Evaluation of the Class Grant and Contribution Program to Support Research, Awareness and Learning in Space Science and Technology

For the period from April 2014 to March 2020

Prepared by the Audit and Evaluation Directorate

March 2022

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Canada

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Acronyms used in the report

A&L	Awareness and Learning
AO	Announcement of Opportunity
CaNoRock	Canada-Norway Student Sounding Rocket
CEGC	Centre of Expertise for Grants and Contributions
CFI	Canada Foundation for Innovation
CIHR	Canadian Institutes of Health Research
CSA	Canadian Space Agency
CSDC	Canadian Satellite Design Challenge
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
DRF	Departmental Results Framework
EOADP	Earth Observation Application Development Program
G&C	Grants and Contributions
GBA Plus	Gender-based Analysis Plus
HQP	Highly qualified personnel
IIRB	Integrated Investment Review Board
ISED	Innovation, Science and Economic Development Canada
NPO	Not-for-profit organization
NRC	National Research Council Canada
NRCan	Natural Resources Canada
NSERC	Natural Sciences and Engineering Research Council of Canada
PAA	Program Alignment Architecture
PC	Parks Canada
PIP	Performance Information Profile
PIS	Performance Indicator Survey
PMS	Performance Measurement Strategy
R&D	Research and development
S&T	Science and Technology
SCDP	Space Capacity Development Program
SE	Space Exploration
SEP	Space Exploration Program
SST	Space Science and Technology
STD	Space Technology Development
STEDiA	Science, Technology and Expertise Development in Academia
STEM	Science, technology, engineering, and mathematics
SU	Space Utilization
SUP	Space Utilization Program
TBS	Treasury Board Secretariat
TRL	Technology readiness level

1 Executive summary

This report presents the results of the evaluation of the Class Grant and Contribution Program to Support Research, Awareness and Learning in Space Science and Technology (Class G&C Program or the Program) at the Canadian Space Agency (CSA or Agency). This is the second evaluation of the Program in its current form. It was carried out by the CSA's Audit and Evaluation Directorate, with the support of Goss Gilroy Inc., between January and December 2021. It was completed in accordance with the Treasury Board *Policy on Results* (TBS, 2016a) and *Policy on Transfer Payments* (TBS, 2008a). It was also conducted as prescribed in the CSA's *Five-Year Evaluation Plan* (CSA, multiple years). The Class G&C Program was established in 2009. It was designed to support research, knowledge development and innovation in the CSA's priority areas and enhance Canadians' awareness of and participation in space-related disciplines and activities. It has two components. The Research component provides organizations with financial assistance for science and technology (S&T) research and development (R&D), capacity building, and space-related information gathering, research, and studies. The Awareness and Learning (A&L) component provides funding to individuals and organizations involved in activities and initiatives that support space-related awareness, knowledge development and participation in learning activities. The Program supports the Agency's three *Departmental Results Framework* (DRF) programs (CSA, 2018a): the Space Capacity Development Program (SCDP), the Space Utilization Program (SUP), and the Space Exploration Program (SEP). Its funds are disbursed through Announcements of Opportunity (AOs) and unsolicited proposals. The purpose of this evaluation is to assess the Program's relevance, effectiveness and efficiency over the period from April 2014 to March 2020 (six years), including gender-based analysis plus (GBA Plus). The evaluation used multiple data collection methods, including a document review, a literature review, two online surveys (internal and external), internal group interviews, and external individual interviews with key informants.

Relevance

The objectives of the Class G&C Program are aligned with federal government priorities and departmental strategic outcomes. Through the Program's two components, the CSA's involvement in space-related learning, awareness, innovation, and research is consistent with core federal responsibilities. The Program continues to address a demonstrable need as it plays a unique role in the Canadian space sector and international collaboration. However, there are unmet needs, including recurrent **funding opportunities**, a less cumbersome process and better alignment with communities' needs.

Performance

Overall, the Class G&C Program's outputs are being delivered, and the immediate, intermediate and final outcomes are being achieved. Space-related knowledge, capacity development, and collaboration have increased. The number of AOs is significantly higher than in the previous period, though the number of proposals submitted and their success rate vary from year to year. Nevertheless, more projects are being funded, and efforts have been initiated to make funding more accessible. However, operational and performance **data** could be better structured if the available **tools** were harnessed, and some information is missing from the central database. There are also some opportunities for improvement in the Program's **performance measurement** due to some undefined targets and missing or unmeasured indicators.

Efficiency

Many **operational processes** and work methods are well-established, but some facets should be improved to make the Program even more efficient, enhance synergies, and be innovative: share more information about the **evaluation and selection processes** for greater transparency, clarify and better communicate **roles and responsibilities** to enhance collaboration, and offer training, greater **coordination** and harmonization to support operations more effectively.

On the basis of the key evaluation findings, the following actions are recommended to improve the accessibility and efficiency of the CSA's Class G&C Program:

1. Establish regular funding opportunities with greater sensitivity to the needs of the diverse client base, while increasing harmonization and coordination between branches and recipients.

2. Clarify the rules and requirements regarding departmental collaboration with G&C recipients, and inform stakeholders.

3. Use a single operational database for the Program's administration and management, and monitor data quality, continuity and completeness.

4. Explore the possibility of using standardized tools to streamline the application process, such as using a staged application process.

5. Ensure that systematic feedback is provided for all funding applications.

6. Communicate the roles and responsibilities of the Centre of Expertise for Grants and Contributions (CEGC) to the G&C Program's user branches to ensure a common understanding and meet the branches' needs for the services and expertise they require.

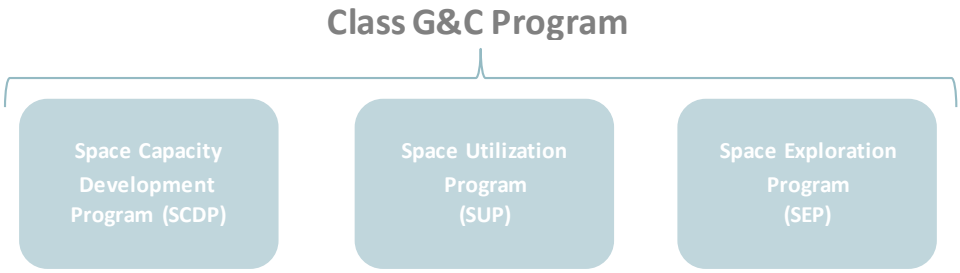
7. In updating performance measurement, ensure that there are CSA logic model indicators for each of the Program's components and client groups, and that specific targets are agreed upon for the Program.

2 Overview of the Program

The Class G&C Program was established in 2009, but it was based on a 2002 program that had 12 components.[1] The current G&C Program was designed to support research, knowledge development and innovation in the CSA's priority areas and enhance Canadians' awareness of and participation in space-related disciplines and activities.

The Class G&C Program is an umbrella program[2] that supports the CSA's three DRF programs, which is why it is not listed in the DRF program inventory (CSA, 2018a). The Program has its own terms and conditions and is subject to the *Policy on Transfer Payments* (TBS, 2008a). It was designed with the CSA's 2009 Program Alignment Architecture (PAA) (replaced by the DRF in 2018).

Figure 1 – Where the Class G&C Program fits into the CSA's DRF



The Program has two components: (1) Research, and (2) Awareness and Learning (A&L). The Research component provides organizations with financial assistance for science and technology (S&T) research and development (R&D), capacity building, and space-related information gathering, research, and studies. The A&L component provides funding to individuals and organizations involved in activities and initiatives that support space-related awareness, knowledge development and participation in learning activities.

The objectives of the two components described in the Program's Terms and Conditions (CSA, 2009) are as follows:

- Support the development of science and technology relevant to the CSA's priorities
- Foster the continuing development of a critical mass of researchers and highly qualified people in Canada in fields relevant to the CSA's priorities
- Support information gathering, studies and research related to space
- Increase awareness of Canadian space science and technology among Canadian youth and educators and their participation in related activities
- Provide learning opportunities to Canadian students and physicians in various space-related disciplines
- Support the operations of organizations dedicated to space research and education

[1] The 2002 program was evaluated in 2008.
[2] Umbrella implies great flexibility regarding eligible recipients, projects and activities.

The target eligible client groups are as follows:

- Companies
- Not-for-profit organizations (NPOs)
- Postsecondary education institutions
- Elementary and secondary schools
- Canadian citizens and permanent residents of Canada

The Class G&C Program's funding is disbursed either through a competitive process (referred to as solicited proposals) in response to Announcements of Opportunity (AOs) or through unsolicited proposals. Each AO is a quasi mini-program with its own criteria.

Governance, roles and responsibilities

There are four levels of actors involved in the Program's governance. According to the Program's Terms and Conditions (CSA, 2009), there is no lead authority for the Program, although it falls under the responsibility of the Chief Financial Officer. The following is an overview of the roles and responsibilities (the first three levels are described in part in the Program's Terms and Conditions (CSA, 2009)):

1) **Branches**
   The branches – Space Science and Technology (SST),[3] Space Utilization (SU), and Space Exploration (SE) – determine which initiatives will be funded to achieve the expected outcomes. They carefully assess, monitor and report on the risks associated with their sector's use of the Program. They liaise directly with recipients and monitor the feasibility, eligibility and progress of G&C projects. They are in charge of the Program's operations and administration.

2) **G&C Centre of Expertise (CEGC)**
   The CEGC is responsible for providing G&C expertise to the CSA's branches. It provides advice, guidance and direction on G&C management. It also monitors, reviews and reports on G&C. It provides standardized tools for AO development and approvals. It supports the G&C decision-makers and steering committees. It reports to the Finance Directorate.

3) **G&C Steering Committee**
   The G&C Steering Committee[4] provides oversight of G&C management and governance. It is co-chaired by the Chief Financial Officer and Director General, Corporate Services, and one of the Directors General (at the time of the evaluation, the Director General SST was Co-Chair). It provides CSA-wide strategic guidance and advice on the use of funding.

[3] The SST Branch works with the Communications Branch on the SCDP's Youth Learning initiative.
[4] The G&C Steering Committee's terms of reference were reviewed in the fall of 2021. The committee became an Advisory Committee, and the new terms of reference were approved in December 2021.

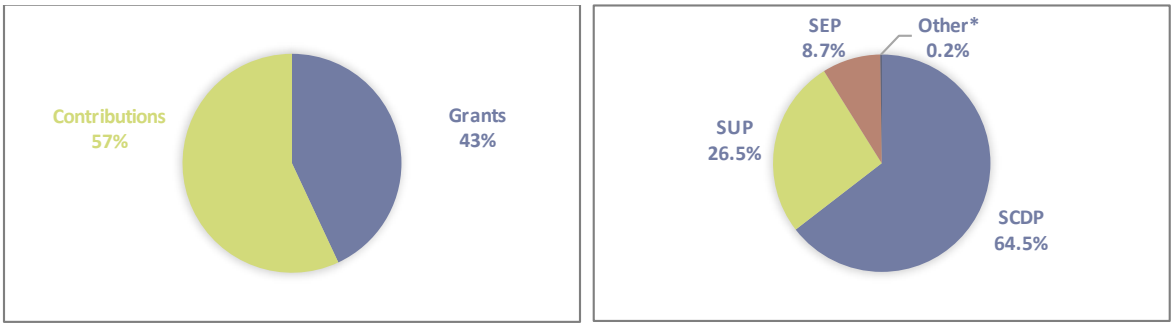
4) **Integrated Investment Review Board (IIRB)**

The IIRB provides the sound management (governance and approval) needed to ensure that all CSA expenditures are made and controlled with a view to optimizing resources and expected results, including those of the G&C Program.

Program resources

Total funding disbursed by the CSA under the Class G&C Program during the evaluation period was $117,906,570, with more than half spent on contributions. Almost all of the funds were used in the Research component (98%). The SCDP accounted for the largest proportion of funds, followed by the SUP and the SEP. For more details on funding allocation and the number of agreements, see the Performance section.

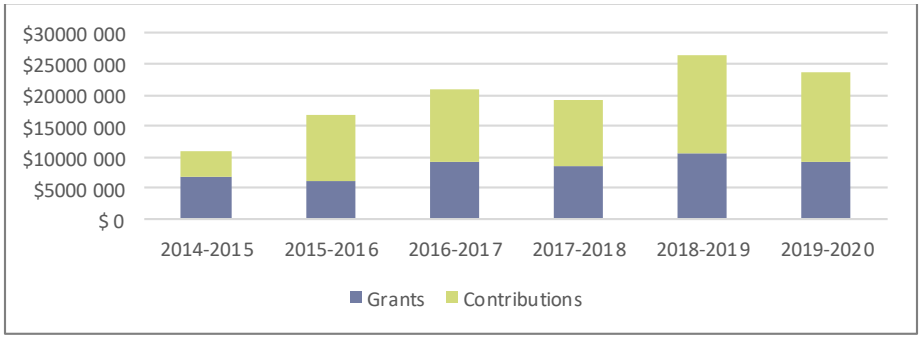
Figure 2 – Percentage of funding disbursed by type of transfer payment and DRF program



** Other: An initial 10-year grant was awarded at the beginning of the evaluation period outside the three DRF programs (it was renewed after five years using another funding vehicle).*[5]

In March 2015, changes were made in the funding of the Program and the CEGC. First, there was an increase in the funds available for the Program, in the volume of agreements signed, and in the proportion of funds disbursed in the form of contributions to companies (instead of contracts). Indeed, funding disbursements grew by 113% during the evaluation period (33% increase for grants, 247% for contributions), reaching a total of $23.5 million in 2019-2020. For comparison, funding disbursements in 2014-2015 totalled $7.8 million.

Figure 3 – Amounts disbursed by type of transfer payment and year



[5] For the purposes of the evaluation and this report, the agreement is included in the aggregate G&C data but excluded from the data for the three DRF programs or for the branches.

Second, in 2015 the CEGC was moved from the SST Branch to Corporate Services (under the Finance Directorate). The resources allocated to the CEGC increased by 62% during the evaluation period, and the number of full-time equivalents (FTEs) grew by 49%.

Table 1 – Actual expenditures of the CEGC

Expenditures	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Salaries	$339,784	$306,648	$329,462	$433,736	$440,231	$570,001
Operations & Maintenance	$43,533	$103,253	$58,349	$12,753	$39,519	$49,661
Total	$383,317	$409,901	$387,811	$446,489	$479,750	$619,662
FTEs	3.20	3.10	3.25	3.96	4.23	4.77

Operating budget data is available only for the CEGC, as the branches do not report this financial information for the Class G&C Program separately within their respective programs. The previous evaluation (CSA, 2017c) reported that there was no information on full-time equivalents (FTEs), salaries, and expenditures specifically for G&C initiatives in the branches. The evaluation concluded (but did not recommend) that data pertaining to the Class G&C Program's full administrative costs should be tracked so that information about the magnitude of the Program's costs would be available.

Previous evaluation of the Program

In the previous evaluation, whose action plan was completed, a number of conclusions were drawn regarding the Program's relevance, performance and efficiency, and the following recommendations were made: (1) review the Program's terms and conditions to determine whether the A&L component remains aligned with the CSA's priorities; (2) for both solicited and unsolicited proposals, standardize the application, selection, and feedback processes and clearly communicate them to the Canadian space community; and (3) review the Program's performance measurement strategy and data capture, collection and storage processes, and standardize the process for identifying ranked lists of funding priorities applicable to all G&C initiatives (CSA, 2017c).

3 Purpose and scope

The evaluation of the Class G&C Program addresses the key evaluation issues specified by the Treasury Board of Canada Secretariat's *Directive on Results* (TBS, 2016b): relevance, effectiveness and efficiency, and gender-based analysis plus (GBA Plus).[6] It is also consistent with the *Policy on Transfer Payments* (TBS, 2008a), which requires that all G&C programs be evaluated every five years. In addition, it was conducted as prescribed in the CSA's *Five-Year Evaluation Plan*. Its goal is to provide a neutral, evidence-based assessment. This is the second evaluation of the Program as defined in the 2009 terms and conditions, and it covers both components (Research and A&L). The period covered by the evaluation is April 1, 2014, to March 31, 2020, a six-year period.

Table 2 – Evaluation questions

Relevance	1. To what extent is the Program aligned with federal government priorities and departmental strategic outcomes? 2. To what extent are the Program's activities aligned with the federal government's core responsibilities? 3. Does the Program continue to meet a demonstrable need, and is it responsive to the needs of Canadians?
Performance	4. To what extent were the Program's expected outputs achieved? 5. To what extent were the Program's expected immediate outcomes achieved? 6. To what extent were the Program's expected intermediate outcomes achieved? 7. To what extent were the Program's expected final outcomes achieved?
Efficiency	8. To what extent is the Program delivering outputs and achieving outcomes as efficiently as possible? 9. To what extent is the use of resources in executing the Program as cost-effective as possible?
GBA Plus	10. What are the Program's impacts on GBA Plus groups?

