



Canadian Space Agency
Agence spatiale
canadienne



Audit of the Management Framework of the Earth Observation Mission Program
– RADARSAT Constellation Mission (RCM)
(1.1.1.1)

AUDIT REPORT

Project # 14/15 01–01

Prepared by the Audit and Evaluation Directorate

AUGUST 2015

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1.0 SUMMARY

1.1 Audit objective

The objective of this audit is to determine whether a management framework is in place to enable the Program objectives to be achieved and, more specifically, to prevent cost increases, comply with the implementation schedule, and meet users' expectations.

1.2 Audit opinion

In our opinion, a management framework is in place to enable the Program objectives to be achieved and, more specifically to prevent cost increases, comply with the implementation schedule, and meet users' expectations.

1.3 Statement of assurance

As Chief Audit Executive, I am of the opinion that sufficient and appropriate audit procedures have been conducted and evidence gathered to support the accuracy of the opinion provided in this report. That opinion is based on a comparison of the circumstances, as they existed at the time of the audit, with the pre-established audit criteria agreed on with management. The opinion is only applicable to the particular entity examined. Evidence was gathered in accordance with Treasury Board internal audit policy, directives and standards. The procedures followed comply with the professional standards of the Institute of Internal Auditors. Sufficient evidence was gathered to convince senior management of the validity of the opinion derived from the internal audit.

1.4 Summary of recommendations

The Earth Observation Mission Program – RADARSAT Constellation Mission (RCM) has established good practices in regard to the identification and management of risks. Indeed, a risk management framework is well defined and implemented. In particular, risks associated with cost increases, schedule delays and user expectations are identified and controlled. If necessary, mitigation measures are developed and/or a risk provision is established. The RCM Project is currently at the halfway point.

We also found that appropriate controls mechanisms are in place to ensure that deliverables comply with predetermined specifications set out in the agreements with suppliers, their integration with other Project components and their proper functioning. Moreover, project roles and responsibilities are well-defined and communicated; activities are monitored and analyzed thoroughly; issues are addressed promptly; oversight or corrective measures are implemented when necessary; and accountability reporting is done in a timely manner and at an appropriate level.

Furthermore, although no recommendation has been made, important issues will continue to require a special attention from management.

Signature of the Chief Audit Executive

Audit Team members

Dany Fortin

Louis Martel



2.0 AUDIT REPORT

2.1 Context and risk

The Canadian Space Agency (CSA) mandate 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”.

Established in 2008, the RCM Project is the follow-on to the Canadian RADARSAT-1 and RADARSAT-2 satellites, and consists of three identical satellites. The RCM Project will allow Canada to maximize its capacity to carry out continuous surveillance from space. It will provide an overview of Canada’s land mass, especially in the Arctic, waterways and coastal areas. It will help to expand Canada’s capacity to observe and manage its natural resources and environment, while increasing the degree of surveillance of Canadian territory to ensure Canada's safety, security and sovereignty. The three satellites will be launched into orbit simultaneously during a one-time launch activity scheduled in 2018. Each satellite has an estimated service life of seven years.

The RCM Project will also support the development, in Canada, of highly specialized design and manufacturing capacities, as well as the incorporation of satellite data in information products and services. Canada’s aerospace and geomatics industries will benefit from better positioning in international markets and have priority access to data deemed essential by many international users. The RCM Project will also provide universities with the data they need to conduct their own research.

By consulting with federal department users, the CSA contributes to applications development and oversees the following:

- Design, development, manufacturing, integration, testing and installation of space and ground segments;
- Launch of the three satellites;
- Constellation operations.

The following are the RCM Project phases.

PHASE	DESCRIPTION	DEADLINE
A	Definition of requirements	March 2008
B	Preliminary design	March 2010
C	Review of detailed design	March 2013
D	Manufacturing and launch of the three satellites	July 2018
E1	Operations within the framework of major Crown projects	September 2019
E2	Operations outside the framework of major Crown projects	September 2025

2.2 Audit objective, scope and method

Objective

The objective of the audit is to determine whether a management framework is in place to enable the Program objectives to be achieved and, more specifically, to prevent cost increases, comply with the implementation schedule, and meet users' expectations.

