following information is provided with the initial sponsoring Branch submission and request for comments. If the sponsoring Branch disagrees with any information provided by the Company in respect to any of the following items, such exceptions should be identified, and commented upon, in a covering letter from the Branch.

1. What types and amounts of assistance are requested as a Crown Grant and as a loan?

2. What production capabilities and/or products are, or would be, directly related to the assistance required?

3. What are the Company's current products and/or services and their markets? Advise approximate current sales volume for each: domestic, commercial export and defence export and, where possible, the name, title, Company and phone number of a person cognizant in a major purchaser's organization of the applicant Company's goods, services and past performance (domestic customer, in the case of indirect exports).

4. What were the Company's sales, per year, for the last five years and what are the Company's projected sales per year for the next five years, in the following categories:

   (a) Defence Export (direct and indirect);
   (b) Commercial Export;
   (c) Defence Domestic;
   (d) Commercial Domestic.

   Five year projections should be provided both (i) without requested government assistance, and (ii) with requested government assistance.

5. What are the target major market areas and specific customers during the next five years as perceived by the Company?

6. What is the Company's marketing plan, to achieve the forecast sales?

7. What is the Company's current sales and marketing organization and what changes are planned, if any, to achieve the forecast export sales for defence and/or related commercial products?

General Outline of a Market Plan

The Market

1. Identify the market segment[1] being addressed.
   What is the market potential for your product in this market segment?
   What are the growth trends and what factors will influence growth? For example, government regulations, changing customer requirements, etc.
   What is your sales forecast, domestic and export, over the product life, by calendar year?

2. What is the identification and classification of customers who make up the segment and what are their buying habits? For example, who do they buy from - agent, direct, etc.? What factors influence their buying habits?

3. Do your potential customers require any special services, product support, or sales program? If so, what? Can you fill their requirement?

4. Have you sold in this market before and if not, how do you propose to establish your position? How would you evaluate your strengths/weaknesses in relation to the market?

5. What major marketing or technological changes have taken place in the past few years which would place you in an advantageous or disadvantageous position? What are the likely marketing or technological trends over the next five years and their effects on your product? For example, will product improvement be necessary. Is it necessary to broaden your product line?

Competition

1. Who are your competitors and what are their strengths/weaknesses?* What products and features do they offer? At what prices? How much have they sold and to whom? Have you bid against the competition and what were the results?

2. Are the number of competitors increasing? Name the companies most likely to enter the market and their strengths/weaknesses.*

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[1] Market segment refers to the "positioning of your product in the market and is usually equated to price. As an example in the automobile industry a low priced economy car attracts a different customer than a high priced luxury car and therefore has a different market potential to draw upon. This "positions" the two types of vehicles in the market and helps to define customer needs, attitudes, competition, etc.

* Strengths/Weaknesses should include, for example: price, product design distribution network, product support, sales programs. It would be useful to rate your company against the competition in these categories.

Marketing Strategy

1. How do you plan to sell your product - e.g. direct sales, agent, etc.? What arrangements with whom have been formalized to date for a sales network, and what further arrangements are planned over what time scale? What are the areas of responsibility? Are trained personnel available? What have been the results to date? Are arrangements exclusive?

2. What sales promotion programs, e.g. demonstrations, exhibitions, do you intend to implement? How? What prospects exist for product evaluations by government agencies, potential customers, and what time frame?

3. What are the product support requirements and how do you intend to perform this function? Is this the normal method of product support in this market and how does it compare with your competition? Are changes necessary? How will changes be implemented?

4. Are there any other products in the company product lines which can be used to influence the sales of this product? How?

5. What is the cost of sales necessary to penetrate the market? Are funds budgeted?

6. As a result of your analysis of your competitive position how do you intend to emphasize your strong points in your selling campaign? How long do you feel your advantages will last?

7. What are the delivery requirements ARO and can the company respond? What are the inventory requirements and what is the company policy regarding inventory build up?

8. Will further Crown funding be necessary in order to complete the project, and if so, what for and how much?

9. Can key marketing milestones be identified and if so, what are they?

MACHINERY ADVISOR
Capital Equipment Information Requirements

The following list is the information to be provided by companies for each piece of equipment for which they request Capital Assistance under the DIP Program:

1. A definition of the manufacturing problem clearly indicating the need for advanced equipment;

2. A detailed specification of the equipment and control system required to fulfill the need in (1) above and justification for such performance and physical characteristics;

3. Copies of quotations and brochures from all suppliers solicited, including those from Canadian manufacturers where applicable;

4. A comparison of each equipment's characteristics to company requirements, (2) above;

5. A detailed price comparison of all equipments investigated;

6. Drawings of typical parts, together with typical lot size;

7. A detailed comparison in elements of times and cost to produce each typical part by the old method and with the new equipment - including set up;

8. Calculation of annual savings using the new equipment over existing method;

9. Rationale for selecting the equipment for which capital assistance is required.

A REVIEW OF THE INFORMATION SYSTEM

There are three major sources of information on DIPP, these being the Programs Branch, the Industry Sector Branches and the Financial Services Branch (Grants, Loans and Contributions).

PROGRAMS BRANCH

Files are maintained by project for R&D developments and by company for CA & SE projects. These files contain correspondence, financial statements, requisition re-votes, a contract, and minutes of the DIPP meeting which approved the projects. These files may not contain as much detail as those located in the individual Industry Sector Branches.

DIPP Expenditures

Information Available

- divided by province and by company (1959/60 to 1978/79)
  - assistance is divided into R&D, CA or SE
  - able to note duration of funding from figures and from project files
- names of companies, ownerships, and total expenditures for 1959/60 to 1970/71.
- expenditures from 17 selected companies for the period 1959/60 to 1977/78.
- DIP Expenditures (1959/60 - 1975/76) totals.
- DIP - Loan Vote Expenditures (1964/65 - 1974/75) totals.

DIPP Committee Approvals

Information Available

- the number and value (totals) of projects approved (1968/69 - 1976/77) - this data may not be totally reliable.
- DIPP approvals (1974/75 - 1978/79)
  - number of companies
  - number of projects
  - funds approved
  - whether CA, SE or R&D
- DIPP approvals (1966/67 - 1976/77)
  - by company
    - amounts authorized
    - CA, SE or R&D
    - Industry Sector Branch involved
- List of approved projects 1977-78
- reasons for approvals or rejections may be found in the minutes of the DIPP Committee meetings (R&D, CA, SE - 1967-79) as well as in the project files

- R&D minutes for 1959-67 were kept separately

- CA & SE minutes for 1965-67 were kept by DIM

- reasons for approvals or rejections and the nature of the project (munitions, hardware, avionics, etc.) may be found in the project files.

Defense Industry Productivity Program Report on Sales

- broken down by:

  - project
  - R&D, CA or SE
  - company
  - Vote
  - Actual Sales
  - Potential Sales

This report has been published by the DIP Program Office and copies from March 31, 1971 to March 31, 1975 are presently available. Older copies should be available at the Public Archives.

INDUSTRY SECTOR BRANCHES

The Industry Sector Branches which are involved with the DIP Program are: 1) Electrical and Electronics, 2) Chemicals, 3) Machinery, 4) Transportation Industries, and 5) Resource Industries.

Project files are maintained by each branch until repayment is complete. At this point the files are sent to cold storage and destroyed after a period of approximately six years. Some files are of historical significance and are sent to the Public Archives upon completion of the project.

The filing system within each sector differs slightly, but the content is similar. The projects which are not approved for DIPP Assistance are filed among the approved ones. To determine the number of rejected projects one could go through all the files or the DIPP Committee's minutes. It is interesting to note that the Branches have seldom been refused DIPP assistance by the DIPP Committee for their proposed projects. Many branches screen projects over the phone before a written submission is made.

The Resource Industries Branch is the only branch which prepares a quarterly report on their DIPP funded projects. The report includes application data, project data and monitoring comments.

The project files in the Branches may include correspondence, financial statements, an auditor's report, projected financial statements, equipment estimates, a contract, claims for progress payments, minutes of the DIPP Committee's meeting, and requisition re-votes. The project officer could also have information stored in his head which may not be included in writing in the file.

DEFENSE PROGRAMS BRANCH

A Project file is maintained until a project is complete. Then it is sent to cold storage and destroyed after a period of time.

The files include things such as correspondence, projected financial statements, auditors' reports, requisition re votes, DIPP Committee minutes, and a contract.

