



CANADIAN SPACE AGENCY

Performance Report For the period ending March 31, 2008

Analysis of Program Activities by Strategic Outcome

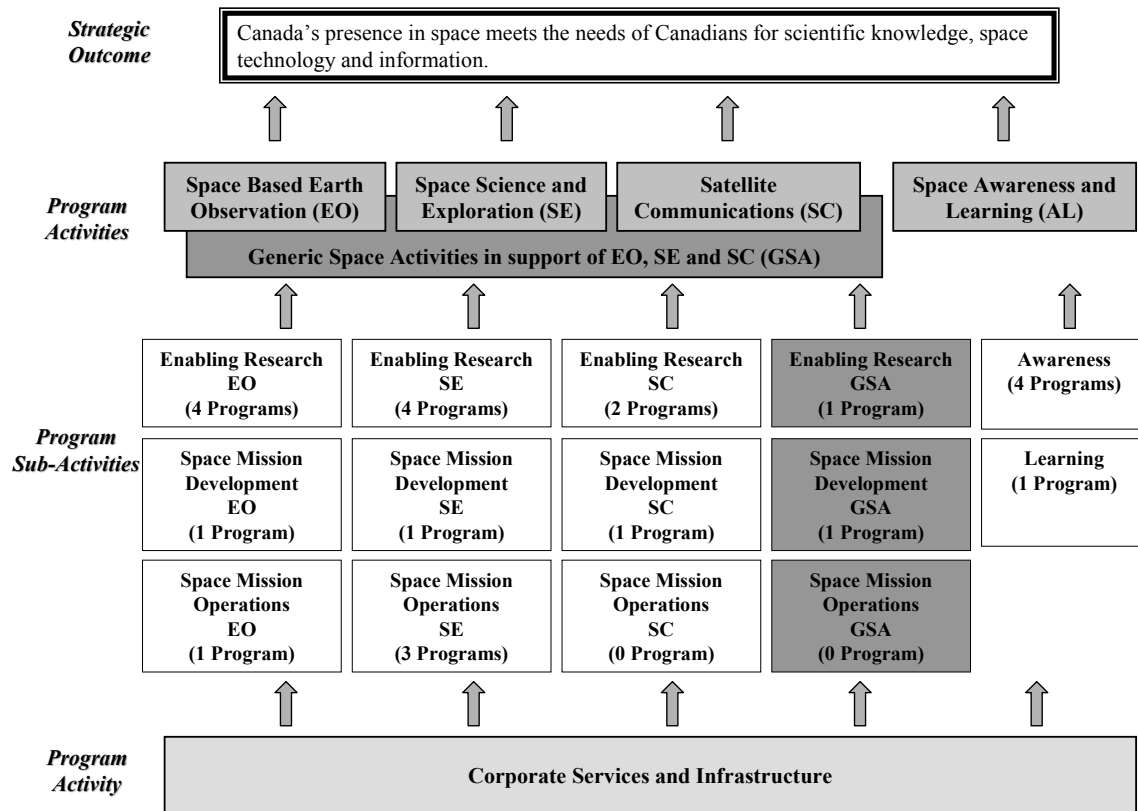
- Detailed Performance Information -

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INTRODUCTION

Since 2005-2006, the Canadian Space Agency's (CSA) achievements' are reported according to the Program Activity Architecture (PAA) framework. The information is presented by Program Activity, Program Sub-Activity and then by Program Sub-Sub-Activity.



Please note that this document is produced electronically only.

SECTION 2: ANALYSIS OF PROGRAM ACTIVITIES BY STRATEGIC OUTCOME

2.1 HOW TO READ THE DETAILED ANALYSIS




Program Activity: For this level, the information is reported against final results and performance indicators. For the first time, a progress report from the year 2005-2006 is provided. However, during the 2008-2009 Performance Management Framework (PMF) exercise, the results and indicators were reviewed thoroughly. The reviewed set of results and indicators was presented in the 2008-2009 Report on Plans and Priorities (RPP). The first final results full analysis will take place in 2010 at the end of the five-year cycle that started with the approval of the Canadian Space Strategy in February 2005 and the implementation of the Program Activity Architecture (PAA) in 2005-2006.

Program Sub-Activity: For this level, intermediate results and performance indicators were only developed in 2007-2008 and therefore are listed for the first time in the 2008-2009 RPP.

Program Sub-Sub-Activity: For this level, the information is reported yearly against immediate results and performance indicators. In this year's report, a 3-year trend performance analysis is provided for each sub-sub-activity.