Scope

The internal audit covered the planning, controlling, monitoring and assessment of outcomes activities relative to the components of Phases D and E1 of the RCM Project:

- a) Phase D:
 - Manufacturing, integration, testing and launch of three satellites;
 - Manufacturing and installation of the related ground segment;
 - Applications development program.
- b) Phase E1:
 - One year of Constellation operations (within the framework of major Crown projects).

Our audit activities focused solely on Phases D and E1 because an external firm had already reviewed Phases A, B and C. The report for this review was released in April 2011.

Method

The audit criteria were determined in accordance with best management practices. The criteria and sub-criteria are included in Appendix A. The audit included various processes, including interviews and a review of documents.

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

2.3 Findings, recommendations and management response

In order to determine whether a management framework is in place to enable the Program objectives to be achieved and, more specifically, to prevent cost increases, comply with the implementation schedule, and meet users' expectations, we expected to find the following elements:

- A management framework used to identify and control project risks related to the following:
 - Cost increases;
 - Schedule delays;
 - User expectations.
- A management framework used to monitor the project and to control compliance of deliverables, that is, procedures for the following:
 - Project monitoring;
 - Compliance of the deliverables with predetermined specifications set out in the agreements with suppliers.

2.3.1 Risk identification and monitoring

<p>Audit objective</p>	<p>To determine whether a management framework is in place to enable the Program objectives to be achieved and, more specifically, to prevent cost increases, comply with the implementation schedule, and meet users' expectations</p>	
<p>FINDINGS</p>	<p>Criterion #1</p>	<p>Risks associated with costs, the schedule and user expectations are managed appropriately.</p>
	<p>Condition</p>	<p>Conclusion about the criterion</p> <p>We found during our audit that the Program has implemented best practices for risk identification and management. Risks associated with costs increases, schedule delays and user expectations are identified and controlled.</p> <p><i>Sub-criterion 1.1: Risk management framework</i></p> <p>RCM Project risk management is carried out in accordance with the CSA's Risk Management Framework and Project Approval Management Framework. The Risk Management Framework emphasizes the early identification and assessment of risks that may have an impact on objectives, costs, the schedule and project performance.</p> <p>Each risk element is assessed according to its probability of occurrence and consequences. Risks are classified as follows:</p> <ul style="list-style-type: none"> - Cost-related: <ul style="list-style-type: none"> ✓ Risks associated with acquisition and development costs possibly going over budget - Schedule-related: <ul style="list-style-type: none"> ✓ Risks associated with the achievement of milestones during the scheduled time period - Technical: <ul style="list-style-type: none"> ✓ Risks associated with engineering processes that may prevent compliance with technical specifications or may affect quality and overall system performance - Program-related: <ul style="list-style-type: none"> ✓ Risks associated with program factors, such as regulations, changes in the project environment, cases of <i>force majeure</i>, etc. <p>The Policy, performance and quality control manager is responsible for the process of identifying, assessing, measuring and monitoring project risks. He also ensures that the principal contractor carries out all necessary risk management activities, including the preparation of reports in accordance with the</p>

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	<p>Statement of Work. The project team participates in the risk identification process and helps carry out monitoring and mitigation activities. Each risk is assigned to a risk owner, who is responsible for identifying and implementing appropriate response measures and reporting to the manager.</p> <p>A database, for which the Project Manager is responsible, is used to compile all of the risks, and an individual record provides detailed information on mitigation measures, responses and changes to each risk. The database is updated regularly. This activity is required for each major project review, as well as for the Risk Management Committee. A risk reserve is budgeted, and a portion of the reserve may be activated after a risk materializes. To release the funds, a form is submitted to the Risk Management Committee Chair for approval.</p> <p>According to contract requirements, the principal contractor is also required to produce a risk management plan, maintain and use a database in which the risks are compiled, monitor changes in the risks, and implement mitigation measures. The principal contractor is also required to report risks in its monthly reports and in meetings with the project team.</p> <p><i>Sub-criterion 1.2: Risks associated with cost increases are identified and controlled.</i></p> <p>Based on our audit, we are of the opinion that the risk of cost increases in the RCM Project is identified and controlled by the Program. We also compiled an inventory of direct components of the project and found that all of them are included in the financial estimates drawn up by project management. The estimates include a risk provision, which is reviewed on a regular basis. No major issue for which a risk provision had not been established was identified.</p> <p>A firm-price contract was negotiated with the principal contractor by Public Works and Government Services Canada (PWGSC). A total of \$706 million out of \$854 million in total costs for Phases D and E1 are included in this contract. CSA managers of the Program carried out analyses to ensure that the signed firm-price contract with the principal contractor was fair and reasonable. Following these analyses, additional negotiations were held prior to the signing of the contract. The agreement covers the manufacturing, assembly and launch of the satellites, as well as the first year of operation. The risks of cost increases for the CSA for the</p>

