Agence spatiale canadienne | Canadian Space Agency

AUDIT OF THE MANAGEMENT FRAMEWORK OF THE CANADIAN SPACE AGENCY'S (CSA) GROUND INFRASTRUCTURE SUBPROGRAM

AUDIT REPORT

PROJECT NO. 16/17 01-02

PREPARED BY
THE AUDIT AND EVALUATION DIRECTORATE

SEPTEMBER 2017

Canada

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1.0 SUMMARY

1.1 AUDIT OBJECTIVE

The objective of the audit is to determine whether a management framework is in place to allow the program to achieve its objectives and to comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.

1.2 AUDIT OPINION

In our opinion, the management framework in place allows the subprogram to achieve its objectives and to comply with all relevant policies, regulations and guidelines issued by the CSA and the central agencies. However, a low-risk deficiency and opportunities for improvement were identified.

1.3 STATEMENT OF ASSURANCE

As Chief Audit Executive, I am of the opinion that sufficient and appropriate audit procedures were followed and that audit evidence was collected to support the accuracy of the opinion provided in this report. This opinion is based on a comparison of the conditions, as they existed at the time of the audit, against pre-established audit criteria determined in consultation with management, and is only applicable to the particular entity being audited. The evidence was gathered in compliance with the Treasury Board's internal auditing policy, guidelines and standards. The procedures followed are in accordance with the professional standards of the Institute of Internal Auditors. The evidence gathered is sufficient to convince senior management of the validity of the opinion derived from the internal audit.

1.4 SUMMARY OF FINDINGS

Our audit revealed that the CSA's Ground Infrastructure subprogram had established best practices to ensure that CSA operations were planned efficiently and that the resources used were adequately controlled. Activity planning is being done appropriately as part of the CSA corporate planning process and the subprogram is currently preparing for the commissioning of the Radarsat Constellation Mission (RCM) planned for 2018.

We also found that the subprogram generally complies with Acts, policies, regulations and relevant guidelines issued by the CSA and central agencies. We reviewed samples of contract awards, operating expenses, travel and collaborative agreements; they were in compliance with the existing rules. In addition, we found that full accountability process is carried out periodically on all subprogram activities.

However, we identified a deficiency with respect to the accuracy of the registry of inventories as well as opportunities for improvement with respect to the documentation in an infrastructure maintenance logbook, the capital expenditure plan update and the business continuity plan (BCP) update.

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Signature of the Chief Audit Executive

Audit team members

Dany Fortin	Louis Martel
Johanna Gailer	Fatima Raveen

2.0 AUDIT REPORT

2.1 BACKGROUND

The CSA's priority is to ensure that satellite data required for government activities is continually provided. Many federal departments rely on satellite radar images to conduct their activities. In this regard, the CSA is committed to carrying out satellite operations to help other Canadian government departments fulfill their mandate.

The purpose of The CSA's 1.1.2 – Ground Infrastructure subprogram includes the development, installation and use of an integrated and coordinated system of ground infrastructure to receive data transmitted by Canadian or foreign satellites. The ground infrastructure houses and uses the equipment required to operate satellites. This CSA subprogram is undertaken with participation by industry, Government of Canada agencies and foreign space agencies. This collaborative effort and is formalized under contracts, grants, contributions, and partnership agreements with national, public/private, and international organizations. The subprogram budget for 2015-16 was $16.6 million whereas it was $11 million for 2016-17. The number of employees based on the organizational structure at the time of the audit was 24 full-time equivalents (FTEs).

2.2 AUDIT OBJECTIVE, SCOPE AND METHOD

OBJECTIVE

This audit project is part of the 2016-2017 to 2018-2019 Risk-Based Audit Plan (RBAP) that was approved by the CSA Audit Committee. This audit is justified by the fact that CSA ground infrastructure plays a critical role in the operations of a number of satellite missions. Furthermore, this subprogram had never been audited before.

SCOPE

The audit focused on all subprogram expenditures as well as planning, control and accountability systems and processes. The audit covered activities conducted between April 1st, 2015, and June 30th, 2016. Only CSA ground infrastructure activities were examined as part of this audit.

METHOD

The audit criteria were established in accordance with the best management practices and guidelines issued by the TBS. The audit involved various audit processes including interviews and reviews of documents, operating expenses, contract files and equipment.

We reviewed:

- 10 operating expenditures (approximately $1.65 million or 11% of spending during the period under review);
- 5 contracts awarded with no bids (out of 21 contracts awarded with no bids during the period under review);
- 5 trips (out of 116 trips taken during the period under review);

- 7 pieces of equipment (out of 474 pieces of equipment included in the list of inventory at the time of the audit); and
- 5 performance indicators (out of 49 performance indicators used in 2015-2016).