Performance measurement and indicators

The evaluation period covers the 2010 Performance Measurement Strategy (PMS) for the A&L component, the 2013 PMS for the Research component, and the 2017 Performance Information Profiles (PIPs) for the three DRF programs (CSA, 2010; 2013; 2017b). Since there are no specific targets for the G&C Program in the 2017 PIPs, the 2013 PMS indicators along with their targets were used for the Research component. Nevertheless, the previous evaluation (CSA, 2017c) indicated that there was a need to update the Program's PMS with output-related performance indicators, baseline data and targets. For targets that were not defined or where the data did not provide a direct response to the indicator, the 2013-2014 baseline year was used. For the A&L component, the 2010 PMS indicators were used, but without specific targets because none was specified. In addition, no baseline year was used since this component was paused following the 2012 program review. For the 2010 (A&L) and 2013 (Research) PMS logic models, see Appendix 1.

[6] GBA Plus is an analytical tool used to assess the potential impacts of policies, programs, services, and other initiatives on diverse groups of women, men and people with other gender identities (Women and Gender Equality Canada, 2021).

4 Methodology

The evaluation was conducted by the CSA's Audit and Evaluation Directorate, with the assistance of Goss Gilroy Inc., between January and December 2021. An advisory group composed of representatives from the various sectors of the CSA was formed to provide advice, guidance and general direction throughout the evaluation process. The advisory group also provided ongoing feedback on various aspects of the evaluation and the deliverables, including the final report, and assisted in collecting and providing data.

Literature review: The evaluation of the Class G&C Program is based in part on a careful analysis of various documents, including public reports, national academic publications and government publications. This literature review was primarily intended to document the Program's relevance, but it was also used to support performance information in some instances.

Document and quantitative data review: Administrative, operational, and performance data extracted from the Unitas database,[7] selected data from performance reports in Excel format,[8] financial data extracted from SAP, A&L-funded student and organization reports, and other internal documents were studied. The main purpose of reviewing these documents and data was to evaluate the Program's performance, but various elements of its efficiency and GBA Plus were also examined.

Internal and external surveys: Two surveys were conducted. One was administered to CSA employees, managers and members of the CSA's senior management. The other was distributed to principal investigators and students who submitted one or more G&C funding proposals (whether funded or not) during the evaluation period. The purpose of the surveys was to collect information about the Program's relevance and efficiency and about performance (Program outputs and A&L outcomes) and GBA Plus.

The internal survey's response rate was similar across the various sectors of the CSA, but slightly lower than expected. However, the survey had exactly the same number of respondents as the internal survey in the previous evaluation (CSA, 2017c).

The external survey's response rate was lower than expected. This may be due to a number of factors, including the COVID-19 pandemic, the fact that the survey was launched just after the 2021 Performance Indicator Survey (PIS) and during the end-of-term period for universities, and the large number of non-recipients surveyed. Although potential respondents were informed that the evaluation survey would not overlap with the PIS, some may have chosen not to respond. However, the number of respondents was higher than in the previous evaluation (CSA, 2017c). The main characteristics of the external survey's respondents are as follows: 68% male, 22% female, 0.4% non-binary; 4% self-identified as persons with disabilities; 0% self-identified as Indigenous; and 16% self-identified as members of a visible minority.

[7] For G&C, the Unitas system is used for processes (AOs, unsolicited proposals), proposal evaluation and feedback, performance indicator measurement (Performance Indicator Survey (PIS) form and performance indicator evaluation), agreement activities and proactive disclosure.
[8] Primarily contribution data for the SCDP's Space Technology Development (STD) initiative between April 2014 and March 2019.

Table 3 – Internal survey response rates

Respondent category (Branch)	No. of people surveyed	No. of respondents (%)	Response rate
Space Utilization	22	10 (19%)	45%
Space Exploration	26	13 (24%)	50%
Space Science and Technology	34	18 (33%)	53%
Others*	27	13 (24%)	48%
Total	**109**	**54 (100%)**	**50%**

** Others include Communications, Policy, Finance (including the CEGC) and senior management.*

Table 4 – External survey response rates (by component; by recipient/non-recipient; by transfer payment type)

Respondent category	No. of people surveyed*	No. of respondents (%)	Response rate
Research component	457	176 (78%)	39%
A&L component	475	50 (22%)	11%
Both components (Research, A&L)	2	0 (0%)	0%
Total, components	**934**	**226 (100%)**	**24%**
Recipients	219	89 (39%)	41%
Non-recipients	597	79 (35%)	13%
Both (recipients, non-recipients)**	118	58 (26%)	49%
Total, recipients and non-recipients	**934**	**226 (100%)**	**24%**
Grants	635	121 (54%)	19%
Contributions	219	83 (37%)	38%
Both (G&C)	20	8 (4%)	40%
Not specified in the database	60	14 (6%)	23%
Total, G&C	**934**	**226 (100%)**	**24%**

** All principal investigators and students who submitted an application and/or were funded during the evaluation period.*
*** Had at least one funded project and one non-funded project.*

Internal interviews and group discussions: The group interviews helped to provide an in-depth understanding of the Program's activities and the various roles in the G&C cycle (in the branches, Corporate Services or the CEGC, for example) and to corroborate and clarify information obtained through other data sources. A total of 28 individuals from different sectors in the CSA were consulted through 11 individual and group interviews.

External interviews, including the comparative study: External interviews were conducted with three third-party organizations that received A&L funding and were not included in the external survey, and with eight other departments and agencies that have class and non-class G&C programs.

The funded organizations were interviewed to gather information about relevance, performance and efficiency. The other departments and agencies were interviewed to identify good practices and points of comparison with the Program. The following departments and agencies were interviewed:

- Canadian Institutes of Health Research (CIHR)
- Canada Foundation for Innovation (CFI)
- Natural Sciences and Engineering Research Council (NSERC)
- Department of National Defence (DND)
- Innovation, Science and Economic Development Canada (ISED) (Innovative Solutions Canada (ISC) program)

- Natural Resources Canada (NRCan)*
- Parks Canada (PC)*
- Fisheries and Oceans Canada (DFO)*

** Has a class G&C program.*

Table 5 – Number of interviews and respondents by category

Respondent category		No. of respondents	No. of interviews
Internal	Space Utilization	4	11
	Space Exploration	5	
	Space Science and Technology	8	
	Others*	11	
External	A&L recipient organizations	3	3
	Other departments and agencies	8	8
	Total	**39**	**22**

**Others include Communications, Policy, Finance (including the CEGC) and senior management.*

Case studies: Some mini-case studies were carried out as part of this evaluation. They covered AOs of different types and sizes. The aim was to reflect the variety of AOs designed and published by the three branches (SST, SU, SE) and to compare the different characteristics of AOs (length of application period, amount and duration of funding, etc.).

Limitations

The main limitations encountered in the evaluation have to do with the data.

- At the beginning of the evaluation period, some non-funded proposals were not entered into the database. At that time, Unitas was not widely used, and documents from unsuccessful proposals were simply saved in Livelink. Since those documents were not reviewed, some non-recipients could not be reached for the external survey, and for some AOs, there is a slight overestimation of proposal success rates as some proposals were not included in the analysis of the number of proposals submitted. The number of proposals missing from the database was not determined but is estimated to be small.

- The PIS collects information from the progress and final reports required for progress and performance evaluation under the *Policy on Transfer Payments* (TBS, 2008a). Reports are requested, submitted and evaluated via the Unitas system platform (progress and final reports for grants; Medium Format for contributions[9]) and are improved from year to year. The response rates are very high (96% for the evaluation period). However, the frequent changes in the PIS make it difficult to compare data on an annual basis. This problem was noted in the previous evaluation (CSA, 2017c). In addition, between April 2014 and March 2019, recipients of SCDP Space Technology Development (STD) contributions completed a different report from the PIS called the

[9] The PIS – Medium Format for contributions was introduced in 2019-2020.

Final Report – Performance Measures, which collected information about key performance indicators for contribution-funded projects. The data was reported in aggregate (for the entire project), not annually as with the PIS, but it was compiled and available in Excel format. For this reason, STD contribution data is presented separately in this report but aggregated where possible.

- A small-scale regional analysis was performed with the geographic location of recipients and non-recipients accessible via the Unitas database, the summary data reported in the PIS to the best of the principal investigator's knowledge regarding the composition of the project team, and the responses to demographic questions in the external survey.

- At the CSA, Unitas is the main centralized information system[10] for G&C operations, contracts, MOUs, and Canadian aerospace industry directory information, and SAP is the reference system for financial data and a number of official lists, such as federal electoral districts and business numbers. However, SAP does not distinguish between solicited and unsolicited project agreements, and data cannot be extracted from SAP by AO. Although a view of SAP financial data is available in Unitas for operational purposes, source data (SAP) was used directly when financial data was examined.

[10] Unitas is the client relationship management (CRM) system.

5 Relevance

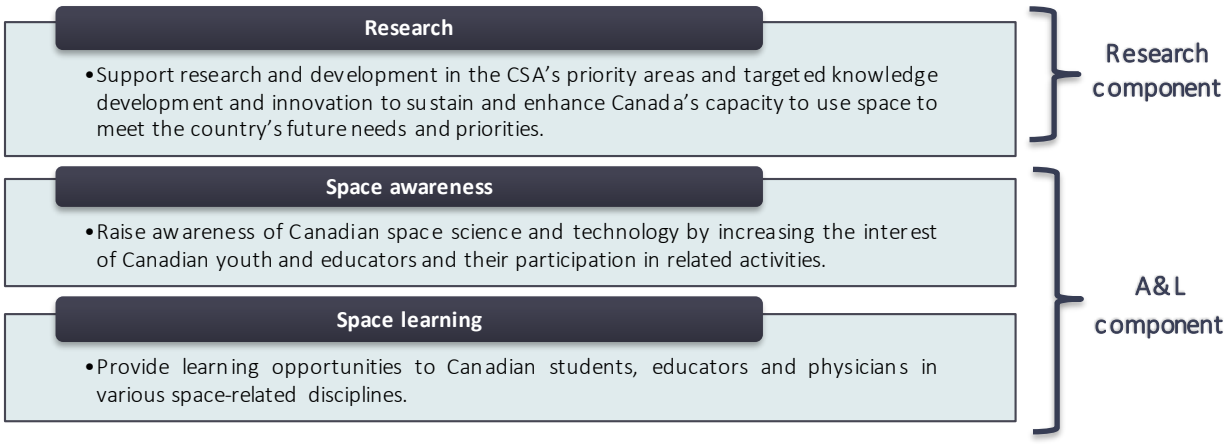
The objectives of the Class G&C Program are aligned with the federal government's priorities and the CSA's strategic outcomes. The Program is a pillar of the Agency, enabling it to support Canada's space ambitions. The CSA's involvement in space-related learning, awareness, innovation and research through the Class G&C Program is consistent with the federal government's core responsibilities as defined in the *Canadian Space Agency Act* and the CSA's *Departmental Results Framework*. In addition, the Class G&C Program continues to address a demonstrable need. The majority of respondents felt that there would be a gap if the CSA's Program did not exist, as it plays a unique role in Canada in the development of space sector capabilities, the advancement of space science and technology, collaboration between stakeholders, and Canada's international presence. Nevertheless, there are needs not met by the Program in its current form.

The Program's relevance was evaluated on the basis of the alignment of its objectives with government priorities and the federal government's core responsibilities[11] and the extent to which it continues to address a demonstrable need in Canada.

Alignment between the Program's objectives and government priorities

The Program supports "knowledge development and innovation in the CSA's priority areas while increasing the awareness and participation of Canadians in space-related disciplines and activities" (CSA, 2021d). It is a transfer payment program designed to provide funding in three main areas of activity: research, space awareness, and space learning (CSA, 2021e). As described above, the Program is composed of a Research component and an A&L component.

Figure 4 – Objectives of the Class G&C Program by area of activity and component



[11] The term "core responsibility" is defined as follows in the *Policy on Results* (TBS, 2016a): "An enduring function or role performed by a department. The intentions of the department with respect to a Core Responsibility are reflected in one or more related Departmental Results that the department seeks to contribute to or influence."

Alignment with federal priorities

The Program's objectives and activities are aligned with *Canada's Space Policy Framework* (2014), in which the government recognizes that space is an important issue and that "[i]t is essential to the national interest […] that Canada maintain a robust, technologically superior and commercially competitive space industry" (GC, 2014). Specifically, the Framework identifies five key priorities and core principles to guide Canadian space activities: (1) ensure Canada's national sovereignty, security and prosperity through the effective utilization of space (e.g., satellite surveillance); (2) support the domestic space industry (e.g., market the most advanced new technologies that address national interests); (3) maintain and strengthen partnerships; (4) support and advance Canadian expertise in selected technology niches (e.g., robotics and telecommunications); and (5) inspire and motivate Canadian youth to pursue careers in science, technology, engineering and math (STEM) with the aim of developing and sustaining an educated and skilled workforce, by working with industry, universities and colleges (GC, 2014).

Similarly, the Space Strategy for Canada, announced by the Minister of Innovation, Science and Industry in March 2019, recognizes the space sector as a strategic national asset and reiterates the government's commitment to ensuring that Canada remains a spacefaring nation (CSA, 2019a). Accordingly, "Canada seeks to create a vibrant and sustainable space sector […] that sets a new vision for Canadian space exploration, sees increased partnership with industry to create the jobs of the future, leverages the power of space to inspire youth, and harnesses the potential of space to solve […] challenges for Canadians" (CSA, 2019a). The Strategy sets out the following five key federal priorities: (1) ensure that Canada remains a leading spacefaring nation by joining the Lunar Gateway mission; (2) inspire the next generation of Canadians to reach for the stars; (3) harness space to solve everyday challenges for Canadians; (4) position Canada's commercial space sector to help grow the economy and create the jobs of the future; and (5) ensure Canada's leadership in acquiring and using space-based data to support science excellence, innovation and economic growth (CSA, 2019a).

By supporting space science and technology research, awareness and learning in Canada, the Class G&C Program is aligned with the government's space priorities. For example, AOs are consistent with the federal priorities outlined in *Canada's Space Policy Framework* (GC, 2014) and the Canadian Space Strategy (CSA, 2019a), such as Lunar Exploration Analogue Deployment (LEAD), Student Participation in the International Astronautical Congress (IAC), or R&D for Multi Earth Observation Satellite Data Integration (EOADP).

In addition, the government noted in Budget 2021 that aerospace "is an important driver of Canada's innovation economy" and that it will continue to explore opportunities to support Canadian capacity, innovation and jobs in the Earth observation satellite sector as it provides critical services that Canadians rely on and creates high-quality jobs in Canada (GC, 2021a).

Lastly, GBA Plus was incorporated into the CSA's G&C program in response to the federal government's increasing emphasis on the principles of equity, diversity and inclusion. For example, the AO to support student participation in the IAC in 2019 specified that for the final selection, the CSA would "consider the applicants having the highest final scores [and] could also take into consideration factors such as a balanced grants distribution across Canada as well as a diversified representativeness among the four designated groups" (CSA, 2019b).

Alignment with departmental strategic outcomes

The objectives of the Class G&C Program are aligned with the CSA priorities set out in the departmental plans and specifically in the DRF (CSA, 2018a):

- DRF1. Space research and development advance science and technology;
- DRF2. Canadians engage with space;
- DRF3. Space information and technologies improve the lives of Canadians;
- DRF4. Canada's investments in space benefit the Canadian economy.

The Program contributes to these objectives by supporting the development of science and technology, fostering the continual development of a critical mass of researchers and highly qualified personnel (HQP) in Canada, and supporting information gathering and space-related studies and research (CSA, 2021d). Specifically, the Program provides financial support to (1) organizations to conduct space-related R&D activities in CSA priority areas, in order to sustain and enhance Canada's capacity to use space to meet the country's future needs and priorities (CSA, 2013); (2) organizations developing initiatives to increase the interest and participation of youth and educators in the Canadian space program; and (3) postsecondary students and educators who wish to participate in educational events to increase their knowledge and gain experience in advanced space-related educational disciplines (CSA, 2010).

While the Class G&C Program has its own terms and conditions, it is used to design funding opportunities that are aligned with the objectives of the CSA's three DRF programs, which in turn are aligned with departmental strategic outcomes. Consequently, the majority of employees surveyed said they believed that the Program's objectives were aligned with the CSA's priorities. Key informants stated in interviews that CSA sectors work together to develop AOs that are aligned with departmental priorities, that AO selection criteria are formulated and reviewed to ensure alignment, and that applicants must demonstrate the link between their proposals and the Program's objectives and the CSA's priorities. However, some employees and members of senior management noted that the Program's medium- and long-term strategic planning could be strengthened to ensure that G&C activities are more directly aligned with the CSA's objectives, since G&C planning can be challenging (see the Efficiency section).

The inclusion of GBA Plus in the G&C and the AO writing guide illustrates the CSA's commitment to advancing equity, diversity and inclusion, consistent with the CSA's Policy on Gender-Based Analysis Plus (CSA, 2017a) and the principles of the Dimensions Charter,[12] signed by the CSA's President in 2020.