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	<p>components and the criteria set out in the contract with the principal contractor are low.</p> <p>The CSA assumes the other costs provided for in Phases D and E1 of the project. Project management identified them during the planning phases. These costs are based on the assumptions described in the Cost Assumptions document, and they are reviewed on a regular basis. These other costs primarily cover CSA employee salaries, the ground segment and applications development. The analysis of the agreement with the principal contractor and the discussions held with the Program, allowed us to identify some issues or situations that could generate additional costs, as follows:</p> <p><u><i>Force majeure</i></u></p> <p>The agreement with the principal contractor includes a <i>force majeure</i> clause and lists potential <i>force majeure</i> situations. The cited situations include the following: an event that cannot be avoided and which is beyond the control of the parties; a launch failure; damage caused by space debris; or a change of launch vehicle because of non-reliability. If this clause is cited by the principal contractor and applicable, additional costs could be generated for the CSA.</p> <p><u>Other possible causes of cost increases</u></p> <p>CSA decisions that would result in changes to the requirements set out in the contract with the principal contractor or CSA non-compliance with a clause in the said contract are cases that might result in additional costs for the project.</p> <p>In addition, failure by the principal contractor to comply with some of the milestones in the schedule or a level of performance below that expected of the Constellation may result in additional costs for the CSA.</p> <p><i>Sub-criterion 1.3: Risks associated with schedule delays are identified and controlled.</i></p> <p>In our opinion, the schedule-related risks are identified and controlled. A possible delay in the delivery of the satellites has been identified by Program management, and the principal contractor has been asked to implement mitigation measures to correct the situation. We believe it to be very important to closely monitor the schedule up until the completion of the project.</p> <p>Since the start of the construction phase, the Program has noted</p>

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		<p>delays in relation to the initial plan for the completion of some tasks. Some of the delays have had an impact on the number of contingency days, while other delays have not had an impact. The number of contingency days was 52 in September 2014 and 24 in December 2014. After the principal contractor and CSA representatives had a meeting (Schedule Summit) in January 2015, a series of measures to increase the number of contingency days were identified by the principal contractor and accepted by the CSA. One of the agreed measures was to undertake the manufacture and assembly of the second and third satellites before all of the tests on the first satellite had been completed. The principal contractor and the Program managers are of the opinion that the risks associated with this measure are acceptable. The internal audit consulted the CSA's Safety and Mission Assurance (S&MA) function about this issue, and it was of the same opinion. The principal contractor assessed other measures for increasing the number of contingency days. However, the Program managers believe that the scope of these measures would be limited. At this point, Program management believes that it is possible with the current number of contingency days to comply with the schedule for delivery of the satellites, although the situation does not allow for any flexibility in the event of a major technical problem.</p> <p>The principal contractor submits a monthly schedule to the CSA. The CSA keeps its own schedule incorporating all of the project deliverables. Discussions between the parties about the schedule are held on a regular basis (often weekly). Concerns that have a potential impact on the launch date are shown in a Critical Path table. The provision for risks includes amounts associated with the schedule that may have an impact on costs. The principal contractor maintains that the launch scheduled for July 17, 2018 will take place.</p> <p>The schedule for the other deliverables, which include government-furnished equipment (GFE), is monitored by the CSA. None of these items is shown on the Critical Path of the project. The contingency period for the Primary Control Facility (PCF) is more than six months, and between eight to ten months for other GFE. Although the PCF's contingency leeway is decreasing, there is no issue to be mentioned.</p> <p><i>Sub-criterion 1.4: Risks associated with users' expectations are identified and controlled.</i></p>