The samples were selected based on the judgement of the auditors. The audit criteria and sub-criteria are shown in Appendix A.

2.3 FINDINGS, RECOMMENDATIONS AND MANAGEMENT RESPONSES

Expected outcomes

To determine whether the existing management framework enabled the program to meet its objectives and comply with the policies, regulations and guidelines issued by the CSA and central agencies, we expected to find the following:

- Effectively planned operations
- Controlled operations and use of resources, and
- Activities subject to accountability and measurable outcomes

It should be noted that the audit's objective and criteria were discussed with management

2.3.1 Subprogram operations planning

Audit objective	The audit project's objective was to determine whether the existing management framework allowed the program to achieve its objectives and to comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.	
FINDINGS	Criterion 1	The subprogram's operations are appropriately planned.
	Condition	**Conclusion on the criterion:** Our audit showed that the subprogram's operations are appropriately planned. However, some opportunities for improvement were identified. ***The subprogram's expected outcomes are clearly defined*** In our opinion, the CSA Ground Infrastructure subprogram's expected outcomes are clearly defined. They have been developed and adequately monitored using the CSA's corporate work plans. They guide the CSA's activities for the purpose of operating an integrated ground infrastructure system to receive, process and make available space data required by users. The main expected outcomes are as follows: • Reliable ground infrastructure. • The CSA's satellites function in accordance with operational

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requirements.

- Canadian and foreign data needs are met through ground infrastructure.
- Foreign satellite missions are supported.
- Satellite data is transmitted to GoC organizations and research institutions.

Performance indicators are in place and performance is measured periodically to monitor the achievement of outcomes. According to the data provided by the subprogram, all of the expected outcomes were achieved in 2015-2016.

Operations planning

In our opinion, the CSA Ground Infrastructure subprogram's operations have been adequately planned. The work plans clearly illustrate the operations required to achieve the expected outcomes. Operations are divided into two main activities: satellite operations and data handling. These activities are performed as part of satellite missions, such as Radarsat-1, Radarsat-2, NEOSSat, SCISAT, M3MSat, and the RCM currently in development.

Considering the scale and importance of the RCM, we have paid particular attention to the planning of the mission's ground infrastructure. As a matter of fact, the CSA's satellite operations will face important changes in 2018, when the RCM becomes operational. This mission's operational volume will be higher than the one currently in operation. The contractor responsible for construction of the RCM's satellites will also be responsible for the RCM's operations during its first year of operation. A number of the CSA's employees will be reassigned to the RCM's operations with the contractor during the first year, and the CSA will become responsible for its operations starting the second year. As the satellites' launch is scheduled for July 2018, there are about 13 months left in which to complete preparations for the ground infrastructure. A work plan describing preparatory steps and a forecast budget for operations were developed and presented to the RCM's vice-president's steering committee. Several actions such as obtaining the operating licence and improving the capacity of the antennas are currently

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		underway. The submitted plan adheres to the timeline, but a final decision concerning the RCM's operational model has yet to be reached. Different opinions on the matter are currently being studied. ***Planning for future infrastructure needs*** The CSA's infrastructure needs have been established in accordance with new satellite programs' requirements for new equipment as well as in accordance with needs to maintain or increase current equipment capacity. This type of spending is recorded in a capital expenditure plan listing the CSA's initiatives and expenses to that effect. The total of these expenses varies annually between $0.5 and $2.5 million. A large portion of the budget is allocated to initiatives to increase capacity. For example, nearly $5 million was invested in the last 3 years to allow a partner's antennas to send commands to the CSA's satellites. It is anticipate that this equipment will be used by a number of the CSA's satellite missions, including the RCM. Another portion that varies from $0.5 to $0.7 million per year is allocated to the renewal of existing equipment and to the replacement of obsolete infrastructure. To this end, we expected to find an equipment maintenance book in which to document plans and corroborate decisions made concerning the type of work to be executed. However, this process currently takes place during team meetings and is not officially documented. We believe that a regularly updated maintenance book would accurately indicate CSA's needs and efficiently support planning and decision making for this kind of spending. A recommendation was made in this regard. ***Financial planning*** We have noted that a financial plan has been drawn up in accordance with upcoming operations and missions. This planning is carried out taking into consideration the overall expenses and particularities for each mission. Among other things, an increase of the operations budget is planned for the RCM's launch in 2018. This budget increase will cover salaries, licences, service contracts and

