



**EVALUATION OF THE RESEARCH
PARTNERSHIP AGREEMENTS PROGRAM
SUMMARY REPORT**

**The Natural Sciences and Engineering Research Council and
Participating Departments**

April 5, 2004

EXECUTIVE SUMMARY

Introduction

The Research Partnership Agreements (RPA) are a series of Memoranda of Understanding (MOU) signed by the Natural Sciences and Engineering Research Council (NSERC) and other federal departments and agencies in order to jointly fund university-industry research that is of interest to those departments/agencies. The overall objective of these Agreements is: *to build strong linkages between the private sector and researchers in universities and federal institutes and to create synergy among the partners.*

An evaluation of this program (which includes all RPAs) was conducted from January to October 2003. The evaluation questions were developed prior to this period, and are based on extensive consultations with program staff, managers in the partner departments and agencies, and other key stakeholders. The evaluation questions are presented in the “Summary of Findings” section below. The overall objectives of the evaluation were to address program delivery issues as well as the outcomes of the program.

Methodology

The methodology used for this study focused on various lines of evidence. These include a document review pertaining to each of the six Agreements that make up the RPA program, interviews with departmental and NSERC officials involved in the management of the Agreements, an interview with the President of NRC, two web-based surveys (one of Principal Investigators on RPA-funded projects, one of their industrial partners), case studies of selected RPA projects (42 in total), as well as 10 supplementary interviews with NRC researchers who participated in RPA projects. A particular challenge for the evaluation team has been the synthesis and integration of these multiple lines of evidence, given that the design of the study required both a technical report with detailed findings for each of the six Agreements included in the program as well as a summary report highlighting the most important findings or trends for the RPA program as a whole.

Program Profile

The RPA program requires that university researchers apply for joint funding, from NSERC and one of the six partner departments/agencies. It also requires that they secure funding from an industrial partner. Typically, NSERC, the government partner and the industrial partner each contribute a third (1/3) of the project funds (although some exceptions have had to be made to accommodate special cases).

The involvement of the government and industrial partners varies from one project to another. In some instances, departmental researchers are heavily involved in the management of the RPA project, or even in the conduct of the research. In other cases, no departmental researchers are assigned to the projects and the departmental partners contribute project funding only. This is also true for industrial partners, who sometimes participate directly in the research, and who sometimes are only interested in receiving the findings of the research with a limited amount of involvement on their part.

Each of the six Agreements has a particular adjudication process, depending on the structure of the partner department/agency and the available resources to manage the program. Generally, the university researcher gathers partner support and submits an application to NSERC. A peer review process is initiated by NSERC, who then makes the results of the review available to the government partner identified in the application. The government

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partner then decides whether to fund the project or not, usually through an informal peer review process within the department itself. An intellectual property agreement then needs to be submitted to NSERC before the funds are released to the Principal Investigator (who is always the university researcher).

The MOUs for the RPA programs describe two joint committees, which are formed by representatives from NSERC and the participating department/agency. For the CFS, DND and ESS programs, joint advisory committees were intended to review applications. In practice, these committees do not operate. In addition, most of the RPA programs (AAFC, CFS, DND and NRC) describe a joint Steering Committee formed by representatives from NSERC and the participating department/agency.¹ This committee is intended to meet annually to review program progress. However, as of yet the committees for CFS and DND have not actually convened, the NRC committee does meet between once a year and once every two years, and the AAFC committee meets as required to review progress and discuss issues. It should be noted that NSERC and its partner departments have various methods of communicating, and that these other methods have been used as required throughout the life of the Agreements.

Summary of Findings

The findings for groups of evaluation questions are summarized below. The specific evaluation questions are presented in the main report.

Extent to which the program addresses the needs of the departments / agencies:

Two main needs prompted the development of the RPA agreements: the need for departments/agencies to develop linkages and maintain on-going relationships with university researchers, and the ability to leverage resources for research in Canada, especially in departmental priority areas. In most cases, it was found that the program is addressing these needs, although these needs still exist for most of the partner departments.

The development of linkages and on-going relationships with university researchers is being addressed well for those departments/agencies where government scientists actively participate in the research projects, but it is not being fully addressed in the others.

Difficulties in accessing the program:

The participating departments and researchers identified the following difficulties in accessing the program and/or with the tri-partite relationship:

- *Securing private sector support:* It is difficult to gather support from the industrial sector in certain areas of research, such as mining and space science. Many potential partners in these fields are small companies who are unable to contribute funds directly, or who have tight deadlines and thus cannot wait for the research findings to be made available to them before making decisions related to their products or services.

¹ In the case of CFS, the committee also includes representatives from SSHRC.

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- *The requirement to develop and sign an Intellectual Property Agreement:* This requirement has resulted in delays for many RPA projects. Principal investigators have stated that there are many issues involved in the development of an IP agreement, and that it can sometimes take months before an agreement is signed.
- *The length of time required for project approvals:* Some principal investigators and their industrial partners have stated that in the past, the length of time between the submission of an application and the first installment of project funding has been rather long, sometimes resulting in the loss of an industrial partner or a missed opportunity to hire students to work on the project. However, reorganization at NSERC has reduced the time between application and funding to some extent.
- *Departmental researchers' perception of the program:* Some departmental researchers view this program as somewhat unfair, since the project funds go directly to the university researcher, who then has full control over expenditures. More education is needed to change some of these perceptions and to explain to departmental researchers how their own research programs can be enhanced by collaborating with universities through the RPA program. This, too, is currently being addressed.

Program management and promotion activities

Various program management and promotion activities were considered in the evaluation of the RPA program. Overall, the findings suggest that these activities are being conducted satisfactorily for all the parties involved, although specific recommendations have been made concerning particular issues. These are summarized below:

- *The departments should assign one of their researchers to each of the RPA projects that they fund:* The involvement of departmental researchers in the RPA projects has proven to be beneficial to both the funding department and the university researchers. The department benefits through its on-going interaction with the Principal Investigator by being more aware of the findings of the project and by having access to highly qualified personnel (HQP) working on the project.
- *The most effective program promotion activities appear to be delivered by NSERC:* Program promotion is mainly done through the publication of NSERC's program literature, available on the web. Some of the departments also promote the program among their researchers, but to a lesser extent.
- *Comparison to other NSERC programs:* By and large, the objectives of the RPA program could not be met through other NSERC programs. The RPA program provides the means to the partner departments to contribute to university research through the MOUs that are signed by representatives of the departments/agencies and NSERC. This gives the participating department/agency a degree of influence over the research, which they would not have otherwise, and it provides a formal mechanism for the participation of their researchers in the research projects. However, in a few cases, it was found that the RPA program could be replaced by the Collaborative Research and Development (CRD) program without losing its advantages to partner departments and the research community.

Program Outcomes

Both immediate and intermediate program outcomes were considered in the evaluation of the RPA program. These include the involvement of highly qualified personnel, the dissemination of research results, the uses and impacts of the research results, and the establishment of linkages between university researchers and their partners. The following points summarize the findings of the study.



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- *Training of highly qualified personnel:* The RPA projects have been beneficial to students and postdoctoral fellows (PDF). An average of 7.1 students and PDFs participated in each RPA project in various capacities, from high school students responsible for data collection to postdoctoral fellows managing entire research projects. The training received by these students and postdocs was beneficial to their subsequent careers, often providing them with job opportunities that they otherwise would not have had.
- *Dissemination of research results:* The Principal Investigators were mainly responsible for disseminating the research results both to their partners and to the scientific community. Generally, dissemination to the industry partners was mostly done by means of a report summarizing the project findings. This was also the case for government partners who were not actively participating in the RPA project. As can be expected, the main methods used to disseminate the findings to the academic research community were publications in journals and conference papers.
- *Uses and impacts of the research results:* The research findings were found to have been useful to both the industrial partners and the departmental partners, although there was variability between departments. Overall, 47% of the Principal Investigators reported that their RPA project has already contributed to the development of a new or improved product; 54% of the PIs said the project has already contributed to the development of a new or improved process. The research findings from the case study findings were found to have a high degree of potential usefulness, on balance, and several of them could lead to significant economic benefits. The main factor in promoting the use of research results in the departments was the participation of departmental researchers in the RPA project.
- *Establishment of linkages between university researchers and their partners:* This program outcome yielded mixed results. The study found that three of the departmental partners placed less importance on the development of linkages with universities, which resulted in fewer on-going collaborations. On the other hand, three of the departments/agencies participate actively in the RPA projects and so appear to have been more successful in developing linkages with university researchers. In particular, in the 20 case studies involving these three departments, 16 of the university PIs retained active linkages with the departmental researcher following the completion of the project.

Conclusion

Based on the findings of this study, it is clear that the majority of the RPA agreements are fulfilling their respective mandates and are of value to the department/agency. This is especially true of departments and agencies that value the participation of their own researchers in research projects, such as DND, ESS and NRC. For DND and ESS, this is mostly to ensure that the research that is conducted is consistent with their own research priorities. However, all three also value the linkages and synergy that are developed through this program and could not be developed to nearly the same extent through other NSERC programs, in which government researchers would not be actively involved in the research.

The RPA Agreements with AAFC and CFS have also been successful in achieving the goals of the department/sector. In both cases, the program has helped to stimulate research and generate findings that have been useful to the industry. Both of these organizations are currently more interested than they have been in the past in the development of linkages with universities, and both are taking steps to ensure that their researchers are more



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actively involved in RPA projects. This mechanism for developing linkages is not available in other NSERC programs.

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1.0 INTRODUCTION

1.1 Background

This document is the summary of six technical reports that have been prepared as part of the evaluation of the Research Partnership Agreements (RPA) program.

The Research Partnership Agreements are a series of Memoranda of Understanding signed by the Natural Sciences and Engineering Research Council (NSERC) and other federal departments and agencies in order to jointly fund university-industry research that is of interest to those departments/agencies. The overall objective of these Agreements is: *to build strong linkages between the private sector and researchers in universities and federal institutes and to create synergy among the partners.*

The Agreements and the extent to which they have been used over the past five years (1997/98 through 2001/02) are summarized below.