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		<p>We found that the risks associated with users’ requirements have been identified and that mitigation measures are planned.</p> <p>Users’ requirements have been established during meetings of internal and government-wide committees and recorded in documents designated for that purpose. All changes are made according to an established procedure and are approved by the appropriate authorities. The approved changes are managed in accordance with the project’s financial framework and schedule constraints.</p> <p>The main risks associated with users’ requirements concern compliance with the schedule and Constellation performance. Should one of these risks materialize, it would delay utilization of the expected data by clients.</p> <p>Measures are provided for in the project and will be implemented, if necessary, to alleviate inconveniences caused to some users in cases where the RCM data are not available as planned (delays, system capacity, service capacity, etc.). During our audit, we examined documents relative to the current utilization of RADARSAT-2 data and had discussions with Program management in order to ensure, in cases of temporary measures relative to the RCM, that the CSA’s requirements for additional RADARSAT-2 data can be met. Program management believes that the current capacity of the RADARSAT-2 satellite and the capacity for downloading data are such that the possible utilization of RADARSAT-2 data in cases where temporary measures are implemented would not be problematic.</p> <p>Provision is made for users to be consulted in all cases where temporary measures could not be implemented. These cases may include users of the Automatic Identification System (AIS), component, given the specific characteristics of the latter.</p> <p>According to Program management, there are currently no signs indicating that a technical risk associated with the performance of the satellites might affect users’ requirements.</p>
	<p>Causes</p>	<p>n/a</p>
	<p>Effect</p>	<p>n/a</p>
<p>RECOMMENDATION</p>	<p>n/a</p>	

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RESPONSIBILITY IDENTIFIED	Organization	n/a
	Function	n/a
MANAGEMENT RESPONSE	n/a	
MANAGEMENT ACTION PLAN	Action plan Details	Deadline
	n/a	n/a

2.3.2 Project monitoring and compliance of deliverables

Audit objective	To determine whether a management framework is in place to enable the Program objectives to be achieved and, more specifically, to prevent cost increases, comply with the implementation schedule, and meet users' expectations.	
	Criterion 2	Project activities are monitored and the key phases are controlled appropriately.
	Condition	<p>Conclusion about the criterion</p> <p>Program management has implemented good practices for monitoring project activities and for controlling key project phases.</p> <p><i>Sub-criterion 2.1: Mechanisms are in place for ensuring project monitoring</i></p> <p><u>Overall monitoring of activities</u></p> <p>We found that project roles and responsibilities are well-defined and communicated, that activities are monitored and analyzed thoroughly, that issues are addressed promptly at the appropriate management level, that oversight and/or corrective measures are implemented when necessary; and that accountability reporting is done in a timely manner at the appropriate management level.</p> <p>The RCM Project team consists of a Project Leader, a Project Director and seven project managers. Five of the seven project managers manage a specific aspect of the project (mission, engineering, operations, GFE and licences). Another manager is responsible for execution of the contract with the principal contractor at the operations level, advancement of the work, major reviews, and information and reports to be received. The</p>



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	<p>seventh manager is responsible for determining and monitoring the implementation of policies, processes and procedures necessary for the project to be properly carried out and to ensure that its outcomes are achieved. All of the project managers have a team of subordinates to help them carry out their tasks. The CSA’s Security and Mission Assurance (S&MA) function is also part of the project team. In total, about 50 people are assigned to the RCM Project, i.e. the equivalent of about 30 full-time equivalents (FTEs). Appendix B of this report includes the May 2015 update of the governance and accountability structure of the RCM Project.</p> <p>The managers and the Project Director meet regularly to discuss progress made in the project and issues concerning costs, the schedule and technical and program aspects. The meetings are held on a weekly or monthly basis, depending on the frequency specified for each meeting. Follow-up on the activities resulting from previous meetings is provided and new activities to be carried out are noted and assigned. Risks are also discussed during these meetings. The project costs are monitored and analyzed during the preparation of the sector’s monthly financial report. Variances between actual costs and initial estimates are analyzed, and projections of future costs are reviewed and adjusted. The Finance Directorate helps the sector carry out this monthly activity. If necessary, funds are reallocated between fiscal years.</p> <p>The CSA uses an integrated consolidated schedule to ensure the smooth conduct of the project and to establish links between the various components. Depending on requirements, the schedule may be detailed or summarized. All aspects of the project are taken into consideration, including the principal contractor’s deliverables, government-furnished equipment (GFE), and all other goods and services required for the project. The deliverables may involve a number of activities that, in turn, may involve a large number of sub-activities. Deliverables with precarious status are indicated in the Critical Path document, and they are given special attention in the project team’s monthly reviews. Program management has also developed tools in house to analyze trends in changes relative to risks, the schedule and technical performance.</p> <p><u>Monitoring of the principal contractor’s activities</u></p> <p>The contract with the principal contractor is a firm-price contract. As stated above, the value of the contract is \$706 million. Unless changes are made to the specifications set out in the contract, or</p>