Miscellaneous Data Available

- list of nominated projects (DIPP)
  - active and complete

- DIPP - contractors (1960 to 1968)
  - Prime and Sub Contractors (totals)
    - Canadian Industrial Funds
    - U.S. Funds
    - Other Allied Funds
    - Canadian Government Funds

- Selected projects which have received DIPP assistance for R&D classified by end users 1975/76 to 1977/78
  (Source: Economic Analysis Division)

- History of DIPP to March 31/1978
  - # of projects contracted 798
  - # of projects completed 469
  - Funds committed $643 million

- results of projects (DIPP assisted)
  - defence sales) This information should be available at a
  - civil related sales) later date.
  - defense/civil related sales)

- Market Research & Analysis Division

  Analysis Division

  - quarterly reports on defense trade
  - information on solicitations from the U.S.
  - narrative on what is happening

  Market Research

  - detailed market research reports that relate to DIPP

FINANCIAL SERVICES BRANCH

Grants, Contributions and Loans
- reports go back to 1965
- information for the period 1959/60 to 1964

(R&D) should be printed on the 1965 reports and be "flagged" to indicate it.

The following are descriptions and sample outputs of the reports which contain information on DIPP.

G.C. 010

I.T.&C. ASSISTANCE PROGRAM
AGED RECEIVABLES REPORT

AS AT MAY 31, 1979

COMPANY NAME	DESCRIPTION PROG	ARV #	TOTAL	NOT YET DUE	UNDER 30 DAYS	31 - 61 DAYS	61 - 90 DAYS	OVER 90 DAYS
AGIO CHEMISTRIES LTD	IRDIA	00002	2,045.00					2,045.00
AGRIPLAST LTD.	IRDIA	00222	451.00					451.00
ALBERTA SHORTHORN ASSOC.	PEMD	01233	873.50					873.50
AMOCO CANADA PETROLEUM	IRDIA	01450	118,880.50				118,880.50	
ANORE DORE	SJCP	00906	79.57					79.57
AURORA DESK MFG. CO. LTD.	PEMD	01559	100.00			100.00		
AUTOMOTIVE PARTS MFG. ASSOC.	PEMD	01244	1,183.86					1,183.86
	PEMD	01253	912.67					912.67
TOTAL COMPANY			2,096.53					2,096.53
BELL OF CANADA	IRDIA	01606	15,587.00		15,587.00			
BENNETT POLUTION CONTROLS LTD.	PAIT	01442	66,820.39				66,820.39	
BILL CLEVELAND	SJCP	01474	69.64				69.64	
BIO-MILLET LABORATORIES	PEMD	01316	1,637.50					1,637.50
BULLOOG LACING LTD.	PEMD	01479	29.51				29.51	
BURCHILL LAMINATING AND GROOVE	PEMD	00686	850.00					850.00
BURNSIDE EQUIPMENT LTD.	PEMD	01355	55.78					55.78
CAE ELECTRONICS LIMITED	DIP	01151	2,171.70					2,171.70
	OIP	01152	490.36					490.36
	OIP	01549	33,154.00			33,154.00		
	DIP	01570	22,891.00		22,891.00			
TOTAL COMPANY			58,707.06		22,891.00	33,154.00		2,662.06
CAN. INT'L DEV. AGENCY		01156	57,354.60					57,354.60
CANABAN INTERNATIONAL LTD.	PEMD	01286	4,700.63					4,700.63

VIII THE SYSTEM

Aged Receivables Report (G.C. 010)

This report is a listing of companies stating what is due to the Crown.

This report is: - sorted by company name,
- totalled by company

Distribution: all G.C.L. units

Action: - informs the payable units of which companies that owe money to the Crown.

This report is produced monthly.

AGED RECEIVABLES REPORT G.C. 010

The following information describes each of the columns of the report:

COLUMN	DESCRIPTION
Company Name	Name of the company
Program	Program
Accounts receivable Voucher number	Accounts Receivable Voucher number
Total	Amount of accounts receivable voucher
Not yet due	Amount of total not yet due by date of invoice
Under 30 days	Amount of total due under 30 days by date of invoice
31-61 days	Amount of total due between 31 and 61 days by date of invoice
61-90 days	Amount of total due between 61 and 91 days by date of invoice
Over 90 Days	Amount of total due after 90 days by date of invoice.

Appendix V

G.C. 010

Page _____

I.T.&C. ASSISTANCE PROGRAM
AGED RECEIVABLES REPORT

Date

F.S.B.

As At _____

Description Company Name	Prog	Arv #	Total	Not Yet Due	Under 30 days	31-61 days	61-90 days	over 90 days

SORTS	TOTALS
Company Name	X
Program	
Arv #	

VIII THE SYSTEM

Contribution Status of Repayments (G.C. 030-A)

This report provides a list of companies which have repaid a refund, repayment or has a recovery clause (see project file) having status codes 1,2,3,4.

This report is:

- sorted by project number
- sorted and totalled by branch, sub-program and program

Distribution: G.C.L. & appropriate line branches

Action: - for information

This report is produced monthly.

G.C. 030-A

CONTRIBUTION STATUS OF REPAYMENTS

COLUMN	DESCRIPTION
Descriptions Project Number Company Name Contract Status Code	 Project file number Company name Contract number Status Code
Current Yr Refunds	Current year refunds as on project file
Total Refunds	Total refunds for all years including current year
Total Expenditure	Total expenditures for all years including current year
Current Yr Repayments	Current year repayments as on project file
Total Repayments	Total repayments for all years including current year
Potential Recovery	Total expenditures - (total refunds + total repayments)
Current Yr Int Recvd	Interest received current year as on project file
Total Int Recvd	Total interest received including current year

G.C. 030-A

Page _____

I.T.&C. ASSISTANCE PROGRAM
CONTRIBUTION STATUS OF REPAYMENTS

Date

F.S.B.

As At _____

Descriptions	Current Yr Refunds	Total Refunds	Total Expenditure	Current Yr Repayments	Total Repayments	Potential Recovery	Current Yr Int Recvd	Total Int Rec

Produced from the Project Detail Records, for contribution projects

SORTS	TOTALS	PAGE BREAK	REPORT BR
Branch	X	X	X
Subprogram	X		
Program	X		

This report will print only those contributions within projects which are identified by Status Codes:

1. Indicates that contract is active
2. Indicates payments complete, awaiting final audit
3. Indicates that payment is complete, final audit received and adjusted
4. Indicates that contract is off status report and still in recovery state

TRANSPORTATION INOUSTRIES OEFENCE INDUSTRY PROGRAM CAPITAL ASSISTANCE F.S.B.
AS AT JUN.30 1979

DESCRIPTIONS	CURRENT YR REFUNDS	TOTAL REFUNDS	TOTAL EXPENDITURE	CURRENT YR REPAYMENTS	TOTAL REPAYMENTS	POTENTIAL RECOVERY	CURRENT YR INT RECVD	TOTAL INT RECVD
PROJECT 1-637 PRATT & WHITNEY AIRCRAFT CAN. CONTRACT 9BT3-0009 STATUS CODE 3	00	1,298.44-	188,703	00	00	187,404	00	00
PROJECT 1-682 HALIFAX INOUSTRIES LTD CONTRACT 9LK4-0003 STATUS CODE 1	00	3,507.50-	909,680	00	00	906,173	00	00
PROJECT 1-756 DAVIE SHIPBUILDING LTD CONTRACT 9MJ5-0048 STATUS CODE 2	00	35,424.50-	323,666	00	00	288,242	00	00
PROJECT 1-772 DEHAVILLAND AIRCRAFT OF CANADA CONTRACT 9BE7600002 STATUS CODE 3	00	5,847.00-	179,080	00	00	173,233	00	00
BRANCH TOTAL	00	46,077.44-	1,601,131	00	00	1,555,053	00	00

VIII THE SYSTEM

Contributions status report (G.C. 030)

This report provides expenditure and commitment information for contribution contracts with status codes 1,3. It is produced from the project file.

This report is:

- sorted by project number and
- sorted and totalled by branch, sub-program and program

Distribution: - G.C.L. Line branches as applicable

Action:
- for information
- Systems Operations must verify totals to Daily Control Account Summary Report (G.C. 200) and Previous Day's Transactions Accepted Report (G.C. 210).
- Grants and Contributions Section to review and balance the report before distribution.