Department/Agency	Year Implemented	# Projects from FY 1997-98 to FY 2001-02 (Either Active or Completed)	NSERC Contributions from FY 1997-98 to FY 2001-02 (\$000)
National Research Council (NRC) ²	1996	61	9,004
Department of National Defense (DND)	1996	16	1,748
Agriculture and Agri-Food Canada (AAFC)	1989	88	3,453
Canadian Forest Service (CFS) ³ of Natural Resources Canada	1989	39	2,127
Canadian Space Agency (CSA)	1993	13	755
Earth Sciences Sector (ESS) of Natural Resources Canada	1999	6	278
Total		223	17,365

In general, the NSERC funding is matched by at least one industrial partner and also by the other department/agency. The total research funding awarded through this program over the past five years has been approximately \$52 million.

² The NRC Fuel Cell Agreement is combined with the overall NRC Agreement in this table.

³ The current CFS Agreement also involves the Social Sciences and Humanities Research Council.

The present evaluation study was conducted over the period January through October 2003. It was based on a set of evaluation issues and questions outlined in an evaluation framework study prepared by NSERC staff in the fall of 2002. Approximately half the evaluation questions deal with program design and delivery, while the other half deal with program outcomes.

This report summarizes the findings of the evaluation in relation to the Research Partnership Agreements with all six partner departments or agencies (Agriculture and Agri-food Canada, Canadian Forest Service of Natural Resources Canada, Canadian Space Agency, Department of National Defence, Earth Sciences Sector of Natural Resources Canada and National Research Council). The evaluation findings were identified using the following data sources:

- Program documents and data describing the individual Agreements and the RPA program in general.
- A March 2000 evaluation study of the first stage of the CFS Agreement.⁴
- Interviews with departmental⁵ and NSERC officials involved in the management of the Agreements.
- An interview with the President of NRC.
- A web survey of 335 university researchers who served as Principal Investigators (PI) for RPA projects since the implementation of the program. There were 149 respondents to this survey (44%). The breakdown of these figures by department/agency is provided in section 2.2 of this report.
- A web survey of 124 industry officials whose companies were partners for RPA projects since the implementation of the program. There were 32 respondents to this survey (26%). The breakdown of these figures by department/agency is provided in section 2.3 of this report.
- Case studies of 42 completed RPA research projects. The distribution of these case studies between the departments/agencies is provided in section 2.4 of this report.
- Supplementary interviews with 10 NRC researchers who participated in the RPA program (but were not involved in the case study projects).

⁴ Evaluation of the CFS/NSERC Research Partnerships Program, *Dr. Ron D. Ayling, March, 2000.*

⁵ *It is to be noted that the CSA departmental representative interviewed had limited experience with the program.*

1.2 Description of the RPA Agreements

Funding Agreements

Theoretically, all RPA projects involve industry and other department/agency funding as well as NSERC funding. This is true for the programs delivered by five of the six departments/agencies. However, in the case of DND, prior to five years ago, approximately 25% of projects were conducted without an industry partner. Since then, this figure has decreased to approximately 5-10% of projects. These projects are now considered exceptional cases.

When the RPA projects do receive funding from all three sources (industry, department/agency, and NSERC), the funding is most commonly split equally between them (one-third each). NRC is the only one of the six participating departments/agencies for which the intended funding split between the department, NSERC, and industry is not clearly outlined in the Agreement. Although the NRC representative stated that most commonly, this split is also one-third for each partner, the case studies conducted for this evaluation indicate that there have been variations in the funding arrangements over the years.

Involvement of Departmental Researchers

In some of the RPA projects, the departmental researchers do not participate in the actual research activities. This is usually the case for AAFC, CSA and CFS projects, although as of 2003, CFS has made a point of explicitly specifying in program documentation the importance of involving CFS researchers in funded projects. AAFC also plans to increase its level of involvement in RPA projects through increased program promotion efforts to its researchers. At the other end of the spectrum, DND, ESS and NRC researchers actively participate in all RPA projects.

Out of all six government partners, CSA is the least actively involved in the RPA program. In theory, proposals to the CSA RPA program can be initiated by any of the three parties – CSA, industry, or a university researcher. In practice, however, CSA does not initiate proposals and has managed this program as a responsive research program. In fact, the program is largely driven by the industry partners (most of which are CSA contractors). As well, CSA essentially leaves the proposal review process up to NSERC, although the Agency does conduct a quick review of applications to verify that the objectives of the project are in line with CSA objectives.⁶

⁶ In 2001, CSA was unable to support several CSA RPA projects approved by NSERC. In order to initiate these projects, NSERC transferred them to its Collaborative Research and Development (CRD) program and funded them in conjunction with the industrial sponsor. As a result of the low participation rate, NSERC terminated the RPA with CSA in 2003. NSERC and CSA subsequently signed a Memorandum of Understanding supporting the participation of CSA as a joint funder in all of NSERC's Research Partnerships Programs..

Research Priorities

For all six departments/agencies, RPA projects are intended to address the research priorities of the governmental organization. These research priorities are most often listed in the MOU and/or in a separate document published by the department or agency.⁷ In addition to addressing departmental research priorities, DND research projects must have a civilian-use or dual-use application.

Adjudication Process - General

The current RPA programs for AAFC and CFS operate in a similar manner. Proposals are generally initiated by the university researcher, who then gathers support from the private sector (the CFS program provides for the participation of non-industry groups as “private sector partners”, as long as at least 50% of the private sector contribution comes from a profit-making organization) and then contacts the sponsoring department and NSERC.⁸ NSERC manages the peer review process and the departmental partners conduct their own informal review to ensure that the research is aligned with departmental/sector priorities. However, since April 2003, NSERC program officials have attempted to speed up the review process by sending the RPA program applications to AAFC to be reviewed as soon as they are received at NSERC. The result of this change has been a decrease in the time for review since at the end of the process it is only necessary for the AAFC representative to quickly review NSERC’s final recommendation.

The MOUs for the RPA programs describe two joint committees, which are formed by representatives from NSERC and the participating department/agency. For the CFS, DND and ESS programs, joint advisory committees were intended to review applications. In practice, these committees do not operate. In addition, most of the agreements (AAFC, CFS, DND and NRC) describe a joint Steering Committee formed by representatives from NSERC and the participating department/agency.⁹ This committee is intended to meet annually to review program progress. However, as of yet the committees for CFS and DND have not actually convened, the NRC committee does meet between once a year and once every two years, and the AAFC committee meets as required to review progress and discuss issues.

⁷ *CFS research priorities are described in the National Forest Science and Technology Course of Action: Science and Technology Priorities for the Forest Sector (prepared by the Canadian Council of Forest Ministers and published by the CFS, 1998). DND’s research priorities are outlined in the Technology Investment Strategy 2002. The priority areas for AAFC are defined in the Agricultural Policy Framework.*

⁸ *Since 1998, the CFS RPA agreement also involves the Social Sciences and Humanities Research Council (SSHRC). The funding is still split on a one-third each basis (private sector, CFS, granting councils) and the funding split between the granting councils for their 1/3 portion of the project funding is negotiated on a case-by-case basis.*

⁹ *In the case of CFS, the committee also includes representatives from SSHRC.*

Application Process – Special Cases

Notable differences exist between the application processes outlined above and the application processes for the ESS and DND RPA programs. In theory, proposals for these programs can be initiated either by a government researcher, by a university researcher or, in the case of DND only, by the industry partner. In the case of DND, the departmental researcher most commonly initiates proposals. Regardless of who initiates the proposal, the lead DND researcher for the project must provide an assurance that the project is relevant to one or more of the department's 21 priority areas and the application process is then left up to NSERC. Likewise, for the ESS program, the ESS researcher must first submit an application to the NRCan STEP program. Once the project is approved at the Director level within ESS, the application is sent to NSERC for peer review.

In the case of the NRC RPA program, proposals are usually jointly developed by the university and NRC researchers, approved by the research institute of the NRC researcher, and then submitted to NSERC by the university researcher. NSERC conducts a peer review of the application and then prepares a summary review report and a recommendation regarding approval. This material (the proposal, the individual peer review reports, the summary review report and NSERC's recommendation) is then forwarded to NRC. NRC Corporate Headquarters then reviews the proposals to ensure that the project addresses NRC's objectives.

Agreement on Fuel Cells with NRC

NRC also has a separate agreement with NSERC under the RPA program dealing with research on fuel cells. This agreement has three components, which provide funding for research projects, research chairs, and co-op students, respectively. Fuel cell research projects are dealt with through NRC's overall RPA Agreement. There have been approximately six fuel cell projects to date (one of which is included in the case studies). There are also three research chairs in place and a few co-op students.

The main characteristics of the six RPA programs are summarized in the following table.

Agreement	Department/agency researchers involved in the research?	Department research priorities stated in the MOU or other docs?	Maximum grant size	Maximum term of grant	Industrial in-kind contributions eligible for matching purposes?
AAFC	Generally not	Yes	No limit stated	5 years	Yes – up to the limit of the cash contribution
CFS	Generally not, until 2003	Yes	No limit stated	3 years	No
CSA	No	Yes	\$50K/year per project (shared between CSA and NSERC)	No maximum term stated.	No