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	<p>the CSA is in default with respect to delivering GFE on time, or the <i>force majeure</i> clause applies, the estimated total amount of disbursements to the principal contractor will not change.</p> <p>The contract includes a schedule for about 100 milestones for payments to be made to the principal contractor. For a payment to be authorized, the principal contractor must have complied to the CSA’s satisfaction with all requirements associated with the milestone concerned. Weekly meetings of CSA and PWGSC representatives are held to review the status of contractual requirements, and to identify and manage associated risks and problems that have arisen.</p> <p>Weekly reviews are also held with the principal contractor to discuss past activities, analyze current problems and plan upcoming activities. Once a month, the principal contractor sends a project progress report to the CSA. This report includes achievements, concerns, a milestone profile (status and variances) and an updated schedule.</p> <p>The CSA incorporates the information provided by the principal contractor into its own tools in order to monitor the project and assess the principal contractor’s performance in complying with the terms and conditions of the contract, managing the schedule, ensuring that deliverables comply with specifications, and identifying issues. Essentially, the principal contractor’s performance is assessed according to milestones and information taken from the monthly project progress report obtained from them.</p> <p>Various exams and tests are scheduled throughout Phase D to ensure that deliverables comply with the required specifications. In the event of non-compliance with the specifications, the principal contractor implements solutions to the CSA’s satisfaction. About 50 interim technical reviews are scheduled for the Phase D assembly and testing activities. About 20 of these must be approved by the CSA’s technical authority. A certification system is in place. To ensure that project components operate properly and are integrated satisfactorily, provision is made in the contract and the schedule to have all project components undergo a final review carried out by the principal contractor and the CSA. Based on our review of reports, analyses, presentations and meeting minutes carried out during our audit, we are able to affirm that the procedures described above are meticulously implemented by the CSA.</p>