This report is produced monthly.

G.C. 030

CONTRIBUTION STATUS REPORT

The following information describes each of the columns of the Contribution Status Report.

COLUMN	DESCRIPTION
Descriptions	
Project	Project file number
Company name	Company name
Contract	Contract number
Status Code	Status Code
Requisition Value	Requisition value from project file
Contract Value	Contract value from project file
Requisition Free Balance	Contract value - Requisition value
Current Yr. Expend.	Current year expenditures from project file
Total Expenditure	Total expenditures for all years
Cont. Free Balance	Total expenditures - Contract value
Current Yr. Commitment	Current year commitments from project file
Future Year Commitment	Future year commitments for all future years project file

Appendix V

. 030

Page_____

I.T.&C. ASSISTANCE PROGRAM
CONTRIBUTION STATUS REPORT

Date

NCH

PROGRAM - SUBPROGRAM
As At _____

F.S.B.

scriptions	Requisition Value	Contract Value	Requisition Free Balance	Current Yr Expend.	Total Expend.	Contract Balance	Current Yr Commitment	Future Yr Commitment

oduced from the Project Detail Records,
r contribution projects

SORTS	TOTALS	PAGE BREAK	REPORT BREAK
Branch	X	X	X
Subprogram	X		
Program	X		

is report will print only those contributions
thin projects which are identified by Status Codes:

Indicates that contract is active
Indicates that payment is complete, final audit received and adjusted

CHEMICALS BRANCH DEFENCE INDUSTRY PROGRAM - CAPITAL ASSISTANCE F.S.B.
AS AT JUN.30 1979

DESCRIPTIONS			REQUISITION VALUE	CONTRACT VALUE	REQUISITION FREE BALANCE	CURRENT YR EXPEND.	TOTAL EXPENDITURE	CONT. FREE BALANCE	CURRENT YR. COMMITMENT	FUTURE YEAR COMMITMENT
PROJECT 1-702										
CYANAMID OF CANADA LTD.										
CONTRACT			351,678		351,678	00				351,678
STATUS CODE 1										
PROJECT 1-707										
SCEPTER MFG. CO. LTD.										
CONTRACT			80,000		80,000	00				80,000
STATUS CODE 1										
PROJECT 1-828										
GULF OIL OF CANADA LTD.										
CONTRACT	9MJ7800003	**	690,500	690,500		00	123,218	567,281		567,281
STATUS CODE 1										
PROJECT 1-946										
CONTRACT			65,000		65,000	00			65,000	
STATUS CODE										
BRANCH TOTAL		**	1,187,178	690,500	496,678	00	123,218	567,281	65,000	998,959

VIII THE SYSTEM

Contribution Status 2 Report (G.C. 031)

This report provides expenditure and commitment information for contribution contracts with status code 2. It is produced from the project file.

Refer to Contribution Status Report G.C. 030 for a description of the report and fields. The only difference between G.C. 030 and G.C. 031 is that G.C. 031 prints only status code 2 records, while G.C. 030 prints records with status codes 1,2,3.

Current yr exp and curr yr commitments should not show up on the report.

This report is produced monthly.

GC 031 (Status Code 2)

GC030 — I.T.&C. ASSISTANCE PROGRAMS — CONTRIBUTION STATUS REPORT — PAGE 0002 — 79/04/04

ELECTRICAL & ELECTRONICS BR — DEFENCE INDUSTRY PROGRAM — CAPITAL ASSISTANCE — AS AT MAR,31 1979 — F.S.B.

DESCRIPTIONS	REQUISITION VALUE	CONTRACT VALUE	REQUISITION FREE BALANCE	CURRENT YR EXPEND.	TOTAL EXPENDITURE	CONT. FREE BALANCE	CURRENT YR. COMMITMENT	FUTURE YEAR COMMITMENT
PROJECT 1-564 BOWMAR CANADA LIMITED CONTRACT 9MJ2-0062 STATUS CODE 2	353,747	353,747		00	353,747			
PROJECT 1-670 CAE ELECTRONICS LIMITED CONTRACT 9MJ4-0009 STATUS CODE 2	24,055	24,462	406-	00	24,055	406		
BRANCH TOTAL	377,802	378,209	406-	00	377,802	406		

VIII THE SYSTEM

Contribution Status Expenditure Summary Report (G.C. 032)

This report provides a summary of the Contribution Status Report (G.C. 030). This report is produced from the project file for contribution projects having status codes 1,2, or 3.

This report is sorted and totalled by:

- sub-program
- program

Distribution:
- G.C.L. and Line branches as applicable

Action:
- for information
- Systems Operations must verify totals to Daily Control Accounts Summary report (G.C. 200) and with the Contribution Status Report (G.C. 030) and with Previous Day's Transactions Accepted Report (G.C. 210)
- Grants and Contributions Section to review and balance the report before distribution.
- to be distributed together with the Contributions Status Report.

This report is produced monthly.

CONTRIBUTIONS STATUS EXPENDITURES SUMMARY REPORT G.C. 032

The following information describes each of the columns of this report.

COLUMN	DESCRIPTION
Prior Years Expenditures	All prior fiscal year expenditures for projects shown on status report.
Current Fiscal Year Expenditures up to and including last month.	Expenditures made in the current fiscal year up to and including last month.
Expenditures This Month	Expenditures made in the current month.
Total Current Fiscal Year Expenditures	Current fiscal year expenditures up to and including last month plus expenditures this month.
Total Expenditures to date	Prior year expenditures plus total current fiscal year expenditures.

G.C. 032

AS AT:

FINANCIAL SERVICES BRANCH
CONTRIBUTIONS STATUS EXPENDITURES SUMMARY REPORT

Prior Year Expenditures		XXXXXXXXX.XX
Current Fiscal Year Expenditures up to and including last month	XXXXXXXXX.XX	
Expenditures this month	XXXXXXXX.XX	
Total Current Fiscal year expenditures		XXXXXXXXX.XX
Total Expenditures to date		XXXXXXXXX.XX

Produced from the Project detail records, for contributions projects.

This report will print only the summary of those contributions within projects which are identified by status codes:

1. indicates that contract is active
2. indicates payments complete, awaiting final audit
3. indicates that payment is complete, final audit received and adjusted.

Sorts	Totals	Page Break	Report Break
Sub Program	X	X	
Program	X		X

GC032 F I N A N C I A L S E R V I C E S B R A N C H

CONTRIBUTIONS STATUS EXPENDITURES SUMMARY REPORT AS AT FEBRUARY 28,1979

	DIP	CA
PRIOR YEARS EXPENOITURES		11,537,162.49
CURRENT FISCAL YEAR EXPENDITURES UP TO ANO INCLUOING LAST MONTH	5,049,162.61	
EXPENDITURES THIS MONTH	424,833.77	
TOTAL CURRENT FISCAL YEAR EXPENOITURES		5,473,996.38
TOTAL EXPENOITURES TO DATE		17,011,158.87

VIII THE SYSTEM

Company Report (G.C. 035)

This report provides gives a listing of grants, contributions and loans given to all companies

This report is: - sorted by project number

- sorted and totalled by a sub-program, program and company

Distribution: G.C.L.

Action: - for information

This report is produced yearly.

COMPANY REPORT G.C. 035

The following information describes each of the columns of the Company Report.

COLUMN	DESCRIPTION
Description	
Program-Subprogram	Program and subprogram
Project	Project file number
Contract	Contract number
Status Code	Status Code
Contract Value	Value of contract as on project file
Total Expend.	Total expenditures to date
Contract Free Balance	Contract value - Total expenditures
Refunds Rpye	Total repayments reported for all years
Repayments Rpye	Total repayments reported for all years
Loan Value	Value of loan as on project file
Total Disbursed	Total loan disbursed for all years
Total Repayments	Total loan repayment for all years
Loan Receivable	Total repayments - Total disbursed

G.C. 035

Page _____

I.T.&C. ASSISTANCE PROGRAM
COMPANY REPORT

Date

Company Name

As At _____

F.S.B.

Note: All values expressed in whole dollars.

	******** Grants and/or Contributions **********					********** Loans **********			
Descriptions	Contract Value	Total Expend.	Contract Free Bal.	Refunds Rpye	Repayments Rpye	Loan Value	Total Disbursed	Total Payments	Loan Receivable

Produced from the Project Detail Records

SORTS	TOTALS	PAGE BREAKS
Project Number		
Subprogram	X	
Program	X	
Company Name	X	X

CANADAIR LIMITED F.S.B.