Alignment with federal government's core responsibilities

The *Canadian Space Agency Act* states that the CSA's mission is "to promote the peaceful use and development of space, to advance the knowledge of space through science and to ensure that space science and technology provide social and economic benefits for Canadians" (s. 4). The Program contributes

[12] The Charter is "foundational to the Dimensions pilot program to foster increased research excellence, innovation and creativity within the post-secondary sector across all disciplines, through greater equity, diversity and inclusion" (GC, 2019).

to the CSA's mission because its objectives and activities are aligned with two major functions assigned to the CSA in its founding legislation. It is the CSA's responsibility to "plan, direct, manage and implement programs and projects relating to scientific or industrial space research and development and the application of space technology" (s. 5(2)(b)). The CSA may also

> "make grants and contributions in support of programs or projects relating to scientific or industrial space research and development and the application of space technology, including projects designed to develop, test, evaluate or apply new or improved processes, products, systems or information relating to space science and technology with a view to determining the commercial potential of that science and technology, but not including any programs or projects relating solely to the commercial exploitation of space science or technology" (s. 5(3)(c)).

Under these provisions, the CSA supports space-related R&D in Canada and is empowered to design and support initiatives for space-related research, study and information gathering (CSA, 2017c). In addition, in keeping with its mandate to advance the knowledge of space through science, the CSA encourages Canadians to participate in awareness and learning activities to enhance Canada's expertise in major space niches and support the development of a critical mass of space researchers and HQP. The Class S&C Program is one way in which the CSA can use the unique appeal of space to encourage students to pursue STEM education and careers and promote space science and technology literacy in Canada (CSA, 2010). The Program thus contributes to ensuring Canada's presence in space, in accordance with the CSA's core responsibility identified in the DRF (CSA, 2018a).

Continued need for the Program

Data collected through the document review, the internal CSA employee survey and the external survey of funding recipients and non-recipients indicates that the Program continues to meet a demonstrable need in Canada. In the surveys, 94% of CSA employees and 97% of recipients and non-recipients said they felt very strongly that there was a continued need in Canada for the CSA's Class G&C Program, as it is a unique framework in the Canadian ecosystem to support space R&D and space S&T awareness and learning. Among external respondents, the rates are 97.7% for the Research component and 94% for the A&L component. Both components of the Program are in high demand and receive numerous funding applications. This observation is consistent with the results of previous evaluations, which stated that the Program "provides the financial support in areas in which other sources of funding do not exist" (PWGSC, 2008) and "is the only federal program entirely dedicated to the development of the space sector" (CSA, 2017c).

Specifically, the data collected in the evaluation showed that the Program primarily addresses the following three interrelated needs.

Advancing space science and technology. The majority of recipients and non-recipients stated that the CSA's Program is a unique framework for supporting space R&D in Canada, and that non-space-specific programs would be hard-pressed to fulfil that role. The Program stimulates the implementation of research projects, knowledge development, and space-related technology advances for the benefit of Canadians. A number of internal and external respondents noted that the CSA's Program played a beneficial role by providing funding in areas where funding is limited (e.g., planetary science research), offered a unique opportunity

to test prototype space platforms, and funded space-related R&D in the early stages of technology development, which may be of limited interest to industry and difficult to justify for organizations that have to focus on short-term needs. Its role in Earth observation was also repeatedly emphasized by respondents.

When external respondents were asked what happened to their project(s) that were not funded by the Research component (113 respondents), 32% reported that their project (or at least one of their projects) did not go ahead. Of the respondents who had at least one non-funded project, only 3% said that their non-funded project was completed as planned, and about 26% responded that their project was completed, but its size and/or timing was affected. Those projects used funding from other federal programs (e.g., DND's Innovation for Defence Excellence and Security (IDEaS) program, the NRC's Industrial Research Assistance Program (IRAP)), NPOs, internal resources, universities, provinces, and/or international funders. In addition, 35% of respondents with at least one non-funded project stated that their project might or might not go forward depending on future funding opportunities[13]. For more information on the Program's complementarity with other federal programs, see the *Efficiency* section.

Building the Canadian space sector's capacity. The CSA's Program is the only program that provides dedicated funding to organizations that play a key role in the Canadian space sector. In so doing, it enhances the innovativeness, competitiveness and vitality of Canadian space companies, which in turn has a positive impact on the Canadian economy. It also plays an important role in the development of space science and technology HQP in Canada, as it funds unique awareness and learning opportunities for Canadians (e.g., training the next generation of Canadian scientists and engineers who will work on crewed space missions). The majority of A&L recipients felt that without the Program, they would not have been able to participate in space-related activities.

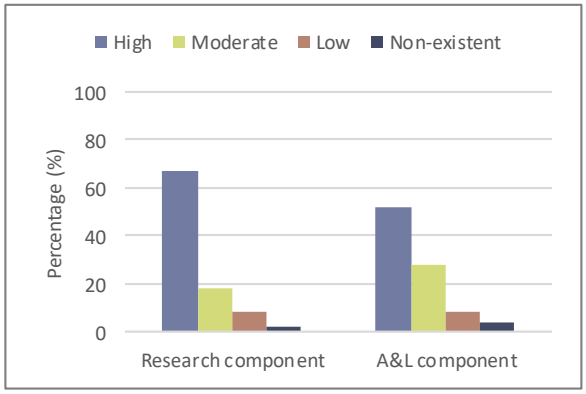
Supporting collaboration and ensuring Canada's presence on the international scene. Consistent with federal priorities and expected outcomes, the Program creates and supports unique opportunities for collaboration at the national and international levels between federal agencies, academia, industry and NPOs. In addition, many external respondents stated that the Program enhanced Canada's reputation in certain important niches (e.g., space robotics) and strengthened Canada's international presence. The data collected indicates that without the Program, academia and industry would have greater difficulty in creating opportunities for space collaboration and education (e.g., access to National Aeronautics and Space Administration and European Space Agency infrastructure) and that space companies would face additional challenges in accessing the international market.

[13] Four percent of respondents indicated they preferred not to answer the question.

Unmet needs and areas for improvement

Although the target groups' satisfaction with the Program is high (92% of recipients and 54% of non-recipients) and the Program meets the majority of needs, it is important to note that there are needs that are not met by the Program in its current form. While the CSA holds regular consultations to identify the target groups' needs, employees indicated that the Program's terms and delivery had changed little since 2009 and that the Program could be made more responsive to current needs, particularly as regards the A&L component. This component is in high demand: the success rate of A&L solicited proposals is only 16% (for more information, see the *Performance* section). The results of the survey of funding recipients and non-recipients reflect this, with 67% of respondents indicating that the Research component was strongly aligned with their needs, compared with 52% for the A&L component. The target groups' satisfaction rate was higher for the Research component (82%) than for the A&L component (52%).

Figure 5 – Alignment between the Program and the needs of the target groups that responded to the survey



Internal key informants indicated that there was room for increased coordination and cooperation between CSA sectors, and between the CSA and external stakeholders, in designing and implementing funding opportunities that would be more responsive to communities' needs, such as a streamlined application process, recurring AOs, and AOs timed to suit the circumstances of the targeted individuals. For more details, see the *Efficiency* section.

In addition, the evaluation identified the continued need to make the space sector more inclusive. Although GBA Plus was incorporated into G&C, funding opportunities were considered accessible and equitable by half of the internal and external respondents. Specifically, employees and funding applicants expressed concern that the Research component was unable to fund researchers outside an institutional context, and that the current processes might inadvertently make it difficult for new players and small businesses to access the Program. For example, it was suggested that funding opportunities reserved for underrepresented groups be established; that applicants' names be withheld from peer review to avoid unconscious bias; that the number of space-related awareness, training and collaboration opportunities be increased, with a greater emphasis on A&L; and that ways of supporting projects differently (e.g., access to facilities and mentoring) be explored.

Lastly, the data collected indicated that it would be beneficial to clarify and better communicate the technology readiness level (TRL) and the type of activities that can be supported by the Program, within the limits of the CSA's mandate, as some internal respondents stated that the CSA could better meet the needs of target groups that receive no funding at a particular TRL, while others stated that the assistance provided by the CSA was already within the limits of its powers under its founding legislation.

6 Performance

Overall, the Program is meeting the 2013 targets with respect to outputs and outcomes. The number of proposals submitted and the success rate varied from year to year, but the number of AOs increased overall. On the other hand, the number of projects receiving funding (new and ongoing projects) increased every year, with projects being funded for more than one year. The majority of recipients were universities, but a growing number of private companies received funding. There were some recurring players, but efforts had been initiated to make funding more accessible. Space-related knowledge, capacity development, and collaboration increased. However, operational and performance data could be better structured if the available tools were harnessed, and some information was missing from the central database. The previous evaluation also identified the need to improve the data entry process to ensure the validity of the data.

Expected outputs delivered

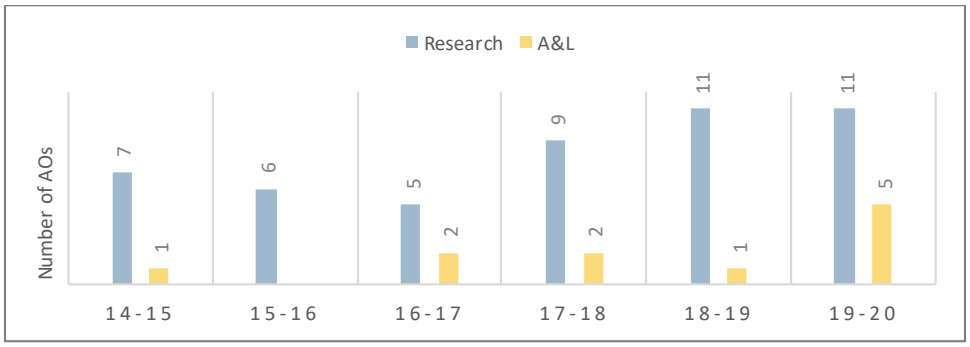
The Program delivers the expected outputs based on the logic model for each component (Appendix 1). However, information and data on outputs (e.g., publication of AOs, production of progress and final reports by funding recipients) were not readily available or complete.

The **funding priority list** is established by each branch and consists of the published AOs. AOs are defined in accordance with DFR program priorities and available budgets, consistent with the CSA's broader mandate and departmental priorities, and generally in consultation with the community and other branches, as noted above. The people interviewed for this evaluation considered this approach to be effective. In addition, the 2020 audit report (CSA, 2020a) found that funding opportunities were appropriately planned. Nevertheless, a number of internal and external respondents stated in their open-ended responses that there was room for improvement in external engagement and consultation with stakeholders and the various scientific and research communities to identify priority themes and be more needs-oriented, and develop AOs accordingly. The previous evaluation suggested that the CSA should standardize the process for developing funding priority lists that apply to all AOs (CSA, 2017c). It was noted that programs were considering new areas of interest and branches were taking steps in their AOs to promote representation of all groups (GBA Plus).

During the evaluation period, there was a gradual increase in the number of AOs published; total AOs were 49 for the Research component and 11 for the A&L component, a significant increase for the Research component from the total of 10 for the previous evaluation period (five years) (CSA, 2017c). Some AOs are recurring, with minor changes from year to year, but with no fixed date, while other AOs are unique. The AO information in Unitas did not always indicate the component or the branch. There are few mandatory fields in the Unitas system. In addition, there is no clear list of unsolicited proposals in the central database:

unlike solicited proposals, unsolicited proposals are not regarded as a process and therefore are not systematically saved in the database.[14]

Figure 6 – Number of AOs by component and year



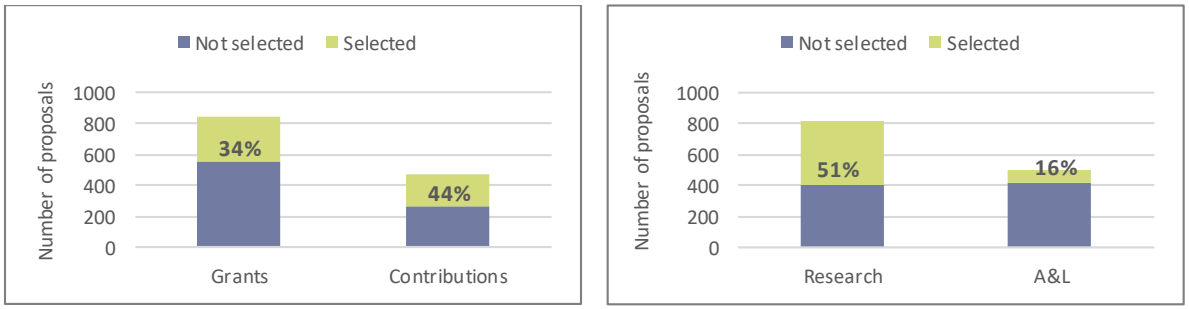
Regarding **communications**, about half of the employees and funding applicants surveyed indicated that there was room for improvement in engaging with potential recipient communities and raising the Program's profile by informing the community more proactively about funding opportunities (expanded communications strategy, targeted distribution lists) and having at least some regular recurring AOs on pre-set dates. In addition, even though the AOs are posted on the CSA website, the information could be more easily accessible (from the home page, searchable information based on filters instead of a keyword search). In fact, the 2019-2020 report on Canadian academic capacity in space research (J.E. Halliwell Associates Inc., 2020) also noted that academic institutions would like more effective communication between the CSA and the academic community. The study found that communications between the CSA and research communities could be better structured and more direct. The report noted that academic institutions would welcome greater interaction with the CSA but would like a point of contact with the Agency and suggested broader engagement across Canada. To that end, the study recommended the establishment of formal liaison roles, regional meetings between the CSA and universities to discuss strategic issues, and the strengthening and expansion of the work of the CSA's scientific advisory committees.

The 1,315 **solicited proposals received were evaluated and ranked** within each branch, based on the applicant's eligibility and the criteria defined for each AO. A ranked list of eligible applications is produced for each AO within the branches (some of this information was entered into Unitas, and this became more systematic during the evaluation period). The number of proposals received varied over the years but showed an upward trend overall for both components. According to the available data, the overall success rate for G&C solicited proposals during the evaluation period, as calculated during the evaluation, was 38% (total of 495 proposals selected). The success rate was higher for contributions (44%) than for grants (34%), reflecting the low proportion of applications accepted in the A&L component (16%), which is in high demand. The success rate varied depending on the type of opportunity and the number of proposals received for each AO. Because the number of AOs varied from year to year and the number of proposals received was different for each AO (depending on the type of AO and/or for various reasons, such as time

[14] Since February 2020, it has been possible to enter unsolicited proposals in Unitas without having to perform a new process for each proposal to be evaluated, but this feature has not been widely promoted because of a lack of time and resources.

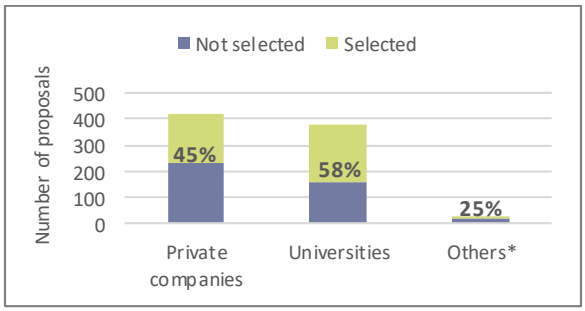
of year or duration of posting), it was difficult to obtain an annual portrait or make a comparison across AOs and even across branches. However, the overall picture over the evaluation period provides a general idea. It is also important to keep in mind that the success rate is based on the data available in Unitas; some non-funded proposals are not listed in the database, and some proposals are not linked to an AO, which results in slightly higher success rates. In addition, the total number of unsolicited proposals received cannot be estimated with the Unitas data because only funded proposals are included (most of them are there, though some are missing).

Figure 7 – Success rate for solicited proposals by funding type and component, 2014-2015 to 2019-2020



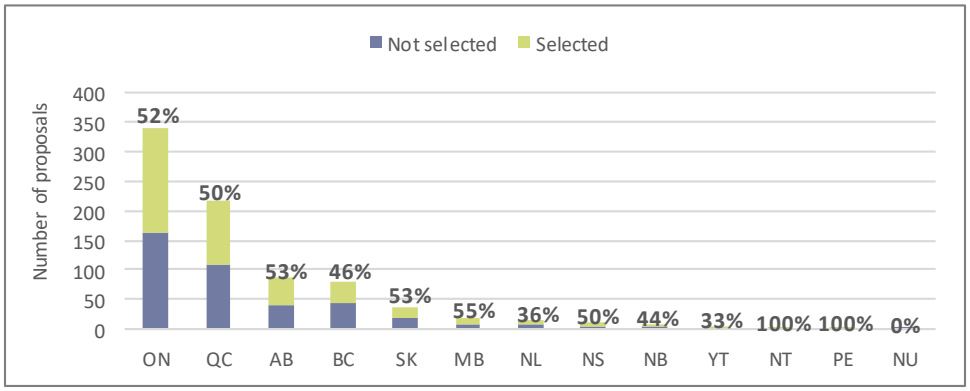
For solicited proposals in the Research component, universities had a higher success rate (58%) than private companies (45%). There was at least one proposal submitted during the evaluation period for each province and territory (see figure below). The success rate was similar across the provinces and territories (of 52% on average) but varied widely (0-100%) for regions with fewer proposals (between 1 and 10 proposals).