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		<p>The documents identified below define the roles and responsibilities of the parties and describe how the principal contractor must fulfill its obligations with respect to project management, subcontractors management, schedule management, risks management, transmission of information, production of reports, management of meetings, technical reviews and approval tests management, liaison activities, communications, and CSA access to its facilities.</p> <p>These documents are the following:</p> <table border="1" data-bbox="646 730 1409 1465"> <tr> <td data-bbox="646 730 932 869"><i>Mission Requirements Document</i></td> <td data-bbox="932 730 1409 869">Document defining the objectives and requirements of users</td> </tr> <tr> <td data-bbox="646 869 932 1008"><i>Product Assurance Requirements</i></td> <td data-bbox="932 869 1409 1008">Document defining the quality assurance requirements for project deliverables</td> </tr> <tr> <td data-bbox="646 1008 932 1146"><i>IT Security Requirements Implementation Plan</i></td> <td data-bbox="932 1008 1409 1146">Document defining appropriate security controls for information technologies</td> </tr> <tr> <td data-bbox="646 1146 932 1327"><i>Agreement and Statement of Work</i></td> <td data-bbox="932 1146 1409 1327">Document defining the responsibilities of the parties and the work to be carried out by the principal contractor</td> </tr> <tr> <td data-bbox="646 1327 932 1465"><i>System Requirements Specification</i></td> <td data-bbox="932 1327 1409 1465">Document prepared by the principal contractor defining the requirements of systems for the project</td> </tr> </table> <p><u>Monitoring of other activities</u></p> <p>The other activities consist mainly of the following:</p> <ul style="list-style-type: none"> - GFE (Primary Control Facility (PCF), backup control facility (BCF), ground stations and antennas, communications infrastructure, portal and archiving, and Polar Epsilon 2); - Cryptography, reservation system, CSA salaries, PWGSC, David Florida Laboratory (DFL), Shared Services Canada, security, applications, support and operations. <p>Cost control of other project components are carried out during the monthly financial review overseen by the Director General,</p>	<i>Mission Requirements Document</i>	Document defining the objectives and requirements of users	<i>Product Assurance Requirements</i>	Document defining the quality assurance requirements for project deliverables	<i>IT Security Requirements Implementation Plan</i>	Document defining appropriate security controls for information technologies	<i>Agreement and Statement of Work</i>	Document defining the responsibilities of the parties and the work to be carried out by the principal contractor	<i>System Requirements Specification</i>	Document prepared by the principal contractor defining the requirements of systems for the project
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	<p>Space Utilization. Other project activities are also incorporated into the CSA's overall schedule. In addition to GFE being part of this overall schedule, there is a specific detailed schedule for GFE. The deliverables of the other activities are tested to verify that they work properly and are adequately integrated with other project components. Milestones are planned for this purpose in the overall schedule.</p> <p>Following our review of the monitoring process for other activities, we can affirm that it is implemented by CSA and that it is appropriate. To arrive at that conclusion, we selected a sample of two components, based on the budgeted amount and on a related risk assessment, in order to review the monitoring process carried out. The Applications Development component and the PCF component were selected from among 13 components. Although these two components were in the course of being implemented, we were able to note that at the time we conducted our review, some agreements had been drawn up to state the expectations of the parties, as well as their roles and responsibilities. Other agreements still have to be established, as in the case of the construction of the PCF in St. Hubert, where the work had not yet begun at the time of our review.</p> <p>With respect to the control facility, we found during our review that the CSA is about to draw up a governance plan for the supervision and monitoring of the PCF construction phase. Two governance committees are being considered: a planning committee and a worksite committee. The planned time period for the construction phase is 290 days. This period of time includes the time required to award a contract to a contractor (60 days) and a contingency period (75 days). Although the number of contingency days is decreasing, the CSA does not see an issue relative to the PCF delivery schedule. The costs are controlled during the monthly financial review. A weekly report on the implementation status of this component is prepared and discussed during the project team's weekly meeting.</p> <p>With respect to applications development, the Data Utilization Application Plan provides detailed information on the financing, implementation, schedule, governance and management framework of this component.</p> <p>Using the documents consulted during our audit, we drew up a list of management tools and controls used for the purposes of the RCM Project. The main categories concerned risks, boards,</p>

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	<p>committees, milestones, security and mission assurance, certification, performance, and oversight. A detailed list is provided in Appendix C.</p> <p><u>Reports and accountability reporting</u></p> <p>We found during our review that project information is disseminated in a timely manner to persons at various project responsibility levels.</p> <p>Every week, an activity report is prepared for the Project Director. It provides a breakdown by component of the status of the project, provides follow-up on activities to be resolved that were carried over from the previous period, includes a project dashboard, mentions achievements as well as issues that arose during the current period, and lists tasks in the upcoming month.</p> <p>It is the Project Director’s responsibility every month to submit to the Project Leader relevant information on progress made in the project. To do that, the Project Director uses a dashboard that provides highlights of the month and key information for monitoring the development of the project. Information related to requested changes to the project, costs, schedule, risks and issues are also part of the dashboard. Similarly, the Project Leader informs the CSA Executive Committee of the project status and any other information deemed relevant.</p> <p>The project stakeholders are also informed of progress made in the project in a quarterly report prepared by the CSA. This quarterly report provides a summary of achievements, issues and progress made during the period ended, and is approved by the Project Director.</p> <p><i>Sub-criterion 2.2: Procedures are in place to ensure that deliverables comply with predetermined specifications in the agreements with suppliers.</i></p> <p>We found that various control points are planned at various times in the overall schedule for Phases D and E1. The CSA uses these control points to ensure that the deliverables comply with the predetermined specifications, their integration with other project components, and their proper functioning.</p> <p>Phase D includes about 50 interim technical reviews, 20 of which must be approved by the CSA’s technical authority of the project. Although all of the control points are important, we focused our attention on the following control points:</p>