AS AT MAR.31 1979 NOTE: ALL VALUES EXPRESSED IN WHOLE DOLLARS

DESCRIPTION	GRANTS AND/OR CONTRIBUTIONS: CONTRACT VALUE.	TOTAL EXPEND.	CONTRACT FREE BAL.	REFUNDS RPYE	REPAYMENTS RPYE	LOANS: LOAN VALUE.	TOTAL DISBURSED	TOTAL REPAYMENTS	LOAN RECEIVABLE
DEFENCE INDUSTRY PROGRAM - CAPITAL ASSISTANCE									
PROJECT 1-664 CONTRACT 9BC4-0007 STATUS CODE 5	275.000	259.725	15.275			275.000	259.725	220.000-	39.725
PROJECT 2-103 CONTRACT 4BT6-171 STATUS CODE 6	338.831	338.831		5.783-		338.831	338.831	338.831-	
PROJECT 2-110 CONTRACT 4BT6-177 STATUS CODE 6	177.064	177.064	-	11.304-		177.064	177.064	177.064-	
PROJECT 2-123 CONTRACT 4BT6-208 STATUS CODE 6	800.634	800.634	-	56.896-		800.634	800.634	800.634-	
PROJECT 2-135 CONTRACT 4BT7-15 STATUS CODE 6	450.724	450.724		4.016-		450.724	450.724	450.724-	
PROJECT 2-139 CONTRACT 9BT7-18 STATUS CODE 6	1,663.276	1,663.276				1,663.276	1,663.276	1,663.276-	
PROJECT 2-14 CONTRACT 4BP5-17 STATUS CODE 6	213.884	213.884				213.884	213.884	213.884-	
PROJECT 2-45 CONTRACT 4BS5-108 STATUS CODE 6	458.000	458.000				458.000	458.000	458.000-	
PROJECT 2-87 CONTRACT 4BT6-122 STATUS CODE 6	2,668.764	2,668.764	-	243.151-		2,668.764	2,725.313	2,725.313-	
SUBPROGRAM TOTAL	7,046.177	7,030.903	15.273	321.151-		7,046.177	7,087.452	7,047.727-	39.725

CANADAIR LIMITED F.S.8.

AS AT MAR.31 1979 NOTE: ALL VALUES EXPRESSED IN WHOLE DOLLARS

DESCRIPTION	GRANTS AND/OR CONTRIBUTIONS: CONTRACT VALUE.	TOTAL EXPEND.	CONTRACT FREE BAL.	REFUNDS RPYE	REPAYMENTS RPYE	LOANS: LOAN VALUE.	TOTAL DISBURSED	TOTAL REPAYMENTS	LOAN RECEIVABLE
DEFENCE INDUSTRY PROGRAM - RESEARCH & DEVELOPMENT									
PROJECT 1-76									
CONTRACT 9M1-44	27,000	27,000							
STATUS CODE 6									
PROJECT 1-779									
CONTRACT 9RD76D0003	14,800,000	8,480,063	6,319,936						
STATUS CODE 1									
PROJECT 1-806									
CONTRACT 9ST7600007	316,500	316,501	1-						
STATUS CODE 4									
PROJECT 1-90									
CONTRACT 98X1-183	915,000	915,000							
STATUS CODE 4									
PROJECT 1-99									
CONTRACT 98H3-26	12,000,000	14,151,662	2,151,662-	2,763,214-					
STATUS CODE 4									
SUBPROGRAM TOTAL	60,085,583	55,040,797	5,044,786	2,823,858-					
DEFENCE INDUSTRY PROGRAM - SOURCE ESTABLISHMENT									
PROJECT 1-524-SE									
CONTRACT 98A2-0001	5,730,340	5,730,340		399,064-					
STATUS CODE 2									
PROJECT 1-658									
CONTRACT 98A2-0001A	5,793,600	5,503,609	289,991						
STATUS CODE 1									
SUBPROGRAM TOTAL	11,523,940	11,233,949	289,991	399,064-					

VIII THE SYSTEM

Loans Status Report (G.C. 040)

This report provides payments, repayments and interest information for active loan contracts. It is produced from the project file for loans which are identified by Status codes 1,2,3 or 5.

The report is sorted by project number, and sorted and totalled by branch, sub-program and program.

Distribution: - G.C.L. and line branches as applicable

Action: - for information

- Systems Operations must verify totals to Daily Control Accounts Summary Report (G.C. 200)

- Grants and Contributions Section to review and balance report before distribution.

This report is produced monthly.

LOAN STATUS REPORT (G.C. 040)

The following information describes each of the columns of the Loans Status Report.

COLUMN	DESCRIPTION
Descriptions	
Project	Project file number
Company Name	Company name
Contract	Contract number
Status Code	Status code
Loan Value	Loan value as on project file
Disbursed Current Year	Loans disbursed current year as on project file
Total Disbursed	Total loans disbursed including current year
Repaid Current Year	Total loans repaid current year
Total Repaid	Total loans repaid including current year
Loan Receivable	Total loans repaid - Total loans disbursed
Cum. Interest Received	Total interest received

G.C. 040

Page_____

I.T.&C. ASSISTANCE PROGRAMS
LOAN STATUS REPORT

Date

RANCH

PROGRAM - SUBPROGRAM

F.S.B.

As At _____

escriptions	Loan Value	Disbursed Current Yr	Total Disbursed	Repaid Current Yr	Total Repaid	Loan Receivable	Cum. Interes Received

Produced from the Project Detail Records for Loan projects.

This report will print only those loans within projects which are identified by tatus Codes:

1. indicates that contract is active
2. indicates payments complete, awaiting final audit
3. indicates that payment is complete, final audit received and adjusted
4. indicates that loans are under payment

SORTS	TOTALS	PAGE BREAK	REPORT BREAK
Branch	X	X	
Subprogram	X		X
Program	X		X

ELECTRICAL & ELECTRONICS BR DEFENCE INDUSTRY PROGRAM - CAPITAL ASSISTANCE F.S.B.
AS AT JUN.30 1979

DESCRIPTIONS	LOAN VALUE	DISBURSED CURRENT YEAR	TOTAL DISBURSED	REPAID CURRENT YEAR	TOTAL REPAID	LOAN RECEIVABLE	CUM.INTEREST RECEIVED
PROJECT 1-768 CAE ELECTRONICS LIMITED CONTRACT 9MJ5-0052 STATUS CODE 5	162,990.00	00	162,687.35	32,598.00-	130,392.00-	32,295.35	00
PROJECT 1-769 CAE ELECTRONICS LIMITED CONTRACT 9MJ5-0051 STATUS CODE 5	138,920.00	00	136,997.68	00	55,568.00-	81,429.68	00
PROJECT 1-794 ALMAX INDUSTRIES LTD. CONTRACT 9PE7600006 STATUS CODE 5	49,405.00	00	49,405.00	9,881.00-	19,762.00-	29,643.00	00
PROJECT 1-796-1 EDAC INC. CONTRACT 9PX7600008 STATUS CODE 1	22,312.00	1,487.00	22,312.00	00	4,462.40-	17,849.60	00
PROJECT 1-798 SHEFFORD ELECTRONICS CORP. CONTRACT 9PG7600015 STATUS CODE 1	32,107.45	00	32,107.45	00	12,842.96-	19,264.49	00
PROJECT 1-802 CROVEN LIMITED CONTRACT 9MJ7600038 STATUS CODE 1	230,662.50	00	105,871.17	46,311.10-	92,622.20-	13,248.97	00
PROJECT 1-811 LITTON SYSTEMS (CANADA) LTD. CONTRACT 9P07700006 STATUS CODE 5	520,500.00	00	520,500.01	00	00	520,500.01	00
PROJECT 1-822 HYPERNETICS LTD. CONTRACT 9PX77-0001 STATUS CODE 5	62,300.00	00	62,300.00	00	12,460.00-	49,840.00	00
PROJECT 1-824 LEIGH INSTRUMENTS LTD. CONTRACT 9PZ7700008 STATUS CODE 1	211,759.00	828.89	172,633.12	00	00	172,633.12	00

VIII THE SYSTEM

Loan Status Summary Report (G.C. 042)

This report provides a summary of the loans status report (G.C. 040). It is produced from the project file for loans which are identified by status codes 1,2,3 or 5.