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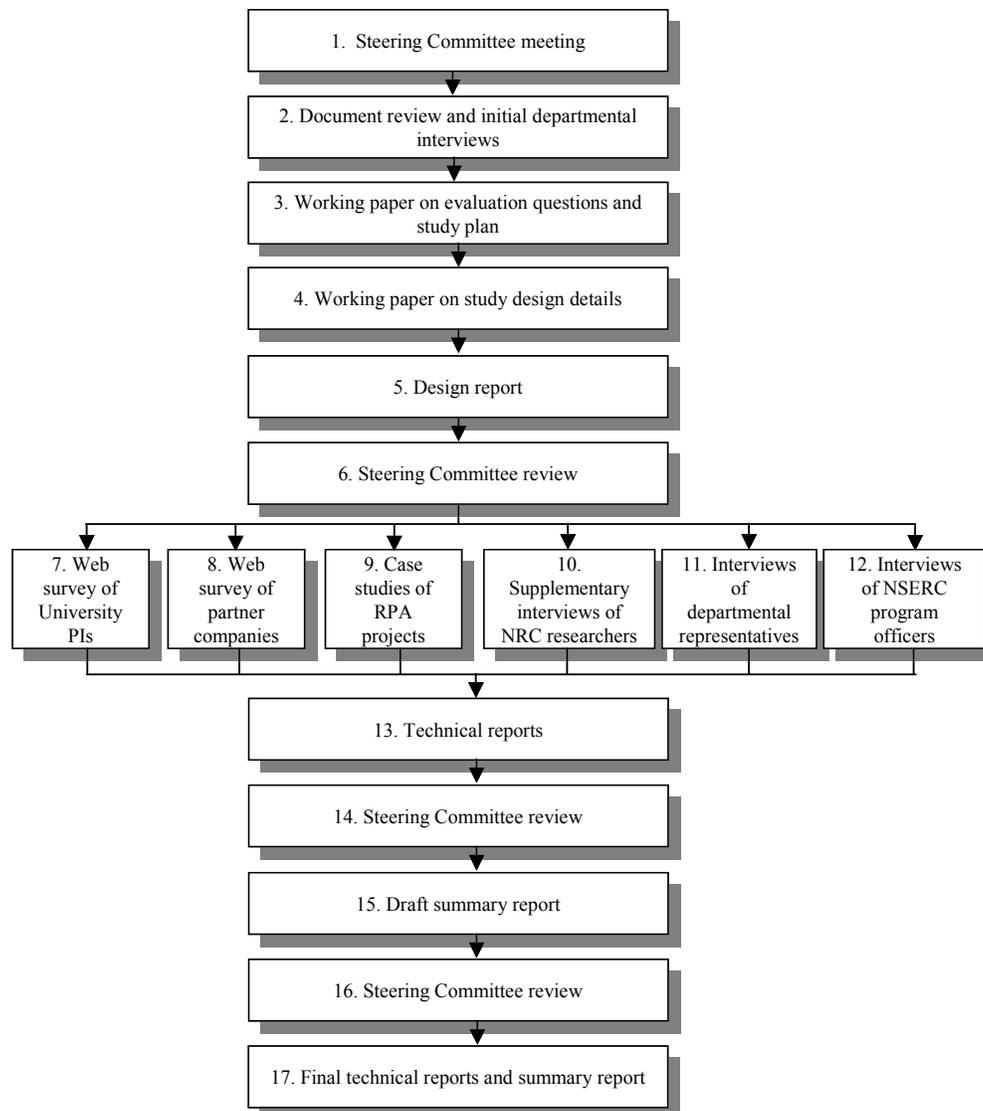
DND	Yes	Yes	\$500K per project (shared between DND and NSERC)	5 years	Yes
ESS	Yes	Yes	No limit stated, but ESS total contributions are limited to 500K/year	5 years	No
NRC	Yes	Yes	No limit stated	5 years	Yes – up to the limit of the cash contribution

2.0 STUDY ACTIVITIES AND METHODOLOGY

2.1 Overview of the Work Plan

The work plan for the evaluation of the Research Partnership Agreements Program is illustrated in Figure 1. The data collection activities and study methodology are described in the following sections.

Figure 1: Work Plan for the Research Partnership Agreements Evaluation



2.2 Web Survey of University Principal Investigators

The sample selected for this survey was the entire population of university researchers who have been the Principal Investigator for one or more active or completed RPA projects since the program first began, less those for whom an email address could not be identified.

Invitations to participate were emailed to potential respondents along with a password required to access the website on which the survey was posted. These passwords also made it possible to determine which participants had not yet responded to the survey. Two e-mail reminders were sent to survey non-respondents in an attempt to increase the response rate. The survey remained on-line for approximately one month.

Once the survey period ended, a small follow-up survey (one question) was sent to a sub-sample of the respondents¹⁰ in order to obtain additional elaborating information regarding one of the survey questions. There were 42 respondents to this question.

The sample size for this survey was 335.¹¹ A total of 149 respondents (44%) returned completed survey questionnaires. The breakdown of these figures by department/agency is as follows:

	Sample Size	Number of Respondents	% of Respondents
AAFC	156	69	44
CFS	75	32	43
CSA	16	7	44
DND	16	7	44
ESS	7	5	71
NRC	65	29	45
Total	335	149	44

Due to the low absolute number of PI respondents for some of the departments/agencies (particularly CSA, DND and ESS), survey data should be interpreted with caution. As well, some respondents did not answer all of the questions; therefore, the number of actual respondents may vary slightly by question.

¹⁰ The follow-up survey related to government involvement in the RPA projects, and was sent to those researchers who had indicated in the original survey that their government partner was involved in the research.

¹¹ Of the 476 projects that have been undertaken as part of the RPA program, 109 projects were duplicates (that is, the PI had more than one RPA project), 11 projects were either terminated or only offered conditionally, and in 21 cases the PI's email address was unavailable. Seventy-three (73) projects were not yet completed at the time of the survey, but were included in the sample in an attempt to reach as many potential respondents as possible.

It should be noted that researchers who had participated in more than one RPA project were told to answer the questions with regard to their most recently completed project.¹²

The majority of PI respondents participated in an RPA project within the last 10 years. The following table presents the years in which the PI respondents' most recently completed RPA grants¹³ were awarded:

Year	AAFC	CFS	CSA	NRC	DND	ESS	Total
1989	2						2
1990	2	7					9
1991	6						6
1992	3	1					4
1993	6	3					9
1994	10	3	2				15
1995	4	1	2	3			10
1996	5	3		8	1		17
1997	3	2	2	6	2		15
1998	4	5	1	5			15
1999	8	4		2	1		15
2000	7	1		2	2	2	14
2001	6	0		3	1	3	13
2002	3	2					5
Total	69	32	7	29	7	5	149

The following table presents the province of the respondents' hosting universities. The majority of PIs are from universities in Ontario and Quebec.

Province	AAFC	CFS	CSA	NRC	DND	ESS	Total
Alberta	5	3		1	1		10
British Columbia	10	6		5	1	1	23
Manitoba	9	2	1	2			14
New Brunswick	1	6		2			9
Newfoundland				4			4
Nova Scotia	2			1			3
Ontario	21	5	1	8	2	2	39
P.E.I.				1			1
Québec	14	9	5	5	2	1	36
Saskatchewan	7	1			1	1	10
Total	69	32	7	29	7	5	149

¹² This is because of the potential difficulties associated with respondents being asked to recall details regarding older projects.

¹³ In some cases, the year applies to the PI's only project, which may or may not be complete.

Almost half of the PI survey respondents received relatively little funding from NSERC (NSERC contributed less than \$50,000 to the project). The following table presents the amount of NSERC's contribution to the PI respondents' most recently completed projects:

	AAFC	CFS	CSA	NRC	DND	ESS	Total
\$0 - \$49,999	41	18	4	1	3	3	70
\$50,000 - \$99,999	17	9	1	7	1	0	35
Over \$100,000	11	5	2	21	3	2	44
Total	69	32	7	29	7	5	149

2.3 Web Survey of Partner Companies

This sample was based on the same sample of RPA projects that was used for the survey of PIs.¹⁴ However, the sample size was smaller, because the contact information for the participating companies was less complete.¹⁵

Invitations to participate were emailed to potential respondents along with a password required to access the website on which the survey was posted. These passwords also made it possible to determine which participants had not yet responded to the survey. Two e-mail reminders were sent to survey non-respondents in an attempt to increase the response rate. The survey remained on-line for approximately one month. Finally, the remaining non-respondents were contacted by telephone in an attempt to increase the response rate

The sample size for this survey was 124. A total of 32 respondents (26%) returned completed survey questionnaires. The breakdown of these figures by department/agency is as follows:

	Sample Size	Number of Respondents	% of Respondents
AAFC	36	12	33
CFS	39	9	23
CSA	11	1	9
DND	8	2	25
ESS	5	0	0
NRC	25	8	32
Total	124	32	26

¹⁴ That is, a census of all RPA projects since the program first began, minus duplicates, terminated projects and projects where the PI's email address was not available.

¹⁵ The NSERC Evaluation staff put in a considerable amount of effort in order to obtain as much company contact information as possible.

Due to the low number of industry partner respondents for some of the departments/agencies (particularly CSA, DND and ESS), survey data for those departments were not included in the summary analysis.

As with the university PIs, survey respondents who had participated in more than one RPA project were asked to answer the questions with regard to their most recently completed project.

The following table presents the years in which the RPA grants were awarded for the industry respondents' most recent projects:

Year	AAFC	CFS	CSA	NRC	DND	ESS	Total
1990		1					1
1991	1						1
1992	0						0
1993	2						2
1994	1	1					2
1995							0
1996	3						3
1997		1		1			2
1998	1	1	1	2			5
1999	2	3		1	1		7
2000	1	1		1	1		4
2001	1	1		2			4
2002				1			1
Total	12	9	1	8	2	0	32

2.4 Case Studies

Forty-two (42) case studies of RPA projects were conducted over the course of the evaluation. It was decided by the Evaluation Steering Committee that the distribution of case studies by sponsoring department/agency should be proportional to departmental/agency participation in the program over the past five years (1997/98 through 2001/02) as well as to program budget for each of the Agreements. The distribution was as follows:

- NRC – 14 projects.
- AAFC – 12 projects.
- CFS – 7 projects.
- DND – 4 projects.
- CSA – 3 projects.
- ESS – 2 projects.

The departmental contact person for the RPA program (in consultation with the NSERC program officer in some instances) selected the individual case study projects from each department/agency, in accordance with the following guidelines:

- All cases should be cases of completed RPA projects.¹⁶
- All projects should have been completed within the past five years.¹⁷
- The university PI is still available to be interviewed.
- The departmental researcher who was involved with the project (if there was one) is still available to be interviewed.
- The projects from each department should be a representative mix of projects across that department's R&D activity areas.
- The projects from each department should be a representative mix of that department's projects with regard to the size (budget) of the project.

Each case study was preceded by a detailed review of the project file information. The study team then attempted to interview the following people:

- The university PI.
- The contact person for the participating company.
- The departmental researcher (when applicable).

In some cases, students who were involved in RPA projects were also interviewed; however students were not available for the majority of the cases.¹⁸

For the majority of the case studies, interviews were completed with the first three individuals. In some cases, not all were available, but the information that was obtained from other sources was often sufficient to be able to prepare a complete case study. In cases where the information was not sufficient to be able to prepare a complete case study, the original case studies were replaced.