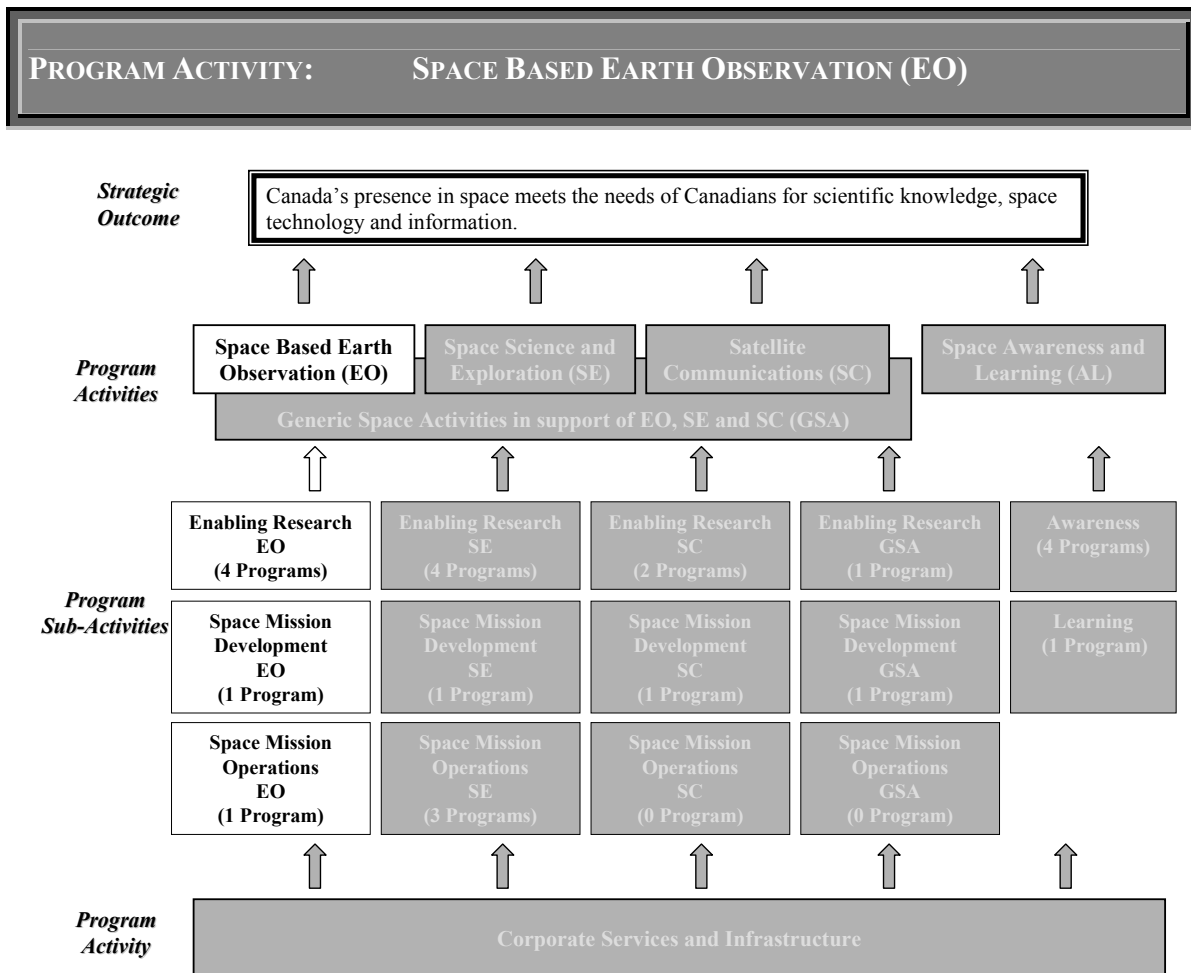
Performance Analysis: Every year, a performance analysis is completed for each level of the PAA. This analysis provides contextual, complementary or methodological, as well as financial and human resources information.

Added feature in this year's report: 3-Year Trend Analysis illustrated by the following star system:

	SUPERIOR ACHIEVEMENT: Uncommon achievement over targeted superior limit.
	SATISFACTORY ACHIEVEMENT: Expected or maintained achievement within lower and superior targeted limits.
	UNSATISFACTORY: Achievement below targeted lower limit.

Highlights of Main Accomplishments: For each Program Sub-Activity, examples of achievements are selected from the array of projects and activities carried out by the CSA and its industry, academic and government partners, in response to what was forecasted in the corresponding RPP.

2.2 SPACE BASED EARTH OBSERVATION



Priority: Develop and operationalize the use of Space Based Earth Observation (EO) for the benefit of Canadians.

Performance Status: 100% (23/23) of the Program Sub-Sub-Activities targets were met in 2007-2008. It is a 17% increase over 2006-2007 achievements.

The Program Activity results and indicators were thoroughly reviewed during the annual 2008-2009 Performance Measurement Framework update. The revised set of results and indicators is listed in the Report on Plans and Priorities 2008-2009. Next year's Departmental Performance Report will be based on these new performance measurements.

SPACE BASED EARTH OBSERVATION

2007-2008 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT

Expected Result

Delivery, directly or in partnership, of Space Based EO data, products and services in response to operational and scientific user requirements in the fields of Environment, Resource and Land Use Management, and Security and Foreign Policy, supported by access capacity development.

MAIN ACCOMPLISHMENTS IN 2007-2008

RADARSAT-2 was successfully launched in December 2007 and the commissioning was completed in April 2008. More than 200 projects are currently preparing the utilization of the RADARSAT-2 Canadian government data allocation, valued at \$445 million.

The CSA continued to ensure Canada's commitment, as an official member of the International Charter "Space and Major Disasters", to use EO satellites in response to disasters. The CSA regularly contributes RADARSAT-1 data products upon charter activation and more than 45 charter activations were supported by the CSA during the year.

Canada's SCISAT-1, launched in August 2003, continues to provide excellent data enhancing Canadian scientist's understanding of stratospheric ozone layers as well as greenhouse gases.

Indicators	Performance
1. Number of RADARSAT operational users and applications.	<p>Commercial users have utilized a total of 21,126 frames with 17 different domains of application; 10 Federal Government departments have used a total of 7,910 frames.</p> <p>The Alaska Satellite Facility (ASF) has processed a total of 64,800 frames and 7,500 Interferometry products. The National Oceanic and Atmospheric Administration (NOAA) and National Ice Center (NIC) remained the ASF's largest clients.</p>
2. Number of active missions supported directly or indirectly by Canada.	A total of 8 active missions and 11 missions in development were supported directly or indirectly.
3. Growth in federal government departments and agency budgets allocated to the exploitation of Space Based EO data, data derived information and services in the fields of the Environment, Resource and Land Use Management, and Security and Foreign Policy.	There were 10 federal government departments using RADARSAT EO data in 2007-2008, the same number of departments as in 2006-2007. However, the amount of RADARSAT data used by 4 of them has increased considerably.