Figure 8 – Success rate for solicited Research proposals by applicant category



**Others include schools/colleges/CEGEPs, NPOs, research centres, and medical centres/hospitals.*

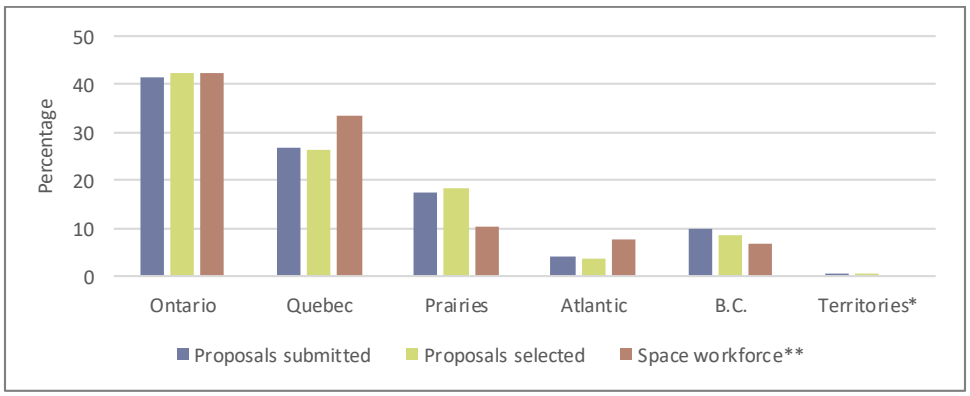
Figure 9 – Success rate for solicited Research proposals by province and territory



Provinces and territories with fewer than 10 proposals submitted: NB 9, YT 3, NT 1, PE 1, NU 1.

The number of proposals submitted and the number of proposals selected by region was representative of the Canadian space sector.

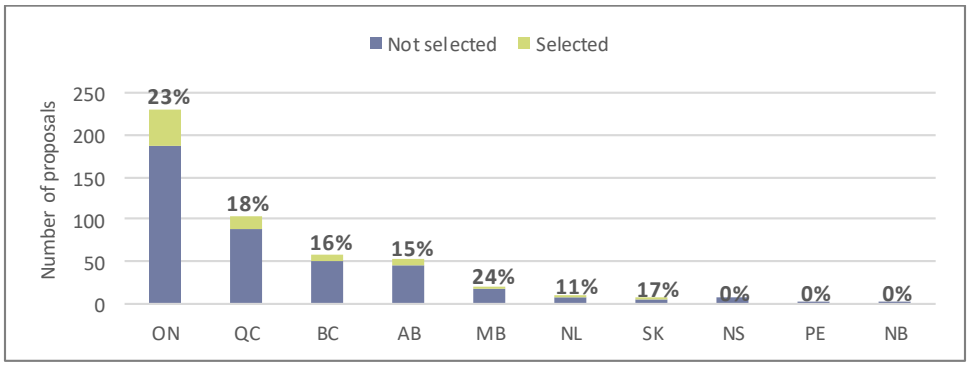
Figure 10 – Distribution of submitted and selected Research proposals (2014-2015 to 2019-2020) relative to the total Canadian space workforce by region



** There is no workforce data for the territories.*
*** Based on data from the State of the Canadian Space Sector Report 2018 (CSA, 2019c).*

For solicited A&L proposals, primarily from university students, Ontario accounted for almost half of the applications, but Manitoba had the highest success rate (24%). There were no proposals from the three territories.

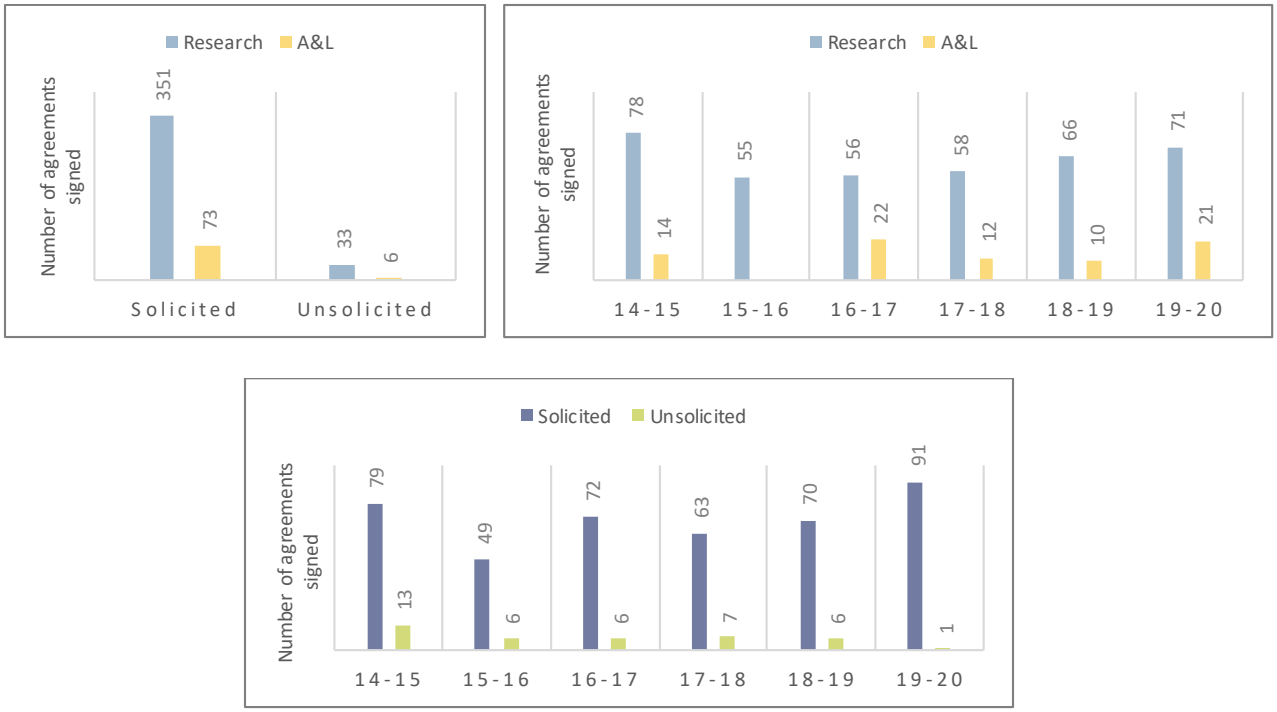
Figure 11 – Success rates for solicited A&L proposals by region, 2014-2015 to 2019-2020



** Provinces and territories with fewer than 10 proposals submitted: SK 7, NS 7, PE 3, NB 3.*

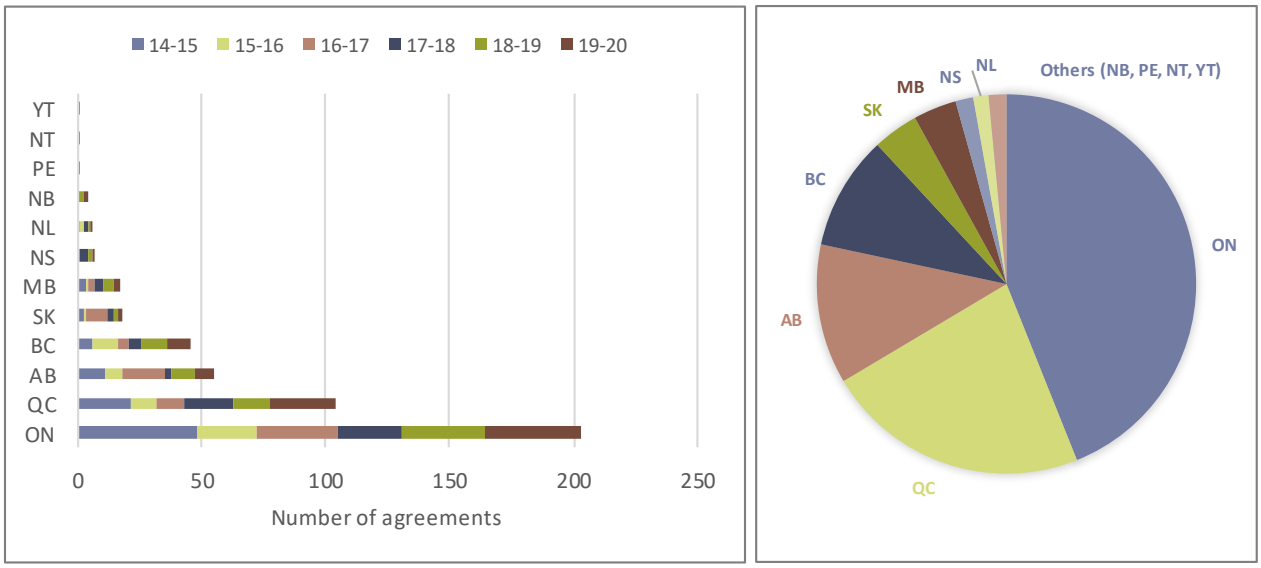
During the evaluation period, there were 463 new **signed agreements**, a significant increase from the 195 agreements for the Research component in the previous evaluation period (five years) (CSA, 2017c). Ontario (44%) and Quebec (23%) were the top recipients year after year (AB 12%, BC 10%, SK 4%, MB 4%), while some regions had only one signed agreement during the period (PE, NT and YT in 2017-2018). The majority of agreements signed during the evaluation period were for solicited proposals (89%) and research proposals (83%). The number of signed agreements based on unsolicited proposals decreased over the period from 13 per year to 1 per year (based on available data).

Figure 12 – Number of new agreements by proposal type, component and year



There was no significant difference in the geographic distribution of agreements between the beginning of the evaluation period and the end, even though the branches were more aware of GBA Plus issues, including regional diversity. The fact that Ontario and Quebec accounted for a large proportion of the proposals submitted and agreements funded in both the Research and A&L components is attributable to the fact that most space-sector companies are based in those two provinces, which also have a large number of postsecondary institutions. According to the State of the Canadian Space Sector Report 2019 (CSA, 2019c), "[t]he majority of STEM employees [in the space sector] can be found in Ontario and Quebec, which accounted for 43% (2,486 FTEs) and 26% (1,510 FTEs) of Canada's STEM workforce, respectively."

Figure 13 – Number of new agreements by region and year



Nearly 61% of the research projects that signed their funding agreements during the evaluation period were carried out by university researchers, compared with about 38% by private companies, which means that more private companies received funding than in the previous evaluation period. Few researchers from other types of organizations applied to the Program or received funding (< 1%; e.g., NPOs, colleges, research centres). For A&L, the CSA supported 73 students, via AOs, who attended conferences under the SCDP's STEDiA initiative[15], and it funded six unsolicited projects from four universities and two NPOs.

According to financial data, the Agency disbursed $117,906,570 in G&C funding during the evaluation period under 488 new agreements and ongoing agreements being funded over more than one year (74%). Of those agreements, 440 were for research projects (98% of the budget) and 48 for A&L projects or activities[16] (2% of the budget). The SCDP disbursed most of the funding (amount and number of agreements), in the form of both grants and contributions.

Figure 14 – Amounts disbursed by year (new and ongoing agreements)

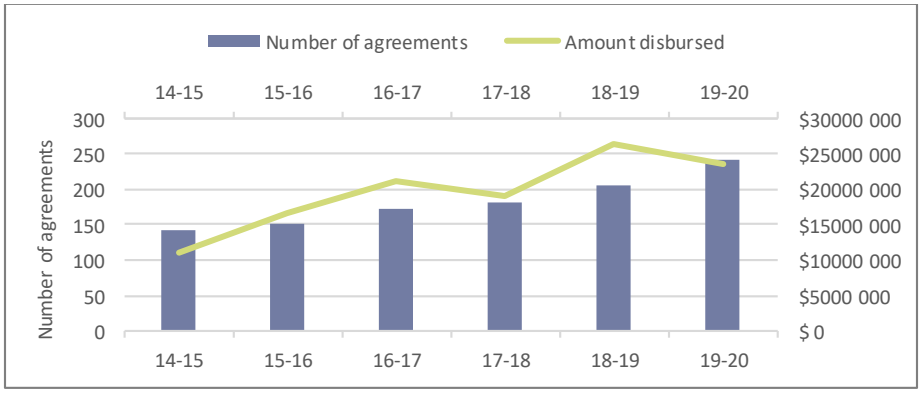
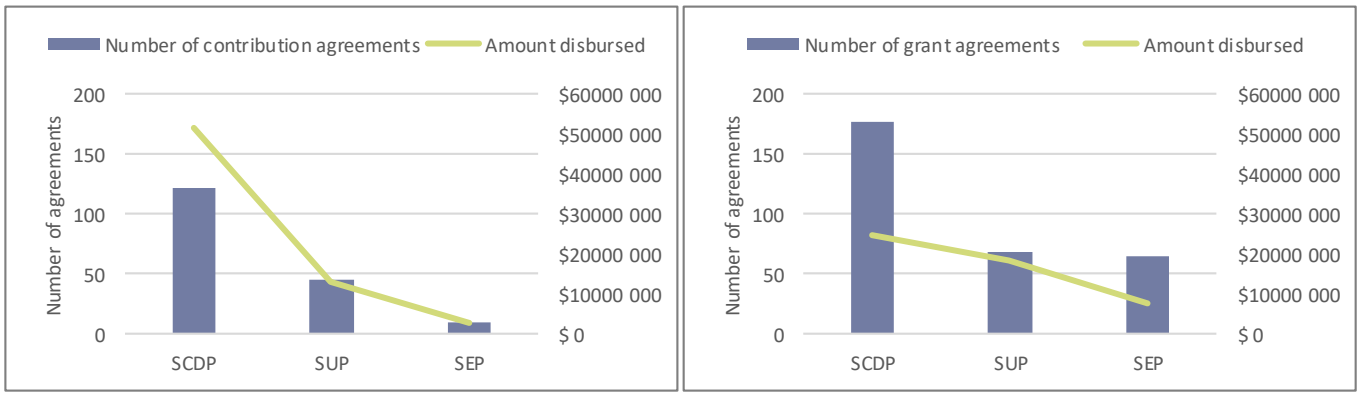


Figure 15 – Amounts disbursed by type of transfer payment and program (new and ongoing agreements)



Regarding **progress and final reports**, almost all recipients submitted their reports annually during the evaluation period (96% on average) via the PIS. The completion rate of the new "Medium Format" report for contributions was somewhat lower (69%) in the first year, as previous reports were submitted in

[15] Science, Technology and Expertise Development in Academia (STEDiA) initiative under the SCDP.
[16] In the SAP financial data, a number of individual A&L grants are grouped under one project.

another format, such as Word or Excel (STD contributions). As these reports are mandatory under the *Policy on Transfer Payments* (TBS, 2008a), recipients who did not use the PIS submitted their reports in another format. Students submit a report in Word or PDF format after their activity. The timeframe for assessing reports is governed by service standards, as reports must be assessed before payments are made to recipients (for contributions). The service standards for payments are four weeks for grants and six weeks for contributions. Under the report assessment process, reports are assessed by the scientific or technical authority and then by the program authority. However, report assessment information does not appear to have been entered correctly or consistently into the central database in all cases, which makes the data unusable for analysis. Assessment of student reports is not done in Unitas at this time. It was noted during the evaluation, however, that the PIS was sometimes perceived as just a performance survey since it is also used for contracts, and the connection with the obligations in G&C agreements under the *Policy on Transfer Payments* (TBS, 2008a) was disregarded.

Expected immediate outcomes achieved

The Program is achieving the immediate outcomes, as the increase in knowledge, activities and focus on space and the access to partnership and collaboration are clear in the data. However, some indicators (e.g., the proportion of leveraged funds) are not measured directly in the PIS, which makes it difficult to analyze the data. The information collected in reports from students and organizations offering learning activities was useful for analysis. However, the questions asked in those reports are not standardized and are mostly open-ended.

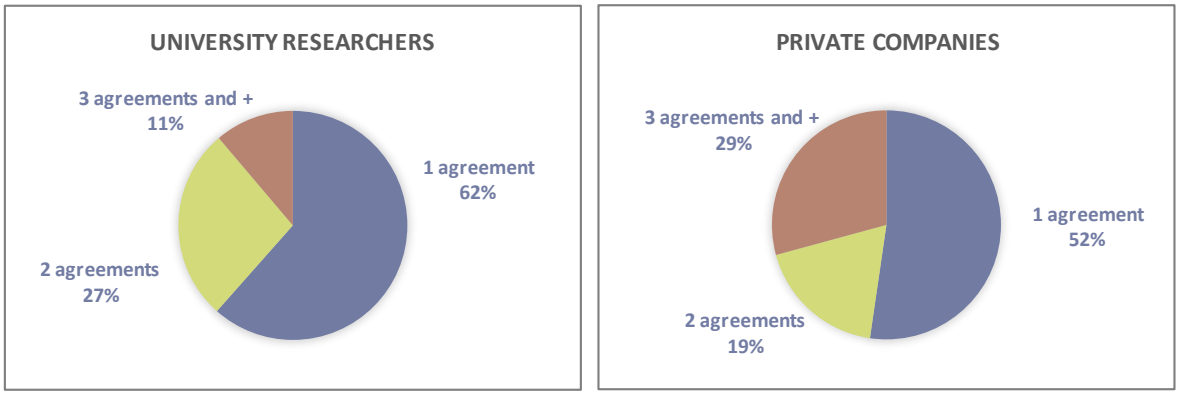
There was an **increase in knowledge** through research projects conducted in the space S&T priority areas: there was a 48% rise in the number of new and ongoing projects and a 121% rise in the number of projects reporting an increase in knowledge. The most frequently reported achievements were technology or scientific breakthrough (65%; 95% for STD contributions) and the use of satellite data (65%). For the A&L component, 89% (16/18) of the external survey respondents indicated that attending conferences or learning events increased their awareness and knowledge of space-related science, technology or issues. Analysis of a sample of 42 STEDiA reports (42/75; 21 women, 21 men) indicates a high level of satisfaction among funded students. In addition, recipient organizations that conducted learning activities stated in interviews that they strongly believed that those activities foster knowledge development and increased awareness among participants (both K-12 and postsecondary students), based on the information they gathered through their surveys and informal feedback.