This report is sorted and totalled by:

- sub-program
- program

Distribution: - G.C.L. Line branches, as applicable

Action: - for information

- Systems Operations must verify totals to Daily Control Account Summary Report (G.C. 200) and with the Loans Status Report (G.C. 040).

- Grants and Contributions Section to review and balance the report before distribution.

- to be distributed together with the loans status report.

This report is produced monthly.

LOANS STATUS SUMMARY REPORT (G.C. 042)

The following information describes each of the columns of this report.

COLUMN	DESCRIPTION
LOANS PRINCIPAL PAYMENTS	
Prior years payments	All prior fiscal years principal payments
Current fiscal year payments up to and including last month	Principal payments made in the current fiscal year up to and including last month.
Payments this month	Principal payments made in the current month.
Total current fiscal year payments	Current fiscal year payments up to and including last month plus payments this month.
Total payments to date	Prior years payments plus total current fiscal year payments.
LOANS PRINCIPAL REPAYMENTS	
Prior years repayments	Loans principal repayments received in prior years.
Current fiscal year repayments up to and including last month	Loans principal repayments received in the current fiscal year up to and including last month.
Repayments this month	Loans principal repayments received in the current month.
Total current fiscal year repayments	Current fiscal year repayments up to and including last month plus repayments this month.
Total repayments to date	Prior years repayments plus total current fiscal year repayments.

LOANS INTEREST RECEIVED

COLUMN	DESCRIPTION
Prior years interest received	Loans interest received in prior years
Interest received in the current fiscal year up to and including last month	Loans interest received in the current fiscal year up to and including last month.
Interest received this month	Loans interest received in the current month.
Total interest received in the current fiscal year	Interest received in the current fiscal year up to and including last month plus interest received this month.
Total interest received to date	Prior years interest received plus total interest received in the current fiscal year.

AS AT:

G.C. 042

FINANCIAL SERVICES BRANCH
LOANS STATUS SUMMARY REPORT

(Program - Sub Program Name)

Produced from project detail records, for loans projects	Sorts	Totals	Page Break	Report Break
This report will print only the summary of those loans within projects which are identified by status codes:	Sub Prog.	X	X	
	Program	X		X

1. indicates that contract is active

2. indicates payments complete, awaiting final audit

3. indicates that payment is complete, final audit received and adjusted

5. indicates that loans are under repayment

AS AT:

G.C. 042

FINANCIAL SERVICES BRANCH

LOANS STATUS SUMMARY REPORT

(Program - Sub Program Name)

LOANS PRINCIPAL PAYMENTS		
Prior Years Payments		XXXXXXXXX.XX
Current fiscal year Payments up to and including last month	XXXXXXXXX.XX	
Payments this month	XXXXXXXX.XX	
Total Current Fiscal Year Paymets		XXXXXXXXX.XX
Total Payments to date		XXXXXXXXX.XX
LOANS PRINCIPAL REPAYMENTS		
Prior YUears repayments		XXXXXXXXX.XX
Current fiscal year repayments up to and including last month	XXXXXXXXX.XX	
Repayments this month	XXXXXXXX.XX	
Total Current Fiscal Year Repayments		XXXXXXXXX.XX
Total Repayments to date		XXXXXXXXX.XX
LOANS INTEREST RECEIVED		
Prior years interest received		XXXXXXXXX.XX
Interest received in the current fiscal year up to and including last month	XXXXXXX.XX	
Interest received this month	XXXXXXX.XX	
Total interest received in the current fiscal year		XXXXXXX.XX
Total interest received to date		XXXXXXXX.XX

GC042

FINANCIAL SERVICES BRANCH

LOANS STATUS SUMMARY REPORT AS AT JUNE 30.1979

	DIP	CA
LOANS PRINCIPAL PAYMENTS		
PRIOR YEARS PAYMENTS		37.967.980.11
CURRENT FISCAL YEAR PAYMENTS UP TO AND INCLUDING LAST MONTH	612.691.06	
PAYMENTS THIS MONTH	488.727.09	
TOTAL CURRENT FISCAL YEAR PAYMENTS		1.101.418.15
TOTAL PAYMENTS TO DATE		39.069.398.26
LOANS PRINCIPAL REPAYMENTS		
PRIOR YEARS REPAYMENTS		19.019.957.42-
CURRENT FISCAL YEAR REPAYMENTS UP TO AND INCLUDING LAST MONTH	1.072.396.40-	
REPAYMENTS THIS MONTH	524.466.04-	
TOTAL CURRENT FISCAL YEAR REPAYMENTS		1.596.862.44-
TOTAL REPAYMENTS TO DATE		20.616.819.86-
LOANS INTEREST RECEIVED		
PRIOR YEARS INTEREST RECEIVED		.00
INTEREST RECEIVED IN THE CURRENT FISCAL YEAR UP TO AND INCLUDING LAST MONTH	.00	
INTEREST RECEIVED THIS MONTH	.00	
TOTAL INTEREST RECEIVED IN THE CURRENT FISCAL YEAR		.00
TOTAL INTEREST RECEIVED TO DATE		.00

VIII THE SYSTEM

Report of Loan Instalments (G.C. 060)

This report provides a listing of all instalments due in the following month or have not been repaid in prior months. This report is produced around the middle of the month from the project file, printing only those instalment within projects which are identified by status codes 1,2,3,4 or 5.

This report is:
- sorted by project number and due date, and
- sorted and totalled by branch, sub-program and program.

Distribution: - G.C.L.

Action: - Grants and Contributions Section to initiate proper action for all instalments.

REPORT OF LOAN INSTALMENTS (G.C. 060)

The following information describes each of the columns of the Loan Instalments Report.

COLUMN	DESCRIPTION
PROJECT NUMBER/SERIAL NUMBER	
Project number	Project File Number
Serial number	Contract Number
Company	Company name and address
Interest Rate	As stated in contract and is changed only when contract is amended
Principal Balance	Total principal payments less total principal repayments
Principal Due	Instalment amount due in the following month, and what was not repaid in prior months.
Due Date	Date instalment due in the following month.
Instalment Number	Number of instalments that are not repaid in full are due on the due date.
Status Code	1. indicates that contract is active 2. indicates payments complete, awaiting final audit 3. indicates that payment is complete, final audit received and adjusted. 5. indicates that loans are under repayment.

NOTE: Only those projects with instalments due in the following month are printed around the middle of the month.

REPORT OF LOAN INSTALMENTS

LOAN NO./ SERIAL NO.	COMPANY	INTEREST RATE	PRINCIPAL BALANCE	PRINCIPAL DUE	INSTAL. NO.	DUE DATE	STATUS CODE
	DIP *			CA			
DSS-100	DSS WAREHOUSE	.0000000	31,448.13	1,539.91	3	16/05/79	5
DSS-100							
		000000					
1-400	DOMINION FORGE CO.	.0000000	147,495.29	70,780.00	19	01/05/79	2
9ME0-0009A	2480 SEMINOLE STREET						
	WINDSOR, ONTARIO	N8Y1X3					
1-478	PRECISION ELECTRONICS COMPON.	.0000000	41,120.27	18,184.50	3	31/05/76	1
9MJ1-0016	19 HAFIS ROAD						
	TORONTO ONTARIO	M6M2V6					
1-478	PRECISION ELECTRONICS COMPON.	.0000000	41,120.27	18,184.50	4	31/05/77	1
9MJ1-0016	19 HAFIS ROAD						
	TORONTO ONTARIO	M6M2V6					
1-478	PRECISION ELECTRONICS COMPON.	.0000000	41,120.27	4,751.27	5	31/05/78	1
9MJ1-0016	19 HAFIS ROAD						
	TORONTO ONTARIO	M6M2V6					
1-564	BOWMAR CANADA LIMITED	.0000000	41,713.09	69,592.35	3	01/01/77	2
9MJ2-0062	1257 ALGOMA ROAD						
	OTTAWA, ONT.	K1B3W7					
1-564	BOWMAR CANADA LIMITED	.0000000	41,713.09	70,749.35	4	01/01/78	2
9MJ2-0062	1257 ALGOMA ROAD						
	OTTAWA, ONT.	K1B3W7					
1-564	BOWMAR CANADA LIMITED	.0000000	41,713.09	70,749.62	5	01/01/79	2
9MJ2-0062	1257 ALGOMA ROAD						
	OTTAWA, ONT.	K1B3W7					

VIII THE SYSTEM

General Purpose Report (G.C. 154)

This report provides a listing of projects in the system in any output format and by any selection criteria. It is produced from the project file.

