THE

RESEARCH AND DEVELOPMENT PROJECT APPROVAL PROCESS

A Study Conducted For The
Research and Development Branch
National Defence Headquarters

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Executive Summary

In the examination of the R&D major project approval and procurement process we have examined the procedural steps through which the projects move and have tracked approximately 45 projects through the process using data derived from the R&D Program Information System and the Defence Services Program Information System.

Our conclusion from the Survey of procedure is that the steps of the approval and procurement process reflect the provisions of the Defence Program Management System, Treasury Board instructions and requirements of the Financial Administration Act and it is unlikely that particular problems with R&D project handling would justify procedural changes in the System. Our review of project processing is that the approximately 50% of the projects which are well defined and relatively simple and straightforward in their nature move through the process expeditiously. The other 50% which are for the most part more complex in their activity structure and involve lengthy project life cycles appear often to lack the initial detailed project definition that would enhance the preparation of Treasury Board Submission and the development of Project Implementation Plans from which statements of work must be developed for the generation of contract demands. Consequently the passage of Such projects through the process is significantly slower.

While concluding that the processing of the less complicated projects is adequate to the need in general we have made recommendations which the Branch might consider for acceleration of the process with respect to the slower, more complex projects. These recommendations consist of placing greater emphasis upon project definition prior to the authorization of PCP action; beginning the development of the Project Implementation Plan at an earlier stage of the process throughout the life cycle of the project; and defining the role and responsibility of Project Directors covering the total span of the project.

TABLE OF CONTENT

PROJECT PROCUREMENT R&D
MAJOR NON-RECURRING CONTRACTING OUT

1.0 INTRODUCTION

1.1 Objective

The purpose of this study for the Research and Development Branch, National Defence Headquarters is to examine and report upon aspects of research and development procurement as concerns major contracted out projects exceeding $ 1 M in value.

With respect to this particular category of research and development the Branch reports that the procurement process (including project approval and subsequent contracting) is extremely lengthy and may thereby prejudice the effectiveness of the Research and Development Program. In this context it is suggested that the rapid evolutionary pace of defence related technologies outruns the procurement process when the industrial sector technology base is involved and this can mean that windows of opportunity will be missed. Such a situation can have serious effects upon industrial - Departmental R&D relationships and the combined efforts of the two sectors in achieving objectives. In reporting upon this situation the Department advises that not infrequently the time from which a project initiative is identified and defined until the award of contract to the industrial sector can be as long as 23 months. A time lapse of this magnitude can have serious implications for the maintenance of project momentum.

The Study requirement, as put forward by the Branch, is to examine the R&D procurement process with respect to contracted out major projects (exceeding $ 1 M) and to suggest ways in which the process may be accelerated. In doing this such suggestions or recommendations that might be made are to fall within the present regulations with respect to procurement and should conform to the current provisions and limitations imposed by the Defence Program Management System (DPMS) as reflected in Departmental publications CFP 125 and CFP 113.

1.2 Conduct Of The Study

The R&D procurement process reflects all of the characteristics of the science environment and it is therefore noted that comparisons of equipment procurement with R&D procurement in the context of the

1.2 DND project approval process are not always very helpful. As an example R&D initiatives directed toward finding solutions to capability deficiencies in military systems, or in searching for enhancement and renewal of military systems which are moving toward the end of their life cycles is a much more complex process than the simple acquisition of a piece of hardware (on the shelf). While the specific hardware acquisition involves procurement of a product already known, R&D procurement is characterized by a significant element of uncertainty and risk involving a multi-step process in which success at one phase often is essential to continuance to a sequential phase. Postulations of method, approach, and technological applications are studied, debated, and analyzed in depth to avoid risk. This means that while the procedural steps in procurement (approval and contracting) may be the same in the procedural or mechanical sense the movement between the procedural steps will be much slower in the procurement of R&D contracted out services. Short cuts in the process itself are not possible since the steps represent authorized delegations of approval and accountability within the ambit of Government procurement legislation. Shortening of the time interval between the steps seems to offer the best opportunity. In the conduct of the study therefore we have interviewed a number of R&D project directors particularly with respect to moving from step to step in the process and many of their comments are incorporated into the report which follows.

The procurement process mechanics themselves are complex however in the sense that the system involves a hierarchy of sequential approval authority within and beyond the Department. This is to say that while a $2 M project may require the approval of a single authorizing group a very large project (in the order of $50 M) may require five approvals prior to contracting action. An approval process of such rigour is not normally amenable to significant acceleration without the presence of special circumstances for haste in which expediency overcomes ritual, or in cases where the project is very clearly defined.

Within the Assistant Deputy Minister (Material) Group (Which includes the Research and Development Branch) the allocation of role and responsibility in the process is divided among three Responsibility Centers - the Branch as initiators and performers, working in concert with the Branch of the Chief of Engineering and Maintenance (CEM), and the Supply Branch with responsibility for financial allotment control,

1.2 Section 3 - Examination of 45 non-recurring contracted Out R&D Projects

- categorization of projects and chronology of approval and procurement

- findings and conclusions

Section 4 - Findings, Conclusions and Recommendations

2.0 REVIEW OF THE R&D PROCUREMENT PROCESS

2.1 Introduction and Background

The procurement process for the contracting out of R&D requirements is regulated within the Department by the provisions of the Defence Program Management System (DPMS) and those contained in the Life Cycle Management System (LCMS). The Instructional and Procedural Manuals issued by the Department with respect to these systems (CFP 125 and CFP 113 respectively) contain reference to Treasury Board and Supply and Services, Canada, contracting regulations for the guidance of DND staff officers.

The special area of examination in this analysis is that of major projects, of a non-recurring nature, which are usually directed to the industrial sector. In the R&D context typically these are projects in which a product is involved (hardware or software) and usually in the form of an experimental or advanced development model suitable for (and subject to) trials and test, prior to acquisition. In some cases an "operational requirement" for the capability which the product represents has been established through the Deputy Chief of the Defence Staff Group, in other cases the product represents an innovation in technology emanating from established centers of expertise in the Departmental Technology Base in the course of continued research and science application to relevant areas of military operational capability and interest. In neither case is there any guarantee of ultimate production and introduction into inventory.

Such procurement would be contingent upon optional solutions to specific operational requirements (or perceived capability deficiencies) that are available to the Executive. Such options are in the form of an array of similar products (some already available) combined with an array of other factors which make up the decision-making mosaic such as national industry benefit, potential for national or international sales, various socio-economic factors, and the urgency of competing demands for scarce resources in the Departmental Capital Acquisition Program.

Consequently, with or without benefit of an established operational requirement, the R&D initiative which would typically evolve to the point of requirement for industrial production of an exploratory or advanced, development model does so in a milieu characterized by two major areas of risk and uncertainty. The first of

2.1 these is the early stages of work within the Technology Base in which a sequential process of science application takes place with each step contingent upon the success of the preceding step. This phase of the project is characterized by extensive study and debate within the scientific staffs and executives in reaching agreed approaches which are deemed to have the best prospects for success. The second area is that in which the Departmental Executive must decide whether or not he favors having the R&D initiative evolve to the advanced development phase in the context of other demands with which he is faced and optional courses that are available to him in committing scarce resources. In taking his position he may be less influenced by the attractiveness of the technological innovation than by his uncertainty with respect to the end use of the resulting product should the development initiative turn out to be successful.

The foregoing describes a situation in which R&D procurement differs from ordinary hardware procurement (where there is virtually no serious area of uncertainty) by involving a very high level of uncertainty in which R&D project approval or denial of approval may be based upon other than science related factors. Notwithstanding this difference, for statutory and regulatory reasons both requirements must follow the same procurement process, but the R&D procurement will characteristically involve a more lengthy approval course because of the uncertainty factors clouding the decision process. In this context we might conclude that the Branch would be more likely to be accorded project approval more quickly in cases where an established statement of requirement is already in place, a demonstrable factor of urgency exists, and whenever the Branch is able to demonstrate or make a case for the R&D initiative to represent a unique achievement superior to present options and alternatives.

2.2 External Project Approval Regime

As mentioned briefly previously the project approval regime within the total procurement process may involve approval at several levels of management responsibility relative to the value of the project. These levels which are external to the Branch (Branch internal authority will be referred to later) involve both the Department and Treasury Board and are defined in CFP 125.

2.2 The value levels relating to decision authority fall into 3 categories as follows:

- $ 1 - 10 M - A program Change Proposal (PCP) as defined in CFP 125 is required as documentation and approval is delegated to sub-committee of Program Control Board (PCB). Such approval may require confirmation by the main-committee of PCB.

Presentation by the Branch is a requirement. - MMC and PCB

- Final approval of the Minister is required who will forward the approved documentation directly to Supply and Services Canada for contracting action.

- The total documentation package consists of

  PCP (Branch)
  Capital Project Summary
  PRC Report
  Contract demand (CS)
  Letter to Treasury Board (CS)

- $10 - 50 M - A hierarchy of Department approvals culminating in an approval by Treasury Board is required. Ultimate approval of award of contract may require further Treasury Board approval.

- Approval levels include:

  MMC (Branch)
  PCB (main committee) (Branch)
  Minister
  Treasury Board (1)
  Treasury Board (2)

- Documentation Requirement is:

  PCP (prepared by Branch
  TBS (Supply Branch)
  CD (Supply Branch)
  TBS (SSC.).

2.2 . $ 50 M and More - Departmental approval including Defence Management Committee in addition to the above culminating in approval by Treasury Board and ultimate approval by Treasury Board of award of contract is required.