¹⁶ For some departments/agencies, it was difficult to find the total number of completed projects necessary. Therefore, a small number of case studies present projects that were very near completion.

¹⁷ The reason for this was that the individuals interviewed were asked detailed questions about the conduct of the research and, if the projects dated from too long ago, it is believed that it would have been difficult for the respondents to recall details.

¹⁸ Students were interviewed for two of the 12 AAFC case studies, for four of the seven CFS case studies, for one of the three CSA case studies, for none of the four DND case studies, for both (2) ESS case studies, and for six of the 14 NRC case studies.

2.5 Supplementary Interviews of NRC Researchers

A total of ten additional interviews were conducted with NRC researchers who had been the lead NRC researcher for a completed NRC RPA project. Case study projects were excluded. The main purpose of these interviews was to obtain additional information regarding the extent to which NRC RPA projects have involved true collaborations between NRC researchers and the university PIs. These interviews also dealt with several of the other evaluation questions, including the extent to which the research findings have been used and the ways in which NRC benefited from participating in the RPA project.

2.6 Interviews of Departmental Representatives

The representatives of the six departments/agencies that participate in the RPA program were interviewed twice over the course of the study:

- Once during the study design phase, to obtain information regarding how their department's participation in the program is structured and delivered, as well as their views regarding the evaluation questions and the study plan.
- Once during the main data collection phase to discuss the rationale for their department's participation, program delivery issues, and the intended benefits of participating in the RPA program for their department.

As well, the President of NRC was interviewed once following the completion of the draft NRC technical report, to obtain further information on program delivery issues, as well as the intended benefits to NRC of participating in the RPA program.

2.7 Group Interviews with NSERC Program Officers

The NSERC Program Officers for the RPA program were interviewed twice over the course of the study, both times as a group:

- Once early in the data collection phase to obtain background information regarding the participation of the various departments (in particular, the variations in the program delivery process by department) and their views regarding the benefits of the program for the participating departments and NSERC, program delivery issues, and best practices/lessons learned.
- Once following the completion of the draft technical reports and the review of these reports by the Program Officers to obtain their feedback regarding these reports (e.g., omissions and inaccuracies).

2.8 Study Limitations

The amount of data that could be collected in this study was limited by two factors:

- Study budget: This study involved carrying out evaluations of six programs, which turned out to be quite different, and the preparation of six separate evaluation reports. The average budget available per evaluation study was approximately \$20,000, and this obviously limited the amount of data that could be collected.¹⁹
- Program size: These are not large programs, and there have not been very many projects and program participants, especially in the smaller programs. This limited the amount of data that could be collected. For example, in the two web surveys all the potential respondents for whom contact information could be obtained were surveyed. But for some of the programs the number of respondents was small, because the sample sizes were small.

Due to the small program size, the study team recommended early in the study that a case study approach be adopted for these evaluations. This approach can enable valid conclusions about the program to be drawn because of the in-depth nature of the case study data collection, even for programs for which the other data sources were limited.²⁰

As discussed above, certain data should be interpreted with caution, and this is highlighted in the text of the six evaluation reports and this summary report. We re-state these cautions here:

- The data from the principal investigators survey for the three smaller programs (ESS, DND, and CSA) should be regarded as indicative only, due to the small number of responses.
- The data from the survey of partner companies for all programs should be regarded as indicative only, due to the small number of responses.

Because of these limitations we have been careful in each of the six reports to only present findings that the study team is certain are correct. By the time this summary report was prepared, each of the six evaluation reports had been subjected to a number of external reviews – by the NSERC program officers and program evaluation staff, by the study Steering Committee, by NSERC’s Program Evaluation Committee, and by representatives of each of the six participating departments. Any finding that was questioned by any reviewer (and there were very few) was reconsidered by the study team and only presented in the final reports if the study team was certain of its validity.

¹⁹ More effort was spent on the evaluations of the larger programs (i.e., NRC, AAFC, and CFS), but the resources available for even these three evaluations only averaged about \$30,000.

²⁰ As discussed above, each case study involved a detailed file review and, in the majority of cases, three in-depth interviews with representatives of three separate organizations.

In general, our perspective as the evaluators was to ensure that the findings would be as accessible and as useful to decision-makers as possible. The nature of this program, the low participation rate of some of the departments, and the scope of the study posed some challenges in terms of being able to apply a highly rigorous methodology. We have tried to not over-emphasize methodological rigour, and our approach has been to provide all the information we believe would be useful with the appropriate qualifications rather than withhold potentially useful information.

3.0 FINDINGS REGARDING PROGRAM RELEVANCE AND PROGRAM DELIVERY

3.1 Extent to which the program addresses the needs of the departments / agencies

Evaluation questions:

- a) What needs (or conditions) prompted the development of the Research Partnership Agreement?
- b) How has the Agreement addressed these needs?
- c) Do these needs still exist?

3.1.1 Summary of Findings

1. The following needs prompted the development of the RPA agreements (as identified by department/agency representatives, NSERC Program Officers, and program documentation):

Needs	AAFC	CFS	CSA	DND	ESS	NRC
Linkages and on-going relationships with university researchers	X		X	X	X	X
Leveraged resources for research in Canada (in departmental priority areas) / Support for university research	X	X		X	X	
Student training	X	X	X			
Department/agency recruitment		X				X
Technology development and transfer to industry / Industry research needs		X	X			
Technology development (for departmental use)				X		
Access to university knowledge base (work that is being done, broader range of technologies).				X		
Encourage and support collaboration between industry and universities		X				
A desire for government researchers to become more "outward looking" – i.e., gain a better appreciation of external problems.					X	

2. In most cases, the program is addressing the needs of the departments/agencies.
3. The development of linkages and on-going relationships with university researchers is not fully being addressed at departments/agencies where government scientists do not actively participate in the research (i.e. AAFC, CSA).
4. In general, the needs outlined by the departments/agencies still exist

3.1.2 Discussion

For the most part, the RPA program is effectively addressing the needs of the participating departments. Two particularly important needs were identified by most departmental partners: the need to leverage additional research funds and the need to develop stronger linkages with university researchers.

The first need that prompted the development of four of the RPA Agreements (AAFC, CFS, DND, ESS) was the need to leverage additional research funds in departmental priority areas. In the case of CFS, the program was intended, in particular, to support university-based forestry research.

The findings indicate that this need is being addressed in all four of the above-mentioned Agreements. Most PI respondents to the survey, who participated in these Agreements, believe there is a less than 50% chance their project would have proceeded without RPA funding. A majority of these PIs also noted that if it had proceeded without RPA funding, it would have been more limited in scope.

As well, the following table presents the incremental value of the RPA funding on the case study projects for each of these four departments:

	AAFC	CFS	DND	ESS
Number of projects where RPA funding was highly incremental, i.e. the project probably would not have gone ahead in the absence of RPA funding.	6	2	2	1
Number of projects where RPA funding had a significant influence on the scope of the project.	5	5	1	1
Number of projects where RPA funding had little or no impact in generating incremental research (or results were unclear).	1	0	1	0
Total # of case study projects	12	7	4	2

A second need that was mentioned by five of the six departments/agencies (AAFC, CSA, DND, ESS, NRC) was the need to develop stronger linkages with university researchers (in the case of ESS, the need is, in fact, increased partnerships with both universities and industry). In addition, although the development of linkages was not identified as an important need of the CFS in the

program documentation, it has increased in importance over the past few years and CFS now clearly specifies in its program documentation that Principal Investigators are encouraged to include CFS researchers in their RPA research proposals.

The data on linkages and on-going relationships are presented in section 4.5.

For DND, ESS and NRC, this need is clearly being addressed. The results of the survey and case studies demonstrate that, for most RPA projects funded by these departments/agencies, the government partner (and the industry partner, in the case of ESS) is actively collaborating in the research. In fact, 81% of PI respondents to the survey, who participated in DND, ESS or NRC RPA projects, indicated that their government partner actively collaborated in the research. As well, in almost all cases where the partners are involved, the PI has maintained an involvement with the partners following the completion of the research.

In contrast, the AAFC and CSA RPA programs operate with very little interaction between government scientists and university researchers. The survey findings indicate that in approximately two-thirds of the projects, AAFC acted only as a funding source and was not involved in the research. As a result, only 43% of the PIs noted that they have maintained some involvement with AAFC following the completion of the project. CSA had no involvement in any of the three case study projects and a relationship was not developed with the university researcher in any of these cases.

Data from the reviews of the Agreement documentation indicate that a higher level of participation by departmental researchers in the RPA program can have a significant effect on the creation of linkages. AAFC representatives recognize that the promotion of the program is not as strong as it could be and are therefore trying to encourage a higher degree of participation of AAFC researchers in RPA projects. Although the CSA representative mentioned that “closer relationships with academia” was one of the Agency’s needs, this is not actually a formal objective of the CSA/NSERC RPA program. NSERC noted that partner linkages are a desired result of the RPA program and expressed the concern that the CSA had not been able to fully develop relationships with its university and industry partners.

For the most part, the departments/agencies have noted that the needs outlined above still exist, and are still relevant to them. However, in the case of CFS, there is less concern about “supporting” university research capacity and it would probably be more appropriate for CFS to seek to “align” university research with CFS research priorities.

3.2 Expected benefits for the departments / agencies

Evaluation questions:

- a) Are the program’s objectives consistent with the priorities of the department/agency?
- b) In what ways do government partners benefit from the research partnerships, besides the direct use of research results?

3.2.1 Summary of Findings

- The program's objectives of increased linkages and synergy are totally consistent with AAFC, DND, ESS, CFS, and NRC priorities, as discussed above. The expected program benefits are consistent with the priorities of the departments/agencies.
- Although CSA priorities differ somewhat from the program's objectives, they are not entirely inconsistent.

3.2.2 Discussion

As noted above, the overall objective of these Agreements is: *to build strong linkages between the private sector and researchers in universities and federal institutes and to create synergy among the partners*. In most cases, this is very consistent with the priorities of the individual departments and agencies.

The only exception to this is CSA, although the program's objectives and expected benefits are not inconsistent with the Agency's priorities. The objectives of CSA's Space Technology Branch (which oversees the RPA Agreement) are: "to establish the feasibility of new ideas and concepts, to foster the timely development of strategic space technologies to meet projected Canadian needs, to provide technical support for, and advice about, enabling technologies, and to strengthen the Canadian industry capability. The Branch also has the mandate to support the training and development of highly qualified personnel..."²¹ The operation of the RPA program is supportive of these objectives. However, as noted above, the Agency has placed less importance on the development of linkages and synergy with academia.