<p>4. Number of annual hits on the Canadian Geospatial Data Infrastructure (CGDI) related to CSA-sponsored (directly and/or indirectly) scientific and operational missions.</p>	<p>During fiscal year 2006-2007, the Discovery Portal of GeoConnexion received an average of 3,909 visitors per month requesting an average of 379,530 pages per month for an estimated yearly total of 47,000 visitors and 4.6 million pages.</p>
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Indicator 1 – Performance Analysis

RADARSAT data can be ordered through 4 different order desks. A total of 7,910 frames were processed at the Canadian government order desk located at the CSA and the Canadian Ice Services located at Environment Canada. The commercial order desks at MacDonald Dettwiler and Associates (MDA) and at the Alaska SAR Facility for U.S. government request are the two other order desks.

It should be noted that the number of 10 Departments does not take into account branches and divisions that are part of these departments (i.e. Canada Centre for Remote Sensing (CCRS), Canadian Forest Services (CFS), Geological Survey of Canada (GSC) are three branches of Natural Resources Canada). The largest government user of RADARSAT data is still the Canadian Ice Service of Environment Canada for ice monitoring activities. Environment Canada (EC), the Canadian Coast Guard (CCG), Transport Canada (TC), Department of National Defence (DND) and Fisheries and Oceans (DFO) are coordinating their efforts to implement ISTOP (Integrated Satellite Tracking of Polluters). By doing so, they have been more effective and have reduced their cost by sharing RADARSAT data acquired to monitor the targeted area. ISTOP became fully operational in 2006-2007 and the amount of RADARSAT data usage has increased in 2007-2008. RADARSAT data are also used successfully for applications related to crop monitoring, ship detection, wetland mapping, ocean wind field mapping, soil subsidence and soil movement monitoring, disaster monitoring and, especially, flood monitoring.

The Alaska Satellite Facility (ASF) handled data requests from the U.S. governments as part of the U.S. allocation of the RADARSAT Mission, processing a total of 64,800 frames during the 2007-2008 period. The main areas of application for the frames processed by ASF are for sea ice monitoring, wind speed determination, geological hazards, and scientific research.

MDA Geospatial Services Inc. (GSI) is responsible for the commercial sale of RADARSAT data. A total of 21,126 frames were sold by MDA for telemetry and commercial use through 1,305 orders in 2007-2008. Europe is the largest market accounting for 61%, followed by the U.S. with 15%, and the Far East with 12%. Ship detection is the main application accounting for 54% of the frames, followed closely by applications related to ice monitoring with 15%, defense applications with 13%, and oil pollution with 7%. These numbers do not include the frames ordered by Canadian government departments and agencies or processed at the Alaska Satellite facility for the U.S. government.

Indicator 2 – Performance Analysis

Missions	Status	Fields
CloudSat (2006)	In operation	Environment
ESA-ERS-2 (2005)	In operation	Environment, Resource and Land Management
ESA-ENVISAT (2002)	In operation	Environment, Resource and Land Management
MOPPITT (1999)	In operation	Environment
OSIRIS (2001)	In operation	Environment
RADARSAT-1 (1995)	In operation	Environment, Resource and Land Management, Security and Foreign Policy
SCISAT (2003)	In operation	Environment
RADARSAT-2 (2008)	In operation	Environment, Resource and Land Management, Security and Foreign Policy
RADARSAT Constellation (2014)	In development	Environment, Resource and Land Management, Security and Foreign Policy
PROBA-2 (2008)	In development	Environment
AQUARIUS (2009)	In development	Environment
Chinook (2010)	In development	Environment
ESA-SMOS (2008)	In development	Environment
ESA-Swarm (2010)	In development	Environment
ESA-ADM/Aeolus (2009)	In development	Environment
EarthCARE (2013)	In development	Environment
ESA-Cryosat (2009)	In development	Environment
ESA-GOCE (2008)	In development	Environment
ESA-Sentinel-1 (2011)	In development	Environment, Resource and Land Management, Security and Foreign Policy
* Weather instruments on the Polar Communication and Weather (PCW) satellite (2014)	Under review	Environment, Resource and Land Management, Security and Foreign Policy

(Year) = Actual or projected launch date or date of completion if in the "Status" column.

* = New missions in 2007-2008

Indicator 3 – Performance Analysis

There were 10 federal government departments using RADARSAT EO data in 2007-2008. The same number of departments as in 2006-2007. The largest users are still the Canadian Ice Center of Environment Canada, Natural Resources Canada, Fisheries and Oceans, Agriculture and Agri-Food Canada, National Defence and the Canadian Space Agency. It is worth noting that 4 other departments were repeat users of RADARSAT data during the 2007-2008 period — Parks Canada, the National Research Council, the Canadian Nuclear Safety Commission and Public Safety and Emergency Preparedness Canada. In 2006-2007, a total of 6,755 processed image frames were provided to federal departments and agencies. In 2007-2008, the total increased to 7,910 processed image frames.

Discussions are currently taking place among the government departments and agencies under the leadership of PWGSC, to consolidate the purchase of EO data for the government departments as a whole. If negotiations are successful, information on all EO data purchases, not just RADARSAT data, by Canadian government departments will become available in 2008-2009.