- Approval levels include:

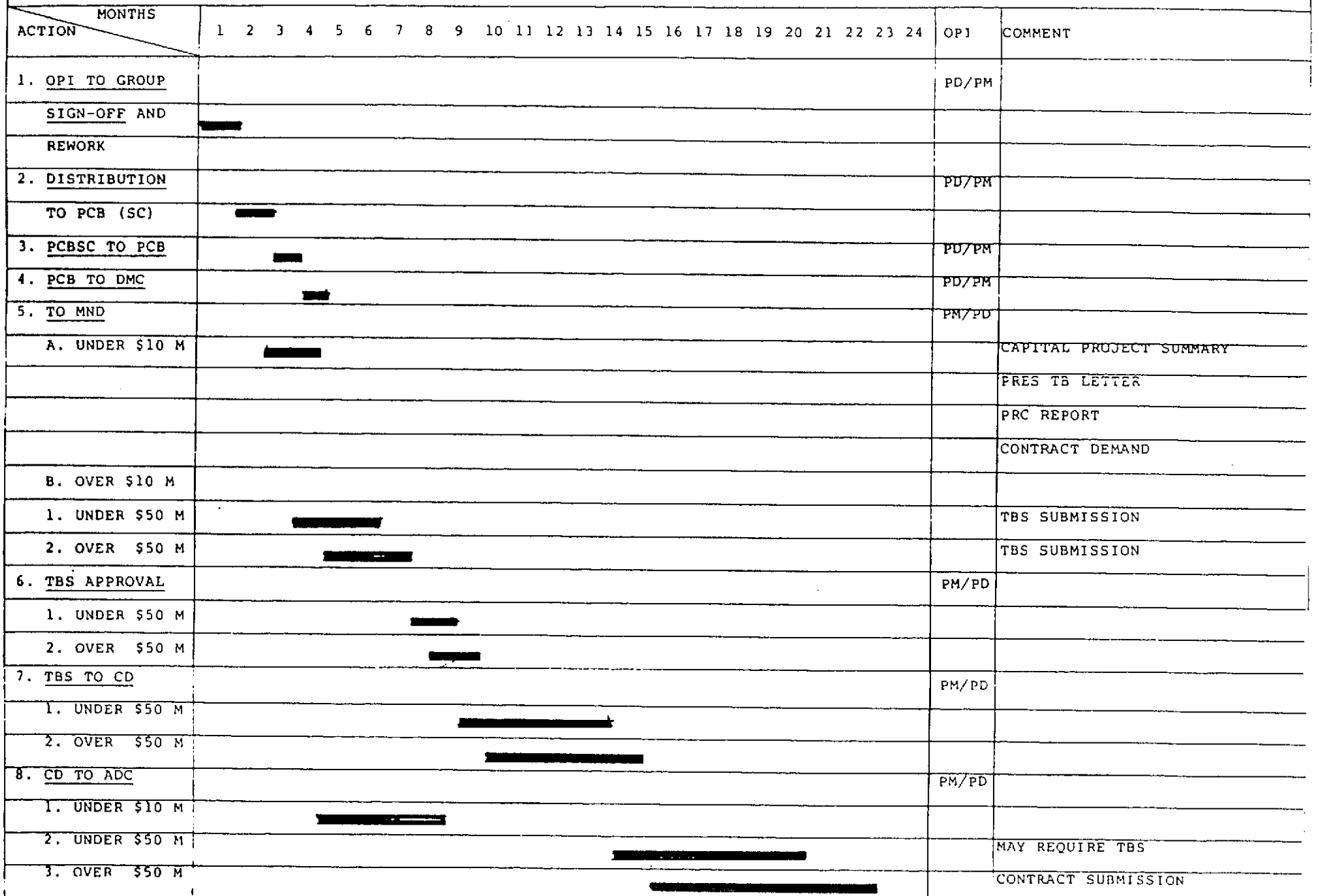
  MMC (Branch)
  PCB (Branch)
  DMC (Branch)
  Minister
  Treasury Board (1)
  Treasury Board (2)

- Documentation Requirement is

  PCP (Branch)
  TBS (supply Branch)
  CD (supply Branch)
  TBS (SSC.)

Table 1 portrays the time lapses between the various approval points of the procurement as they are estimated by those responsible for the Defence Program Management System in CFP 125. Interpreting from the Table it is suggested that for a procurement of less than $10 M the total process should be expected to require approximately 9 months whereas projects which exceed $ 10 M would require 21-23 months. These generalized times are not specifically related to R&D. In all cases less than half of the total elapsed time is consumed in the Departmental approval process. The time lapse from the point at which the procuring agency launches its documentation into the external process and achieves Ministerial approval and release to Treasury Board is estimated to require 8 months or less. Treasury Board approval is estimated to be between 2 and 2 1/2 months. Taking into account the sequential interagency review process with respect to projects which exceed $ 10 M in value and the large number of variables that come into play such time requirements do not seem unrealistic as general planning yardsticks. Obviously projects involving R&D with higher levels of uncertainty and technical

TABLE 1 : EXTERNAL PROCESS TIME YARDSTICK AND TIME BY PROJECT LEVELS
(REPERENCE CFP 125, CHAP 5. SEC 4)



ACTION \ MONTHS	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	OPI	COMMENT
1. OPI TO GROUP		PD/PM	
SIGN-OFF AND			
REWORK			
2. DISTRIBUTION		PD/PM	
TO PCB (SC)			
3. PCBSC TO PCB		PD/PM	
4. PCB TO DMC		PD/PM	
5. TO MND		PM/PD	
A. UNDER $10 M			CAPITAL PROJECT SUMMARY
			PRES TB LETTER
			PRC REPORT
			CONTRACT DEMAND
B. OVER $10 M			
1. UNDER $50 M			TBS SUBMISSION
2. OVER $50 M			TBS SUBMISSION
6. TBS APPROVAL		PM/PD	
1. UNDER $50 M			
2. OVER $50 M			
7. TBS TO CD		PM/PD	
1. UNDER $50 M			
2. OVER $50 M			
8. CD TO ADC		PM/PD	
1. UNDER $10 M			
2. UNDER $50 M			MAY REQUIRE TBS
3. OVER $50 M			CONTRACT SUBMISSION

2.2 complexity may move either more quickly or slowly depending on their natures; their specificity of definition, and the different situations that prevail among the approving committees at any given point in time.

The area of the process which is more difficult to view with total equanimity however is that which concerns the preparation of the Contract Demand. This takes place within the ADM (MAT) Group following approval of any project (over $ 10 M) by Treasury Board. This seems, according to DPMS estimates to require 4-5 months. A second area of concern in this context would be the contracting process managed by Supply and Services Canada which it seems may consume 6-8 months, although this may also include a further submission to Treasury Board for approval of award of contract. Together these phases consume almost 2/3 of the total process.

The preparation of the contract demands which follow Treasury Board project approval is a function conducted by the Supply Branch of the ADM (MAT) Group. The Project Manager is required (as reflected in CFP 125) to produce a Project Implementation Plan prior to this however.

The Project Manager, assumes responsibility for project implementation following Treasury Board approval of the project and begins the actual process of procurement by following a pre-developed Project Implementation Plan (reference CFP 113 and CFP 125). This plan entails developing a full implementation schedule, identification of contractual plan and the preparation of work statements (SOW) which are required for the preparation of contract demands. The PIP must be circulated through participating agencies for concurrence prior to initiating the project.

Should the project be one which requires multi-source contracting (with the contracts (or sub-projects) interrelated and interactive) one can see that the Project Implementation Plan and the contractual work statements can be an intricate and time-consuming task and can involve a considerable number of people/ agencies, including the Project Manager (and centers in his operating milieu), the Project Director (R&D Branch) and procurement officers of Supply and Services Canada, in arriving at a documentation package which permits the Supply Branch to initiate the required contract demands.

2.2 The complexity of this phase of the process raises the question of when it gets underway. The Project Manager is normally identified early in the project approval process and the process of formulating the Project Implementation Plan can be initiated prior to final project approval so that it is essentially completed coincident with Treasury Board approval. A great deal of time may then be gained. On the other hand, and bearing in mind that the project while in the approval process is subject to change of significance (not to mention rejection), the Project Management Group may conclude that the project is so uncertain that to spend much time on production of the PIP and work statements prior to ultimate approval is not justified. One might suspect that such an argument might be more valid in the context of projects not supported by an established SOR or other stated requirement than would be the case with those projects which relate to a firm operational requirement or represent a response to a directed current operational capability deficiency. But on the basis that final Departmental approval (either PCB/DMC or Ministerial sign-off to Treasury Board) could be seen as the point at which the SOR is no longer an issue the PIP process could well be initiated at least at this point and be virtually concluded by the time of Treasury Board approval, with contract demands prepared to launch almost immediately.

As mentioned above all time yardsticks reflected in Table 1 seem to indicate a significantly lengthy process in contracting which also is interrelated with the development of the Project Implementation Plan and contract demands within the Department. If there has been little effective dialogue and consultation between the Department and Supply and Services Canada during this stage the contracting phase is likely to take considerably longer than would be the case otherwise. Working from the principle that when a number of agencies have complementary roles in a single project they all are more effective in these roles if they are brought into the project early, this may be the case both with Supply and Services Canada and with the Treasury Board Staff.