In contrast, the program's objectives of increased linkages and synergy are totally consistent with the priorities of DND and ESS. As discussed in section 3.1, DND and ESS both noted that two of their main priorities are the development of linkages with universities and increased resources for research in DND priority areas.

AAFC and CFS also view the program's objectives as being very much consistent with Departmental priorities. Linkages and synergy expand Canada's capacity to conduct agricultural and forestry research and provide more opportunities for collaboration. As well, the program is clearly intended to support university research, address industry needs, and support student training.

The RPA program's objectives also are very much consistent with the priorities of NRC. As noted above, increased linkages and synergy with the university research community is one of NRC's main objectives for its participation in this program and it appears NRC is benefiting from the relationships that are being developed through the RPA program (nine of the ten NRC researchers, who were contacted for supplementary interviews, noted that NRC collaborated significantly with the PI during the research project and of these, six reported that subsequent

²¹ CSA/NSERC MOU, Article 2, section A.

linkages between the NRC and the university have been sustained). As one NRC researcher mentioned, “NRC benefits in the fact that the universities get to know its capabilities. This helps researchers from both sides to advance their subject matter, and increases the overall knowledge base. It also has some implications for future projects involving other countries; country-to-country interactions are usually done through universities”.

3.3 Difficulties in accessing the program

Evaluation questions:

- a) What are the difficulties experienced by the various parties in accessing the program and receiving funding for a project?
- b) What are the difficulties associated with the tri-partite relationships?

3.3.1 Summary of Findings

The participating departments and researchers identified the following difficulties in accessing the program and/or with the tri-partite relationship:

- Securing private sector support
- Lengthy proposal approval process
- Intellectual property issues
- NRC program information

3.3.2 Discussion

According to departmental representatives and PIs, accessing the program and receiving funding for projects appears to be difficult in most cases.

Securing Private Sector Support

One difficulty, which was noted by CSA, CFS and ESS (which happen to be the three departments/agencies with agreements under which industry in-kind contributions are not eligible for matching), is the requirement for private sector organizations to provide one-third of the funding. According to the CSA representative, many companies in the aerospace industry are relatively small and find it difficult to provide this level of funding. NSERC has noted that from fiscal years 1994 to 1999, there were 24 applications to the NSERC/CSA RPA program for an average of almost 5 per year. However, from fiscal years 2000 to 2003 there were 3 applications to the program in total. It is not clear why the application rate declined starting in 2000 but this decline may have been due to the financial limitations of potential industry partners.

ESS representatives agree that “Industry”, in the case of ESS, is composed of small mining exploration companies, which generally do not have funds for research – and if they do, they are usually unwilling to give funds to a third party, especially if there is a proprietary aspect to the research.

For CFS, the need for private sector funding was more of a deterrent in the early years of the program. However, according to the departmental representative, this is no longer a problem, except in the case of longer-term research and less applied fields of research.

AAFC representatives also noted that small agricultural producer groups tend to have less money for research, but noted that the two-to-one matching of industry funds is an important feature of the program in allowing them to access the program. There are several examples of this in the case studies. In five of the 12 AAFC case studies, the Principal Investigator listed the need for private sector funding as a main disadvantage of the program; however, in three other case studies, the Principal Investigator noted that the matching funds offered by the RPA program encourage industries to financially contribute to the research.

Lengthy Proposal Process

Representatives at DND and at NRC noted that the length of time required for project approvals creates a great deal of frustration with researchers.²² However, less than 20% of PI respondents to the survey indicated that the approval process for the RPA program was longer than that of other NSERC programs.

Intellectual Property Issues

A major disadvantage of the RPA program, which was reported by representatives from DND, CSA and NRC as well as industry, university and government researchers interviewed, is the complexity associated with developing intellectual property (IP) agreements.

In the case of CSA, Agency representatives noted that industry partners tend to be concerned about the prospect that the universities will want to own the IP, whereas in cases where government researchers are actively involved in the research (such as NRC and DND), the IP discussions usually involve all three parties. According to some NRC researchers interviewed, this complexity has the potential to deter industry from future formal collaborations with university and government.

NRC Program Information

Another issue, which is specific to NRC, relates to NRC researchers’ interpretation of the program. As evidenced in a number of case studies and supplementary interviews with NRC

²² In the case of NRC, turnaround time was an issue in the past, but has improved to 3-6 months, including NRC review, as a result of recent re-organization and increased staffing.

researchers, researchers from NRC who participated in the RPA program have often been disappointed by their lack of control over the conduct of the research and over the project funds.

In response to these views, NRC representatives stated that managing the expectations of NRC researchers and ensuring that they know the rules associated with the program are essential to the success of the program. That way, PIs will be aware from the start that money from the RPA program is totally in the hands of the university PI, but they will also know what they can negotiate for under the program.

For instance, NRC researchers may not be aware of the fact that, while they cannot be considered as PIs under NSERC's definition, the program does allow for co-management or three-way management of projects. By negotiating such an arrangement with the PI, the NRC researcher could potentially be more involved in the decision-making and control over the project.

3.4 Program management practices

Evaluation question: What are some of the best practices/lessons learned from the departmental partners managing the program?

3.4.1 Summary of Findings

1. AAFC and CSA have been only minimally involved in the management of their RPA Agreements, and this has limited the benefits they have received from this program.
2. The departments that play a larger role in the management of their RPA Agreements have highlighted a number of lessons learned from their experiences.

3.4.2 Discussion

Compared to other departments and agencies, AAFC and CSA are only minimally involved in the management of their RPA agreements. For AAFC, changes to the program including the involvement of an AAFC scientist as a peer reviewer, and plans to explore new options to develop linkages between AAFC scientists and university researchers have been well received by NSERC. Some AAFC representatives mentioned that they would like to have more time to be involved in the management of the program, and others expressed that project outcomes, as described in interim and final reports, should be made available to AAFC. However, according to one AAFC representative, report distribution has been restricted due to the proprietary nature of certain outcomes.

The following lessons learned have been identified by representatives of departments/agencies that play a larger role in the management of the RPA program.

- It is important to formally assign a researcher to RPA projects. This helps to ensure that the research is aligned with departmental priorities, and it increases the probability of continuing linkages between the department/agency and the university researcher. (CFS)

- It is advantageous to not have fixed deadline(s) for applications – i.e., to enable researchers to submit applications at any time during the year. In the earlier years of the program there was a fixed application deadline, which resulted in university faculty members all trying to obtain industry funding at the same time. Spreading out the applications has also made the program administration easier. (CFS)
- A strong departmental coordinating role is needed in order to ensure that the projects that are approved are consistent with departmental priorities. (DND)
- It is necessary to market the program internally to research staff. (ESS)
- It is important to ensure that researchers understand the RPA program, and to be aware that it may not necessarily suit every researcher or industry partner. (NRC)
- It is important for departmental program managers to stay in contact with the departmental researcher over the course of the project. This enables them to intervene in a timely fashion, if there is a problem. (NRC)

3.5 Program Promotion

Evaluation question: How can the program best be promoted among university researchers, to industry, and within the involved government departments and agencies?

3.5.1 Summary of Findings

1. University researchers across all Agreements seem to be aware of the RPA program as a possible source of funding.
2. The most effective program promotion activities appear to be delivered by NSERC.
3. DND and ESS are more actively involved in promoting the program to their researchers than other departments and agencies.

3.5.2 Discussion

According to the survey findings, the Canadian science and engineering community is aware of the RPA program as a possible source of funding for university research. Eighty-four percent (84%) of PI respondents (for all six government partners) indicated that they knew about the RPA program prior to commencing discussions with their industry or government partners regarding their RPA project. As well, 60% of the PIs stated that the university researchers in their department are well aware of the RPA program (i.e., 5 or better on a 7-point scale, with 1=not at all aware, 7=very aware). Of the remaining 40%, most of the PIs responded that the university researchers in their department or faculty are “somewhat aware” of the RPA program.

In addition, the most effective program promotion activities appear to be delivered by NSERC – through its website and through visits to universities. Sixty-nine percent (69%) of all of the PIs (across all Agreements) who responded to the survey learned about the RPA program from NSERC and 51% learned about it from university sources. For most of the Agreements, less than 15% of PI respondents initially learned of the program through the participating department or agency. The two exceptions to this are DND (57%) and ESS (40%). These two departments actively promote the program to their researchers because they view the program as a way of leveraging additional resources for their own research program.

3.6 The Application Process and Project Administration

Evaluation questions:

- a) What are the main impediments to the smooth processing of applications and awards and the monitoring of progress?
- b) What have been the reasons for these, and to what extent have these been solved?

3.6.1 Summary

In addition to the issues mentioned in section 3.3, the participating departments and researchers identified the following difficulties with regards to the application process and project administration:

AAFC	<ul style="list-style-type: none"> ■ Procedures for disbursing funds to the PIs are awkward. AAFC research managers responsible for the program would prefer to pay AAFC's portion of the funding to the university directly. ■ AAFC is concerned about the potential for the program being oversubscribed, because the department has little flexibility with regard to moving funds that have already been budgeted for other purposes. ■ AAFC would like to receive project progress reports and final reports. These reports are not provided to the Department because they often include proprietary information.
CFS	(no significant difficulties were encountered)
CSA	<ul style="list-style-type: none"> ■ Approval process is lengthy
DND	<ul style="list-style-type: none"> ■ Procedures for obtaining the funding from all sources were difficult
ESS	<ul style="list-style-type: none"> ■ Application guidelines are unclear; application procedures are complex ■ Complexity and time required to process applications
NRC	<ul style="list-style-type: none"> ■ It is difficult for NRC to know how to evaluate the NSERC peer reviews, in the absence of knowing who the reviewer was, or their expertise. ■ Some university PIs reported delays in receiving confirmation of funding.

3.6.2 Discussion

A significant issue that was reported regarding the application process and project administration is the length of time required to process the application. This was mentioned in the case studies by university researchers and industry partners for CSA-funded projects and by representatives of ESS, NRC and DND. However, across all departments, only 22% of all PI respondents to the survey felt that the approval process for the RPA program was longer than for other NSERC programs.