Indicator 4 – Performance Analysis

Data on the number of hits on the Canadian Geospatial Data Infrastructure (CGDI) related to the CSA sponsored scientific and operational missions are not available. GeoConnections, was able to provide the CSA with monthly statistics from their Discovery Portal, which connects databases with the CSA supported missions. Data for 2007-2008 were not available for the DPR deadline.

2007-2008 - Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
114.1	112.1	53.3
2007-2008 - Human Resources (FTEs)		
Planned	Total Authorities	Actual
92.4	N/A	59.1

To learn more about Earth Observation, go to:
<http://www.asc-csa.gc.ca/eng/observation/default.asp>

The programs under this Program Activity are divided into three Sub-Activities: Enabling Research, Space Mission Development and Space Mission Operations.

ENABLING RESEARCH – EARTH OBSERVATION

Four Earth Observation Enabling Research Programs with a combination of accomplishments demonstrate how the following expected results were measured and attained.

1- EO Mission Concepts – Objective: Assume leadership and provide support in research and development of new space mission concepts leading to the realization of CSA or international EO space missions.

EXPECTED RESULT:
Industry, government and/or academia conduct mission and payload concept and feasibility studies to establish the technical and/or scientific feasibility and relevance of missions or payloads in order to enable CSA decisions on future EO space missions of interest to Canada.

Indicators	Performance
1. Number of concept (mission and payload) or feasibility studies initiated, pursued or completed. (Target: 7 initiated and 1 completed)	Target Exceeded: 8 concept (mission and payload) or feasibility studies initiated and 2 completed.
2. Number of new missions (Phase 0/A) retained for further implementation. (Target: 1)	Target Met: 1 new mission (Phase 0/A) retained for further implementation.

PERFORMANCE ANALYSIS:3-Year Trend

The comparison was only possible between 2007-2008 and 2006-2007. On both occasions, targets were achieved and showed significant progress towards achievement.



Satisfactory

Indicator 1

From the 8 initiated concept studies, 6 are pertaining to atmospheric processes of climate and its change (APOCC), 1 is for the advanced study for an instrument to observe upper atmosphere dynamics through waves Michelson interferometer (WAMI), and 1 is for the next generation of instruments for the measurements of pollution in the troposphere (MOPITT2).

The 2 completed concepts are an advanced study for and instrument to observe water vapour in the upper troposphere and lower stratosphere (SHOW), an advanced study for an instrument to observe carbon dioxide, methane, and carbon monoxide in the lower atmosphere through carbon cycle science with Fournier transform spectrometry (CCSFTS).

Source: Internal document.

Indicator 2

The mission concept retained for implementation is Spatial Heterodyne Observations of Water vapour (SHOW) an advanced study for an instrument to observe water vapour in the upper troposphere and lower stratosphere.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
1.3	2.9
2007-2008 - Human Resources (FTEs)	
Planned	Actual
5.1	5.4

2- European Space Agency (ESA) Programs in EO – Objective: Through key international partnerships, enhance the Canadian industry's technological base and provide access to European market for value-added products and services in the field of EO.

EXPECTED RESULT:

Successful development and demonstration of advanced technologies, systems, components, or studies provided for in the contracts awarded by ESA to Canadian firms under EO optional programs.

Indicators	Performance
1. Canadian industrial return coefficient in ESA optional programs in EO. (Target: 0.84 or higher)	Target Exceeded: 1.12

PERFORMANCE ANALYSIS:

3-Year Trend

The analysis showed exceptional achievements; the targets were exceedingly met.



Indicator 1

The return coefficient corresponds to the ratio between the actual number of weighted contracts given to a country and the ideal number of contracts to be given to that country according to existing rules. Canadian industrial return coefficients are by Program Activity. The EO optional programs are: ENVISAT the largest ever Earth observation satellite built by ESA, EOEP (Earth Observation Envelope Program), Earth Watch GMES (Global Monitoring for Environment and Security) Service Element and GMES Space Component.

Source: European Space Agency Council. Paris, Agency Key Performance Indicators. ESA/IPC, December 31, 2007. Document available since March 2008 in English only.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
10.1	7.3
2007-2008 – Human Resources (FTEs)	
Planned	Actual
NIL	NIL

3- Science Programs for EO – Objective: Coordinate the Canadian EO scientific community in order to pursue world-class research space missions to advance our knowledge of the Earth's atmosphere and of global climate-change phenomena.

EXPECTED RESULT:

Identified opportunities for Canadian scientists to advance understanding and scientific knowledge of atmospheric environment through the use of space-based observations.

Indicators	Performance
1. Number of scientific publications, reports and conference proceedings acknowledging CSA funding. (Target: 70)	Target Exceeded: 130 scientific publications, reports and conference proceedings acknowledging CSA funding.
2. Number of Highly Qualified Personnel (HQP) involved in the program. (Target: 140)	Target Partially Met: 94 Highly Qualified Personnel (HQP) involved in the program.
3. Number of operating or approved space science research missions. (Target: 6)	Target Met: 6 operating or approved space science research missions.
4. Number of scientific presentations. (Target: 110)	Target Partially Met: 98 scientific presentations.
5. Number of research partnerships (nationally and internationally). (Target: 15)	Target Exceeded: 21 research partnerships (nationally and internationally).
6. Number of awards granted in the year under the CSA Grants and Contributions Program. (Target: 5)	Target Exceeded: 7 awards granted.

PERFORMANCE ANALYSIS:

3-Year Trend

Although the number of publications showed a significant growth compared with previous years, all the other indicators for this sub-sub-activity were only within their targeted values.