There was **increased emphasis on space** in universities, private companies and NPOs due to the signing of new agreements and the advent of new players. During the evaluation period, a total of 146 new research G&C agreements (for both solicited and unsolicited proposals) were signed with 65 different private companies, 233 new agreements with 37 different universities, and 5 new agreements with 2 NPOs, 2 colleges/schools/CEGEPs, and 1 medical centre/hospital. For reference, the *State of the Canadian Space Sector Report* (CSA, 2019c) indicates that in 2018, 74 space companies were engaged in R&D activities. With regard to learning opportunities, the availability and use of the space theme increased as 11 AOs provided

opportunities for students to attend conferences or learning events and three new A&L projects[17] were carried out by third-party organizations for younger students (K-12 (Grade 12 is equivalent to Secondary V in Quebec)) and postsecondary students. However, a few external and internal interviewees indicated that the CSA could do more to promote the focus on space by supporting college students, helping postsecondary students to attend a wider variety of events, increasing support to NPOs for the delivery of A&L activities for youth, and fine-tuning the coordination of activities between the CSA (e.g., Junior Astronauts campaign) and other STEM stakeholders.

New recipients entered the space research field. Interviewees noted that because of its specific focus on space, the Program served a relatively small community of potential recipients. Internal respondents and interviewees expressed concern that the main recipients were established organizations already familiar with the CSA's G&C processes. However, even though the space sector is a small community and some organizations are well-established, more than half of private companies (34/65) and the university researchers[18] (88/143 individuals) identified as principal investigators under signed agreements with recipients (universities) signed only one agreement during the evaluation period. In addition, 15% of the organizations that signed an agreement during the period were receiving funding for the first time. However, a **number of recipients were repeat players** (two or more agreements during the period: university 38%, private sector 48%).

Figure 16 – Proportion of Research component recipients with one, two, or three or more signed agreements, 2014-2015 to 2019-2020



Only two student recipients were funded more than once (2/71; 73 grants). In addition, 56% of the projects on average each year reported bringing **new actors into the field of space research**. In 2018-2019 and 2019-2020, research teams had nearly 2,000 members who were new to space work (an average of 6.2 new members per team in the two years).

Partnerships were formed or maintained, organizations had **access to international collaboration**, and **funding was leveraged**. Most research projects (87%) were collaborative in nature, involving the maintenance or formation of new partnerships (79% for STD contributions). There was a 101% increase in

[17] Canada-Norway Student Sounding Rocket (CaNoRock), the Living Space program and the Canadian Satellite Design Challenge (CSDC).
[18] Since all universities had been added to Unitas by 2012, 73% of universities signed more than one agreement during the evaluation period, and because a university may have multiple researchers, the analysis for university institutions was based on principal investigators.

the number of organizations (Canadian and foreign) involved in funded projects (recipients and partners directly involved in the projects) during the period. In general, partnerships with universities (Canadian and foreign) were the most common, followed by partnerships with the private sector, federal entities and foreign research centres.

- About 50 different Canadian universities, 160 different foreign universities in 28 countries, 60 different Canadian private companies and 24 different federal organizations (other than the CSA) were involved in direct partnerships.

- About 150 foreign universities, 70 foreign research centres, 51 private companies and 40 foreign companies were involved in other partnerships (not directly related to the research team).[19]

In addition, reports from students who received funding from the CSA to attend a conference showed that they were particularly enthusiastic about the networking that takes place at space agency conferences and events. A few students noted that there could be greater opportunities for CSA-supported participants to network with each other at conferences and events in order to expand connections among those Canadian students and opportunities for future collaboration.

The number of projects reporting leveraged funding (CSA funding leveraged other funding), including international funding, increased over time, but the proportion declined (from 67% to 42%). A total of 48% of the projects indicated that they had obtained leveraged funding. However, the configuration of the PIS made it impossible to determine the amount of funding obtained. Assistance stacking[20] is part of the financial audit requirements for contributions, and that information is provided via a Word form. However, because stacking information is not aggregated or compiled, it was not accessed for the evaluation. Moreover, the proportion of leveraged funds, despite being included in the departmental plan indicators for 2017-2018, 2018-2019 and 2019-2020 (CSA, 2017d; 2018c; 2019e), is not included in the results reports for those years (CSA, 2018b; 2019d; 2020b). This points directly to the need to develop electronic surveys, reports and forms with good programming logic to avoid errors and ambiguities, and the need to save data directly into a common database for easy access, analysis and reporting.

Expected intermediate outcomes achieved

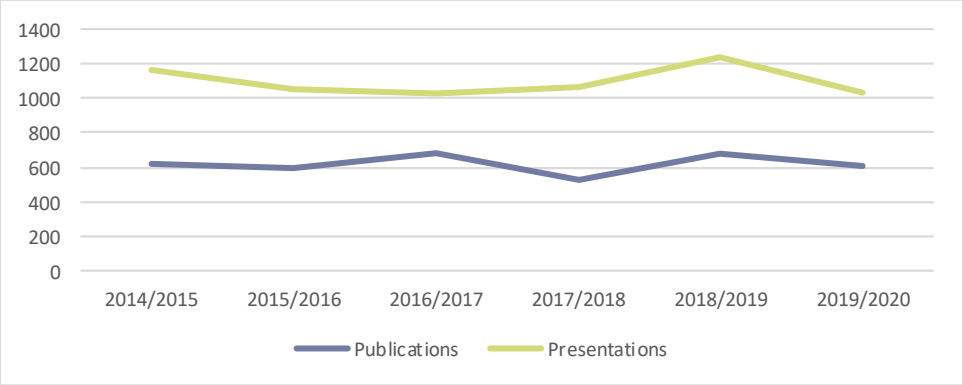
Intermediate outcomes flow directly from the immediate outcomes described above. The availability of space-related knowledge and information in priority areas increased; space S&T capacity in targeted sectors increased; and there was more collaboration, both multidisciplinary and between institutions.

Over the evaluation period, the **increased dissemination of information and knowledge** was maintained (slight fluctuation over six years). An average of 615 publications and 1,097 presentations per year were generated by research projects, according to PIS data.[21] Articles were the main form of publication: 79% of

[19] The PIS distinguishes between partnerships and other partnerships.
[20] Assistance stacking: Total funding received for the project (amount of funding / source of funding).
[21] The question about presentations was removed from the PIS in 2020-2021 because it did not provide a useful level of granularity or worthwhile information. In addition, the question on publications will soon be replaced with a bibliometric study; this will provide useful information over seven years and avoid double counting of publications.

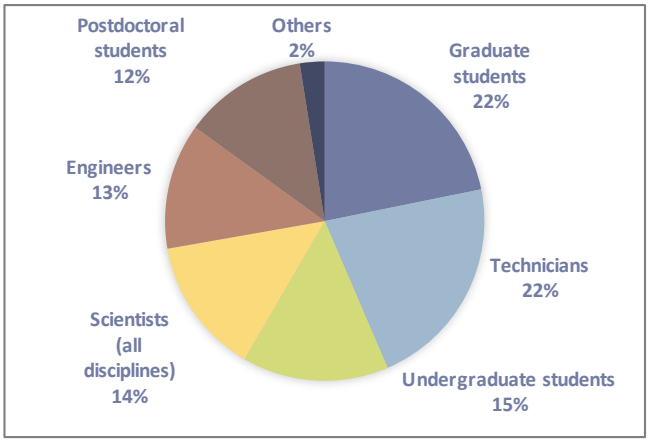
reports completed by funding recipients indicated peer-reviewed articles acknowledging CSA funding, and 41% of reports indicated peer-reviewed articles made possible by CSA funding (31% of STD contribution projects). In addition, 86% of PIS reports and the final reports for 44% of STD contribution projects indicated that presentations had taken place. The data, however, do not speak to the "reach" of the dissemination effort.

Figure 17 – Number of publications and presentations reported annually (PIS)



HQP development increased. PIS data shows an increase in the number of HQP[22] over time, with a spike in 2019-2020, though that was probably due to the introduction of the Medium Format PIS for contributions. Excluding the last year of the evaluation period, an average of 421 HQP were involved in research projects each year. The project teams were composed mainly of technicians (22%) and graduate students (master's and doctorate; 22%), for an annual average of 14.5 members per project team (all categories). There was an increase in participation by all major groups during the evaluation period. Those values are primarily attributable to universities, which accounted for 90.1% of the PIS data (private companies 7.8%, NPOs 1.7%, and others less than 1%) over the six-year evaluation period. In addition, the training and development of HQP was one of the things that both external and internal respondents liked most about the Program. In addition, the results of the PIS final reports (grants) confirmed the strengthening of student capabilities through research projects: almost all projects involving students reported opportunities for the student participants to acquire science skills and general research skills (teamwork, confidence, flexibility, communication, ethical conduct, etc.).

*Figure 18 – Portrait of the composition of research project teams (PIS)**



** The Other category includes management, administration, college or CEGEP students, and health professionals.*

[22] The CSA's definition of HQP was modified in the *State of the Canadian Space Sector Report 2019* (CSA, 2019c) to better align with Statistics Canada's definition (HQP: employees with at least a bachelor's degree). The PIS has data for all project team members, including management and administration, but does not specify which ones have at least a bachelor's degree. For the purposes of this evaluation, HQP includes graduate students, postdoctoral students, engineers, scientists (all disciplines), health specialists and management.

Of the funded postsecondary students who participated in the external survey, some (39%) stated that they were now graduates of space-related programs (mostly bachelor's degree programs). The 2019-2020 report on Canadian academic capacity in space research (J.E. Halliwell Associates Inc., 2020) identified nearly 1,800 university students and researchers working in space-related fields, roughly double the number in the 2013-2014 inventory. Much of that increase was in new fields and emerging research interests and opportunities. The report concluded that there were many more non-traditional space-related fields and more multidisciplinary space-related fields in the 2019-2020 inventory. This information provides some context concerning the growth of space-related research fields but does not indicate whether the CSA's G&C funding can be considered to have contributed to that trend. Since the amount of funding for A&L activities was modest, A&L could not have not contributed substantially to an increase in HQP. Moreover, the number of students trained in research projects probably exceeds the number in the A&L component and, as one internal respondent noted, these two groups may actually overlap (e.g., students supported by AOs under the STEDiA initiative also being involved in research projects).

With regard to gender composition, in 2018-2019 and 2019-2020, about 30% of grant-funded project team members were women, with a few individuals identified as gender-fluid, non-binary and/or two-spirited.[23] This is comparable to the composition of the space workforce.

- According to the *State of the Canadian Space Sector Report* (CSA, 2019c), in 2018, Canadian space companies hired 741 employees, 26% (196) of whom were women and 74% (545) were men.

- According to Statistics Canada (2019), 30% of STEM graduates were women.

However, the figure was lower for contribution-funded projects (18% (n=42) in PIS reports in 2019-2020; 14% (n=73) for STD contributions over the period).

Multidisciplinary collaboration increased between 2014-2015 and 2019-2020. In total, 51% of PIS reports indicated multidisciplinary research, while 35% of STD contribution projects indicated involvement with partner organizations and team members from multiple disciplines. Collaboration between institutions (partnerships) also increased (see the subsection on expected immediate outcomes achieved). In fact, access to networking, partnerships and collaboration was one of the things that both external and internal respondents liked most about the Program.

For students and youth, **interest in space-related disciplines was supported**. STEDiA-funded students surveyed indicated that their participation heightened their interest in space research or space-related fields (83% of respondents) and encouraged or enabled them to participate in additional space-related activities or training to a large extent (61%). Although based on a small sample (23%, 18 student recipients/80 students (recipients and non-recipients) surveyed), these observations are also supported in the sample of post-conference reports analyzed (56%, 42/75). Although there is no reference list of fields

[23] The gender question was added to the PIS in 2018-2019. However, the data was provided by the principal investigator and was therefore not self-reported.

of study targeted by the CSA, the activities carried out under the STEDiA initiative tend to encourage students from a wide range of disciplines to pursue a career in space.

In addition, although not systematically reported, the A&L-funded organizations interviewed found, through a survey of past participants,[24] that their activity programming had helped heighten participants' interest in space and encouraged them to take part in other space-related activities as some of their participants had gone on to higher education and careers in the space field.

Lastly, the elementary, secondary and postsecondary student **target audience was reached** through S&T learning activities and materials.

- Eighty university students[25] were selected through the STEDiA initiative to attend conferences.
- Some 70,000 elementary school students and nearly 49,000 secondary school students completed the Let's Talk Science Living Space program, some of them being students from schools in underrepresented communities, including Indigenous jurisdictions, and remote communities (e.g., in northern Canada (Northwest Territories and Yukon)).
- The Canada-Norway Student Sounding Rocket (CaNoRock) – a partnership between the University of Alberta, the University of Calgary, the University of Saskatchewan, the Royal Military College, the University of Oslo and the Andøya Space Centre in Norway – provided 60 Canadian students with the opportunity to participate in weeks of training in Norway.
- The Canadian Satellite Design Challenge Management Society's eponymous challenge (CSDC) reached as many as 800 university students through four organized challenges.

The CaNoRock program spawned additional developments in educational activities at participating universities, including programming at the graduate level to create a pathway for students to continue their studies in a space-related discipline.

Expected final outcomes achieved

There is no indicator associated with the Research component's final outcome[26] in the PMS (CSA, 2013), but the PMS indicates that all intermediate outcomes should contribute to the long-term outcome. Canada should therefore have the capacity to conduct space R&D and have sufficiently advanced space knowledge and information to meet national needs and priorities (CSA, 2013). The PIS Final Report completed only by grant recipients collects data on the final impacts of funded projects.

[24] Canadian Satellite Design Challenge Management Society Inc., April 2021. Where are they now? Following the careers of former participants in the Canadian Satellite Design Challenge (CSDC).

[25] During the evaluation period, 80 students were selected, but 73 grants were awarded to 71 students.

[26] The final outcome of the Research component is "Canadian space-related research and development responds to national needs and priorities."

In addition, it is very difficult to measure the A&L component's final outcome indicators[27] with the available data because the two indicators defined in the PMS (CSA, 2010) – "[number] and proportion of recipients that report […] subsequent selection for internship [or] employment in space-related disciplines [or] subsequent provision of services in space-related disciplines" and "level of awareness of targeted audience reported by recipients" – are not part of the information collected in the reports from recipient students or organizations. However, the external survey and interviews administered as part of the evaluation did provide some data. Nevertheless, fostering continued development in space-related disciplines should help ensure a critical mass of HQP in areas relevant to CSA priorities, and that critical mass of HQP should be available for future internships, jobs or service delivery in space-related disciplines (CSA, 2010).

Therefore, based on the intermediate outcomes, some of the PIS Final Report data, external survey and interview data, and the Program's relevance discussed above, the evaluation concludes that the following elements contribute to meeting national space-related needs and priorities, sustaining and strengthening the capacity to conduct space R&D and operations, and increasing S&T awareness:

- The Program addresses the needs of recipients in the field of space R&D in Canada and is aligned with federal priorities.
- Completed projects will continue to generate publications and presentations.[28]
- The majority of projects involved a significant number of university students, who made up 56% of the research teams and contributed to the development of their expertise and skills.
- Partnerships formed after project completion will persist.
- Funded university students sought (44%) or obtained (22%) employment in a space-related field, and some CaNoRock and CSDC participants pursued graduate studies and careers in the space field.
- After attending a conference, most funded university students (89%) had an increased level of awareness and knowledge of S&T and space science.
- The activities carried out by A&L-funded organizations raised awareness among youth and postsecondary students on various space-related topics and career options in the space field.

It is important to keep in mind that the G&C Program's final outcomes contribute to the achievement of the CSA's strategic outcomes and ultimately to its core responsibility (see the *Relevance* section).

However, a few internal and external interviewees noted that there were concerns about the continuity of funding. The previous evaluation noted that, according to key informants and recipients, the lack of continuity of funding in areas targeted by previous AOs had reduced the ability of some R&D projects to

[27] The final outcomes of the A&L component are "Increased/sustained capacity to conduct or support space-related research and/or operations" and "Increased awareness of science and technology among target audience."

[28] The question "Will this project continue to generate publications and presentations after completion?" was dropped from the PIS in 2018-2019. However, a study of the potential of bibliometrics for measuring publications (during and after the agreement) is underway at the CSA.

reach a higher TRL and exploit their knowledge acquisition potential. In addition, one interviewee noted that to create a continuum between youth interest in STEM, postsecondary education in a space-relevant discipline, and space-related employment, it is necessary to maintain A&L activities over time. A number of internal and external survey respondents pointed out the A&L component's importance in the space ecosystem.