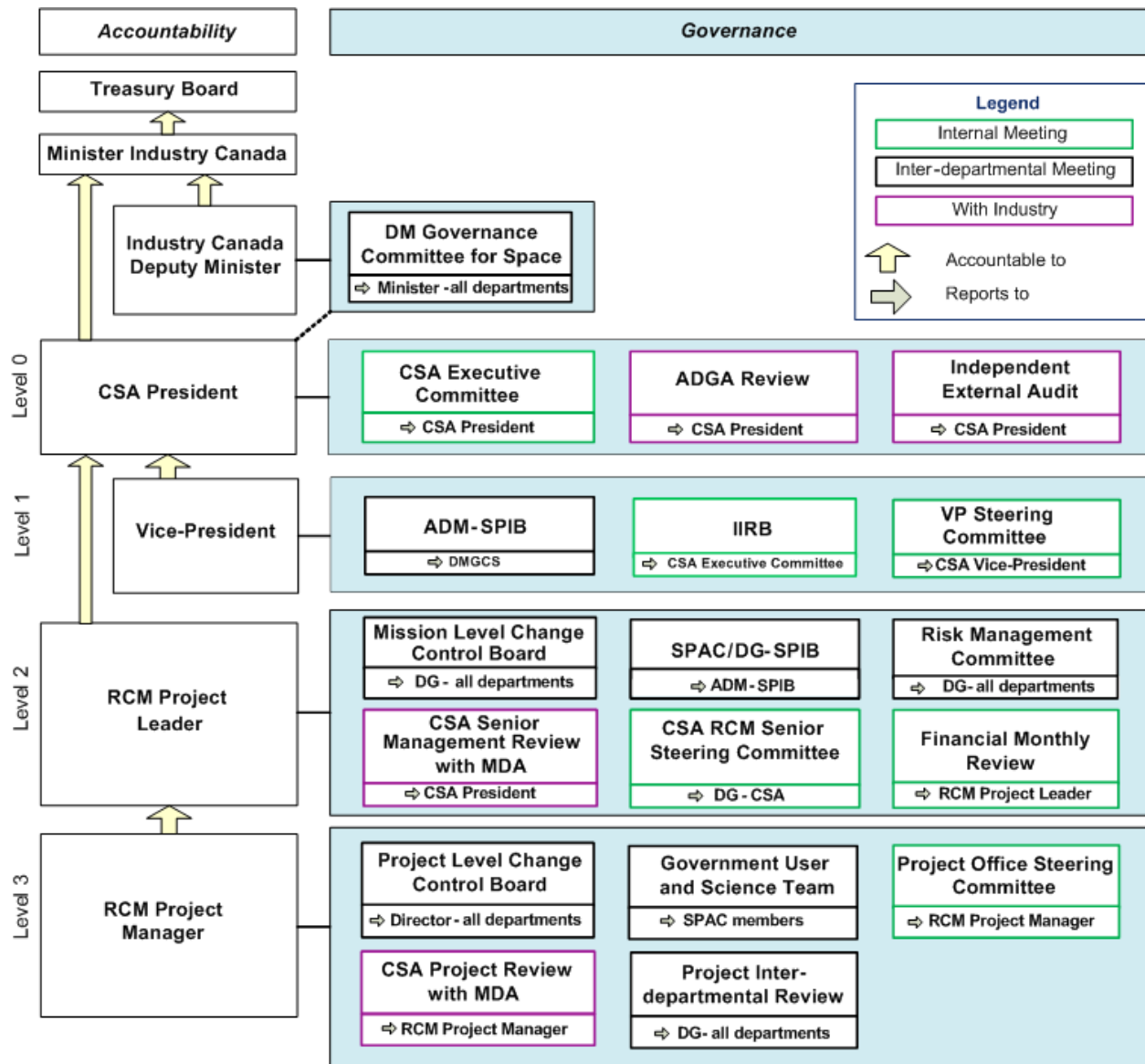
Audit objective	To determine whether a management framework is in place to enable the Program objectives to be achieved and, more specifically, to prevent cost increases, comply with the implementation schedule, and meet users' expectations.	
		<ul style="list-style-type: none"> - Acceptance Review - Readiness Review - Commissioning Review - Commissioning Complete Review - Constellation Commissioning Complete Review <p>The commissioning reviews are planned near the end of the Phase D schedule and help the CSA ensure that all project components operate correctly.</p> <p>In our opinion, the compliance controls are implemented properly by CSA and the results are well-documented. To reach this conclusion, we selected three compliance controls among those that the CSA had already carried out or supervised, and we found the following:</p> <ul style="list-style-type: none"> - The planned compliance controls in the schedule are carried out satisfactorily; - The CSA ensures that the deliverables comply with the predetermined specifications in the agreement; - When compliance with specifications was not achieved, the parties communicated with each other and corrective measures were implemented to the CSA's satisfaction; - The compliance tests are validated and approved at an appropriate CSA management level; - Where the tests of deliverables are positive, and if required, a certificate of compliance or similar document is issued.
	Cause	n/a
	Effect	n/a
RECOMMENDATION	n/a	
RESPONSIBILITY IDENTIFIED	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:	To determine whether a management framework is in place to enable the Program objectives to be achieved and, more specifically, to prevent cost increases, comply with the implementation schedule, and meet users' expectations	
<u>Audit criteria</u>	<u>Audit sub-criteria</u> Sub-criterion met  Sub-criterion partially met  Sub-criterion not met 	
Criterion No. 1 Risks associated with costs, the schedule and users are managed appropriately.	Sub-criterion 1.1: A risk management framework is in place.	
	Sub-criterion 1.2: Risks associated with cost increases are identified and controlled.	
	Sub-criterion 1.3: Risks associated with schedule delays are identified and controlled.	
	Sub-criterion 1.4: Risks associated with users' expectations are identified and controlled.	
Criterion No. 2 Project activities are monitored and the key phases are controlled appropriately.	Sub-criterion 2.1: Mechanisms are in place for ensuring project monitoring.	
	Sub-criterion 2.2: Procedures are in place to ensure that deliverables comply with predetermined specifications in the agreements with suppliers.	