This report can be sorted and/or totalled by any field found in the project file.

Distribution: - G.C.L.

Action: - usually the reports are request from members of parliament and are thus for information purposes.

This report is produced on request.

Because of the number of possible outputs, a sample of the output is not provided.

VIII THE SYSTEM

Project file printout (G.C. 240)

This report provides a complete printout of all fields for each project/contract and is produced from the project file on request.

This report is sorted by:

- project
- sub-program
- program

Distribution: - G.C.L.

Action: - Grants and Contributions Section to review printout to ensure completeness of the project file.

This report is produced on request.

PROJECT DATA****	PROJECT NUMBER	1-671		PROGRAM	DIP
	SUB-PROG	CA		BRANCH	044
	PROJECT NAME				
	PROJ CROSS-REF			REQUISITION VAL	143,329.46
COMMITMENT DATA	COMMITMENT YEAR	75		CONTR. COMMITMNT	141,[illegible]0.00
	LOAN COMMITMENT		.00	TRANS REF	
COMMITMENT DATA	COMMITMENT YEAR	76		CONTR. COMMITMNT	6,731.98
	LOAN COMMITMENT		.00	TRANS REF	
COMMITMENT DATA	COMMITMENT YEAR	77		CONTR. COMMITMNT	3,686.48
	LOAN COMMITMENT		.00	TRANS REF	
COMMITMENT DATA	COMMITMENT YEAR	78		CONTR. COMMITMNT	.98
	LOAN COMMITMENT		.00	TRANS REF	
CONTRACT DATA****	CONTRACT #	CMC4-0005		COMPANY CODE	046590
	INVEST CLASS	3730		CROWN RATIO	050
	EFFECT DATE	250774		RECOVERY CODES	R
	HOLD %			FOLLOW-UP MONTH	05
	INTEREST RATE	.0000000		CONTRIB. VALUE	143,329.46
	HOLDBACK AMOUNT		.00	RECOV. AMOUNT	.00
	LOAN CONTR. VAL.	143,329.46		CONTR. FIN. AUD	.00
	LOAN FIN. AUDIT		.00	HOLDBCK COLLATOR	
	STATUS	2		CONT COLL	11061
	LOAN COLL	99401		REVENUE COL	99951
	TOTAL EXPEND	286,656.92		TOTAL COMM	.00
	ADDRESS LINE 1			WELLAND ONTARIO	
	ADDRESS LINE 2				
	POSTAL CODE	L3B5P7		TRANS REF	
	RATE RE-INVESTED				
	HOLDBACK DATE			LAST PAYMT HOLDB	
EXPENDITURE DATA	EXP YR	75		CONTR. EXPEND	139,643.02
	CONTR. REFUNDS		.00	CONTR. REPAYMENT	.00
	LOAN PRINC. PAY	139,643.03		LOAN PRIN. REPAY	.00
	LOAN INT. RECID		.00	EXCHANGE RATE	.0000000
	1973 ACCM FLAG				
EXPENDITURE DATA	EXP YR	77		CONTR. EXPEND	3,686.48
	CONTR. REFUNDS		.00	CONTR. REPAYMENT	.00
	LOAN PRINC. PAY	3,686.43		LOAN PRIN. REPAY	29,275.00-
	LOAN INT. RECID		.00	EXCHANGE RATE	.0000000
	1973 ACCM FLAG				
EXPENDITURE DATA	EXP YR	78		CONTR. EXPEND	.00
	CONTR. REFUNDS		.00	CONTR. REPAYMENT	.00
	LOAN PRINC. PAY		.00	LOAN PRIN. REPAY	29,275.00-
	LOAN INT. RECID		.00	EXCHANGE RATE	.0000000
	1973 ACCM FLAG				
EXPENDITURE DATA	EXP YR	79		CONTR. EXPEND	.00
	CONTR. REFUNDS		.00	CONTR. REPAYMENT	.00
	LOAN PRINC. PAY		.00	LOAN PRIN. REPAY	29,275.00-
	LOAN INT. RECID		.00	EXCHANGE RATE	.0000000
	1973 ACCM FLAG				
EXPENDITURE DATA	EXP YR	80		CONTR. EXPEND	.00
	CONTR. REFUNDS		.00	CONTR. REPAYMENT	.00
	LOAN PRINC. PAY		.00	LOAN PRIN. REPAY	29,275.00-
	LOAN INT. RECID		.00	EXCHANGE RATE	.0000000
	1973 ACCM FLAG				
LOAN INSTAL DATA	INSTMT NUMBER	0001		LOAN DUE DATE	300576
	LOAN AMT DUE	29,275.00		LOAN INST PAID	29,275.00-
	LOAN INST DATE			EXCHANGE RATE	.0000000

LOAN INSTAL DATA	INSTMT NUMBER	0002		LOAN DUE DATE	300577
	LOAN AMT DUE	29,275.00		LOAN INST PAID	29,275.00-
	LOAN INST DATE			EXCHANGE RATE	.0000000
LOAN INSTAL DATA	INSTMT NUMBER	0003		LOAN DUE DATE	300578
	LOAN AMT DUE	29,275.00		LOAN INST PAID	29,275.00-
	LOAN INST DATE			EXCHANGE RATE	.0000000
LOAN INSTAL DATA	INSTMT NUMBER	0004		LOAN DUE DATE	300579
	LOAN AMT DUE	29,275.00		LOAN INST PAID	29,275.00-
	LOAN INST DATE			EXCHANGE RATE	.0000000
LOAN INSTAL DATA	INSTMT NUMBER	0005		LOAN DUE DATE	300580
	LOAN AMT DUE	29,275.00		LOAN INST PAID	.00
	LOAN INST DATE			EXCHANGE RATE	.0000000
ARV NUMBER DATA	AR VCHR NO.	-		REC DUE DATE	-
	REC AMOUNT	-		REC AMT COLLECTD	-
	TRANS REF	-			

Methodology 1: Project Survey

WORKPLAN

a) Identify the file sources for the data items.

b) Choose a probability sample of projects, stratified by type of program (capital assistance, source establishment, research and development, and nominated projects) and size of company.

c) Develop and specify in detail the primitive incrementality model, with required data items.

d) Develop the two instruments, one for completion by the user and one to be used in the file search.

e) Obtain approval from Statistics Canada, Paper Burden Commission, and Treasury Board.

f) Pretest the instruments.

g) Administer the user survey and execute the data collection from the files.

h) Prepare required software.

i) Penetrate the non-response curve with follow-up surveys.

j) Edit and computerize the data.