From the perspective of DND, the long lead-time required for project approvals is a major drawback of this program – “Given the pace of technology development, eight to ten months is too long for project approvals”. DND representatives recognize that this is mainly caused by the complexities of the peer review process – finding qualified and willing peers and getting them to review applications in a timely fashion – but they would still like to find some way to speed up this process, possibly by having DND researchers suggest peer reviewers. Note that this illustrates the inevitable tension between the varying views of this program – on the one hand as a program to support mission-oriented research (perspective of DND) and on the other, a program to support academic peer reviewed research of high scientific merit (perspective of NSERC). Interestingly, when the PIs from DND-funded projects were asked if they experienced any particular difficulties in applying to this program, in comparison to other NSERC programs, only one of the seven respondents selected “approval process was longer”.

NSERC officials agree that in the past, approval times have been lengthy. NSERC recently increased its staff, resulting in significantly improved turnaround times of 3-4 months for NSERC approval of a DND RPA. DND undergoes a subsequent review of each proposal. It should be noted, however, that NSERC now requires signed IP agreements before any funds may be released. This can increase the total length of time between application and funding.

Concerns regarding the length of the approval process also came through as a significant issue in the case studies for CSA projects, which, like DND projects, tend to focus on leading-edge technologies.

NRC identified a particular area of difficulty with respect to the RPA application process. The difficulty focuses on the application peer review process. NSERC supplies the results of these reviews to NRC, but because of federal government legislation (Access to Information and Privacy Acts) regarding the confidentiality of reviewers, neither the names of the reviewers nor information regarding their expertise is provided. As previously noted, NRC conducts a second review of all the proposals. Not knowing who the reviewers are creates some frustration, because there may be mixed reviews or reviews NRC does not agree with. It is difficult for NRC to know how to evaluate these reviews in the absence of knowing who the reviewer was, or their

expertise.²³ NSERC has indicated that, while the names of the reviewers cannot be revealed, their expertise will be provided as part of the review package in future applications.

3.7 Comparison to other NSERC programs

Evaluation questions:

- a) Could the objectives achieved through this program be met through other NSERC programs?
- b) Is there overlap between this program and other NSERC programs?

3.7.1 Summary

1. PI survey respondents (across all departments) selected “the opportunity to work with both industry and government” as the main advantage of the RPA program over the Collaborative Research and Development (CRD) program.
2. The objectives of ESS, DND and NRC for the RPA program could not be achieved through other NSERC programs.
3. CFS and AAFC’s current objectives for the RPA program could probably not be met equally well through the CRD program.
4. The original objectives of CSA for the RPA program could likely be met equally well through NSERC’s CRD program since, to date, CSA has placed less importance on developing linkages with universities.

3.7.2 Discussion

Advantages of the RPA program

Across all Agreements, the PIs who responded to the survey noted three main advantages of the RPA program over the Collaborative Research and Development (CRD) program. The CRD program is identical in nature to the RPA program, except for the fact that it does not require government departments to contribute funding. In other words, it is a university-industry program, with one-to-one matching by NSERC. These advantages are:

- The opportunity to work with both industry and government (selected by 58% of all PI respondents as a reason for applying to the RPA program).

²³ Note that this difficulty is unique to NRC. The other departments rely on NSERC to review the scientific merit of proposals and concentrate their own review on the consistency of the proposal with departmental priorities. This difference in the review process likely reflects differences between NRC and the other departments/agencies with regard to how NRC approaches research proposals generally.

- The opportunity to obtain larger grants (selected by 42% of all PI respondents); and
- A better chance of success. In fact, with a committed industry partner, the PI's chances of being awarded funding are quite high (selected by 35% of all PI respondents).

These three advantages of the RPA program were also identified by many of the PIs interviewed for the case studies.

The departmental representatives indicated that there are two main reasons why, in theory, a department or agency that participates in the RPA program might find this program more advantageous than the CRD program:

- 1) They might use the RPA program to support their own research program, so that the RPA projects are, in effect, departmental projects. The RPA program mechanism potentially gives the partner department a high degree of control over the research that is funded. DND is a good example of this.
- 2) They might be interested in developing linkages with university researchers to expand the potential for future collaboration or for obtaining advice and assistance. ESS and NRC are good examples of this.

Other possible departmental objectives, such as supporting research that is of interest to the department's industrial clients, strengthening university research capability in the area, and supporting student training in the area, can be met equally well through the CRD program.²⁴

Departments/agencies whose objectives could be met through other NSERC programs

The objectives of the CSA for this program (technology development and student training) could likely be met equally well through the NSERC CRD program. As noted above, the Agency has, so far, placed less importance on influencing the research or on developing continuing linkages with the researchers or the companies. The CRD program would still enable the Agency to stimulate additional space research, and it is a less complex mechanism for doing so than the RPA program. If the Agency were to contribute to research projects in the same ratio as in the RPA program, its contribution and the net effect on the funding required from all parties would be the same. As well, with the CRD program, if at some point CSA becomes unable to contribute to the projects (as has been the case since 2001), the university researcher can still pursue the project with funding from NSERC and industry. However, the government department contribution would not be leveraged in the CRD program, which may ultimately result in less funding going to the researchers.

²⁴ However, the participating departments and agencies have no mechanism to contribute to a research project that is not part of a specific grants and contributions agreement. Thus, the advantages of the RPA program cannot simply be moved to a CRD grant.

From the perspective of CFS, the original objectives of the RPA program (leveraged support for university research, findings that address industry needs, and student training) could probably be met equally well through NSERC's CRD program.²⁵ In fact, CFS places less importance on the potential benefit of having some influence over the conduct of the research. However, in the past few years, CFS has become increasingly interested in developing linkages with university researchers, and the participation of CFS researchers in RPA projects (which would not be possible to the same extent under the CRD program) facilitates this.

Departments/agencies whose objectives could NOT be met through other NSERC programs

AAFC's current objectives for the RPA program could probably not be met equally well through the CRD program. Although in the past, AAFC does not appear to have made the most of the two advantages listed above, the department is currently changing its approach to the program. While AAFC scientists were previously only involved with a minority of RPA projects, the department currently has plans to increase program promotion and its level of involvement. This increased involvement, along with additional recent measures, such as AAFC's increased role in the application process, would give the department a higher level of control over the research that is funded, while at the same time, contributing to the development of linkages with university researchers.

The objectives of DND for this program (incremental funding for DND research, access to university research knowledge, university linkages), as well as those of ESS (linkages and synergy), could not be achieved through other NSERC programs. In other NSERC programs, such as the CRD program, government researchers would no longer have an integral role in the research and would lose their ability to influence and direct the research projects. Government officials from these two departments/agencies view the involvement of their researchers in the research process as being very important and beneficial.

The objectives of NRC for this program (linkages, recruitment) also could not be achieved through other NSERC programs. These objectives require the active participation of NRC researchers in the research projects, which would not occur through NSERC Collaborative Research and Development (CRD) or Strategic Grant projects.

²⁵ NSERC representatives have also expressed the opinion that the CRD program would fulfill the objectives of CFS as effectively as the RPA program, and would require less effort to operate.

4.0 FINDINGS REGARDING PROGRAM OUTCOMES

4.1 Participation of students and postdoctoral fellows

Evaluation question: To what extent and in what capacity do Highly Qualified Personnel (HQP) participate in the research being conducted in RPA projects?

4.1.1 Summary

1. An average of 7.1 students and postdoctoral fellows participated in each RPA project (averaged across all departments).²⁶
2. By department/agency, the average number of students and postdoctoral fellows that participated in RPA projects is presented in the following table. Note that because these numbers were obtained from the survey, they should be interpreted as an estimate.

Department	ESS	AAFC	DND	CFS	NRC	CSA
Avg. # of students / project	4.0	5.2	7.5	9.0	9.6	13.1

4.1.2 Discussion

According to the survey of PIs, an average of 7.1 students participated in RPA projects (across all Agreements). This figure can be broken down into an average of 2.5 undergraduate students, 1.9 Masters students, 1.5 PhD students and 1.2 postdoctoral fellows. As well, 58% of university PI respondents indicated that these students were fully supported financially by the RPA program, and 31% indicated that the students received partial support.

The 29 companies that responded to the survey (across all Agreements) reported that, on average, they interacted with 3.3 students during their RPA project. Although the sample of company respondents is small, this may indicate that approximately half of the students who participated in RPA projects interacted with the company partners. However, 48% of industry respondents to the survey also noted that they only had “minimal interactions” with the students.

Still, in a number of the case studies, the students benefited from considerable interaction with the government and industry partners. For example:

AAFC case study #9	The Masters students and the postdoctoral fellow were each responsible for a sub-project. The undergraduate student acted as a research assistant and participated in all the sub-projects. All four students interacted closely with the industry partners and worked once a week at the industry facilities.
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²⁶ The number of students does not represent FTEs, but rather, the actual number of students involved in the projects.

CFS case study #4	The PhD student conducted the majority of the research on this project (organized meetings, collected data from the industry partners, and conducted most of the analysis), with some guidance from the PI.
CSA case study #1	The PhD student had the opportunity to visit the company and spend some time in their facilities in order to have a first-hand look at what the industry was trying to accomplish.
DND case study #3	One postdoctoral fellow and one PhD student were responsible for doing bibliographical research, and with the help of DND, they familiarized themselves with the code, configured simulations and collected simulation results.
ESS case study #2	The students were responsible for synthesizing, processing and interpreting the data collected at the mining site of these companies. The industrial partners were impressed with the level of enthusiasm the students demonstrated and the strength and knowledge they brought to the project.
NRC case study #7	One postdoctoral fellow and two PhD students were fully funded by the RPA project funds. One student had the opportunity to spend 20% of his time at the industry partner's location and the postdoctoral fellow worked full-time at NRC. They performed the experimental portion of the research and were also responsible for drafting a number of scientific publications.

4.2 Relevance of the training and subsequent employment

Evaluation questions:

- a) How relevant is the expertise gained by HQP during these research activities to industry and/or government?
- b) How successful are HQP involved in RPA projects at obtaining employment in their field once their formal training ends?