APPENDIX B – ACCOUNTABILITY AND GOVERNANCE



APPENDIX C – MANAGEMENT AND MONITORING TOOLS

Boards / Committees	
Change Control Board	CCB
Control Review Board	CRB
Deputy Ministers Governance Committee for Space	DMGCS
Executive Committee	XC
Parts Control Board (S&MA)	PCB
Project Office Steering Committee	-
Risk Management Committee	RMC
Senior Project Advisory Committee	SPAC
Senior Steering Committee	-
Space Program Integration Board	SPIB
Test Review Board	TRB
VP Steering Committee	-

Risks	
Risk Information and Assessment System	RIAS
Risk Management Framework	RMF
Risk Management Plan	RMP

Security & Mission Assurance (S&MA)	
Product Assurance	PA
Program Assurance	PA
Quality Assurance	QA
Safety and Mission Assurance	S&MA
Safety and Program Assurance	S&PA

APPENDIX C – MANAGEMENT AND MONITORING TOOLS (CONT'D)

Milestones	
Acceptance Review	AR
Commissioning Complete Review	CCR
Constellation Commissioning Complete Review	CCCR
Critical Design Review	CDR
Factory Acceptance Test	FAT
Final Acceptance Review	FAR
Flight Readiness Review	FRR
GFE Acceptance Review	GAR
Launch Readiness Review	LRR
Mission Acceptance Review	MAR
Mission Critical Design Review	MCDR
On-Site Acceptance Test	OSAT
Operations Planning Review	OPR
Operations Readiness Review	ORR
Operations Validation Readiness Review	OVR
Operations Validation Review	OVR
Preliminary System Requirements Review	PSRR
Pre-Shipment Review	PSR
Spacecraft Operations Validation Test	SOVT
System Product Assessment Review	SPAR
Test Data Review	TDR
Test Readiness Review	TRR

Certification	
Certification and Accreditation	C&A
Mandatory Inspection Point	MIP
Statement of Compliance	SoC

Performance	
Schedule Performance Index	SPI

Oversight	
Independent External Audit on Internal Controls	-
Independent Review	-

APPENDIX D – LIST OF TECHNICAL ACRONYMS USED

AIS	Automatic Identification System
PCF	Primary Control Facility
BCF	Backup Control Facility
GFE	Government Furnished Equipment
RCM	RADARSAT Constellation Mission
S&MA	Security & Mission Assurance