With reference to contracting out research and development requirements, the technology sources are generally known to the Department and to SSC procurement officers. Some project requirements are uniquely relevant to specific firms which have a technical and competitive edge and proven track record; other requirements are of such a nature that they may be met satisfactorily by a number of firms (although that

2.2 number may not be large). Frequently feasibility studies have preceded the main project which has been assigned to the Project Manager and the contractors who have completed such work may be deemed to be entitled to preferential consideration in subsequent contracting in the project context. Presumably there is some contractual plan thought to be better than other options which is developed prior to contract demand preparation. Such a plan if developed in consultation with SSC procurement officers and with consultation between SSC officers and Treasury Board Staff can produce a contracting implementation plan which conforms to contracting regulatory conditions and agreement with respect to sole source and competitive contracting. Such consultation and agreement can set the stage for contractual negotiation with contractors prior to the actual issue of contract demands so that when the formal contract demands are received in SSC from the Department the contracts can be awarded almost immediately. Similarly Treasury Board Staff approval of contract award is greatly simplified by the pre-notification that is inherent in this consultation process.

Although not specifically defined in any of the Branch documentation that we have examined the respective roles of various responsibility centers in the pre-implementation and implementation phases of the project can be interpreted from CFP 125 (and as partially reiterated in CFP 113). Two situations are definable, the one in which the Standing Senior Review Board (R&D) is convened and the situation in which it is not. When the R&D Senior Review Board, described in CFP 125, is convened CRAD fulfills the role of Project Leader and is "responsible for the overall conduct of the project". The project Director (R&D Branch) acts as Deputy Project leader in pre-implementation phase and the Project Manager acts as Deputy Project Leader during implementation phase. In the second situation the Project Director fulfills the role of Project Leader in pre-implementation phase and is succeeded by the Project Manager for implementation. This succession does not however terminate the involvement of the Project Director who has joint responsibility with the Project Manager in preparation of the implementation Work Plan and associated statements of work relative to Contract Demand preparation. CFP 125 defines the role of the Project Director as that he shall "be responsible for providing guidance and direction for other working level staffs on matters relating to the project's aims".

2.2 In the light of the foregoing with respect to those projects in which the Standing Senior Review Board is convened and those for which it is not it would seem that within established Departmental legislation the Branch either through the Chairman (SRB) or the Project Director carries a responsibility for the overall conduct of the project and that this responsibility extends to the planning and coordination of working level effort at all stages including the effectiveness of Departmental participation in the procurement process.

2.3 Internal Project Approval

The major contracted out R&D project requirement emerges as a consequence of work that has been conducted in the Technology Base area or when a specific requirement is defined by operational staffs. The decision to proceed to major contracting and preparation of a Program Change Proposal in that respect represents a consensus among R&D, Engineering, and operational staffs at the working level. Under the terms of the Defence Program Management System the Project Director for such a project is assigned by the R&D Branch.

The R&D Branch Project Director will conform to the project submission and approval process implicit in CFP 125 by taking the following action

1. Produce the first draft of the required Program Change Proposal

2. Refer the initial draft to the "team" members for comment

3. Re-draft the Program Change Proposal as required

4. Circulate the second draft within the Branch to interactive responsibility centers

5. Re-draft the document

6. Submit the re-draft PCP to CRAD for sign-off and transmission to the Office of ADM (MAT) MGIS and comment from ADM (MAT) Group responsibility centers

7. Re-draft the document as required

2.3 8. Submit to CRAD for sign-off recommending ADM (MAT) approval and forwarding to PCB Secretariat

Table 2 reflects the foregoing 8 steps and the approximate times that they have been reported to consume under normal conditions. The information suggests that although the process is estimated to have a time envelope yardstick of 6 months from steps 1 through 8 in the recently revised R&D Program Management System that the process functions at a faster pace in most cases. The time data has been provided by Project Directors.

Even so there appears to be a body of opinion among the Project Director group that this Branch internal process could be more efficient through the elimination of administrative delay and by following different procedures for the PCP review carried out by CRAD responsibility centers. Further reference to this will be found in Section 4.

TABLE 2

STEPS 1 THROUGH 8 - INTERNAL PROCESS

Step	Weeks
1	1
2	2
3	1
4	4
5	1
6	4
7	1
8	2
	16

3.0 REVIEW OF MAJOR PROJECTS

3.1 Introduction

In order to gain some insight into the projects involved in the project approval process of the Defence Program Management System we have examined the category 1.A. projects contained in the 1987/88 R&D Annual Program. The purpose of this survey is to understand the nature of the projects as well as the way in which they have moved through the process. Additional information about these projects has been obtained through interviews with Branch project directors, staffs of the Programs directorate, and supplementary approval and procurement process data from the Defence Services Program Information System (DSPIS).

Annex A consists of a list of 45 Category 1.A. projects in the 1987/88 R&D Annual Program together with a record of their movement through the approval process and brief notes with respect to particular projects. Annex B consists of a list of 45 projects listed in the DSPIS with respect to their process milestone performance.

The following Sections will analyse the milestone performance of the projects and examine the nature of the projects as they relate to the project approval process.

3.2 Approval Process Performance - 45 Projects

In looking at the data regarding these projects listed in Annexes A and B we have done so by dividing the approval process into four parts as follows:

- from CRAD final PCP Sign-off to the Approval of PCBSC, PCB, or DMC as applicable (determined by project value);
- from the foregoing approval to either Ministerial or Treasury Board approval as applicable;
- from the foregoing approval to Contract Demand approval and issue;
- from Contract Demand issue to award of contract,

3.2 and have compared the lapsed time actually experienced with the predicted yardsticks for these steps as reflected in Section 1 (Table 1).

3.2.1 PCP sign-off to PCBSc, PCB, DMC approval

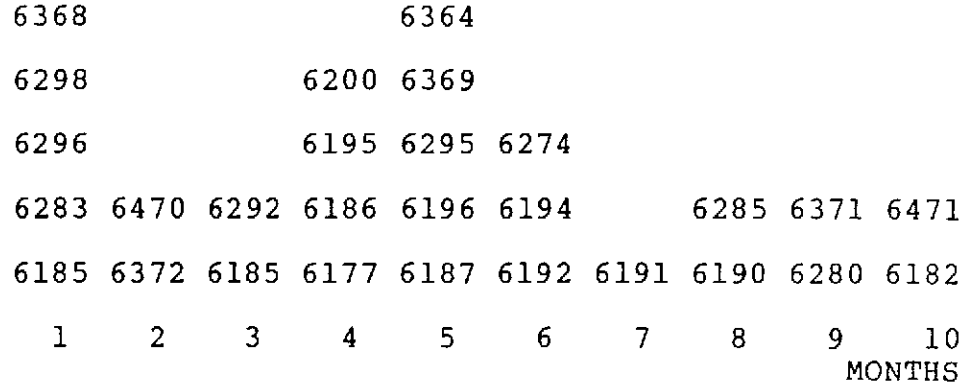
The time requirement yardsticks for this part of the process vary with the level of approval required and suggest:

- PCBSC approximately 3 months
- PCB approximately 4 months
- DMC approximately 5 months

Data dealing with this first part of the process is reflected in Annex A only and is derived from Branch Sources. Since there are a number of sources the data is not totally consistent but is sufficient for this purpose.

Twenty nine of the 45 projects at Annex A identify the date at which CRAD executed final sign-off of the PCP for ADM (MAT) authorization. One of these, D 6201, signed off December 1985, is not reported to have been presented to PCB at this date. The remaining 28 projects in aggregate have cleared PCBSC, PCB, DMC as applicable in an average of 5 months. However the projects taken individually are shown as taking as little as 1 month and as long as 10 months. Taking the "norm" to be the 4 month period predicted to PCB approval 18 of the 28 projects have received PCB (or appropriate) approval by "norm + 1 month".

The actual performance of the individual projects in this step of the approval process is depicted as follows by serial numbers

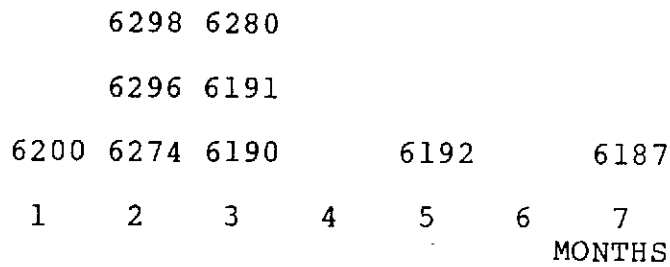


3.2.2 PCB to Ministerial or Treasury Board Approval

Of the 45 projects listed in Annex A, 9 were approved by Ministerial authority without submission to Treasury Board while 22 projects were submitted to Treasury Board. The remaining 14 projects in the Annex have not moved through this stage of the process as yet. It is interesting to observe that under the current delegation of authority Ministerial delegation would constitute sufficient authority in 30 of the projects listed with only 15 requiring Treasury Board Submission.

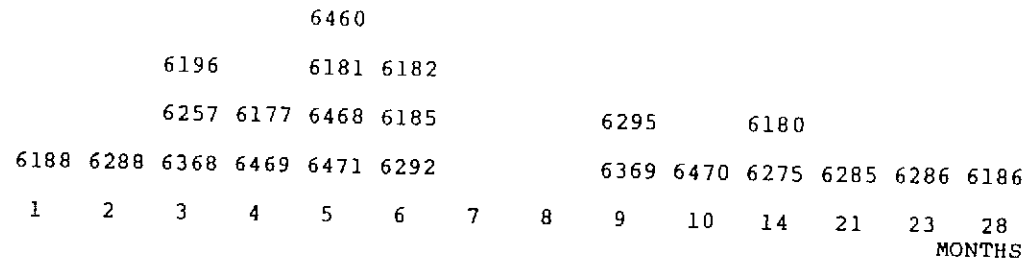
The time lapse yardsticks reflected in Section 1 (Table 1) suggest that those projects requiring only Ministerial approval should require up to 2 months in this stage whereas those requiring Treasury Board approval may require 5 to 6 months.

The 9 projects in Annex A which were approved by the Minister divided into 7 projects requiring 3 months or less and 2 projects requiring more.