4.2.1 Summary

1. The training received by students on these RPA projects was beneficial to their subsequent careers.
2. For most of the departments, the students benefited most from interactions with the industry partner. In the case of NRC projects, the students benefited most from interactions with NRC.

4.2.2 Discussion

The data used to answer these questions were mainly taken from the case studies, although the survey of industry partners also provided some information on this issue. Of the 31 industry respondents to the survey (across all departments):

- Seventy percent (70%) rated the expertise gained by the students as relevant to subsequent professional activities related to their industry sector (specifically, they rated the relevance of the expertise gained by the students as 5 or higher on a 7-point scale, where 1=not at all relevant and 7=very relevant).
- Twenty-nine percent (29%) indicated that their company had hired some of the students.

The case study data indicate that, in general, the training received by students on these RPA projects was beneficial to their subsequent careers. Although there are many good examples of this, the following case studies illustrate particularly well the value of the training received by students who participate in the RPA program:

(AAFC case study #4)

One PhD student, who was fully funded by the RPA project funds, played a very active role in the project. With support and feedback from the Principal Investigator, this student wrote the majority of the research proposal, communicated with the industry partner, organized the research, supervised the data collection, and wrote reports and research papers.

Over the course of the project, this student also brought in 5-10 high school and undergraduate students, who received an hourly wage from the RPA funds, to assist in the data collection. Two of these high school students became so interested in the research that they attended the PhD student's thesis defence and subsequently presented the Principal Investigator with an unsolicited research proposal. The Principal Investigator obtained funding for this project and the high school students, who had by then enrolled in an undergraduate program at the university, took up this research. The two students are currently pursuing their studies and have published a scientific paper on pollination.

The PhD student has since started her own consulting company in the field, which, according to the industry partner, has been quite successful.

(DND case study #3)

One postdoctoral fellow and one PhD student were both partially funded through the RPA project funds. They were responsible for doing bibliographical research and, with the help of DND, familiarized themselves with the code, configured simulations and collected simulation results. According to the Principal Investigator and the representative from DND, the students interacted a lot with the project partners, which allowed them to acquire contacts within the industry.

In fact, the PhD student benefited greatly from this interaction. Upon completion of his degree, he was offered a position with General Electric, but turned it down. Instead, he started his own small business, and now offers consulting services in numerical simulations, an area directly related to the RPA project.

The contacts he acquired through the project have been instrumental to the success of his business. Presently he is working on a project for DND, using the same technology and methodology that was developed during the RPA project.

The postdoctoral fellow has also found employment and is now working in the aerospace industry with an aircraft simulator company in Montreal.

In the case of NRC, government researchers were frequently more involved in the research projects than the industry partners. Therefore, the students benefited from a greater level of interaction with them. Nine of the ten supplementary NRC researchers interviewed noted a significant collaboration between the university researchers and NRC during the research project. Nine of the 10 NRC researchers also indicated that the experience the students gained through the RPA program was definitely relevant to industry and/or government. As one researcher noted, “This partnership allows students to gain a different perspective by working at NRC and with industry (as opposed to working solely at the University)”. Another researcher commented, “This program represents a great opportunity for the students. It is a major chance for students and postdoctoral fellows to get a high level of expertise in an environment that is fantastic compared to what they would get elsewhere.” In the case of this researcher’s RPA project, all of the students who participated ended up being hired in industry and/or NRC. As well, in six of the 14 case studies, some of the students went on to gain employment with NRC.

4.3 Dissemination of research results

Evaluation questions:

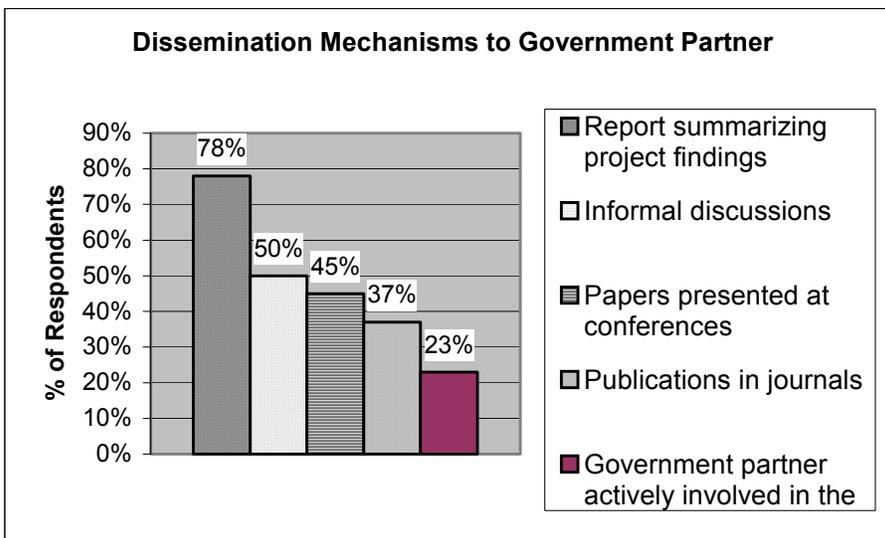
- a) How are the research results shared with government and industry partners?
- b) How are they disseminated to the research community?
- c) Are the dissemination mechanisms appropriate given the target audiences and nature of scientific research?

4.3.1 Summary

1. Dissemination to the industry partners was mostly done by means of a report summarizing the project findings. In general, industry representatives perceive the dissemination to them as being effective.
2. In cases where the government partner was not actively involved in the research, dissemination to the government partners was also mostly done by means of a report summarizing the project findings.
3. Publications in journals and conference papers are the main methods used to disseminate the findings to the academic research community.

4.3.2 Discussion

In terms of disseminating the research results to the government partners (see graph below), 78% of the PI respondents (across all Agreements) said this was done by means of a report summarizing the project findings. Fifty percent (50%) of the PIs indicated that information was disseminated via informal discussions, 45% said papers presented at conferences, 37% mentioned publications in journals, and 23% indicated that dissemination mechanisms were not necessary because the government partner was actively involved in the research (note that the majority of respondents who selected this last option were PIs of ESS or NRC-funded projects).



The same methods were cited by the PIs as mechanisms used to disseminate the findings to their industry partners, but the percentages were higher in almost all cases:

- 85% said this was done by means of a report summarizing the project findings
- 73% said informal discussions, and
- 44% said papers at conferences.

The industry partner respondents (across all Agreements) agreed that the first two of these methods were the most commonly used methods, but the percentages of respondents who cited each method were slightly lower (58% for report summarizing the project findings, and 61% for informal discussions). Three-quarters of industry respondents rated the dissemination methods used as effective (5 or higher on a 7-point scale), and only one respondent selected “not at all effective”.

The usual methods (publications in journals and conference papers) were cited by almost all of the PIs as the main methods used to disseminate the findings to the academic research community.

Other interesting findings from the case studies stood out with respect to the individual departments:

- Both AAFC coordinators for this program (past and present) stated that they did not receive the final reports produced by the PIs and that they had very little information regarding what was accomplished in these projects.
- In **all** of the CFS case studies there have been significant efforts made to disseminate the findings beyond the direct industry partner – to the industry as a whole and to other potentially interested parties.
- In the CSA case studies, it is clear that the PIs did not make an active effort to disseminate the research findings to the CSA. On the other hand, there were active efforts to disseminate the findings to the industry partners.
- In the DND case studies, almost all of the partners were heavily involved in the conduct of the research, so formal methods of dissemination were not usually necessary.
- Both ESS case study projects have resulted in a number of publications and conference presentations.
- In the case of NRC RPA projects, the NRC researcher is usually actively collaborating on the project and is, therefore, familiar with the findings. Consequently, dissemination to NRC is generally not an issue. Because of this, the main emphasis of both the PI and the NRC researcher is (a) dissemination to industry and (b) dissemination to the research community.

4.4 Uses and impacts of the research findings

Evaluation questions:

- a) How do governmental and industrial partners use the research findings, and what benefits do they experience as a result? If the findings have not been used/useful, why not?
- b) Have the RPA projects resulted in innovation and increased commercialization of university research?

4.4.1 Summary

1. The research findings have been far more useful to the industry partners than to the government partners under the AAFC, CFS and CSA Agreements, which is to be expected, since the intent of RPA projects under these Agreements is the generation of findings that are important to industry and to Canada's national interest.

2. The research findings resulting from DND-funded projects have been slightly more useful to DND than to the industry partners.
3. The research findings resulting from ESS-funded projects have been highly useful to both the industry and government partners.
4. In the case of NRC, the research findings have been used mostly for information and reference or for input to subsequent research and development

4.4.2 Discussion

In the case of AAFC, CFS, and CSA the survey results indicate that the research findings have been far more useful to the industry partners than to the government partners, which is not surprising since the intent of these projects is the generation of findings that are important to industry and to Canada's national interest. The percentages of projects rated by the PIs as 5 or higher on a 7-point scale, where 1=not at all used and 7=heavily used, are shown below:

Findings Used by	For information and reference (%)	For input to subsequent R&D (%)	For policy analysis or decision making (%)	For development of products or processes (%)
AAFC	35	21	14	10
AAFC industry partner(s)	55	44	40	34
CFS	43	46	36	29
CFS industry partner(s)	83	80	57	56
CSA	29	29	29	0
CSA industry partner(s)	71	71	71	29

On the other hand, the survey results indicate that the research findings have been slightly more useful to DND than to the industry partners and, in the case of ESS, at least three of the Sector's five projects represented in the survey have been highly useful to both the industry and government partners. The **number** of projects (from a total of six PIs that responded to this question) rated 5 or better on a 7-point scale (1=not used at all; 7=heavily used) are shown below:

Findings Used by	For information and reference	For input to subsequent R&D	For policy analysis or decision making	For development of products or processes
DND	4	4	2	3
DND industry partner(s)	4	4	1	2

Findings Regarding Program Outcomes

ESS	5	3	2	1
ESS industry partner(s)	5	3	3	0

In the case of NRC, the survey results indicate that the research findings have, so far, been used mostly for information and reference or for input to subsequent research and development. The **percentages** of projects rated by the PIs as 5 or higher on a 7-point scale are shown below (where 1=not at all used and 7=heavily used):

Findings used by	For information and reference (%)	For input to subsequent R&D (%)	For policy analysis or decision making (%)	For development of products or processes (%)
NRC	56	48	16	36
NRC Industry partner(s)	61	57	25	43.5

In approximately half of the case studies, further development work is required before the findings can be fully applicable. This is especially true for NRC, where the majority of the work has focussed on emerging or leading-edge science and technology.