Satisfactory

Indicator 1

Many space science missions are currently producing excellent results. Some of the publications are from contracts already completed. Previous year adequate levels of funding greatly helped, in this case, exceeding targets. CSA funds are highly leveraged by funds provided by universities and the National Sciences and Engineering Research Council of Canada (NSERC).

Source: CSA annual survey with scientists currently funded by the Space Science Program.

Indicator 2

The term Highly Qualified Personnel (HQP) includes undergraduate, graduate and postdoctoral fellows, as well as research assistants, research associates, faculty and non-faculty staff. Due to a decrease in budget, the targeted number of HQP could not be met.

Source: CSA annual survey with scientists currently funded by the Space Science Program.

Indicator 3

Funded activities are supporting instrument control, data validation and processing for 6 operating missions: MOPITT, OSIRIS, SCISAT, RADARSAT-1, ENVISAT and CloudSat.

Source: Internal document.

Indicator 4

Due to a decrease in budget, the targeted number of presentations could not be met.

Source: CSA annual survey with scientists currently funded by the Space Science Program.

Indicator 5

There are no additional research partnerships nationally and internationally since 2005-2006. Efforts went to consolidate a large and diverse network of national and international partners.

Source: Internal document.

Indicator 6

Six new grants have been awarded through the Space Science Enhancement Program and 1 grant awarded through the program for Institutions dedicated to Space Research and Education.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
1.2	2.1
2007-2008 – Human Resources (FTEs)	
Planned	Actual
3.0	1.0

4- EO Application Development Programs – Objective: Enhance Canada's ground receiving and data processing systems, and develop and demonstrate EO data value-added applications for commercial use and for Canadian government operations.

EXPECTED RESULT:

Increasing the use of EO data in public and private sectors through the development and demonstration of applications.

Indicators	Performance
1. Number of new EO applications operationally used. (Target: 20)	Target Met: 22
2. Number of new field of applications using EO data. (Target: 8)	Target Exceeded: 15

PERFORMANCE ANALYSIS:

3-Year Trend

All indicators exceedingly met their targets.



Indicator 1

The applications operationally used were developed through the Earth Observation Application Development Program and the Government Related Initiatives Program. In 2008-2009, this indicator was replaced by a new one that demonstrates better the output produced by the programs: *Number of new applications using EO data.*

Source: Internal document.

Indicator 2

The number of new fields of application are linked to the applications reported under the indicator no 1. For example they cover fields such as Ground Water, Ocean Operations, Operational Oceanography, Parameters for Agricultural Practices. In 2008-2009, this indicator was replaced by a new one that demonstrates better the output produced by the programs: *Number of new users of EO applications.*

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
13.6	11.9
2007-2008 – Human Resources (FTEs)	
Planned	Actual
11.3	9.7

Highlights of Main Accomplishments – Enabling Research (EO)

- The CSA completed the Mission definition phase and initiate the process for the preliminary and detailed design definition phases of the RADARSAT-Constellation Mission.
- CSA is currently supporting 236 projects to prepare for the utilization of the RADARSAT-2 Canadian government data allocation, valued at \$445 million. The Government-Related Initiatives Program (GRIP), the Earth Observation Applications Development Program (EOADP) and the Science Operational Application Research Program (SOAR) generated research projects and pilot and demonstration projects from industry, government, universities as well as international partners. Projects initiated during the 2007-2008 period focussed on applications development of the advanced mode of RADARSAT-2 and on its operationalization.
- As part of the ‘Earth Observation for Sustainable Development for Forest’ program, a Canada-wide forest map is used to support the completion of the National Forest Inventory and as a baseline in the greenhouse gas international reporting activities. These five-year initiatives were co-funded by the CSA and the Canadian Forest Service in collaboration with other government departments, the ten provinces and three territories, and several universities across Canada.
- The Coordinated Earth Observation Marine Surveillance project (CEOMS) has been implemented and provides an exhaustive understanding of Earth observation needs and requirements for the Marine Surveillance and Security operational stakeholders among the Government of Canada.
- Four of the seven projects undertaken under CSA's TIGER initiative have been completed. TIGER aims at demonstrating the usefulness of space based Earth observation for integrated water resources management applications in Africa. CSA is currently in discussion with the European Space Agency for the planning of TIGER Phase 2.

- The CSA, NASA, the Center for South-eastern Tropical Advanced Remote Sensing and the U.S. National Oceanic and Atmospheric Administration have reached an agreement to launch an Announcement of Opportunity for new developments in the application of RADARSAT-1 data and for innovative mapping approaches to better understand the dynamics of hurricane genesis, morphology and movement.
- Canadian companies continued to develop advanced space-borne instruments and user-oriented applications through Canada's contribution to the Earth observation programs of the European Space Agency. For example:
 - A Canadian company is developing an uncooled micro bolometer focal planar which will measure the radiation budget of the top of Earth's atmosphere;
 - Canada participates in the calibration and validation activities, and in the development of the retrieval algorithms and data exploitation for the Earth Explorer missions, such as the Soil Moisture and Ocean Salinity Mission (SMOS), the Atmospheric Dynamics Mission (ADM-Aeolus), and CryoSAT-2;
 - CSA is also initiating a joint program with ESA to generate accurate maps of Arctic coastline, incorporating satellite data; and,
 - Another Canadian company led an industrial consortium involving circumpolar countries and the UK to develop pilot services providing information on ice floe and location of icebergs.
- Many scientific teams continue to exploit the data generated by Earth observation instruments on the European Space Agency (ESA) Envisat satellite. For example, a special arrangement was concluded with ESA to receive the Medium Resolution Imaging Spectrometer data directly over Canada. The data is which are processed and distributed to scientists in National Resources Canada, Department of Fisheries and Oceans, other government departments as well as in universities across Canada.
- The CSA completed the assessment of the requirements of the Canadian government users for an optical/hyperspectral mission as part of a joint study with the Italian Space Agency (ASI) that would meet both Canadian and Italian user need.
- From 2004 to 2008, the CSA, Parks Canada, Canadian Centre for Remote Sensing and the University of Ottawa developed together a standardized landscape modification monitoring methods for the Canadian national parks and their surrounding areas using Earth observation data, and especially those from RADARSAT-1. These data are now being used by Parks Canada in the course of its ongoing national monitoring program and in its communication with stakeholders involved in preservation activities. In the near future, Parks Canada intends to start using RADARSAT-2 data for its operations.