Of the 22 projects which were submitted to Treasury Board 11 of these required 7 or fewer months for approval following their PCB or DMC clearance. As suggested in Section 1 (Table 1) the additional DMC step beyond PCB required only a month in the two cases among the 22. Among the 11 projects requiring more than 7 months for approval were a few extreme cases where the elapsed time extended to 21, 23, and 28 months.

3.2.2



Although it is not within the time and resource limits of this study to examine individual projects in detail it has been noted that the Treasury Board approval function has frequently been considerably faster than indicated above in the following instances:

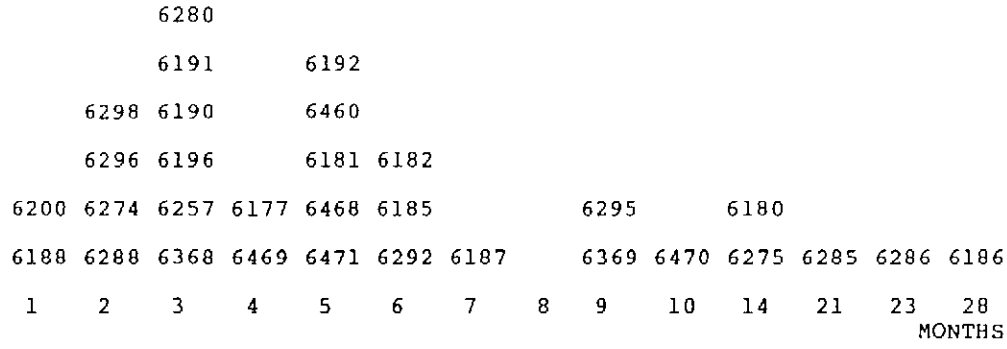
- D6285 MND approval 19th month; TB 21st month
- D6286 MND approval 21st month; TB 23rd month
- D6292 MND approval 7th month; TB 8th month *
- D6295 MND approval 7th month; TB 9th month
- D6468 MND approval 7th month; TB 7th month
- D6470 MND approval 9th month; TB 10th month
- D6471 MND approval 6th month; TB 7th month *

Ministerial approval in the projects submitted to Treasury Board follows preparation of the Treasury Board Submission, and therefore includes preparation time.

Combining all of the 31 projects reviewed in this step of the approval process the performance record is as follows in which 74% of projects were approved in 6 months or less.

* As reported at Annex B (DSPIS). Tabular data taken from RDPIS

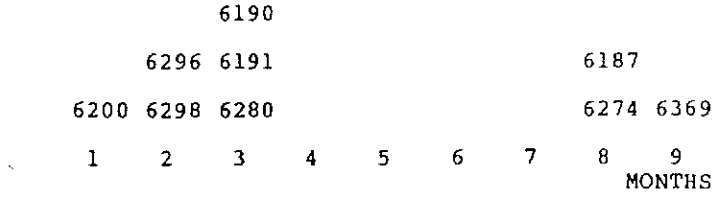
3.2.2



The foregoing survey and analysis is based upon the data related to the project list at Annex A which is derived from R&D Branch sources. The information and project list at Annex B is derived from the Defence Services Program Information System (DSPIS) maintained by the Departmental Programs Division. Since there is some variance between these two information systems we have examined it as well.

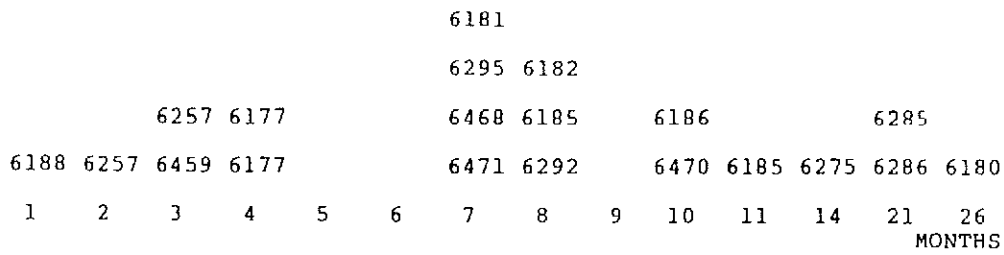
The Annex B project list also contains 45 projects although the list is not identical with the Annex A list. Nine projects are identified as being Ministerial approved while 18 are Treasury Board approved. Two of these projects were submitted and approved twice making a total of 20 Board approvals. Seventeen of the projects are either future program not up to this stage of the process or are "in process" though not approved.

The 9 Ministerially approved projects were dealt with as follows:

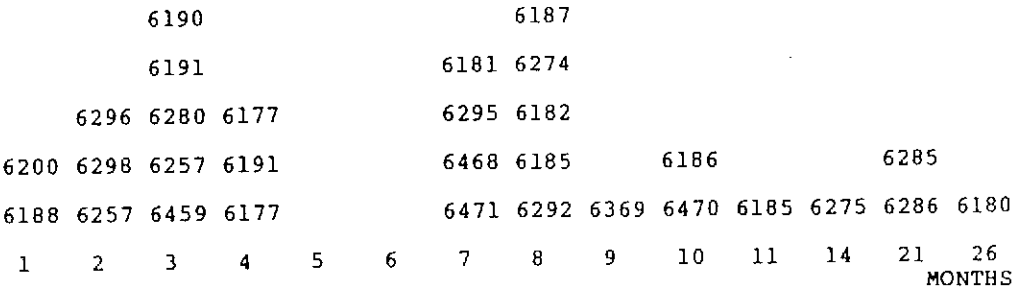


The 20 Treasury Boards approvals registered in the DSPIS were dealt with as follows:

3.2.2



Combining the total projects at Annex B as has been done for Annex A produces the following profile:



The data at Annex B indicates that 73% of projects cleared Treasury Board approval, or Ministerial approval (as applicable) in 8 months or less. The gap in the profile for months 5 and 6 is inexplicable. Essentially comparing the reported dates in the RDPIS vis a vis those in the DSPIS the difference is that according to the RDPIS more than 70% of projects are cleared Treasury Board in 6 months whereas the DSPIS indicates 8 months.

3.2.3 Treasury Board Approval to Approval of Contract Demand

This third step of the approval process is applicable only to the projects which require Treasury Board approval. Those which require only Ministerial approval for implementation involve preparation of Contract Demand prior to Ministerial Submission. In these cases therefore Ministerial approval is also Contract Demand approval.

3.2.3 Data on the subject of Contract Demand approval following TBA from Branch sources has posed some problems. It is noted that in many of these projects the responsibility has been transferred at this point from the R&D Project Director to the Engineering Branch Project Manager and consistent project detail is not always reflected in the RDPIS. In other cases where the project management function is retained within the Branch the establishments are the responsibility centers and such data is not normally lodged in the RDPIS. The DSPIS on the other hand in its tracking of project milestones for the DPMS records this data and it is so reflected in Annex B.

Accordingly the following table reflects all of the projects recorded in the DSPIS including those which were Ministerially approved and those which were Treasury Board approved in order to establish the time that was required for preparation and approval of the contract demand.

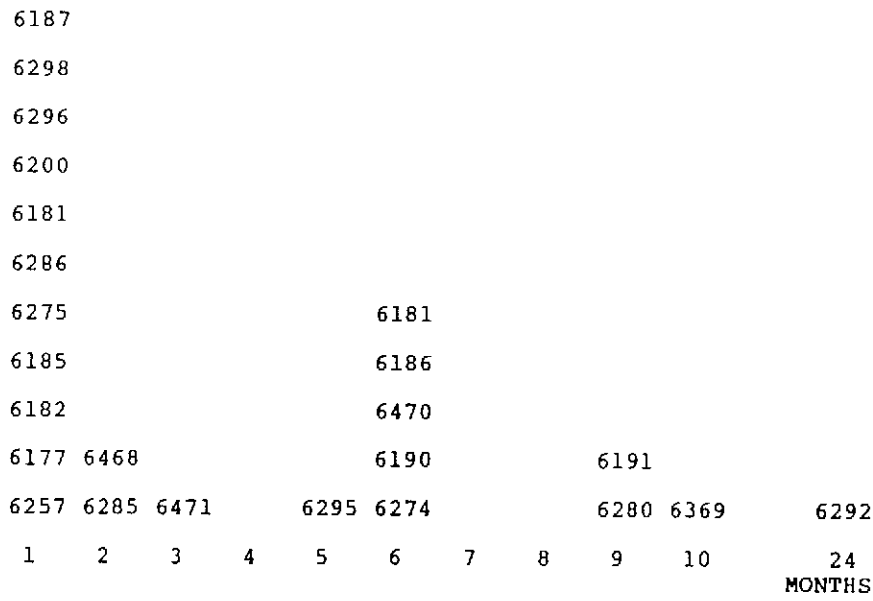
The Ministerially approved projects are:

	PCB	CD	MND Approval	Months
D6200	4/86	6/86	5/86	1
D6296	2/85	5/85	4/85	1
D6298	8/85	11/85	10/85	1
D6190	7/85	4/86	10/85	6
D6191	6/85	6/86	9/85	9
D6280	2/85	2/86	5/85	9
D6187	12/83	8/84	8/84	1
D6274	10/84	6/85	12/84	6
D6369	8/83	3/85	5/84	10

Although our understanding (provided by the Branch) is that the Contract Demand accompanies the Ministerial Submission this does not appear to have been the case with the possible exception of 6187. A possible explanation of this seeming anomaly might be that the Contract Demand required further modification following Ministerial scrutiny or approval.