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		the cost for using the antennas for data receipt. An operating budget developed for this purpose was presented to the RCM project vice-president's steering committee. This plan could be modified depending on the operational model selected for the mission. Furthermore, as previously mentioned, the program makes capital expenditures every year to increase capacity or maintain the infrastructure. This spending is recorded in a capital expenditure plan that lists future initiatives and expenses. The last update to the capital expenditure plan for the subprogram was made in November 2015. We feel that it should have been updated in 2016-2017 in order to support planning. A recommendation to this effect has been made. ***Organizational structure and human resources planning*** During the audit, we reviewed the subprogram's organizational structure. Out of the 24 positions identified, 3 were vacant. We also noted that many positions were filled temporarily. However, it should be noted that a new organizational structure was implemented at the beginning of 2017-2018. As a result of the implementation of the new organizational structure, a number of staffing activities are planned throughout 2017-2018, including the staffing of a certain number of temporary positions in preparation for the launch of the RCM project. ***Risk identification and management*** The risks identified for the Ground Infrastructure subprogram were documented during the CSA's corporate risk assessment in 2015. The results of this assessment identified a low risk level for the subprogram with regard to most corporate risks, except for the risk of potential cost increases and the risk of security of people, goods and information. These had been assessed at a medium risk level and mitigation measures were to be put in place. As for a potential increase in costs, we have identified a major project that was subject to this risk over the last few years. This involved an investment of a little over $5 million that aimed to increase the capacity of a partner's antennas. The work was

<table>
<tr><td>Audit objective</td><td colspan="2">The audit project's objective was to determine whether the existing management framework allowed the program to achieve its objectives and to comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.</td></tr>
<tr><td></td><td></td><td>managed by the partner and is almost complete. So far, the budget envelope has been respected. The residual financial risk is limited. From a technical point of view, the documentation reviewed shows that the CSA has been monitoring the situation throughout the performance of the work to make sure that the requirements were met. A new collaboration agreement between the two parties for the use of these antennas by the CSA within the framework of RCM is currently being developed. The business model and usage costs are currently being discussed.

With respect to the risks associated with the security of people, goods and information, one of the mitigation measures identified was the annual update of the BCP. However, we ascertained that the business continuity plan had not been updated for a few years. Certain employees identified as responsible for the BCP have either left the organization or no longer work with the subprogram. Furthermore, none of the subprogram's employees can access the BCP electronically. It is restricted to those working for the Security and Facilities group. As for the contents of the BCP, certain elements suggested in the Government of Canada's Guide to Business Continuity Planning are absent, such as readiness procedures and quality assurance techniques (exercises, maintenance and auditing). Bearing in mind the high criticality level of the subprogram's operations in relation to satellite operations, we feel that the BCP should be updated in order to become an efficient management tool if needed. Accordingly, the CSA is currently in the process of reviewing BCPs for the entire organization. We have reviewed the relevant data security documentation and noted that the expected principal general security controls are in place.</td></tr>
<tr><td>RECOMMENDATION</td><td colspan="2">1. Establish a maintenance book for ground infrastructure.
2. Perform annual updates to the capital expenditure plan.
3. Update the BCP.</td></tr>
<tr><td rowspan="2">IDENTIFIED RESPONSIBILITY</td><td>Organization</td><td>Space Utilization Branch</td></tr>
<tr><td>Function</td><td>Director, Space Operations</td></tr>
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<tr><td>Audit objective</td><td colspan="2">The audit project's objective was to determine whether the existing management framework allowed the program to achieve its objectives and to comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.</td></tr>
<tr><td>MANAGEMENT RESPONSE</td><td colspan="2">The Branch agrees with the recommendations.</td></tr>
<tr><td rowspan="2">MANAGEMENT ACTION PLAN</td><td>Action plan details</td><td>Deadlines</td></tr>
<tr><td>Recommendations 1 and 2 – Maintenance book and capital expenditure plan

The maintenance book and the capital expenditure plan for ground infrastructure will be updated as part of the Annual Reference Level Update (ARLU) for 2018-2019 scheduled for August and September 2017, and then on an annual basis. They will be included in the ARLU documents that are approved by the Space Utilization Management Committee. An approval request for the combined elements will then be directed to the Integrated Investment Review Board (IIRB).

The maintenance plan for the RCM will be based on the RCM System Maintenance and Spares plan developed by the general contractor. This document delivered on June 24, 2016 will be updated when the ground system is sufficiently developed.