- Data obtained from Earth observation satellites, and especially RADARSAT-1, helps the Alberta Geological Services monitor the ground movements using the interferometer radar techniques. Space information facilitates the production of maps showing potential landslides, which can have a high impact on the economy, on transportation infrastructures, and on health of Canadians. These maps are used as land management planning tools for decision makers and, by the transportation and petroleum industries.
- A Canadian company has developed a Web site called: *Iceberg Finder.com* which helps locate icebergs using RADARSAT-1 data. Last November, this Web site won two Canadian innovative product awards for on-line tourism industry.
- A Canadian company completed a pilot project aiming at the use of RADARSAT and ENVISAT imaging to provide strategic information on ice movements for operational navigation. The system was first installed onboard two Canadian Coast Guard Ice breakers, then onboard two ore-carrying ice-breakers and on four oil exploration ships.

SPACE MISSION DEVELOPMENT – EARTH OBSERVATION

One EO Space Mission Development Program, with a combination of accomplishments, demonstrates how the expected result outlined below was measured and attained.

1- EO Projects – Objective: Ensure the development, delivery and commissioning of space-qualified systems for EO missions through effective project, quality and engineering management.

EXPECTED RESULT:

EO projects' deliverables meet mission objectives at critical steps.
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Indicators	Performance
1. Safety and Mission Assurance (including Configuration Management) requirements are identified and met for each project. (Target: 100%)	Target Met: 100%
In accordance with Treasury Board approved Project Approval and Management Framework (PAMF):	
2. Mission objectives are met at critical steps of the projects. (Target: 85%)	Target Met: 100%
3. Project cost is maintained within authorized levels. (Target: 100%)	Target Met: 100%

4. Risks are identified and mitigation plans prepared for each project. (Target: 100%)	Target Met: 100%
5. Number of approved projects associated with science support. (Target: 2)	Target Met: 2 approved projects associated with science support.

PERFORMANCE ANALYSIS:

3-Year Trend

All indicators met their targets within planned limits.



Satisfactory

Indicator 1

Safety and Mission Assurance and Configuration Management (S&MA and CM) requirements are implemented on all EO projects: RADARSAT-2, CHINOOK and RADARSAT Constellation.

S&MA and CM requirements are implemented for phases related to preliminary design definition, detailed design definition and manufacture and acceptance implementation.

Source: Internal document.

Indicator 2

Instead of conducting a client satisfaction survey, as in 2005-2006, other administrative means were used this year to capture and document performance information. A "Client Satisfaction" report indicated that bilateral meetings and project reviews had been held. Additionally, a service standard (including a complaint mechanism) was developed to capture information on clients' satisfaction.

Source: Internal document located in Livelink – Document #9881933.

Indicator 3

All 3 EO project costs were maintained within authorized levels.

Source: Annual Table of Projects Milestones, internal document in English only.

Indicator 4

All 3 EO project risks have been identified and a mitigation plan has been prepared for each project. The project risk matrix is reviewed monthly at each project review and discussed in more detail during Space Program Risk Committee meetings, which take place three times a year.

Source: Internal document.

Indicator 5

Two projects associated with science support were approved: CHINOOK, and NIRST on Aquarius.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
69.7	15.0
2007-2008 - Human Resources (FTEs)	
Planned	Actual
28.4	14.5

Highlights of Main Accomplishments – Space Mission Development (EO)

- The assembly, integration and test of the RADARSAT-2 spacecraft at the David Florida Laboratory, along with the operations-preparations activities at CSA St-Hubert, Quebec, and launch campaign in Baikonur, Kazakhstan, were completed in time for a launch on a Soyuz rocket on 14 December 2007. The commissioning of RADARSAT-2 was completed in April 2008.
- The CSA continued with feasibility studies and a risk assessment of the Chinook mission. Chinook, a Canadian-led atmospheric research satellite mission will be carrying two experiments: Stratosphere Wind Interferometer For Transport studies (SWIFT) and Atmosphere Research with GPS Occultation (ARGO). This mission will advance our knowledge and understanding of our atmosphere and will provide scientific foundation for the sound policy needed to protect the future health of our planet. The data will lead to advances in weather and climate prediction models that are key tools to provide answers on the health of the ozone layer and climate. The three-year mission is currently planned for 2011-2013. The CSA continued to develop the CHINOOK mission, albeit at a slower pace than anticipated. Efforts were directed at decreasing technical risks.