The following data (from Annex B) reflects the times reported from either Ministerial approval or Treasury Board approval to the approval and issue of the Contract Demand, where this is reported:

3.2.3



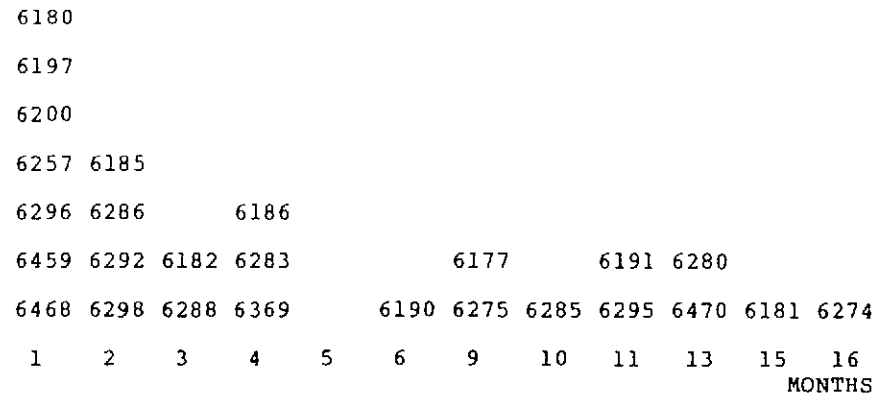
From the above it appears that contract demand preparation and approval has proceeded simultaneously with other aspects of the approval process in a great many of the projects. In cases where it takes place sequentially following approval periods of 2 to 10 months (frequently in the 6 month timeframe) are required.

The inference we would take from this would be that the time required may be an indicator of the way in which the Project Implementation Plan is developed, and the complexity of the project itself.

3.2.4 Approval of Contract Demand to Award of Contract

Again in this 4th step of the process the DSPIS provides the most comprehensive statement of the projects, both Ministerially and Treasury Board approved. In the following display the award of contract data is either the first contract in projects which involve more than one or the main contractor in cases involving a single Contractor or prime contractor. Projects in which both the CD date and AOC dates are projected are not included. The total of reportable projects is 26. One project concluded to have special problems involving 26 months in this sub-process is excluded from the Group (6187).

3.2.4



The performance of the contracting process seems to be quite good with 16 of 26 projects having achieved an award of contract within 4 months of approval of a Contract Demand. In 11 of these 16 cases the time was 2 months or less. The remaining 10 projects required periods from 6 to 16 months to award of contract. Reviewing this step 4 with the previous step 3 however indicates that slow processing in one of the steps seems frequently to result in speedy processing in the other. As examples project 6292 which required 24 months to Contract Demand approval required only 2 months; project 6369 required 10 months in step 3 but 4 months in step 4. On the other hand this has not always been the case - Project 6280 with 9 months in step 3 required also 13 months in step 4; Project 6191 required 9 months in step 3 and 11 in step 4; Project 6190 required 6 months in each step. Projects 6200 and 6257 are among the fastest in moving through steps 3 and 4 requiring only 1 month in each step but on the other hand 6257 required extensive revision through steps 1 and 2. Project 6200 involved DIPP and international program implications.

3.2.5 Comment on Project Performance - Summarization

The general conclusion from the examination of the projects in terms of the 4 step of the process is that:

Step 1 averages	5 mths		or less	(PCB)
Step 2 averages	6 mths	(RDPIS)	or 8 (DSPIS)	(TB)
Step 3 averages	6 mths		or less	(CD)
Step 4 averages	4 mths		or less	(AOC)
	21 mths			

3.2.5 This compares with predictions Section 1 Table 1

Step 1	5		5
Step 2	9	cum.	4
Step 3	14	cum.	5
Step 4	22	cum.	8
			22

The findings, from examination of the projects, confirm the general validity of the Table in Section 1 in total though not in detail with respect to Step 4.

Accepting that step 1 action in general conforms with the timetable the three following steps are much less predictable. A sample of 27 projects taken from Annex B show the following time lapses from PCB equivalent approval through the 3 steps to award of contract:

Project 6177	14 months
Project 6180	57 months
Project 6181	28 months
Project 6182	12 months
Project 6185	64 months
Project 6186	20 months
Project 6187	26 months
Project 6190	12 months
Project 6191	21 months
Project 6192	21 months
Project 6200	1 month
Project 6257	17 months
Project 6274	23 months
Project 6275	32 months
Project 6280	22 months
Project 6283	8 months
Project 6285	33 months
Project 6286	23 months
Project 6292	34 months
Project 6295	23 months
Project 6296	2 months
Project 6298	4 months
Project 6369	14 months
Project 6459	52 months
Project 6968	10 months
Project 6470	28 months
Project 6471	10 months

Eleven projects moved through Steps 2, 3, and 4 in the 17 months or less which would conform to the prediction timetable from Section 1. Sixteen of the projects required longer periods. Three of these required an exceptional time - one at 52 months, one at 57 months, and the other 64 months. As mentioned earlier we have

3.2.5 had neither the time or resources to conduct detailed examination of the 16 projects which exceeded the 17 month period. But as we have noticed in our review of each of the Steps earlier in this Section there seems to be in almost all projects the problem that only in "best" circumstances do they move through all of Steps 2, 3, and 4 with speed and inevitably seem destined to falter in one of the Steps, probably in the areas of definition and implementation planning. Our general conclusion with respect to the 11 projects that have conformed to the schedule is that the projects were:

- of demonstrable priority/urgency and were specifically defined;
- they had benefit of political stimulus (e.g. Nunn Amendment project);
- they were less complex in that they involved a single (perhaps sole source) contractor and were related to the later stages of the innovation cycle.

4.2 extending toward the production of advanced or engineering models. This event seems to represent a transfer of project responsibility from "Technology Base" to "Development" with the "Development" activity comprising feasibility studies, further technology development, system integration and other activities some contracted out to external sources but some assigned back to the Technology Base by the Project Director or Manager as "Tasking". Projects such as the foregoing are directed to an established operational capability or "mission" requirement which may or may not be formalized but is nonetheless valid. In these cases the Category 1.A project is often the derivation of Category 2 program. Other major projects are in fact Category 2 program of a broader scope than the more specific Category 1 derivative. Project management of this latter group continues to reside in the Technology Base Program with R&D Branch Project Managers. These projects also will include several activities, multi-sourcing, and phasing. In reviewing the major projects in this study we have noted that 37 projects in execution have Engineering Branch Project Managers while 9 projects have R&D Branch Project Managers and have concluded that the former represent projects supported by specific military operational requirement, either emerging as specific individual operational requirements or derivatives of Category 2, and the latter are of a broader military capability span more related to Technology Base activity.

It is our view then that the multi-sourced R&D project of either type can be perceived structurally as smaller scale versions of major Departmental acquisition programs, taking into account the inherent differences between the two activities. As such both types of initiative are characterized by:

- long lead times and long projects with the ultimate phase several years into the future and definable only in outline in the initial stages;
- lack of initial precise definition in seeking first approval;
- open to change in scope and substance;
- indeterminate as to final cost;
- involving major and minor contracting simultaneously combined with substantial continuing internal level of effort;

4.2

- interdependent project phases in which one phase depends upon achievement of an earlier phase.

Such factors represent issues of complexity in preparing documentation required for obtaining managerial approval for such projects through the Defence Program Management System and in the execution stage following approval. These initiatives may often be sensitive to unforeseen and unpredictable events which require re-formation and amendment of project plans. Under these circumstances it would seem unrealistic to expect easy passage and only superficial scrutiny of such projects in the approval process. If the data and the analyses of how projects have moved through the process conducted in Section 3 provides any single message it is that projects of this nature are likely to bog down somewhere where in the process and seldom will move through all steps of the process without encountering delay at some point. Generally speaking the performances of projects examined in Section 3 conform with the predicted timetable in Section 2 with respect to individual steps (70% or more of projects) but only 50% of projects will move through all 4 steps on schedule and without interruption.

It seems clear that in dealing with projects of such duration and complexity that a major element of the project approval process is that of confidence building among decision-makers.

4.3 What the Data and Project Review Has Indicated

In reviewing the projects in the framework of four process steps in Section 3 it is to be noted that they involve 3 agencies as follows:

- DND - Step 1 and 3
- Treasury Board - Step 2
- SSC - Step 4

4.3.1 Step 1

The performance of projects in this step, which in Section 3.2.1 indicated that 21 of 29 projects sampled were approved within 6 months, is highly sensitive to the quality of presentation of the project and the ground work that has been prepared for its passage. In this respect we feel that the Environmental Advisory Group operating under the leadership of the DGRD Ops

4.3.1 could be a significant instrument in smoothing the process of sign-off of the PCP prior to its consideration by PCB.

In reviewing the projects we have noted also that several of them are interconnected and taken together form the mosaic of a larger program package than the individual project by itself may indicate. Sometimes the project is not as "Stand alone" as it may seem.

To illustrate the point we have assembled the project elements related to the development of the AN/SQS 510 Sonar System. This is displayed at Figure 1 (following). Those who have been more intimately involved with this rather major R&D initiative may perceive that the program package displayed is not complete. But even in its incomplete form it illustrates the evolution of R&D work undertaken initially in the Technology Base evolving over time into 3 major derivative projects culminating in an engineering model of an advanced sonar system which has involved an R&D investment exceeding $50 millions.

The point is that we feel that there may have been occasions in which the full context of the larger program background has not always been presented to review and approving committees and if so the Defence R&D process in respect of the continuity between Technology Base and Development initiatives has not been clearly apparent. At Figure 2 is a schematic display of the anatomy of a major R&D initiative reflecting continuous and simultaneous activity in all program categories. We have no doubt that these relationships come out in discussion of these projects in committee but feel that there is merit in making these points beforehand in the documentation so that reviewers perceive that they are dealing with the continued evolution of a project or program with which they have already agreed and in which they have authorized prior investment.