The following table summarizes the uses of the research, by department, as noted by the Principal Investigators surveyed.

	AAFC	CFS	CSA	DND	ESS	NRC
% of PIs who said the research findings have already contributed to the development of a new or improved product	45	30	100	67	25	52
% of PIs who said the research findings have already contributed to the development of a new or improved process	59	57	43	33	75	48

4.5 Linkages between the partners

Evaluation questions:

- a) To what extent do the industry and government partners participate meaningfully in the research projects?

- b) Do university researchers maintain long-term relationships with their industry and government partners? In what capacity? What factors foster and/or inhibit these relationships? Are these relationships valuable to industry and the partner departments?

4.5.1 Summary

1. In general, AAFC, CFS and CSA have placed less importance on the development of linkages with universities. For these departments/agencies, the involvement of industry partners in the RPA projects has been significantly greater than that of the government partner.
2. DND, ESS and NRC participate actively in RPA projects and have been more successful in developing sustained linkages with university researchers.

4.5.2 Discussion

As noted in section 3.1, the AAFC and CSA RPA programs operate with very little interaction between government scientists and university researchers. Based on the survey findings, AAFC was involved in the research in one-third of the projects, but in the remaining two-thirds acted only as a funding source. As noted previously, only 43% of the PIs surveyed noted that they have maintained some involvement with AAFC following completion of the project. AAFC indicates that they are aware of the opportunity to enhance the research synergy between the Department and the universities and that they plan to capitalize on it in the future. Survey findings for the CSA Agreement indicated that the CSA had no actual involvement in the RPA projects.²⁷ However, the involvement of industry partners in the various phases of the projects has been significantly greater in both cases. Well over half of the AAFC PIs surveyed and five of the seven CSA PIs surveyed indicated that their industry partners were actively involved in the research projects (planning the research project and collaborating in the research). As a result, 75% of the PIs for AAFC RPA projects and six of the seven PIs for CSA RPA projects have maintained some involvement with their industry partner following the completion of the project.

In the case of CFS, until recently, there has been limited government involvement in research projects.²⁸ Therefore, the involvement of industry partners in the projects has also been greater than that of CFS. Seventy-eight percent of the PIs have maintained some involvement with their industry partner following the completion of the project, and 91% of these researchers said this

²⁷ The survey responses relating to sustained relationships are more positive, but further analysis revealed that the question itself might have been ambiguous, thus introducing a source of error of measurement for this item.

²⁸ The development of linkages with universities has increased in importance over the past few years and CFS now clearly specifies in its program documentation that Principal Investigators are encouraged to include CFS researchers in their RPA research proposals.

continued involvement was as a result of the RPA project. As expected, the continued involvement of the PIs with CFS has been slightly lower. Sixty-nine percent of the PIs have maintained some involvement with CFS following the completion of the project, and 82% of these researchers said this continued involvement was a result of the RPA project.

In contrast to the departments/agencies mentioned above, DND, ESS and NRC have made an effort to actively participate in RPA projects. This has had a positive impact on the linkages that were developed between the universities and government partners. According to the survey findings:

- Four of the seven PIs responsible for DND-funded projects noted that their government partner actively collaborated in the research and four of them also indicated that they have maintained an involvement with DND following the completion of the project (all four attributed this to the RPA project). The PI has maintained some involvement with the industry partner in four of these projects, and in all four, the PI said this was a result of the RPA project.
- All five of the PIs responsible for ESS-funded projects noted that both their government partner and their industry partner actively collaborated in the project. All five PIs also indicated that they had maintained some involvement with their government partner and four of the PIs indicated that they had maintained some involvement with their industry partner following the completion of the research. All of these researchers attribute this continued involvement to the RPA project.
- In the case of NRC, 80% of the respondents who served as PIs for RPA projects reported that their government partner actively collaborated in the research and 82% of the respondents have maintained some form of involvement with NRC following the completion of the RPA project. As well, the industry partners were actively involved in over half of the research projects. Of the eight industry partners who responded to the industry survey, half of them played an active role in the project, while the other half provided funding only.

Dept./ Agency	Dept. involved in planning project?	Dept. involved in research collaboration?	Subsequent linkage of the PI with the dept.?	Company involved in planning project?	Company involved in research collaboration?	Subsequent linkage of the PI with company?
AAFC	5 of 12 cases	3 of 12 cases	5 of 12 cases (but 4 of these linkages pre-existed)	8 of 12 cases	5 of 12 cases	11 of 12 cases
NRC	14 of 14 cases	12 of 14 cases	11 of 14 cases	12 of 14 cases	11 of 14 cases	10 of 14 cases
CFS	2 of 7 cases	2 of 7 cases	3 of 7 cases	7 of 7 cases	3 of 7 cases	4 of 7 cases
ESS	2 of 2	2 of 2 cases	2 of 2 cases	2 of 2 cases	2 of 2 cases	1 of 2 cases

	cases					
DND	4 of 4 cases	4 of 4 cases	3 of 4 cases	2 of 4 cases	1 of 4 cases	0 of 4 cases
CSA	0 of 3 cases	0 of 3 cases	0 of 3 cases	3 of 3 cases	1 of 3 cases	1 of 3 cases

4.6 Impact on the PIs subsequent research and teaching

Evaluation question: How are the research and teaching activities of the university researchers enhanced as a result of the collaboration?

4.6.1 Summary of Findings

RPA projects have had a significant influence on the PIs' subsequent research and teaching.

4.6.2 Discussion

The RPA projects appear to have had an influence on the subsequent research activities of most of the university survey respondents. Eighty-four percent of the PIs said the project helped them to identify new research opportunities, and 66% of them said the project helped to influence the direction of their research.

The teaching activities of the majority of respondents were also influenced by the RPA project – 89% of PIs noted that the project helped to modify or provide new content for existing courses.

Many of the case studies provide illustrations of impacts of the RPA project on research or teaching or both. For example:

- AAFC case study #3 provides a particularly good illustration of a significant impact on research, for both the PI and the AAFC researcher.

An indirect discovery was made during this project about some positive nutritional effects of flax. The Principal Investigator has become interested in further exploring the nutraceutical possibilities of flax.

These results also had a significant impact on the AAFC scientist's research. One of the flax breeders that the AAFC scientist works with is interested in developing an overall breeding project on flax, (which) will allow producers to know whether or not a flax seed will grow into a plant with desired characteristics.

- CFS case study #5 provides a particularly good illustration of how the PI's subsequent research was influenced by the RPA project:

Prior to this project, the principal researcher had never focused his studies on insect diseases. Since the balsam fir sawfly project, 40% of his research now

deals with disease. He is currently working on developing the virus discovered as a control agent, which is a direct result of the RPA-funded project.

- In CSA case study #1, the researcher has continued to work in the same area. He also uses this project as an example in his teaching in order to give the students a good example of industry involvement.
- In ESS case study #1, the researcher has secured funding to pursue further petrological analyses of the rocks studied in the RPA project, and he has plans to pursue further research on similar rock formations located in other regions. He has also used the data collected through this project in the university courses he teaches.
- NRC case study #6 provides a particularly good illustration of how RPA projects can have a significant impact on the research capabilities of NRC. Prior to the project, NRC researchers had no direct experience in the industrial fabrication of near gamma alloys, nor did they possess the required equipment. Through this project, they gained access to equipment, which allowed them to systematically process certain alloys.

5.0 CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it is clear that the majority of the RPA agreements with the government partners are fulfilling their respective mandates and are of value to the department/agency. This is especially true of departments and agencies that value the participation of their own researchers in research projects, such as DND, ESS and NRC. For DND and ESS, this is mostly to ensure that the research that is conducted is consistent with their own research priorities. However, all three also value the linkages and synergy that are developed through this program and could not be developed to nearly the same extent through other NSERC programs, in which government researchers would not necessarily be actively involved in the research.

The RPA Agreements with AAFC and CFS have also been successful in achieving the goals of the department/sector. In both cases, the program has helped to stimulate research and generate findings that have been useful to the industry. Especially now that both government partners are increasingly interested in the development of linkages with universities, the participation of departmental/agency scientists in RPA-funded research is a benefit that cannot be achieved through other funding sources.

In the case of CSA, the RPA Agreement appears to be fulfilling most of the Agency's needs and priorities. However, the lack of agency involvement in the individual RPA projects has limited the opportunity for the Agency to develop continuing linkages with the university researchers and with the participating companies.

Recommendations

Based on the findings and analysis, which stem from this study, the study team advises that NSERC and the departments/agencies participating in the RPA program consider the following recommendations.

1. RPA Agreements should be continued with those departments that are committed to actively participating in the program. Although this is a relatively high overhead program (per dollar of research funding awarded).²⁹, this report has clearly demonstrated the benefits that accrue to all parties in this situation.
2. Departmental researchers should be actively involved in the RPA projects whenever possible. The involvement of departmental researchers may lead to an increased access to and use of the research findings and provides the department with the opportunity to influence the direction of university research in its field of expertise. Active involvement in RPA projects is also likely to lead to greater sustained linkages between the department and university researchers and gives the department access to highly qualified personnel that it may want to recruit in the future.

²⁹ This relatively high overhead became apparent, following a review of project files, and interviews with program officers. It is especially evident when comparing the RPA program administrative requirements (specifically the requirement to get three parties together and the high amount of reporting that is required) to other NSERC programs.

Conclusion and Recommendations

3. Program education is needed in some of the partner departments to dispel certain misconceptions regarding the program and to encourage departmental researchers to partner with the universities in order to conduct research that is of use to the department.
4. Program officials should provide some help and/or templates for IP agreements. Although the time required for the application approval process has decreased, the time required to develop and sign an IP agreement is still an impediment to the program in most cases. NSERC should develop templates for IP agreements and provide help to researchers in order to speed up the process.
5. For the smaller agreements (those with very few projects per year), and especially those in which the department places less importance on sustained linkages with university researchers, NSERC should explore ways in which its other programs can allow departments to contribute to university research without a program-specific MOU. This would simplify program administration and allow partner departments to have a broader range of programs in which to participate.