- A Request for Proposals was issued to industry for the award of a contract to a prime contractor for the preliminary, detailed design and manufacturing of the first satellite for the RADARSAT-Constellation, the follow-on program to RADARSAT-2. Three small satellites will be flown in the configuration of a constellation that will provide up to twice daily all weather, day and night coverage of Canadian territory and of most of the world. It will further improve Canada's ability to manage its resources and environment and improve environment-monitoring, maritime surveillance and disaster management. The launch of the first satellite is planned for early 2014 followed by the other two satellites in 2015 and 2016 respectively.

SPACE MISSION OPERATIONS – EARTH OBSERVATION

One EO Space Mission Operations Program, with a combination of accomplishments, demonstrates how the expected result outlined below was measured and attained.

1- EO Mission Operations – Objective: Operate the space and ground segments for EO mission operations.

EXPECTED RESULT:

EO Space Mission Operations meet user/client needs as per mission requirements.

Indicators	Performance
1. System performance, as per mission requirements and resources. (Target: 80%)	Target Met: System performance of 95% for RADARSAT-1 was maintained.
2. Volume of data acquired or delivered as per mission requirements and resources. (Targets: 10,000 SAR minutes of RADARSAT-1 data; 375.2 Gbyte of SCISAT-1; and Commence Canadian Government Order Desk for RADARSAT-2 operations)	<p>Target Exceeded: More than 60,000 SAR minutes of RADARSAT-1 data acquired.</p> <p>Target Met: A total of 375.2 Gbyte of SCISAT-1 data acquired.</p> <p>Target Met: Canadian Government Order Desk for RADARSAT-2 operations started, following commissions of RADARSAT-2 satellite.</p>
3. Number of missions in operational phase associated with science support. (Target: 4)	Target Met: 4 missions associated with science support reached operational phase.

PERFORMANCE ANALYSIS:3-Year Trend

All indicators met their targets within planned limits.



Satisfactory

Indicator 1

RADARSAT-1 average system performance has been maintained consistently high at 95%. The same reliability and data delivery to clients was maintained over the last three years. System performance is measured in terms of the percentage of data requests that were planned and subsequently executed by the spacecraft payload and received.

Source: CSA's Mission Management Office / Database Management (MMO/DBM), internal document in English only.

Indicator 2

Data volume for RADARSAT-1 and SCISAT-1 met their targets. The Canadian Government Order desk for RADARSAT-2 was ready to start operations following the commissioning in April 2008.

Sources: CSA's Mission Operations Center System; CSA's Mission Management Office / Database Management, internal documents in English only.

Indicator 3

Four missions, associated with science support, reached operational phase: SCISAT, MOPITT, OSIRIS, and CloudSat.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
15.7	12.6
2007-2008 – Human Resources (FTEs)	
Planned	Actual
30.1	20.2

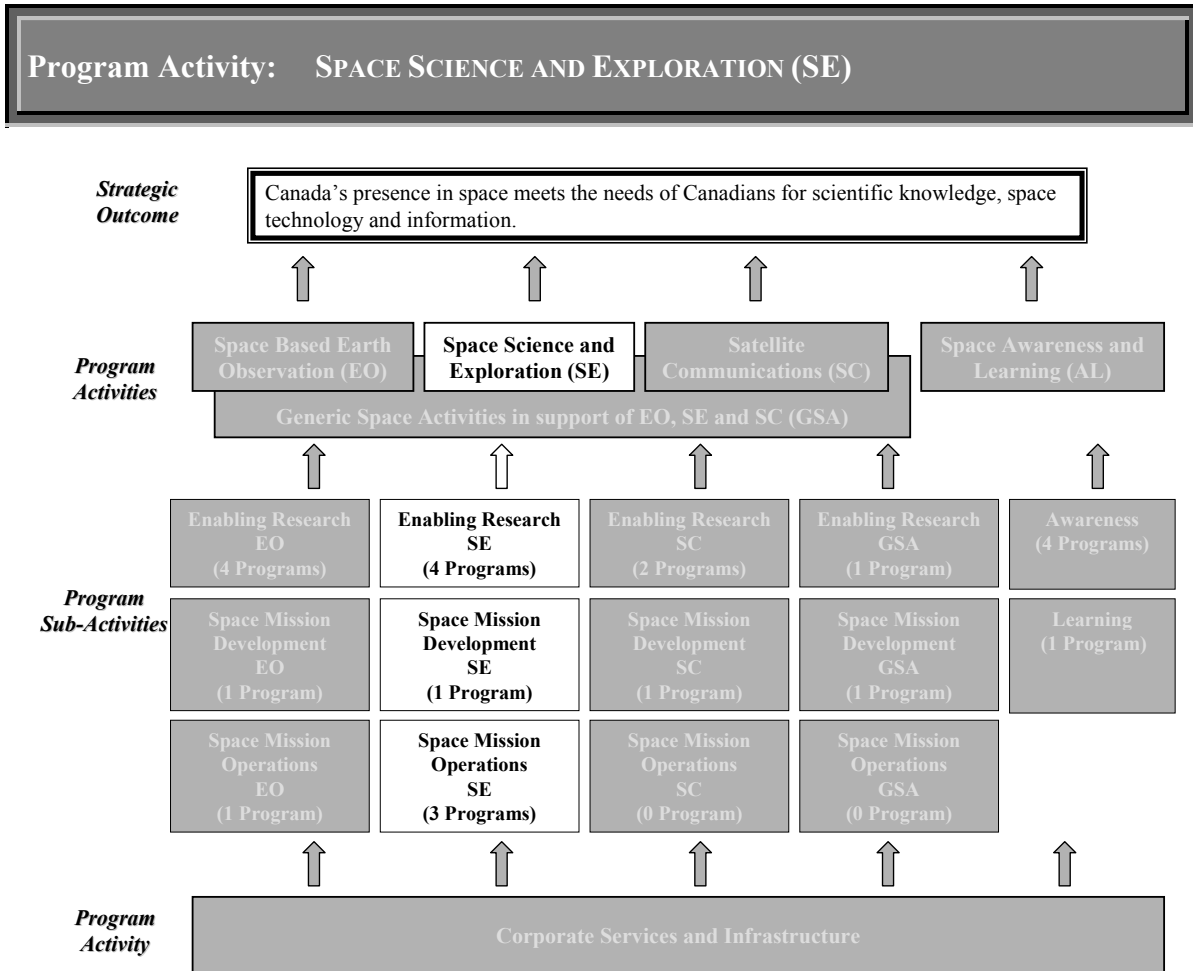
Highlights of Main Accomplishments – Space Mission Operations (EO)