The example which we have chosen, involving Projects 6177, 6185 and 6196 illustrates in two of the projects the things that may happen to such projects which interfere with their accomplishment and timing. Both projects 6177 and 6185 were required to go through the process twice (including Treasury Board) because of costing problems. Project 6177 originally authorized by PCB in August 1977 was required to be re-authorized at a higher price by PCB in September 1981 - the contract was awarded in November 1982. In the case of 6185 authorized in September 1981 by PCB a

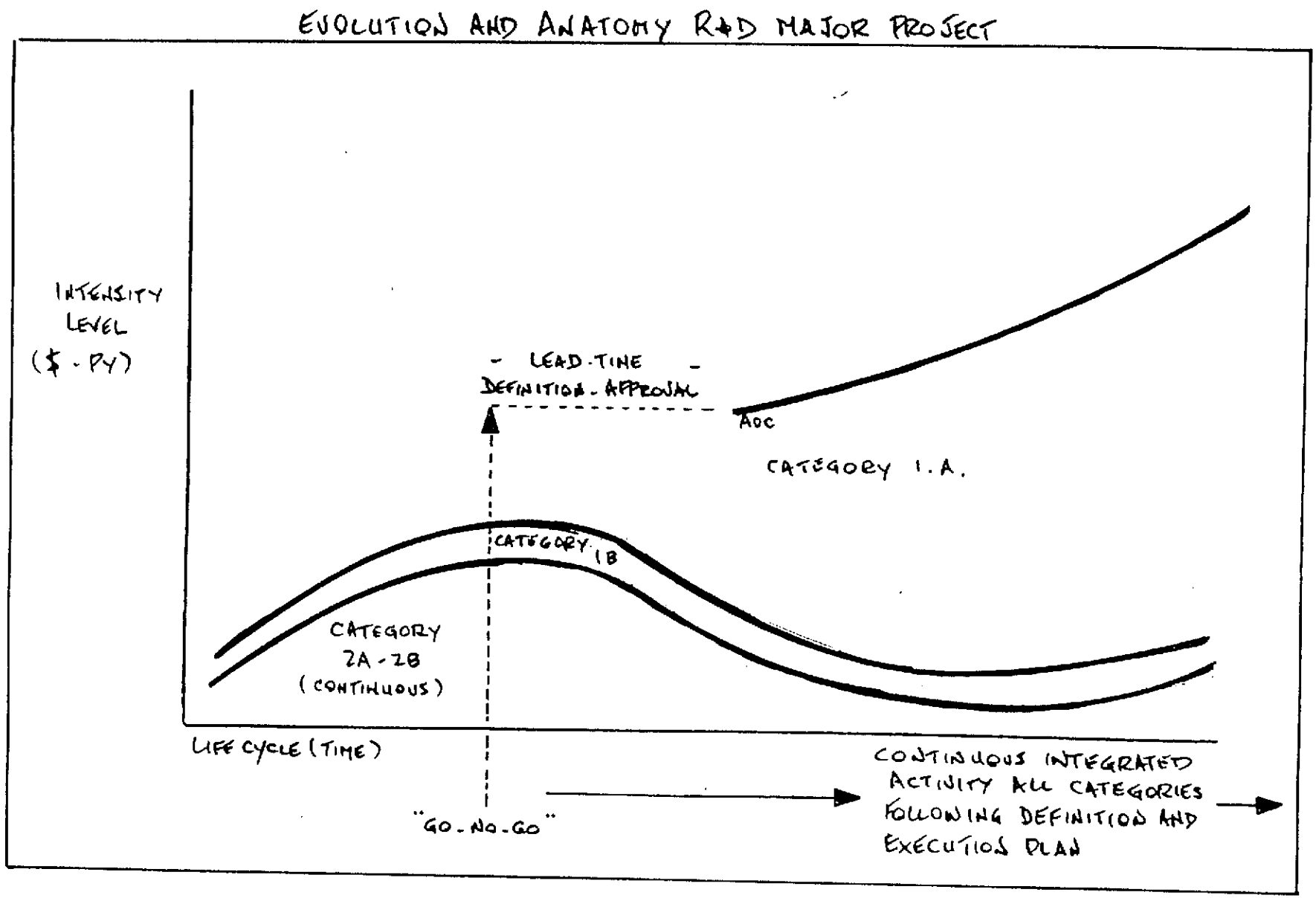

EVOLUTION AND ANATOMY R&D MAJOR PROJECT
INTENSITY LEVEL ($ - PY)
- LEAD-TIME - DEFINITION - APPROVAL
AOC
CATEGORY 1.A.
CATEGORY 1B
CATEGORY 2A - 2B (CONTINUOUS)
LIFE CYCLE (TIME)
"GO - NO - GO"
CONTINUOUS INTEGRATED ACTIVITY ALL CATEGORIES FOLLOWING DEFINITION AND EXECUTION PLAN

Figure 2.

4.3.1 " (i) CRAD is away

(ii) Assoc. CRAD reads the PCP, has a query and sends the PCP back to the Director

(iii) The PCP is revised (or query answered) and it is sent forward again

(iv) meanwhile CRAD has returned

(v) CRAD reviews the PCP for the first time has a query and the PCP goes back for yet another response ".

Other reports suggest that the Program implications (in the resource sense) are not addressed until the PCP has been drafted and submitted to CRAD for his approval. This may generate delays. It is noted that following CRAD approval the PCP is forwarded to ADM (MAT) staff by CRAD office staff rather than by the Project Director.

It is our understanding, from questioning of Branch staff officers, that CRAD approval for PCP action may be given without the Project Director providing CRAD with a Project Plan outline. Consequently CRAD upon reviewing the PCP draft may be viewing for the first time the project in a form and level of detail with which he is not familiar. One might conclude that the presentation of an outline Project Plan by the Director in seeking CRAD authority to undertake PCP action could result in the setting guidelines and parameters for the project prior to preparation of the PCP and avoid such issues arising during the Step 1 process. Such a documentation would amount to a Project Definition Study Report and would have relevance in Step 2.

4.3.2 Step 2

The data with respect to the second step of the approval process in which the project is submitted for the approval either of the Minister or the Treasury Board indicates that projects requiring Ministerial approval only, have done so within a 3 month period in almost all cases. In cases involving Treasury Board approval has been forthcoming in 6 months or less in 14 of 22 cases. It must be noted that, quite apart from Ministerially approved projects, submissions to the Treasury Board for the other projects over $10 million also require Ministerial approval of the Treasury Board submission. Consequently all projects reviewed in this

4.3.2 step have required Ministerial approval. Although these Ministerial approvals have not been reported consistently in the DSPIS a partial set of 7 projects reflects that following Ministerial approval such projects have been approved rather quickly:

Project	MND Approval	TB Approval
6285	19th month	21rst month
6286	21rst month	23rd month
6292	7th month	8th month
6468	7th month	7th month
6470	9th month	10th month
6471	6th month	7th month
6295	7th month	9th month

The foregoing may constitute enough evidence to suggest that the major part of step 2 in respect of time required is the preparation of project documentation and the Treasury Board Submission.

In this respect however it should be appreciated that the preparation of the Treasury Board Submission is an undertaking not vastly different from the preparation and processing of the Program Change Proposal. Significant staffing and group principal sign-off is required. The preparation of the accompanying project brief also is a complex task and depends heavily upon the Project Definition Study Report and Project Implementation Plan. This process is further complicated by the continuing evolution of the project during this process. - a living project with considerable dynamics of change. Moreover this part of the project approval requirement is undertaken in a more complex milieu involving the Project Director, the Project Manager and the staff of the Chief of Supply. While the Treasury Board Submission document itself follows a simple legislative approval format the accompanying Project Brief is more complex and relies on the existence of - a Project Definition Study Report and a Project Implementation Plan. (CFP Chapter 9 Annex D).

Under these circumstances it would not be expected that Treasury Board Submission preparation and approval time would be measurably shorter than Step 1 approvals without the prior existence of the Project Definition documentation and Project Implementation Plan referred to in CFP 125 and CFP 113.

4.3.3 Step 3

Following Treasury Board approval (or Ministerial approval if this is applicable) and the transfer of project responsibility from the Project Director to the Project Manager for implementation phase the Contract Demand preparation activity begins. The efficiency of this Step is largely determined by the quality and scope of the Project Implementation Plan from which contractual statements of work are prepared for the issue of Requests for Proposal (RFP) from potential contractors. This suggests a preconceived contracting plan which if not developed beforehand must be undertaken now. The less specific and defined project may require more time in Step 3 than more specific projects (compare project 6471 with project 6196 as an example). Options and preferences with respect to prime contractor mandates, competition and sole source contracting and contractual planning in general should be discussed with SSC staffs beforehand.

Our review of the projects in this respect at Section 3.2.3 indicates that contract demand preparation (at least the initial contract demands of a project) in about 50% of the projects has required approximately 1-2 months. Some of the projects, it must be noted, were going through the process for the second time. In the remaining 50% of the projects in which Step 3 required 5 or more months it would be our suspicion that either Project Definition Reports or subsequent Project Implementation Plans were less than adequate for the development of clear statements of work (SOW) and contractual planning.

4.3.4 Step 4

Our interpretation of the data charted at Section 3.2.4 is that in at least 11 of the 26 projects some form of contractual pre-planning eventually was achieved (perhaps through process step delays) so that SSC could proceed directly to contract award. Our understanding in discussion with SSC officials is that pre-contractual consultation with SSC can result in situations which allow SSC to pre-negotiate contracts during preparation of contract demands so that when the contract demand is received by SSC the contract can be awarded often within a day. This implies the existence of a preliminary contracting plan. This certainly would be the case when pre-consultation with respect to sourcing has taken place. Presumably sourcing would be dealt with in some detail in Project Definition Study Reports and Project Implementation Plans.