Lastly, little information is available on the impacts of CSA funding on the various GBA Plus groups. Only 9% of external survey respondents could confirm that the funding they received benefited various groups in some way.

7 Efficiency

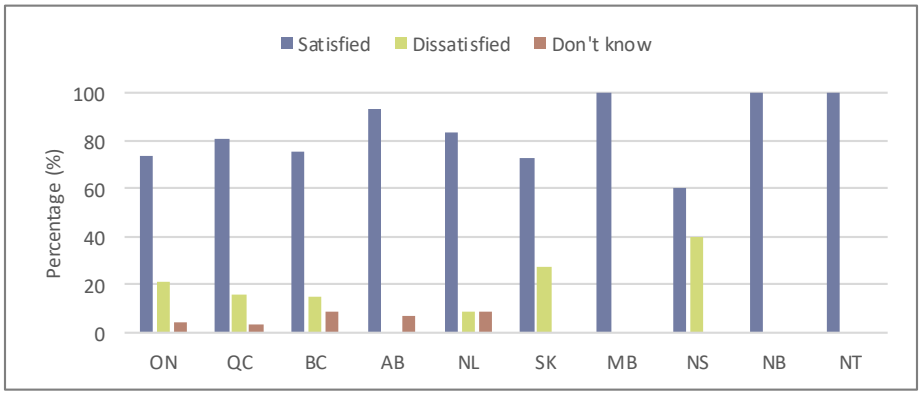
Many of the processes and procedures are well-established and working smoothly. However, there are some areas that need improvement to make the Program even more efficient and to increase synergies. Although improvements have been made in the Program over the past six years, some of the observations in this evaluation are similar to those made in the previous evaluation.

Administration, management and planning of the Program

The administration and management of each AO and agreement fall within the purview of the branches responsible for the activities, not the Program. One of the things that both internal and external respondents liked most was the Program's flexibility regarding project types or themes, and during projects.

Most external respondents were satisfied or very satisfied (78%) with the Program and appreciated the increase in funding opportunities. From a regional perspective, the level of satisfaction was similar in all provinces/territories.

Figure 19 – Overall satisfaction with the Program by region



In particular, recipients were highly satisfied with the **Program's administration**: issuance of payments; amendments and follow-ups were done properly and in a timely manner (83% to 89%); the support provided for the implementation of the agreement or during the agreement was adequate (85%); and the reporting requirements were very or extremely reasonable (72%; higher for contributions (80%) than for grants (69%)). This is probably due, in part, to the posting of service standards on the CSA website, which helps manage timeliness expectations. Following the 2020 audit report (CSA, 2020a), an annual reminder has been sent to the branches regarding the importance of capturing information in the Unitas system to meet obligations under various policies (e.g., *Policy on Transfer Payments* (TBS, 2008a), *Policy on Service and Digital* (TBS, 2020), TBS's *Management Accountability Framework*). All service standards were met in 2019-2020. However, although there is an automated report that extracts service standard results from the Unitas database, previously published results cannot be replicated because missing data was manually

added to the extraction files and other data was corrected, while missing data or data that was erroneous at the source (in the central database) was not added or corrected.

According to external respondents, the reporting requirements were similar to or better than (63%) those of other programs (federal, provincial or non-governmental organization programs), indicating that the online reporting platform (PIS) was convenient and the Agency provided flexibility and requested reasonable information. That being said, some respondents mentioned that the reports asked for more detailed information than those of other programs. The reporting process was described as straightforward by the majority of external respondents and was one of the things they liked most about the Program.

CSA employees were somewhat less satisfied with the Program (61% satisfied or very satisfied) overall than people outside the Agency. Employees were less satisfied with the **Program's administration**: only 13% of internal respondents agreed that operational processes were optimal; 44% indicated that there was insufficient capacity (number of staff, budget and expertise) in their area to do the job; and 48% said that their team had the necessary tools and technical resources. With respect to operational processes, a common concern raised by employees surveyed and interviewed was the complexity of the processes and the **cumbersome governance**. The previous evaluation also identified the problem of cumbersome internal processes. A few internal interviewees specifically suggested that agreement approval should be delegated to a lower level and that the possibility of taking a risk-based approach should be explored. To streamline governance, a new charter for delegating agreement approval to a lower organizational level was approved during the evaluation and has been in effect since October 2021. Internal respondents also suggested more standardization and coordination between different branches to streamline internal processes, as working in silos was one of the things they liked least about the Program. Under the *Policy on Service and Digital* (TBS, 2020), Class G&C Program processes may be reviewed in the near future. That review will highlight discrepancies between current processes and the theoretical processes documented in the G&C Toolbox developed by the CEGC and identify specific things to be improved in order to harmonize and streamline common processes while reviewing the RACI grid.[29]

With regard to capacity across the Agency, employees noted limited G&C expertise, staff turnover/shortages, and a bottleneck in the CEGC (the CEGC receives more requests than it can handle). CSA employees also linked these resource issues to the cumbersome nature of G&C processes (consultation processes, documents to be completed, etc.), regardless of agreement scope, and to the growth of G&C. Both the amount of G&C funding and the number of agreements signed have more than doubled while there are also new AO formats, such as challenges, which require more time to develop. Regarding technical tools and resources, several elements are already in place, such as the G&C Toolbox on Livelink and the Unitas system, but as mentioned in the Performance section and suggested by internal respondents, some elements need to be improved: a central database, electronic forms, and enhancements to Unitas and the PIS. One key informant raised the possibility of G&C training to ensure that employees fully understand the Program's framework and rules.

[29] RACI: **R**esponsible, **A**ccountable, **C**onsulted, **I**nformed.

On a related note, G&C growth may present a higher risk to the Agency. Although that risk is not documented in the *Corporate Risk Profile 2021-2022* (CSA, 2021b), it is noted in the *2021-22 Business Plan* that the **G&C risk** framework will be reviewed (CSA, 2021c). In 2010, the CEGC developed a guide and form for the assessment of recipient risk[30] based on the type of transfer payment and the level of monitoring required, as required by the *Directive on Transfer Payments* (TBS, 2008b). AO risks are also assessed using the same tools as potential recipient risks. Since the risk assessment is done on a project-by-project basis, a recipient may have multiple risk levels (different type of project, complexity of activities, financial value, etc.). Information about risk levels is not collected centrally in the CSA. In addition, as a result of the 2020 audit report (CSA, 2020a), the CEGC developed a recipient monitoring and verification plan as required by the *Directive on Transfer Payments* (TBS, 2008b) and audited two contribution recipients in 2020-2021.

Using the Class G&C Program as the primary instrument for delivering G&C and allowing each branch to design and manage AOs that reflect its priorities, the CSA's priorities and the needs of their respective communities are unique to the Agency. Other departments and agencies that have a class G&C program use it to complement other, more specific G&C programs. While this is seen as a good approach, some internal respondents acknowledged that the Agency tended to work in silos, but stated that there were opportunities for coordination and standardization across the Agency. The **G&C Steering Committee** acts in an advisory capacity and provides a forum for information-sharing and a degree of coordination (the work of the CEGC and the Committee has led to some standardization of processes), but according to some respondents, the Committee does not have a clear mandate, does not really provide strategic direction, and does not have a relevant level of membership. One internal interviewee felt that the Committee could be used for higher-level discussions concerning ongoing developments and provide an opportunity for greater coordination in planning. New terms of reference for the G&C Steering Committee were approved in December 2021, and it became an Advisory Committee.

The Program's medium- and long-term **planning** is limited, and that is a challenge for the CSA and some other departments and agencies interviewed. Nearly half (43%) of internal survey respondents were unable to say whether the Program's medium- or long-term planning was effective; only 9% were fully convinced that it was. Internal interviewees explained that there was very little medium- or long-term planning within the Program; planning was primarily done in each branch, and sometimes even for each specific initiative rather than for a whole branch, although the annual strategic retreat was used to set priorities across the branches. In addition, not all branches are able to engage in long-term planning because they are influenced by external factors, such as the CSA's external partners (other government departments and space agencies). While there is a G&C Steering Committee (Advisory Committee since December 2021), employees interviewed indicated that there was no overview of all AOs being developed and launched (e.g., no global dashboard, no roadmap). In fact, the lack of a common vision and long-term planning was one of the things employees surveyed said they liked least about the Program.

Planning was discussed in interviews with other departments and agencies, and most stated that it was a challenge in general. While some departments and agencies do some strategic planning for G&Cs, in many

[30] At CSA, the term "recipient risk" is used to distinguish between G&C-funded projects and investment projects (contracts), but other departments use the term "project risk."

cases, long-term planning is only done by the specific branch or program. Nonetheless, employees interviewed and surveyed suggested greater coordination and planning across branches (opportunities to design cross-sector AOs to avoid duplication of effort and confusion of applicants, such as the AO on data analysis), with a timeline for certain recurring funding opportunities and five-year approval for example; they also recommended strengthening G&C planning and management capability to focus on integrated branch-level planning. Some suggested the development of a holistic approach to all G&C.

Best practices of other departments and agencies in administration, management and planning:

- *Adoption of public service standards for acknowledging receipt and evaluating proposals;*
- *Effective risk-based governance approaches or thresholds for approvals and proportionate oversight;*
- *Establishment of a G&C community of practice, working groups (e.g., finance, risk, and user experience) and/or a G&C funding coordination group.*

According to the Program's Terms and Conditions, governance is managed by the G&C Steering Committee; harmonization and standardization are the responsibility of the CEGC; and the branches are responsible for the Program's delivery (the branches manage the AOs and agreements). However, the Terms and Conditions also state that "[a]t the implementation level, **working groups** will be established to work on a thematic basis across CSA to identify the activities needed to deliver outputs and attain the specified outcomes" (CSA, 2009). These groups' key roles and responsibilities are to identify opportunities for service improvement; streamline, standardize, and harmonize application processes; introduce risk management practices; and improve stakeholder involvement (CSA, 2009). A few interviewees suggested the possibility of creating a unit in charge of coordinating G&C operations, with due regard for the fact that the branches know the needs and understand the potential recipients. A few internal respondents also suggested that establishing a community of practice might help advance collaboration across the Agency. In general, respondents were looking for an opportunity for the different branches to share more information and gain insight into G&C activities across the CSA.

G&C Centre of Expertise

Relocation of the CEGC to Corporate Services was a positive step, according to internal respondents; some agreed that the change was beneficial (35%, very or extremely), while others had no opinion on the subject (37%). Most respondents also felt that removing the CEGC from SST made sense from a neutrality perspective. The CEGC's contribution was one of the things respondents liked about the Program. Responses to the internal survey pointed to a lack of resources at the CEGC: 32% of employees selected "moderately" when asked if the CEGC had sufficient resources to provide timely service. The number of full-time equivalents (FTEs) continued to decline at the beginning of the evaluation period compared with the previous evaluation period; it then rebounded starting in 2017-2018, reaching in 2019-2020 a level equivalent to the 2012-2013 level, while the number of AOs and agreements and the available G&C funding increased significantly. However, there is no information on how commensurate the level of resources allocated to the CEGC is with its roles and responsibilities. However, having a small staff leaves little room for innovation, program improvement, seizing opportunities for collaboration, and strategic thinking.

Figure 20 – Relocation of the CEGC to Finance was beneficial

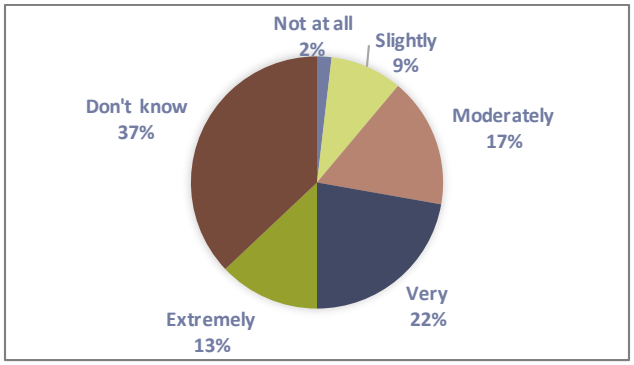
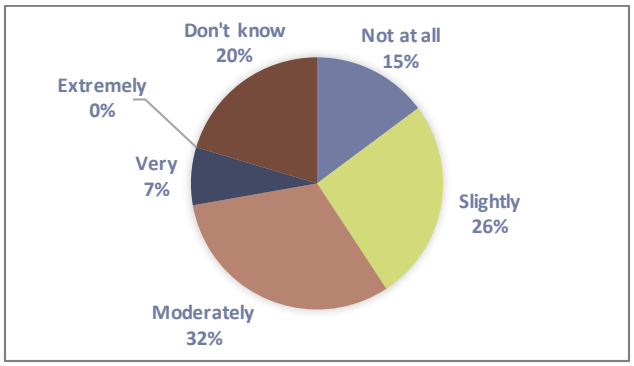


Figure 21 – CEGC resources are sufficient to provide timely service



For every dollar spent on funded projects and activities, it cost two cents to operate the CEGC,[31] which was less than in the previous evaluation period (seven cents from 2010-11 to 2014-15), despite an increase in resources and FTEs during the evaluation period as the funding budget for agreements increased further. This decrease in the disbursement ratio raises questions about the appropriate level of resources for the CEGC in relation to its roles and responsibilities.

Table 6 – CEGC spending and amount disbursed to funded projects

	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
CEGC expenditures	$383,317	$409,901	$387,811	$446,489	$479,750	$619,662
G&C agreement expenditures	$11,053,340	$16,765,113	$21,016,771	$19,181,537	$26,399,276	$23,490,533
Ratio	0.03	0.02	0.02	0.02	0.02	0.03

[31] As noted in the *Overview* section, operating budget data is available only for the CEGC, as the branches do not report this financial information separately for the Class G&C Program within their respective programs.

> ***G&C centres of expertise in other departments and agencies:***
> - *Assistance in drafting G&C agreements and implementing projects;*
> - *Support in interpretation, policy, negotiations, design compliance (Treasury Board submissions, model agreements, including general standards clauses) and governance;*
> - *Development of standardized materials;*
> - *Management of the class G&C program used primarily to fund unsolicited proposals that do not fit into regular G&C programs;*
> - *Assistance in evaluating and reviewing program terms and conditions and modernizing the G&C infrastructure;*
> - *Contribution to reporting and program evaluation;*
> - *The engine behind the community of practice.*

Even though most employees surveyed (67%) considered the CEGC to be very or extremely valuable, most of them (59%) were unsure of exactly what the CEGC's function was: (1) act as a service and support to the branches (e.g., support AO design and agreement development; develop templates; standardize processes); (2) provide expert advice (e.g., provide general guidance; provide expertise to address specific cases); or (3) play an oversight role to ensure compliance (e.g., compliance with TBS standards). Some senior management and branch interviewees felt that the CEGC's focus on compliance was not an effective use of resources and added to the governance structure already in place. Senior management respondents said they would like to see the CEGC play a more strategic (or long-term) planning role in thinking about the use of G&Cs (e.g., reviewing the Program's Terms and Conditions). Branch respondents viewed the CEGC as a service and wanted it to provide advice and more support for implementing AOs and developing agreements. The previous evaluation identified the need to review and better communicate the obligations, roles and responsibilities of the CEGC and the branches' G&C managers and to ensure that the level of resources allocated to the CEGC is commensurate with its roles and responsibilities.

Use of funds

The **use of Program funds is appropriate**. The actual percentages of funding spent grants (43%) and contributions (57%) were close to the forecasts (39% and 61% respectively). There was a 7% variance for all branches combined[32] (SST 9%, SU 1%, SE 8%) between planned and actual funding over six years (between 3% and 22% underspending in four of the six years; 3% overspending in two of the six years). The most frequently cited constraints included uncertainty about available funding, a lack of predictable AOs, and a lack of coordination between the branches and stakeholders. However, most employees surveyed (61%) said they could not tell if the proportion of funds disbursed through contributions versus grants was appropriate because the decision on the type of transfer payment (grant or contribution) was directly related to the results of the risk assessment for the AO or unsolicited proposal.

[32] The Communications Branch's funding variance (-161%) is not included in the figure for all branches combined because the Communications Branch, under the SCDP, had budgeted $250,000 in 2018-2019 alone but disbursed $651,000 in four of the six years of the evaluation period.