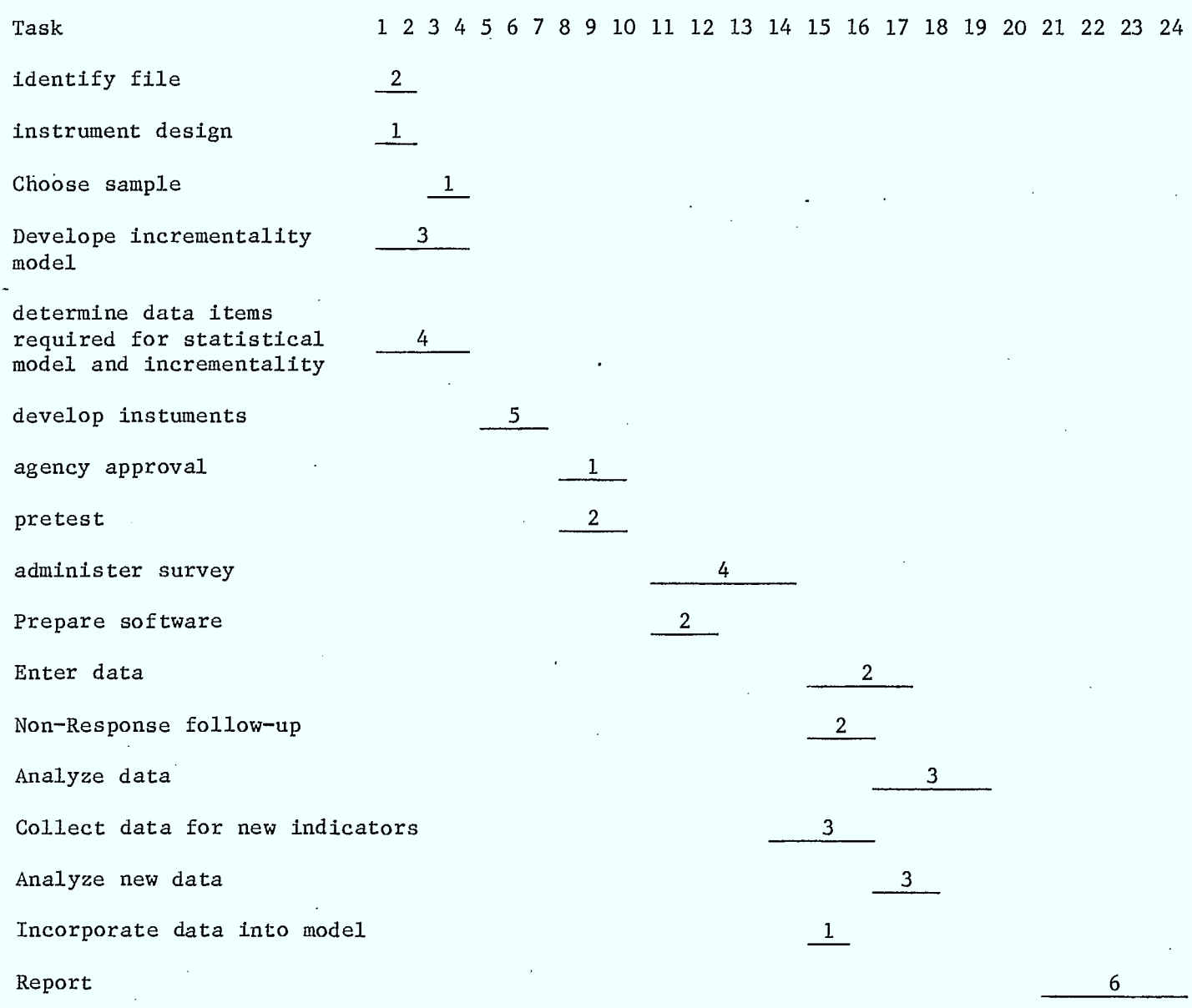
k) Analyze the data from survey.

l) Obtain new indicators from multidimensional scaling of expert opinion.

m) Collect and analyze these data through file surveys.

n) Prepare the data for input into the statistical model.

PROJECT SURVEY



Methodology 2: Statistical Analysis and Modelling

WORKPLAN

a) Establish data requirments.

b) Formulate the possible model specifications, including formats for the independent and dependent variables.

c) Set up the database to incorporate data items from the project survey.

d) Prepare software and computer facilities.

e) Establish a preliminary set of hypotheses to be tested.

f) Incorporate data from survey and expert opinions.

g) Calibrate model, and test hypotheses.

h) Formulate the model results into program options, particularly with regard to program criteria.

STATISTICAL MODEL

Task	Weeks 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Establish final data requirements	4
Formulate model	1
Set up database, software, etc.	2
Establish preliminary data-bases	1
Incorporate data from survey and expert opinions	2
Calculate model	5
Interpret data in terms of criteria, etc.	4
Report	4

Methodology 3: Case Studies

WORKPLAN

a) Review previous case studies.

b) Select a representative cross-section of DIPP projects and companies, ensuring different sizes, different program types, and different results.

c) Formalize the discounted social cash flow model to be used for the incrementatlity estimates, and produce required set of data items from company or project files.

d) Prepare methodology for measuring technical, financial, and marketing risk, and establish required data items.

e) Develop instuments.

f) Carry out an accounting and financial audit of the companies to determine the project-specificity of DIPP funds.

g) Obtain Statistics Canada, Paper Burden Commission and Treasury Board Approval.

h) Through file reviews and interviews with ISBs, company personnel, post officers, and marketing experts, analyze the reasons for marketing success or failure, and establish the requirements for the winning of contracts.

i) Through company interviews and analysis of historical company data, determine the incremental impact of DIPP funding on the technological and defense capability of the firms and sector.

j) An examination of Committee minutes, project files, and interviews with the DIPP Committee, ISBs, Treasury Board representatives, the IT&C Senior Management Committee, IT&C ADMs, members of the Program Branch, advisory subgroup, DPB, Machinery and Financial Services Branch, DSS, CCC, OSI, Legal Services, and DND.

k) A sample and analysis of project submissions, corporate submissions, Statements of Work, Progress Reports, Status Reports and project evaluations.

l) An audit of the project planning and control systems (CPM's).

m) Interpret findings into policy recommendations for the improvement of the DIPP delivery system, economic and marketing success, or technological impact.

PROGRAM DELIVERY

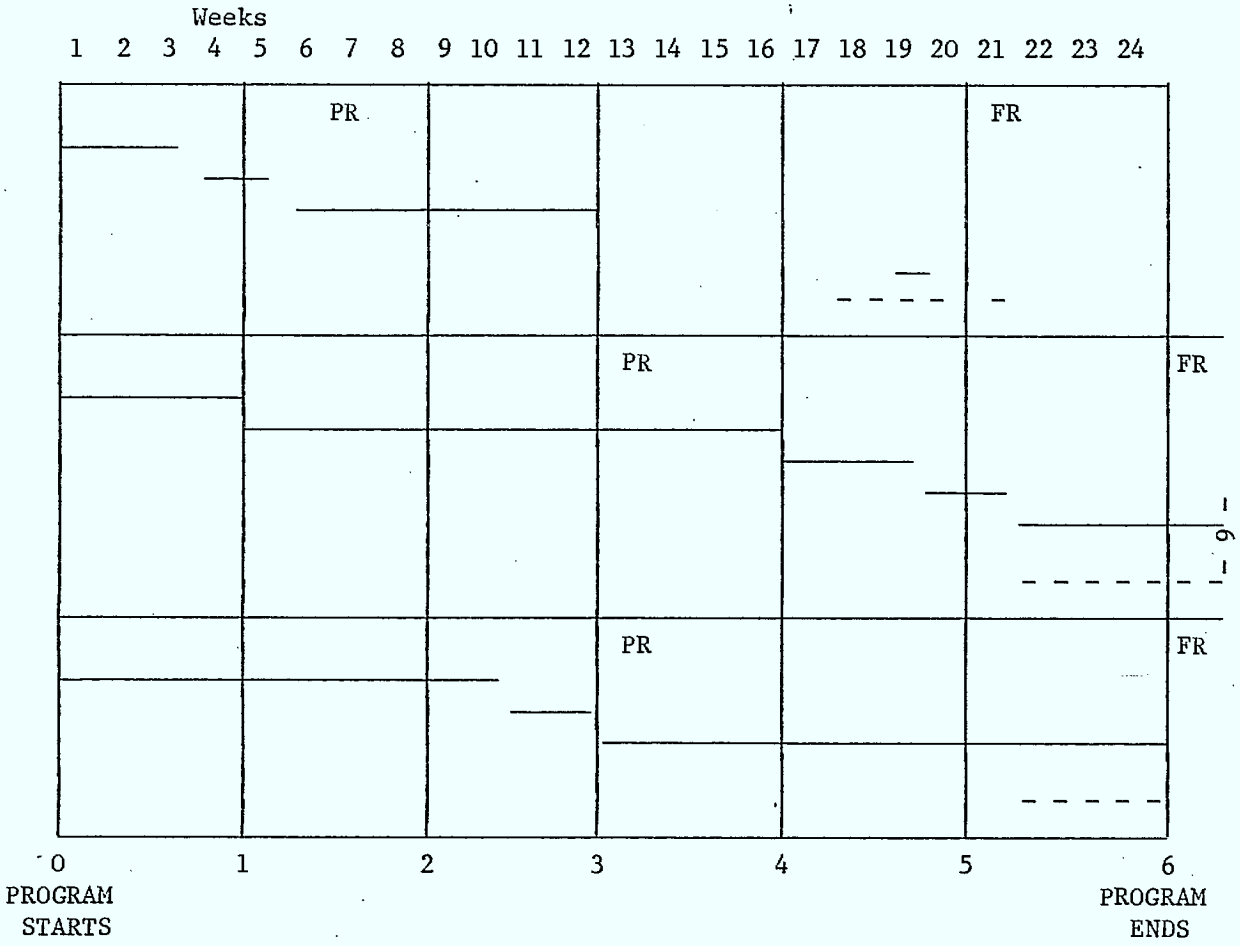
A. PROGRAM MANAGEMENT
- Review Delegated TBS Authorities
- Review Other Studies, Audits
- Compare Innovation Programs, Flowcharts
- Examine ITC Division of Responsibility
- Examine Reporting Mechanism
- Final Report