Recommendation 3 – Business continuity plan

The Branch contributes to departmental efforts to update the BCP as identified in the Directive for the Business Continuity Planning program from February 2017.

The update will include the names of those responsible for the plan. Quality assurance is included in the new procedure. We will respect the calendar proposed by Security and Facilities management.</td><td>R1 : ARLU calendar for 2018-2019

R2: Presentation of the capital expenditure plan to the IIRB in September 2017

R3: Security and Facilities management calendar:
•Analyze impacts on operations – mid-September 2017
•Finalize business continuity plans – January 31, 2018
•Implement business continuity plans – March 31, 2018
•Review the program and update it – March 31, 2018</td></tr>
</table>

2.3.2 Control of subprogram activities

Audit objective	The audit project's objective was to determine whether the existing management framework allowed the program to achieve its objectives and comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.	
FINDINGS	Criterion 2	The subprogram activities are controlled in an appropriate manner.
	Condition	**Conclusion on the criterion:** Our audit demonstrated that the subprogram's activities are appropriately controlled. ***The spending authorizations are controlled, and the expenditures are approved and made to in accordance with acts, policies and regulations.*** We examined a sample of ten operating expenses for five trips. The sample selection was based on a variety of activity types, the monetary value and the type of contract used. The total value of the expenses reviewed was $1.65 million and represented approximately 11% of the total expenses for the 2015–2016 fiscal year and the first three months of 2016–2017 fiscal year. We noted that the program complied with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies. Essentially, these operations were authorized and approved in accordance with the Financial Administration Act (sections 32, 33, and 34). The transactions were made on the basis of payment relating to contractual agreements and to laws and guidelines. Additionally, the trips reviewed were justified and the most economical methods were used. With respect to contract awards, we selected a sample of five contracts awarded to providers without bids. For the documents examined as a whole, the justification and the documentation used for the process were adequate and in compliance with the Treasury Board's *Contracting Policy*. ***Financial transactions were accounted for appropriately*** We examined the accounting of the selected expenses in the above criterion and we determined that they were appropriately recorded in the accounting records.

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		We also examined a sample of seven items from the inventory to determine whether the way they were recorded and the amortization methods used were appropriate. This involved mainly used or stored equipment for the operation and management of satellite infrastructure. The inventory items whose value was the highest and whose date of acquisition was the furthest back in the past were selected to target the riskiest items. The amortization methods used were appropriate and no deficiency was found in this area. However, one piece of equipment in the subprogram's inventory out of the seven examined could not be located and another was declared obsolete and disposed of, even though both still appeared in the inventory records. Additionally, we noted on several occasions that the location of equipment in the warehouse was not up to date. The risk to the organization arising from this deficiency is low, as these equipments were already amortized and no value was recorded in the financial statements. These equipments were also no longer used. Nevertheless, we recommend reviewing the inventory list to determine its accuracy and make any corrections to it so that there is adequate control over the equipment. With respect to cost breakdowns between missions and recording common operating costs, we reviewed the formulas used and the transactions completed in 2015 and 2016 and we noted that the accounting for expenditures was correct. ***Controls are in place to allow for monitoring of activities*** We noted the controls in place to promote the efficient monitoring of activities. Several accounts and reports submitted were used to monitor the activities of each mission. We paid close attention to the investment project mentioned earlier that was aimed at increasing the capacity of a partner's antenna. We noted that a weekly follow-up on the project was done to determine whether the project's requirements were met. Additionally, several monitoring documents were used, such as meeting minutes, reports on ongoing and upcoming activities along with test reports and procedures. An audit and compliance matrix for each requirement was created for

<table>
<tr><td>Audit objective</td><td colspan="3">The audit project's objective was to determine whether the existing management framework allowed the program to achieve its objectives and comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.</td></tr>
<tr><td></td><td></td><td colspan="2">the program.