4.3.4 In other cases in which a pre-negotiated contracting plan and pre-selection of contractor does not apply the contracting process consists of conversion of the contract demand to a Request for Proposal. Selection of qualified contractor list and dispatch of RFP's to contenders allows them typically at least 30 working days to make their response. Assuming following this a 3 to 4 week Contractor Selection process plus SSC administration time in negotiating the actual contractual agreement with the successful contractor a minimum total contracting time of 4 months should be expected. On the other hand in larger and broader contractual situations where there are differing opinions respecting technical approaches, areas of risk, and methodology, as can frequently occur in some instances, contractual processes extending up to a year may not be out of the ordinary. Under some circumstances the award of contract may require a submission to the Treasury Board by SSC. Our view of the 9 projects in Section 3.2.4 which required from 9 to 16 months to award of contract would be that they are in this category.

4.4 Conclusions and Recommendations

Our general conclusion of the project approval and procurement process as it relates to R&D major projects is that the process is capable of processing the projects to award of contract efficiently when they are well defined. An example of such a project is that of the CP 140 Memory Development Project in which the elapsed time to contract after initial staffing was 7 months, and another project (not identified) somewhat different in which the four steps from initial staffing and processing through Treasury Board award of contract was achieved in 59 weeks.

On the other hand not all projects are this well defined and straightforward, and may involve more steps and activities. If feasibility studies upon which the viability of the project depend are not completed PCP approval may become difficult. If a satisfactory and justifiable Project Implementation Plan cannot be completed because of unresolved issues Statements of Work crucial to contract demand execution will not be possible. If technical and contractual agreements between contractors and clients are difficult to achieve awards of contract will be a prolonged process. If approval is given initially to a project of broad span and activity not fully defined such definition ultimately will be demanded in the implementation process in terms of specific actions, specific

4.4 contracts, and specific deliverables. Our opinion is that the project approval and procurement process will function with efficiency and speed relative to the specificity of the project. Unfortunately such specificity is extremely difficult to achieve or define before the fact in research and development projects.

The problem is not the process, which has demonstrated its responsiveness and efficiency on many occasions, but the advance definition and specification of the project that is required in order to activate the procedural Steps of approval and procurement in the most expeditious way.

In this context we would direct our focus to the Project Definition Study phase in the early stages of the project approval process and upon the Project Implementation Plan in the intermediate stages of the process; since it is through these functions that the project acquires a level of definition and cohesion that is related to a more effective implementation of the procedural steps of approval and procurement. Also in this context we would emphasize the role of the Project Director as the officer responsible for the achievement of the aims and objectives of the project. As mentioned in passing earlier in the Study it is sometimes difficult to distinguish the point at which a major project requirement emerges in the Branch and the transition between Technology Base and Development Program. Recently the RDPMS has been adjusted so that PCP action must be authorized by CRAD prior to undertaking staff action. We are not fully cognizant of the bases upon which CRAD makes this decision and the presentation which is made to elicit the approval which is sought. The reason for the recent change in the RDPMS was that the Advance R&D Program displayed for the Department formerly included reference to major projects unrealistically far in advance of their entry into the decision making process which then caused a consequent distortion of financial commitment forecasts. The main parameter introduced in seeking CRAD major project PCP action mandate was that the PCP would be submitted to CRAD for sign-off within six months. Projects which could not meet this criteria should be shown as future Program. Implicit in this (although not explicitly stated), would be the requirement to satisfy CRAD that the project is sufficiently defined that it would move with dispatch through the decision-making process.

This requirement emphasizes the benefit of a Project Definition Study and Study Report as a prerequisite for

4.5 contract demands. Other delays or time intervals have been differences of opinion with respect to technical approach, risk and costs between the Department and Contractors;

- that the decision-making process has functioned expeditiously in dealing with projects that are well-defined and in which the implications of contracting, technical implications and deliverables are clear;

- that delays or long time intervals in the Steps of the process relating to Treasury Board Submission preparation and contract demands preparation may be primarily a function of lack of clear project definition and slow development of Project Implementation Plans;

- that the seemingly inordinate delays or examples of slow performance of the decision-making process apply in approximately 50% of R&D major projects and that this group comprises those projects with high levels of complexity and uncertainty along with long project life cycles;

In reviewing this situation, and taking the position that the decision-making process itself remains as it is, we have focused our attention upon the areas of

- project definition

- project implementation planning

- roles of project director and project manager

as areas of initiative within R&D Branch scope of authority that could play a role in accelerating the process for the complex and extended life-cycle projects. However in viewing this subject we are inclined to lean toward a position that complex R&D projects can be difficult to formulate, define, present and justify in the DPMS milieu without a continuous active involvement and executive direction on the part of senior management.

4.6 Recommendations

We make three recommendations which the Branch might consider with respect to this process:

Recommendation 1 -Project Definition Report

We believe that PCP action authorization by CRAD should be based upon a Project Definition Report to be provided by the Project Director demonstrating that the project is sufficiently defined in all respects that it is appropriate to begin the PCP process. This would imply that feasibility studies upon which the project is founded are completed and the project work which is envisaged can be fully described. The Project Definition Report should address and resolve tentatively all matters that are relevant to preparation of the PCP Project Brief which must be prepared to accompany the Treasury Board submission that will follow PCB (or other) approval and for the preparation of the Project Implementation Plan which must be prepared by the Project Manager coincident with Treasury Board approval.

Acknowledging that R&D projects of this category involving lengthy project life cycles and a variety of activities are difficult to precisely define before the fact we believe that the Project Director should update the Report continuously in the exercise of his responsibility for the achievement of the aims and objectives of the project and that the Report should be reviewed periodically by the R&D Management Committee

By the adoption of such a measure we believe that many of the delays which are experienced by R&D major projects through approval and procurement steps can be substantially reduced. We believe that good project definition prior to PCP action authorization, and the completion of conditional major project activity and feasibility studies also prior to commencement of the PCP process, represents time that is offset by a shorter (often substantially shorter) decision-making sequence in Steps 2, 3, and 4 of the process. This will be almost certainly the case whenever the project is marked by a lengthy project cycle and several activities within the definition of the project. On the other hand we are aware that this somewhat different sequence may not in the event achieve a reduction of the total project life cycle if one counts the additional time prior to PCP action as a part of the project approval process. There is always the possibility that while achieving a statistical victory

4.6 over the approval process time schedule one has not achieved a victory of substance in terms of total project time span. The problem is that one never really knows if the project processing time was in fact accelerated. One should logically expect however that greater attention to project definition, earlier attention to Project Implementation Planning, and not initiating PCP action until all of the appropriate issues are resolved, constitutes a much more orderly milieu for project approval that is beneficial in the project context and also in the perception of the Branch at large.

Recommendation 2 - Project Implementation Planning

The DPMS requires that the Project Manager in taking over his responsibilities for implementation of the project following its final approval prepare and have approved a Project Implementation Plan. Our review of such documentation indicates that in some instances where complex projects are involved such a document may amount to 75 pages or more. On the other hand plans for simple and direct projects are themselves simple. However our concern is the complex projects. Constant updating and currency are essential. We believe that the Project Definition Report referred to above is the starting point from which the Project Implementation Plan is derived. A base requirement to the Project Implementation Plan is that it reflect a contracting plan and be sufficiently detailed that contractual statements of work (SOW) can be written from it. The timeframe available for the preparation of the Project Implementation Plan is that measured from the authorization of PCP action to the approval of Treasury Board (or other authority). If the project is fully defined in the Project Definition Study and all conditional feasibility studies are completed the timeframe could be expected to be in the area of 7-8 months and frequently less. During this period the Plan must be prepared approved, and Statements of Work written to permit the raising of contract demands.

Based on the foregoing it would be our recommendation that the Project Director in the exercise of his responsibilities as defined in CFP 125 and 113 should collaborate with the Project Manager in initial preparation of the Project Implementation Plan coincident with the preparation and initial processing of the PCP. This action is consistent with the legislated responsibility of the Project Director to achieve the aim and objective of the project. To be able to do

4.6 this with efficiency however may depend upon adopting the Project Definition recommendation.

Recommendation 3 - Role of the Project Director

The DPMS defines the role and responsibility of the Project Director to include responsibility for project definition, securing approval for the project (e.g. PCP - PCB - Treasury Board approval), and responsibility for the achievement of the aims and objectives of the project. This implies that the Project Director is assigned an active role throughout the life cycle of the project and is accountable to CRAD and the project sponsor for the overall effectiveness of the project including its product and timeliness. The assignment of the Project Manager to be responsible for the implementation phase of the project does not diminish the responsibility assigned to the Project Director for overall project effectiveness.

We have noted in conducting this study of the project approval and procurement process that the Branch does not publish Branch instructions and procedures to be followed by Project Directors. Bearing in mind the very significant responsibility of the Project Director in the early stages relating to project definition and project approval we would recommend that standard operating instructions and procedures be developed by the Branch and promulgated for usage.

In the event that the Branch might undertake to apply the Project Director role in a more vigorous fashion, and consider a higher level of senior management involvement it would be desirable to enhance the data content of the RDPIS in Category 1.A. and to achieve a more effective consistency between the RDPIS and the DSPIS particularly with respect to Project Definition and Implementation.