B. PROGRAM IMPLEMENTATION
- Eligibility Criteria, Project Selection
- Proposal Review Mechanism
- Examine Decision Process
- Authorisation and Contract
- Review Data Rights, Data Collection (Sales, Repayments) Mechansism
- Final Report

C. PROJECT EVALUATION
- Examine Monitoring and Control
- Financial Reporting System
- Evaluation, Performance Indicators, Efficiency
- Final Report

PR PROGRESS REPORT

FR FINAL REPORT



CASE STUDIES

Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Review previous case studies	3																							
Select cases		3																						
Review file data		4																						
Analyze incrementality model and risk	4																							
Establish required data items					10																			
Develop instruments						6																		
Agency Approval							1																	
File Reviews											25													
Interviews											25													
Analysis																			10					
Report																						8		

Methodology 4: Expert Opinion

WORKPLAN

a) Interview local experts in technology and marketing to come up with a preliminary set of possible experts.

b) Contact and arrange the permanent panel of experts.

c) Design questionnaire, based on carefully controlled and varied questions.

d) Pretest instrument and analysis.

e) Arrange interviews or procedures for filling out questionnaire.

f) Set up database, establish editing rules, and prepare software.

g) Execute survey.

h) Edit and computerize data.

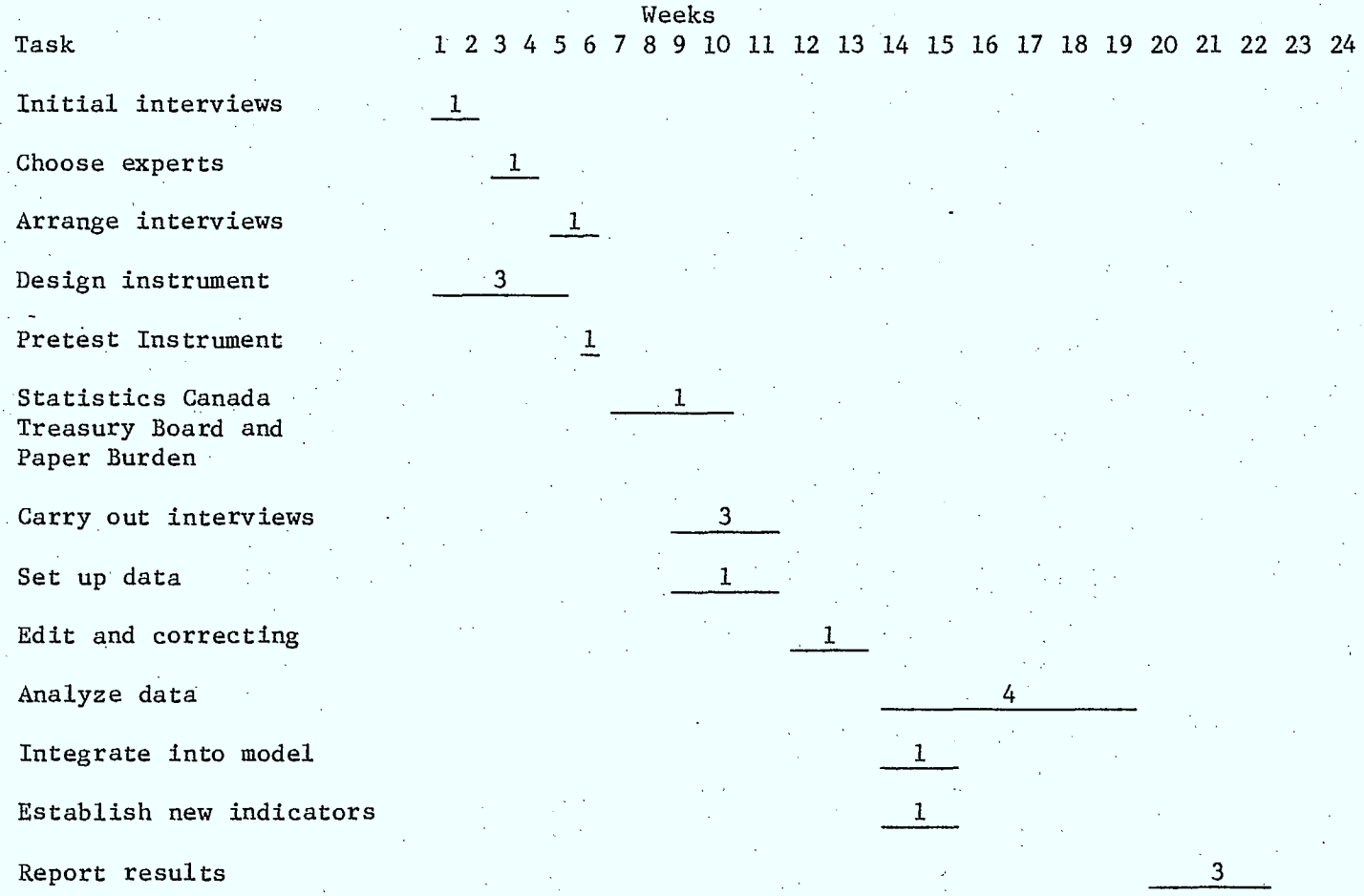
i) Analyze data.

j) Interpret multidimensional scaling results for other objective indicators, and establish procedures for collecting and analyzing these data.

l) Feed data into statistical model.

m) Interpret data into policy options.

EXPERT OPINION



Methodology 5: Journalistic Evaluation

WORKPLAN

a) Establish the type of people required to be interviewed.

b) Arrange interviews with the necessary people.

c) Design interview instruments.

d) Pretest instruments.

e) Research the completed papers and studies on marketing, subsidies, etc. which will serve as a base for the journalistic evaluations.

f) Collect data on EDP as a comparison project.

g) Analyze the differences between the two programs.

h) Carry out the interviews (mainly open-ended).

i) Analyze the entire set of results, and recommend ways of improving the program.

JOURNALISTIC EVALUATIONS

Task	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Study design	6
data collection for subsidy analysis	10
analysis of subsidies	8
comparison with EDP	3
Arranges interviews	1
Establish data collection instruments	2
Conduct interviews (Canada)	12
Conduct interviews (U.S.) use PM&P Washington	8
Analysis	8
Report	

REQUIRED RESOURCES

Methology	Objectives	Resources	Person-Weeks
Project Survey	Objective indicators for the technology, defence, and economic goals. Estimate of risk Accuracy of market research Data for model	2 Data analysts Statistician Computer analyst Outside expert	38 2 2 1
Statistical Model	importance of variables like company and grant size, company owership, technology type, market focus, R&D intensity, risk, and innovativeness on success, particularly economic. Measurement of characteristics related to risk.	Statistician Computer analyst Data analyst Outside expert	15 4 4 1
Case Studies	Estimates economic, technological and defence impacts of DIPP. Measures risk, and its relation to project success. Estimates extent to which DIPP funds go directly toward projects. Analysis of historical determinants of marketing success. Analysis of the program delivery system, including management control procedures, data requirements, etc. Examines types of stated or unstated criteria which have been or would be used "seed money" compared to "chosen instrument".	2 Program analysts 2 Marketing analysts 1 Accountant 2 Business analysts Outside expert	48 36 12 51 6

Methology	Objectives	Resources	Person Weeks
Expert Opinion	Measures technological and defence objectives.	Statistican	2
	Measures and relates risk, R&D intensity, and innovativeness to technological goal, and economic success.	Analyst	12
		Computer analyst	2
	Estimates future market trends.	Outside expert	1
Journalistic Evaluations	Estimates future marketing potential in terms of demands of different types of technology, political trends, effects of political agreements, changes to tariffs and national content requirements.	3 policy analyst	52
		Outside expert	3
	Analysis of requirements for selling in current defence markets.		
	Analysis of program rationale.		
	Comparison of DIPP with EDP.		
	Relating company and project characteristics to success.		
Secretary	Type, file	secretary	24

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