Figure 22 – Overview of planned and actual funding

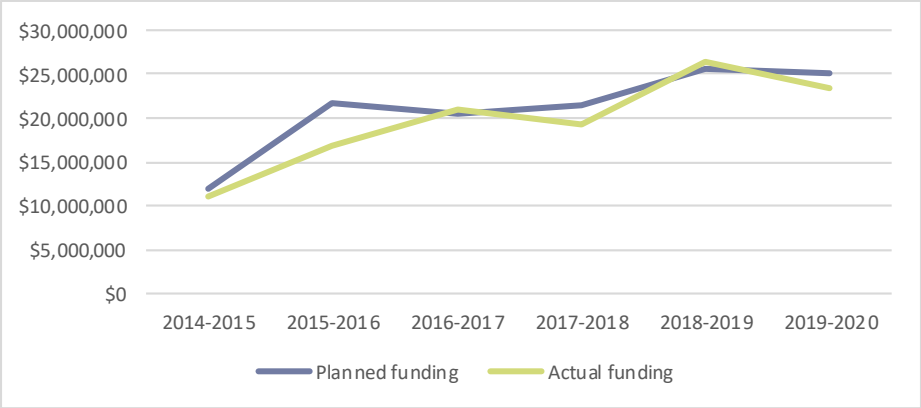
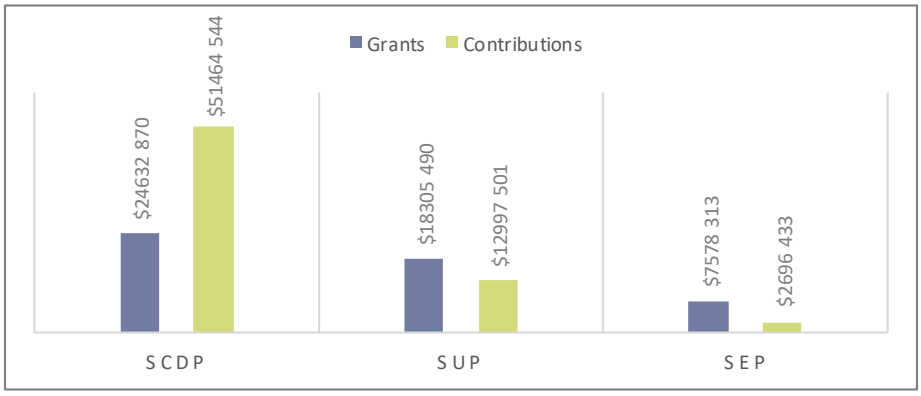


Table 7 – Variation between planned and actual funding by main branch

	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
SST	22%	29%	2%	13%	-4%	3%
SU	-12%	3%	-22%	12%	6%	16%
SE	-2%	30%	10%	0%	-27%	20%

Figure 23 – G&C spending by DRF program



In addition, 30% of internal survey respondents felt that the CSA funded too few G&C recipients, and 35% indicated that they were unable to answer, while only 19% felt that the CSA was reaching the right type and number of recipients. The success rates of proposals presented in the *Performance* section point to a strong demand for the available funding. In addition, the small number of funded applicants, insufficient funding, and short-term funding were among the things that internal and external respondents liked least about the Program. A number of internal survey respondents suggested funding projects of different sizes and a greater diversity of applicants. In addition, employees interviewed indicated that the CSA could achieve a greater impact with its funding and could produce just as many significant results using moderate funding with grants (smaller amounts as opposed to contributions). This suggests the need for a broader discussion of the type and size of funding and its overall impact, which could be measured over a longer term (e.g., a few years after an agreement ends).

The AO approach

Soliciting proposals through **AOs is an effective approach**. Half of the external survey respondents (50%) and most internal survey respondents (65%) considered designing and managing funding opportunities that reflect communities' needs, the priorities of the DRF programs and, by extension, the CSA, and the G&C Program's objectives to be an effective approach. However, a common concern internally and externally was that funding opportunities were ad hoc and unpredictable. The need for greater predictability and harmonization to facilitate internal planning was also identified in the previous evaluation. The 2019-2020 report on Canadian academic capacity in space research (J.E. Halliwell Associates Inc., 2020) also documented comments favouring more frequent and predictable FAST[33] AOs. Predictable AOs would make opportunities more accessible and impactful, improve the experience of funding recipients, and simplify the CSA's internal planning and operations. Some external respondents and a few staff members recommended more coordination and harmonization across the Agency to make AOs more effective for both applicants and employees. To date, some standardization of processes for establishing AOs has occurred through the work of the CEGC and with the support of the G&C Steering Committee, but more could be done, according to respondents: greater predictability and stability in the criteria for recurring AOs, and the creation of AOs that cover common themes across DRF programs rather than multiple specific opportunities (e.g., on satellite data analysis).

While more than half of both internal (52%) and external (57%) survey respondents considered G&C opportunities accessible, internal (20%) and external (14%) respondents who felt that there were barriers to access for various groups (based on geographic location, language, ethnicity, sex or gender, physical or intellectual ability, and/or other identity factors). Those respondents suggested that more consideration be given to certain organizations and types of researchers (e.g., small businesses,[34] start-ups, early-career researchers, underrepresented groups (e.g., women)) in designing AOs (format, criteria, academic and financial schedules, etc.). Some suggested that support, such as access to training, be provided in the application process. Some recent AOs have already targeted smaller players, and discussions and developments are underway at the Agency on how to overcome potential barriers to access and ensure diversity among G&C recipients following approval of the evaluation report on GBA Plus implementation in June 2021 (CSA, 2021f).

Good practices of other departments and agencies regarding AOs:

- *Predictable, regular calls for proposals;*
- *Sufficient time to prepare proposals (and avoiding conflicting or unfavourable timing for the community).*

[33] FAST: Flights and Fieldwork for the Advancement of Science and Technology.

[34] According to the *State of the Canadian Space Sector Report* (CSA, 2019c), in 2018, 94% of all space companies were small businesses.

The unsolicited process

Responses across information sources show that there is **little awareness of the unsolicited proposal process**. External survey respondents indicated that they were unaware of the process or had never considered it (46%). Only 17% agreed that the unsolicited proposal process was "very or extremely" adequate, and 26% rated it as "slightly or not at all" adequate. Only 7% of internal respondents agreed that the CSA's approach to managing unsolicited proposals was adequate, and almost half of respondents (49%) said they were unaware of it (some indicated that they had never experienced it or thought such a process existed). For teams that accepted unsolicited proposals, the process was administratively cumbersome and inconsistent. The previous evaluation indicated that the adoption of standardized, transparent application, selection and feedback processes for unsolicited proposals would address the problems associated with them, and that having a list of funding priorities for each branch would ensure alignment between unsolicited projects and CSA priorities. However, a few respondents said that this process should be used more as an innovation driver for non-traditional projects.

> ***Interesting fact about other departments and agencies:***
> *Other departments and agencies that have a class G&C program use it to fund unsolicited proposals. Each specific program that uses AOs has its own terms and conditions.*

Other formats

Since G&Cs are for the benefit of Canadians, it is important to identify the needs of potential recipients in order to better support R&D, including basic research, as noted in the *Relevance* section. In addition, the evolution of the space sector, the changing international marketplace, and the rapid growth of the commercial sector, as described in the Space Strategy for Canada (CSA, 2019a), mean that the Agency needs to be innovative in the ways it does business. External survey respondents suggested other funding formats to increase efficiency, accessibility and collaboration: joint AOs with other organizations, specific AOs to access CSA services or infrastructure (i.e., in-kind contributions),[35] mentoring, challenges and competitions (such as the Deep Space Food Challenge or the Deep Space Healthcare Challenge), scholarships, research chairs, and so on. In fact, the *2021-22 Business Plan* (CSA, 2021c) mentions the development of a framework to implement the *Guide to Departmental Collaboration with Recipients of Grants and Contributions* (TBS, 2021) in managing G&C initiatives. While open calls for proposals were suggested as one of several alternative opportunities by internal interviewees, some other departments and agencies mentioned that open calls create planning challenges and tend to be resource-intensive for staff.

[35] NRCan implemented an S&T assistance component (in-kind support from a federal research centre) through a Science and Technology Assistance for Cleantech (STAC) annex that directly targets small businesses as part of the contribution projects funded under the Clean Growth Program.

Complementarity and collaboration with other programs

> ***Good practices of other departments and agencies regarding collaboration:***
> - *More regular or ongoing collaboration with other departments (not just ad hoc).*

The majority of funding applicants surveyed viewed the CSA's Class G&C Program as **complementary** to other programs (61%) and not redundant (76%). The differentiating factor is the CSA's emphasis on space. This is one of the things that both external and internal respondents liked most about the Program. Of CSA employees surveyed who were familiar with other programs (23/54, or 43%), 65% indicated that there was overlap with other programs, but more than half (52%) of those respondents indicated that there were **opportunities to collaborate with those programs** to boost the impact of the funding, including NRC (IRAP), NSERC and CFI. Some collaborations had already taken place and others were underway, but some respondents acknowledged that certain administrative requirements could curb opportunities and that collaboration required an investment of time and resources. A few respondents noted that interdepartmental cooperation was a broader policy discussion currently underway (in particular with the interdepartmental committee on G&C), but that the Agency tried not to duplicate programs offered in other departments and agencies. This is one of the expected results of the *Policy on Transfer Payments* (TBS, 2008a): "Collaboration exists within and among departments to harmonize transfer payment programs and standardize their administration, when appropriate." Nevertheless, the complexity of interdepartmental relationships was one of the things that internal respondents liked least about the Program. With respect to collaboration, the evaluation found that the recommended new *Canadian Research and Development Classification* (CRDC) standard (StatCan, 2020) used "by the federal granting agencies and Statistics Canada to collect and disseminate data related to research and development in Canada" was not part of the information collected in Unitas, with internal CSA research topics being selected. One of the CRDC's purposes is to identify opportunities for collaboration to optimize research efforts and improve outcomes and to improve reporting on the combined contributions of Canada's research and science organizations.

Application submission, evaluation and selection processes

Overall, the **application submission, evaluation and selection processes are appropriate but could be improved in some respects**. Most internal and external survey respondents who were familiar with other programs indicated that the G&C processes of other organizations were better than or about the same as the CSA's and generally felt that the CSA's processes were more cumbersome or complex than those of other organizations (such as NSERC, DND, NRC or CFI). The previous evaluation indicated that standardizing the application submission and selection processes, including feedback, would optimize resources for both the solicited and unsolicited processes.

Table 8 – Overall comparison of the processes of the CSA's Class G&C Program with those of other programs

	Processes in general (internal survey: 23/54)	Application process (external survey: 85/226)	Reporting process (external survey: 41/226)
Others are better (the CSA is worse)	37%	36%	31%
Similar	58%	28%	43%
Others are worse (the CSA is better)	5%	27%	20%

With regard to the application process, the CSA mostly required proposals on paper or USB drive during the evaluation period. Most external respondents stressed that applications should be submitted online via a user-friendly, simple and efficient portal. In fact, one of the goals of *Canada's Digital Government Strategy* (GC, 2021b) is to replace thousands of inaccessible and inconvenient PDF forms with modern, user-friendly web-based versions so that information can be submitted easily and securely online. Under the CSA's new *Digital Transformation Strategy* (CSA, 2021a), the Program's processes will be reviewed from a client-oriented perspective and an online, end-to-end service approach. This is also part of a GBA Plus focus on equal access regardless of place of residence. Because of the COVID-19 pandemic, the CSA permitted electronic submissions for 2021 opportunities.[36] However, there are no plans at this time to make this approach permanent, comprehensive and mandatory.

External respondents were not entirely satisfied with the application process: only half considered the effort and time required to complete a funding application to be very or extremely reasonable (51%; the proportion was obviously lower for non-recipients (33%)). In particular, respondents described the submission process as too cumbersome, time-consuming, detailed, repetitive, complex and/or disproportionate to the amount of funding offered; they also said there was not enough time to submit applications. This is one of the things respondents liked least about the Program. However, internal survey respondents and interviewees and external survey respondents indicated that the submission process could be improved with, for example, a better interface and a staged application process. Using letters of intent as an initial application step for some AOs is an effective approach for reducing the burden on applicants (who can find out in the first stage whether their project is eligible) and on reviewers (who have fewer complete proposals to evaluate in the second stage). This approach is a good practice used by other departments and agencies and was also suggested by some external respondents. In addition, a staged application tool is already in place in the centralized Unitas system (along with a two-stage AO guide in the G&C Toolbox), the first stage being screening for applicant eligibility and project eligibility, but the process and the associated service standards have not yet been established. As a result, the tool is seeing little use.

Regarding the evaluation and selection processes, proposals are evaluated overall on the basis of applicant eligibility and the criteria grid established for each AO. The evaluation of unsolicited proposals is based

Good practices of other departments and agencies regarding application submission, evaluation and selection processes:

- *Online submission and efficient information management system for applicants;*
- *Staged application process (letter of intent followed by a full proposal);*
- *Fully transparent selection process (detailed submission guide, evaluation grid, composition of the review team, final scoring of proposals (including a list of successful applicants);*
- *Effective use of external reviewers;*
- *Systematic integration of equity/diversity/inclusion and GBA Plus considerations through initial evaluation criteria and adequate resources and training for reviewers;*
- *Systematic feedback to all applicants.*

[36] Currently, three systems are being used for electronic submissions: (1) an electronic portal for account creation (basic information), (2) the PIE-ISEP system for document transfer (in a dedicated space), and (3) Livelink to save documents (also in a dedicated space). Unitas is used to evaluate proposals and manage the various stages of the G&C life cycle.

on certain criteria in the Applicant's Guide[37] (e.g., applicant eligibility, project eligibility, relationship with the CSA's priorities and the Program's objectives) and depends on a decision by the Directorates based on other factors (e.g., budget availability, schedule, alignment with other CSA initiatives, collaboration with other departments and agencies).

Proposals are generally evaluated by CSA staff from the relevant branch and other branches (internal peer review, a panel of two or three reviewers), but SST, SU and SE use external reviewers for some of their AOs. In some cases, the ranked list of proposals is reviewed by senior management for possible adjustment based on strategic overall selection factors (geographic distribution, priorities, recipient profile, etc.) known as "soft criteria," normally stated in the AO, which constitutes a second stage in the selection process. This varies from branch to branch and from AO to AO. The final selection of proposals is approved by the IIRB or, under the new agreement approval delegation charter that came into effect in October 2021, at a lower organizational level. Internal survey results (56%) confirm that this approach to selecting recipients is appropriate: respondents who had confidence in the selection processes used for AOs felt that they were comprehensive, fair and rigorous. In the recent *Evaluation of the Implementation of Gender-Based Analysis Plus at the Canadian Space Agency* (CSA, 2021f), the two-stage selection approach is identified as a best practice at the Agency. However, comments indicate that the cumbersome and subjective nature of the process remains a concern. Moreover, external respondents were not entirely satisfied with the selection process: only about half reported that the selection process was very or extremely clear (53%) and very or extremely fair (55%) and agreed very or extremely strongly that the CSA responds to applications in a timely manner (48%), with satisfaction obviously higher for recipients and lower for non-recipients. A few internal interviewees acknowledged that the CSA did not always clearly indicate how proposals were evaluated. Internal interviews also indicated that considering diversity and inclusion in the evaluation of proposals was a challenge for the branches (how to properly consider demographic variables and how they should intersect with other selection criteria). As noted in the previous evaluation, internal survey respondents and interviewees and external survey respondents indicated that the CSA could improve its evaluation and selection processes by, for example, making them more transparent (including clearly explaining and communicating the process and the scoring), using recurring, clear evaluation criteria that are built in and communicated from the outset, making greater use of external reviewers and peer review, and providing systematic feedback to all applicants. There is a feedback component in the Unitas system's proposal evaluation module: when the reviewers complete the proposal evaluation summary, it can be annotated with positive and constructive comments and then generated as a document for transmission to the applicant (it is not sent automatically, however).

[37] The CEGC developed the Applicant's Guide to assist applicants throughout the application process. It contains important information, including eligibility criteria, and details on eligible projects and the selection process. However, it is not accessible via the Agency's website, and there is no indication as to when it is shared with applicants.

Systems and tools

Even though the CSA has a main central database for recording G&C information (Unitas) and a portal for funded research projects to complete their progress reports and final reports (PIS), the evaluation showed that the Agency still has multiple internal databases or files and manual data capture and reconciliation approaches (using Excel), which makes it difficult to analyze information. In addition, there is no quality assurance or quality control on the data. The information about AOs, proposals, progress reports and final reports came from multiple sources and required significant clean-up. Nevertheless, efforts are being made to improve the tools: continuous improvement of the PIS and Unitas (including a new Unitas community of practice in 2021) and updating of some documents in the G&C Toolbox. For other departments and agencies, an effective system should have certain features.

Good practices of other departments and agencies regarding tools and systems:

- *Centralized documentation and information;*
- *Efficient, user-friendly database for reporting and internal research.*

Table 9 – Necessary features of an effective system, according to other departments and agencies

Features
Support both standardization and flexibility in the information required for an AO in the form of **modules** to accommodate different types of opportunities and client groups.
Cover the application submission and evaluation processes from beginning to end and the production of progress reports and final reports, standardizing the **user experience** for clients and reviewers.
Provide **business intelligence** for analysis of fund distribution, equity/diversity/inclusion tracking data, etc.
Support **operational activities** effectively.
Meet government **security** and **privacy** requirements for information-sharing.