PROCEDURAL RECORD OF 45 R&D MAJOR PROJECTS
(Source: R&D Program Information System)

PROJECT	APPROVAL STEPS ACHIEVED						COMMENT
	CRAD	PCB (SC)	DMC	MND	TBA	AOC	
6177 $13.5M	5/81	9/81		12/81	1/82 6/82	11/82 1/83 11/83	INITIATED 1977
6180 $4.7M	7/81				11/83	12/83	
6181 $6.7M					5/80	2/82	
6182 $30.6M	3/82	8/82 1/83 10/83 6/84		8/83	9/83	11/83 11/84	INITIATED 1979 3 PCP APPROVALS AND 5 AMENDMENTS FOR CORRECTION OF COSTS
6184 $6.7M						7/81 10/81 10/82	INCOMPLETE DATA
6185 $21.1M	10/84 3/85	4/85		9/85	12/85	1/86	INITIATED 1981 COSTING CLARIFICATION PROBLEMS
6186 $23.7M	2/81	5/81	6/81		10/83 8/84	8/84	SFAR SOLE SOURCE - JOINT CDA - US
6187 $1.4M	7/83	12/83		8/84		6/85	RELATED WITH 6177

PROCEDURAL RECORD OF 45 R&D MAJOR PROJECTS
(Source: R&D Program Information System)

PROJECT	APPROVAL STEPS ACHIEVED					COMMENT
	CRAD	PCB (SC) DMC	MND	TBA	AOC	
6188 $3.4M	10/83	1/84	2/84	2/84		
6190 $7.2M	11/84	7/85	10/85		10/86 3/87	REQUIRED COMPLETION OF FEASIBILITY STUDY PRIOR TO CONTRACTING
6191 $5.5M	11/84	6/85	9/85		6/86 8/87	
6192 $13.7M	11/84	5/85 8/85	9/85		3/87 9/87	2 DELIVERABLES - 1 CONTINGENT OF OTHER - PCB AUTHORIZING FIRST ONLY INITIALLY
6194 $17.8M	6/86	1/87				SUBMITTED TO CRAD - 2/86 - STILL IN PROCESS
6195 $9.1M	10/86	2/87				IN PROCESS
6196 $15.2M	10/86	3/87		6/87	8/87	TBA & AOC ESTIMATED
6197 $8.5M	5.86					FUTURE PROGRAM
6198 $9.5M	5/86					FUTURE PROGRAM

PROCEDURAL RECORD OF 45 R&D MAJOR PROJECTS
(Source: R&D Program Information System)

PROJECT	APPROVAL STEPS ACHIEVED						COMMENT
	CRAD	PCB (SC)	DMC	MND	TBA	AOC	
6200 $2.8M	12/85	4/86		5/86		7/86	DIPP -TB AUTH FOR CONTRACT - 6299-226
6201 $32.4M	12/85	7/86 PPP					NATO MOU-MATCHING FUNDS WITH DRIE - RELATES 6296
6205 $5.9M	2/86						FUTURE PROGRAM
6206 $2.3M							FUTURE PROGRAM
6257 $6.2M					8/84		COMPLETED
6274 $9.8M	8/83 2/84 4/84	10/84		12/84			AOC ESTIMATED 4/86
6275 $1.1M					7/81		INCOMPLETE DATA
6280 $6.8M	5/84	2/85		5/85			PROJECT IS PHASE 2 OF 6299-109 COMPLETED 3/85

PROCEDURAL RECORD OF 45 R&D MAJOR PROJECTS
(Source: R&D Program Information System)

PROJECT	APPROVAL STEPS ACHIEVED						COMMENT
	CRAD	PCB(SC)	DMC	MND	TBA	AOC	
6283 $2.9M	6/81	7/81					INCOMPLETE DATA
6285 $2.4M	4/81	12/81		7/83	9/83		OAC NOT REPORTED
6286 $11.5M		12/80	1/81	6/81	10/82	12/82	FEASIBILITY 6299-89
6288 $1.0M		10/80			12/80		INCOMPLETE DATA
6292 $4.6M	5/83	8/83		3/84	4/84		6299-29 COMPLETED 10/85
6295 $31.2M	10/84	3/85		10/85	12/85 6/86		TB PARTIAL APPROVAL CONTINGENT ON SKR PROGRAM
6296 $5.2M	1/85	2/85		4/85		10/85	MOU - NATO PROGRAM
6298 $1.1M	7/85	8/85		10/85			FROM 6299-215
6368 $1.6M	5/81	6/81		8/81	9/81		INCOMPLETE DATA
6369 $5.3M	3/83	8/83			8/86		

PROCEDURAL RECORD OF 45 R&D MAJOR PROJECTS
(Source: R&D Program Information System)

PROJECT	APPROVAL STEPS ACHIEVED						COMMENT
	CRAD	PCB (SC)	DMC	MND	TBA	AOC	
6370 $20.0M							REGISTERED NUMBER - NO FURTHER DATA
6371 $7.3M	6/86	4/87		6/87			
6372 $25.6M	3/87	5/87					NUNN AMDT - MOU 4/87- IN PROCESS
6364 $7.8M	3/81	8/81					PROJECT WITH-DRAWN
6459 $6.3M		5/81				7/81	INCOMPLETE DATA
6460 $12.0M					1/79		FOLLOWING CA-BINET APPRO-VAL IN PRIN-CIPLE 9/77
6468 $1.3M		5/81		12/81			
6469 $.5M		3/82		4/82	7/82		TERMINATED
6470 $48.1M	6/84	8/84		5/85	6/85		
6471 $47.6M	6/85	3/86	5/86	11/86	12/86		

PROCEDURAL RECORD OF 45 R&D MAJOR PROJECTS
(Source: Defence Services Program Information System)

PROJECT	APPROVAL STEP ACHIEVED					COMMENT
	PCB	DMC	MND	TB	CD	AOC	
6177	8/77 9/81			12/77 1/82	2/82	11/82	RELATED 6182, 6185, 6196
6180	3/79			5/80 11/83	11/83	12/83	SUSPENDED 11/81 REACTIVATED 6/82 TBA EXPIRED 7/83 RE-APPROVAL REQD DELIVERY 10/86
6181	10/79			5/80	11/80	2/82	
6182	1/83			9/83	10/83	1/84	RELATED 6185
6185	9/81 4/85			8/82 12/85	12/85	1/86	RECOSTED
6186	 12/82	6/81		7/81 10/83 8/84	 4/84	 8/84	 RECOSTING AND RE-APPROVALS REQUIRED
6187	12/83		8/84		8/84	10/86	
6188	1/84			2/84			NO OTHER DATA
6190	7/85		10/85		4/86	10/86	
6191	6/85		9/85		6/86	5/87	AOC ESTIMATED
6192	5/85		9/85		3/87	5/87	6199-346

PROCEDURAL RECORD OF 45 R&D MAJOR PROJECTS
(Source: Defence Services Program Information System)

PROJECT	APPROVAL STEP ACHIEVED					COMMENT
	PCB	DMC	MND	TB	CD	AOC	
6193	12/85				12/85	8/86	ESTIMATES ONLY - NOT UP DATED
6194	1/87			4/87	5/87	9/87	ESTIMATES ONLY
6195	4/86						ESTIMATE - NO FURTHER DATA - NOT REPORTED RDPIS
6196	3/87			5/87	5/87	6/87	ONLY PCB CONFIRMED
6197	10/87		10/87		11/87	11/87	ESTIMATES ONLY - FUTURE PROGRAM
6198	9/87						ESTIMATES ONLY - FUTURE PROGRAM
6200	4/86		5/86		6/86	6/86	
6201	5/87			11/87			ESTIMATE -COVERS PPP ONLY
6202	11/87				7/88		ESTIMATES ONLY - FUTURE PROGRAM
6203	4/87						ESTIMATE -FUTURE PROGRAM
6204	4/87						ESTIMATE -FUTURE PROGRAM

PROCEDURAL RECORD OF 45 R&D MAJOR PROJECTS
(Source: Defence Services Program Information System)

PROJECT	APPROVAL STEP ACHIEVED					COMMENT
	PCB	DMC	MND	TB	CD	AOC	
6205	11/87						ESTIMATE -FUTURE PROGRAM
6206	2/88		4/88				ESTIMATE -FUTURE PROGRAM
6257	4/73 5/74			6/73 8/74		9/74	REVISION REQUIRED
6274	10/84		12/84		6/85	11/86	
6275	7/79 5/80			7/81	8/81	5/82	COST REVISION REQUIRED
6280	2/85		5/85		2/86	3/87	AOC ESTIMATED
6283	7/80			10/80	11/80	3/81	
6285	12/81			9/83	11/83	9/84	
6286	1/81			10/82	10/82	12/82	
6288	6/81			12/80		2/81	RETRO ACTIVE PCB APP
6292	8/83			4/84	4/86	6/86	
6295	3/85			10/85	3/86	2/87	
6296	2/85		4/85		5/85	6/85	NATO INTL PROGRAM
6297	12/86			3/87		5/87	ESTIMATED - NOT REPORTED IN RDPIS

PROCEDURAL RECORD OF 45 R&D MAJOR PROJECTS
(Source: Defence Services Program Information System)

PROJECT	APPROVAL STEP ACHIEVED						COMMENT
	PCB	DMC	MND	TB	CD	AOC	
6298	8/85		10/85			2/86	
6369	8/83		5/84		3/85	7/85	
6370	6/89			1/90	2/90	1/91	ESTIMATES ONLY
6371	4/87					11/87	ESTIMATES ONLY
6372	11/87					3/88	ESTIMATES ONLY
6454	3/77			6/77 5/80			
	2/81				6/81	7/81	
6468	5/81			12/81	2/82	3/82	
6470	8/84			6/85	11/85	12/86	
6471	5/86			12/86	3/87	3/87	CD AND AOC ESTIMATED ONLY