We also paid special attention to the controls surrounding the production of collaborative agreements for the subprogram. In fact, the subprogram is responsible for more than 30 collaborative agreements with several national and foreign partners such as Government of Canada departments, provincial governments, and foreign governments. We examined a sample of five collaborative agreements and we noted the main controls expected were applied, including the review of agreements by legal services and the signing of agreements by authorized individuals. However, we identified some differences between the roles and responsibilities listed in the document CSA Policy & Procedures on Collaborative Arrangements and what happens in practice. These differences primarily concern the role of the Policy Branch in the agreement development process Additionally, depending on the source of the information, the list of collaborative agreements obtained during the audit was different. For control and monitoring purposes, it would be desirable to have a complete list with the details for all active and cancelled collaborative agreements. We are of the opinion that a review of the roles and responsibilities of the different stakeholders involved in the CSA collaborative agreement development process would be appropriate to determine whether updating the policy is required.</td></tr>
<tr><td>RECOMMENDATION</td><td colspan="3">4. Review the inventory records or log to determine its accuracy and make corrections if necessary.</td></tr>
<tr><td rowspan="2">IDENTIFIED RESPONSIBILITY</td><td>Organization</td><td colspan="2">Directorate, Space Utilization</td></tr>
<tr><td>Function</td><td colspan="2">Director, Space Exploration</td></tr>
<tr><td>MANAGEMENT RESPONSE</td><td colspan="3">The branch agrees with the recommendation.</td></tr>
<tr><td rowspan="2">MANAGEMENT ACTION PLAN</td><td colspan="2">Action plan details</td><td>Deadline</td></tr>
<tr><td colspan="2">Recommendation 4</td><td></td></tr>
</table>

Audit objective	The audit project's objective was to determine whether the existing management framework allowed the program to achieve its objectives and comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.	
	The inventory record or log will be reviewed in accordance with the established official calendar. Special attention will be given to the location of equipment and those responsible will ensure that equipment is written off when necessary. Finally, some equipment was assigned to satellite operations even though it belonged to other sectors. Corrections will be made if required.	March 31, 2018

2.3.3 Indicators and accountability

Audit objective	The audit project's objective was to determine whether the existing management framework allowed the program to achieve its objectives and comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.	
FINDINGS	Criterion 3	The activities are measured according to the expected outcomes and are subject to accountability.
	Condition	**Conclusion on the criterion:** Our audit demonstrated that the subprogram's activities are measured according to the expected outcomes and subject to accountability. ***Accountability*** We noted that the performance indicators have been established and compared to the mid-year and year- end objectives. Accountability and reporting are carried out during the CSA integrated management cycle. Additionally, regular meetings are held with the CSA management to report on the subprogram's activities. We have also selected a sample of 5 performance indicators and we have validated the data used during the CSA reporting and accountability process for the 2015–2016 fiscal year. No significant gap was observed and we have noted the outcomes/results released are valid.
RECOMMENDATIONS	No recommendations.	

Audit objective	The audit project's objective was to determine whether the existing management framework allowed the program to achieve its objectives and comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.		
IDENTIFIED RESPONSIBILITY	Organization	N/A	
	Function	N/A	
MANAGEMENT RESPONSE	N/A		
MANAGEMENT ACTION PLAN	Action plan details		Deadline
	N/A		N/A

APPENDIX A – TERMS OF REFERENCE

Audit objective:	The audit project's objective was to determine whether the existing management framework allowed the program to achieve its objectives and comply with acts, policies, regulations and relevant guidelines issued by the CSA and the central agencies.	
Audit criteria	**Audit sub-criteria**	Sub-criterion met 🟢 Sub-criterion partially met 🟡 Sub-criterion not met 🔴
Criterion no. 1: The subprogram's activities are planned in an appropriate way.	**Sub-criterion 1.1:** The subprogram's expected outcomes are clearly defined.	🟢
	Sub-criterion 1.2: The subprogram identified the activities required to obtain the expected outcomes.	🟢
	Sub-criterion 1.3: Plans for the necessary development of infrastructure to meet the future user needs have been made.	🟡
	Sub-criterion 1.4: Plans for financial resources have been made for scheduled activities.	🟡
	Sub-criterion 1.5: A human resources management plan has been developed and implemented.	🟢
	Sub-criterion 1.6: The subprogram identifies and manages risks that could hinder obtaining the expected outcomes.	🟡
Criterion no. 2: The subprogram's activities are controlled in an appropriate manner.	**Sub-criterion 2.1:** The organizational structure reflects the division of responsibilities on the basis of activities and these responsibilities are clearly defined.	🟢
	Sub-criterion 2.2: Expense authorizations are controlled, expenses are approved and comply with laws and regulations.	🟢
	Sub-criterion 2.3: Financial transactions are accounted for appropriately.	🟢
	Sub-criterion 2.4: Controls are in place to allow for monitoring of activities.	🟢
Criterion no. 3: Activities are measured according to expected outcomes and are subject to accountability.	**Sub-criterion 3.1:** Performance indicators and targets are established.	🟢
	Sub-criterion 3.2: Information linked to indicators is collected and compared to targets.	🟢
	Sub-criterion 3.3: Activities are subject to accountability.	🟢