Outcomes and impacts

Since the Class G&C Program is a stand-alone program, it has its own **performance measurement** and indicators that must be measured, as specified in the Program's Terms and Conditions. However, the PIPs need to clearly identify the performance information approach specific to the transfer payment program in the event that this G&C program forms only a portion of a program in the program inventory (TBS, 2018), as is the case at the Agency. The Program's results are reported by CEGC, but the branches also report the results for DRF programs, which are aggregated across their sectoral activities. The branches, which are responsible for administering their own AOs, tend to view the Program as a funding mechanism. In fact, this perception is reinforced by the fact that there is a "Funding Mechanism" form in the G&C Toolbox; the form is a decision support tool for choosing between a transfer payment (AO) and a contract (request for proposal). In addition, a few respondents described a disconnect between what was expected of the Program (what is evaluated, measured and reported) and what the branches were attempting to accomplish in their own program using G&C. Nevertheless, a harmonization effort is currently underway

with the PIPs update: six Class G&C Program indicators have been associated with DRF indicators already included in the PIPs of the three DRF programs. This new results framework is expected to be completed in 2022-2023. The result will be a reduction in the number of indicators and more direct alignment with the programs' objectives, which were reported by a few internal respondents (survey and interviews) as problematic (e.g., misalignment between STD objectives and the Program's objectives). However, some internal survey respondents and interviewees indicated that the CSA could do more to tell the story of the long-term impact of its investments. The STD initiative under the SCDP provides information about the business potential or impact one year and five years after the end of the project, which is not possible using the PIS (short term, during the agreement or just after the end of the agreement).

Regarding **unintended outcomes of the Program**, 38% of external survey respondents indicated that their funded research projects had unexpected impacts, most of which were positive. The unintended outcomes included the development of new collaborations, connections that led to subsequent opportunities or potential opportunities, and leveraging of other resources. Employees surveyed commented on both positive unintended outcomes (additional impact of data, space mission precursor projects, and a higher profile for Canada) and, to a lesser extent (21%), negative unintended outcomes (unconscious bias and a tendency to support the same clients, inadequate funding that drives researchers into other fields).

Regarding **impacts on and benefits for various groups**, information is rather limited. Only 9% of external survey respondents were able to confirm that the funding they received benefited various groups (based on location, language, ethnicity, sex or gender, physical or intellectual ability, and/or other identity factors), while 35% of internal respondents said that the Program had different impacts on different groups. In addition, Let's Talk Science, through its Living Space program, provided learning activities to students in schools in underrepresented and remote communities, including Indigenous communities.

8 Conclusion

The Class G&C Program helps the CSA support Canada's space ambitions and plays a unique role in Canada in the development of space sector capabilities, the advancement of space S&T, collaboration among stakeholders, and Canada's presence on the world stage. The information gathered for this evaluation demonstrates that the Program achieved its intended outcomes over the past six years, thanks in part to an increase in the budget and the number of AOs and consequently an increase in the number of projects and activities that received funding. Nevertheless, there are some unmet needs, including the high demand for the A&L component and AOs released at more opportune times. In addition, some operational factors (administrative processes, data organization and compilation) need to be improved to make the Program more efficient, innovative and collaborative. The *Policy on Service and Digital* (TBS, 2020) calls on federal organizations to be more agile and innovative in the way they do business. While there have been efforts to improve in various areas of the Program over the past six years, some of the findings are similar to those of the previous evaluation. The following are the five main themes that emerged from the evaluation of the relevance, performance and efficiency of the Class G&C Program and for which recommendations are made.

Funding opportunities

The number of AOs and the annual amount of funding awarded under the Class G&C Program increased over the past six years. However, the AOs could be better planned, harmonized and recurring, and simplified through a streamlined application process, such as a staged process (letter of interest followed by a full proposal), where possible. In fact, such a process is already in place in the central system, but it needs some fine-tuning. This would increase the impact of AOs, make them more accessible, improve the applicant experience, and simplify internal planning and operations. Predictable AOs might also facilitate participation by external reviewers. The Program could also be more responsive to the needs of communities as regards the timing of AOs, access to facilities and mentoring (in the form of collaboration), support for certain technology readiness levels, collaboration with other departments and agencies, and more sustained interactions with the various client groups. This could be positive for some groups, such as small businesses and early-career researchers, although some opportunities have already been developed specifically for them. Steps should be taken to facilitate access and ensure diversity among G&C recipients from a GBA Plus perspective. Harmonization of AOs will also require greater coordination between the branches. Also, more information about the unsolicited process could be shared within the CSA's sectors and with the various communities.

Tools, data and operational processes

A centralized information system and a number of tools were introduced and/or improved, and their use expanded over the past six years. The Unitas system offers a great deal of flexibility and is used in other contexts since it is the client relationship management system. Although a noticeable effort is being made to enter data at the various stages of the processes, some elements are still not being created systematically or entered correctly. As there are few mandatory fields in the system, a lot of data can be omitted. In addition, although a link has been created from SAP to Unitas, the extracted financial data

differs because of the way the data is coded in SAP (manner and limitation). Also, frequent changes in the PIS and the fact that the fields are formatted as text make it difficult to analyze the data. However, the student and organization reports for the A&L component are being revised so that they can be standardized and posted online. Service standards are also updated and published appropriately, although some data is incorrect or missing from the database. Hence, a directive to use the central system for all G&C processes, more systematic data quality assurance, and revision of the data format would provide better-quality data, leading to richer, more direct, and longer-term information about AOs, branches and programs, recipients and non-recipients, and service standards, which would be useful for reporting and decision support.

There are a number of tools available to G&C operations. They can be found in the G&C Toolbox in Livelink. Some have been updated, but others are still pending, mainly because of a lack of resources but also because they are not consistent with user needs, objectives and requirements. The tasks of creating or updating tools could be broken down into stages, and key users should be involved early in the creation or update process. The G&C Toolbox also includes the operational process steps and the RACI grid, although these processes are not aligned with data entry in Unitas (or in SAP). Information-gathering forms such as the recipient risk assessment form would be better online (instead of in Excel format) so that data can be collected from a centralized perspective.

Lastly, the CSA allowed electronic submission of proposals for some opportunities in 2021 because of the pandemic, but a permanent and comprehensive approach needs to be implemented, while the interface and intuitiveness of the online application process could be improved from a user perspective in particular.

Evaluation and selection process

The Class G&C Program's evaluation and selection processes are appropriate, but when compared with those of other departments and agencies, they could be improved with the addition of systematic feedback to all applicants (there is a feedback component in the Unitas system's proposal evaluation module). In addition, the CSA should specify when AOs are posted the manner in which strategic global selection factors, such as geographic location or demographic factors, are being used. The composition of the review team (e.g., age, position and level, area of expertise) could also be communicated to enhance the transparency of the process. The involvement of external reviewers, which would be facilitated by recurring and planned AOs, would also make the processes more transparent.

Lastly, unsolicited processes are seldom used and are perceived as less transparent. Unsolicited proposals are considered at the CSA's discretion and may be accepted on an exceptional basis. More information about the unsolicited process and the evaluation criteria could probably be shared within the branches and with the various communities.

Roles, responsibilities and coordination

The CEGC is an important function in the delivery of the Class G&C Program, but its roles and responsibilities need to be clarified and better communicated. More resources were provided in 2021,[38] which will afford more opportunity for innovation, strategic thinking, collaboration and improvement of the Program.

The branches have stated a need for G&C and GBA Plus expertise and training and for greater coordination and harmonization to support operations more effectively. Greater coordination and harmonization of operations could be facilitated by a community of practice, one or more working groups, or even the establishment of a dedicated operational group, which is a good practice followed in other departments and agencies. Also, since the Program is under the responsibility of the Chief Financial Officer, the addition of an operational working group in the branches might provide a structure for accountability and information sharing, which would lead to a better overview of G&C activities across the CSA. More synergies between the different sectors of the Agency are already in evidence: there is now an SST employee who also works with the Communications team on A&L projects under the SCDP.

The new terms of reference of the G&C Advisory Committee, which used to be a steering committee, will undoubtedly foster greater coordination between the branches. In addition, governance was partially streamlined with the recent delegation of agreement approval authority to a lower organizational level.

Performance measurement

The Class G&C Program has its own Terms and Conditions, and it needs its own performance measurement. The 2017 PIPs for the three DRF programs replaced the Program's 2010 and 2013 PMSs but did not indicate the approach for measuring the Program's specific performance and did not include a specific target for the Program. The current PIPs update process will associate six indicators for the Program with the three PIPs, including one indicator for the A&L component (number of students involved in projects). This is a step toward aligning the Program with the CSA's recently approved logic model and thus represents more direct alignment with the objectives of the DRF programs. However, specific targets should be identified for the Class G&C Program. In addition, there are no indicators for the A&L youth client group, although the CSA's new logic model contains two indicators that could be associated to it. Also, the PIPs do not indicate how the Program's efficiency is measured. Adding efficiency measures to the PIPs – such as the means to deliver the program, facilitating factors at different stages of the Program's life cycle, and processes implemented to improve the efficiency of the Program's activities – would make it possible to develop questions and indicators relating to program efficiency. Consequently, since there will be fewer indicators for the Class G&C Program, the PIS should be revised to ensure that only the necessary information is requested from G&C recipients.

Lastly, while there is no need to change the Terms and Conditions of the Class G&C Program, Treasury Board's upcoming update of the *Policy on Transfer Payments* may provide an opportunity to update them as required for purposes such as making them more comprehensive regarding R&D, innovation and

[38] The CEGC was given additional resources in 2021, and its structure was updated.

commercial capability in view of the growing commercial space sector market, making them more responsive to the needs of the various client groups, and revising the governance and accountability information they contain.

On the basis of the key evaluation findings described above, the following actions are recommended to improve the accessibility and efficiency of the CSA's Class G&C Program:

1. Establish regular funding opportunities with greater sensitivity to the needs of the diverse client base, while increasing harmonization and coordination between the branches and recipients.

2. Clarify the rules and requirements regarding departmental collaboration with G&C recipients, and inform stakeholders.

3. Use a single operational database for the Program's administration and management, and monitor data quality, continuity and completeness.

4. Explore the possibility of using standardized tools to streamline the application process, such as using a staged application process.

5. Ensure that systematic feedback is provided for all funding applications.

6. Communicate the CEGC's roles and responsibilities to the G&C Program's user branches to ensure a common understanding and meet the branches' needs for the services and expertise they require.

7. In updating performance measurement, ensure that there are CSA logic model indicators for each of the Program's components and client groups, and that specific targets are agreed upon for the Program.

9 Management response and action plan

RECOMMENDATION	LEADS	MANAGEMENT RESPONSE	ACTION PLAN	TIMELINE
Recommendation 1 Establish regular funding opportunities with greater sensitivity to the needs of the diverse client base, while increasing harmonization and coordination between the branches and recipients.	Programmatic DGs And Executive Director, Communications and Public Affairs In collaboration with: DG Policy And Chief Financial Officer and DG Corporate Services	CSA senior management concurs with this recommendation.	1) G&C user directors will work on a multi-year plan and schedule for Class G&C Program initiatives to establish regular funding opportunities. 2) They will incorporate a pilot approach to harmonization and coordination of initiatives to foster the emergence of a comprehensive G&C vision. 3) With the support of Policy and the CEGC, G&C user sectors will update client needs.	April 2023 December 2023 December 2023
Recommendation 2 Clarify the rules and requirements regarding departmental collaboration with G&C recipients, and inform stakeholders.	Chief Financial Officer and DG Corporate Services	CSA senior management concurs with this recommendation.	The CEGC will complete the CSA's Guide to Departmental Collaboration with Recipients of Grants and Contributions and associated tools. It will provide training to CSA users as needed.	December 2022

RECOMMENDATION	LEADS	MANAGEMENT RESPONSE	ACTION PLAN	TIMELINE
Recommendation 3 Use a single operational database for the Program's administration and management, and monitor data quality, continuity and completeness.	1) Programmatic DGs And Executive Director, Communications and Public Affairs 2) Chief Financial Officer and DG Corporate Services In collaboration with: Chief Information Officer	CSA senior management concurs with this recommendation.	1) G&C user sectors will use Unitas as their G&C management database. A communication to this effect will be sent to all users. 2) Training will be offered to all sectors. The CEGC will work with Information Technology to improve the input fields in Unitas with a view to improving quality control.	March 2023 March 2023 March 2024
Recommendation 4 Explore the possibility of using standardized tools to streamline the application process, such as using a staged application process.	1) Programmatic DGs And Executive Director, Communications and Public Affairs 2) Chief Financial Officer and DG Corporate Services In collaboration with: Programmatic DGs And Executive Director, Communications and Public Affairs	CSA senior management concurs with this recommendation.	1) G&C user sectors will be encouraged to use the existing staged application process whenever possible. 2) The CEGC will survey G&C user satisfaction to determine if using the existing tools in stages has streamlined the process. If not, other tools will be considered.	June 2022 June 2023

RECOMMENDATION	LEADS	MANAGEMENT RESPONSE	ACTION PLAN	TIMELINE
Recommendation 5 Ensure that systematic feedback is provided for all funding applications.	1) Programmatic DGs And Executive Director, Communications and Public Affairs 2) Chief Financial Officer and DG Corporate Services In collaboration with: Chief Information Officer	CSA senior management concurs with this recommendation.	1) G&C user sectors will use Unitas, specifically the feedback module. 2) The CEGC will review the feedback process for applications. In collaboration with Information Technology, the CEGC will update and adjust some of the standard management modules and tools in Unitas, specifically regarding automated feedback.	December 2022 March 2024
Recommendation 6 Communicate the CEGC's roles and responsibilities to the G&C Program's user branches to ensure a common understanding and meet the branches' needs for the services and expertise they require.	Chief Financial Officer and DG Corporate Services In collaboration with: Programmatic DGs And Executive Director, Communications and Public Affairs	CSA senior management concurs with this recommendation.	The CEGC and directors involved in G&C management will work together to clarify, document and communicate roles and responsibilities.	December 2022

RECOMMENDATION	LEADS	MANAGEMENT RESPONSE	ACTION PLAN	TIMELINE
Recommendation 7 In updating performance measurement, ensure that there are CSA logic model indicators for each of the Program's components and client groups, and that specific targets are agreed upon for the Program.	1) Programmatic DGs In collaboration with: Executive Director, Programs and Integrated Planning and Chief Financial Officer and DG Corporate Services 2) DG Policy In collaboration with: Programmatic DGs	CSA senior management concurs with this recommendation.	All points of this recommendation are being implemented through replacement of the Performance Measurement Strategy with Performance Information Profiles (PIPs) and the continued improvement of G&C tracking and reporting tools. 1) With the support of Programs and Integrated Planning, G&C user sectors will update the alignment of the PIPs and their targets for the Program's two components. 2) G&C user sectors and Policy will collect project data annually to facilitate multi-year compilation of the Class G&C Program's results and for data completeness and reporting purposes.	December 2022 March 2023

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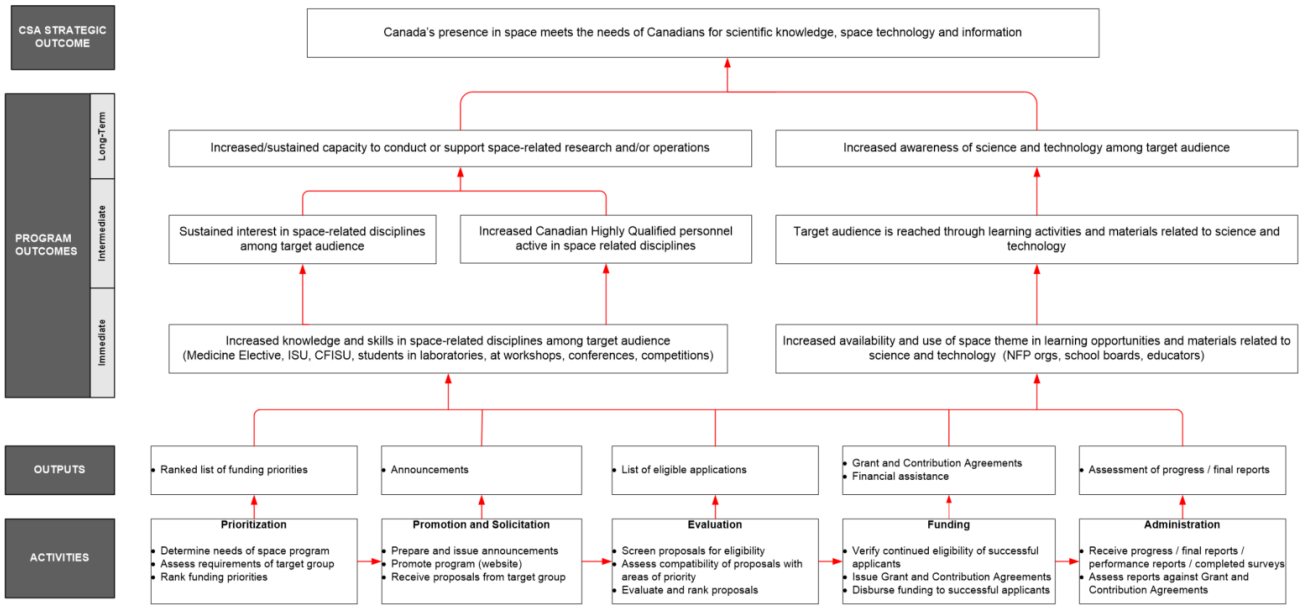
Appendix 1 – Logic Models

Awareness and Learning Component Logic Model (2010)



Research Component Logic Model (2013)