- RADARSAT-1 operations continued to provide data to Government departments and other users with a high system performance. More than 10,000 minutes of Synthetic Aperture Radar (SAR) data was acquired from RADARSAT-1. In parallel RADARSAT-2 was launched in December 2007 and completed commissioning in April 2008. This ensured the continuity of supply of data to users.

- CSA continued to ensure Canada's commitment, as an official member of International Charter 'Space and Major Disasters', to use EO satellites in response to disasters. The CSA regularly contributes RADARSAT-1 data products upon charter activation and more than 45 charter activations were supported by CSA during the year.
- Canada's SCISAT-1 Atmospheric Chemistry Experiment, launched in August 2003 and operated by the CSA, is yielding an excellent data set. More than 375.2 Gbyte of SCISAT-1 data was acquired and delivered to scientist. Many articles are being published in peer-reviewed scientific journals and significant scientific results have already occurred therefore enhance of Canada's understanding and leadership in stratospheric ozone studies. SCISAT-1 focuses on polar ozone budget and dynamics but also contributes to measurements and modeling of mid latitude ozone and upper troposphere chemistry as well as CFC's greenhouse gases. SCISAT has continued to produce large volumes of very-high quality space data for climate, weather and pollution studies.
- Two major Canadian science instruments are currently orbiting Earth and collecting new environmental data: MOPITT (Measurements of Pollution in the Troposphere) and OSIRIS (Optical Spectrograph and Infra-Red Imaging System). MOPITT, which is aboard the NASA Terra satellite, contributes to our understanding of the sources and pathways of atmospheric pollutants. OSIRIS, which is onboard the Swedish Odin satellite, measures the concentration of various gases in the stratosphere, thereby allowing our scientists to make a significant contribution to the global understanding of stratospheric ozone depletion processes. Both instruments have continued to produce high-quality space data for pollution and ozone studies.
- The CSA contributed critical subsystems to the cloud probing radar on CloudSat (launched in April 2006) that are functioning perfectly and generating excellent data. The CloudSat mission is, for the first time, measuring the global properties of clouds in order to improve climate-change forecasts. As part of our agreement with NASA relating to CloudSat, the CSA collaborated with the Meteorological Service of Canada to run a comprehensive validation campaign in the Great Lakes region during past winter seasons. The validation campaign has been successful. The CSA hosted a workshop in the Fall of 2007 to share the results. The Meteorological Services Canada team received an award from Environment Canada Citation of Excellence under the category "Excellent Quality of Work".

To learn more about Earth Observation, go to:
<http://www.asc-csa.gc.ca/eng/observation/default.asp>

2.3 SPACE SCIENCE AND EXPLORATION



Priority: Understand the solar system and the Universe, expand our knowledge of the constituent elements and origins of life, and strengthen a human presence in space.

Performance Status: 94% (29/31) of the Program Sub-Sub-Activities targets were met in 2007-2008. It is an 8% increase over 2006-2007 achievements.

The Program Activity results and indicators were thoroughly reviewed during the annual 2008-2009 Performance Measurement Framework update. The revised set of results and indicators is listed in the Report on Plans and Priorities 2008-2009. Next year's Departmental Performance Report will be based on these new performance measurements.

SPACE SCIENCE AND EXPLORATION

2007-2008 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT

Expected Result

Increased participation in Canadian and international opportunities in order to expand the scientific knowledge base made available to Canadian academia and R&D communities in astronomy, space exploration and solar-terrestrial relations, as well as physical and life sciences.

MAIN ACCOMPLISHMENTS IN 2007-2008

The Special Purpose Dexterous Manipulator, also known as Dextre, successfully reached the International Space Station (ISS) in March 2008. Dextre was then assembled and underwent successful activation. This delivery marked the last Canadian hardware commitment towards the ISS.

The Canadian meteorological station, onboard NASA's Phoenix mission, successfully landed on Mars in May 2008.

Canadian astronaut, Dave Williams, made his second trip to the ISS where he performed three extra vehicular space walks to install a third starboard truss segment and to relocate solar panels in order to increase the capacity of the ISS to generate power to support science and operational activities.

Indicators	Performance
1. Number of participations in Canadian and international space science missions.	A total of 4 new missions in 2007-2008: 1 mission related to Astronomy, 1 to Solar-Terrestrial Relation, and, 2 to Physical and Life Sciences.
2. Rate of successful missions (Total or partial successful Canadian missions/total missions with Canadian participation).	This year, 6 out of a total of 37 missions reached launched, data production or completed status for an average success rate of 16%.
3. Number of peer-reviewed papers published in world-class scientific journals as a result of the CSA's participation in Canadian and international missions (papers featuring Canadian academia and/or R&D community).	A total of 383 peer-reviewed papers, reports and conference proceedings acknowledging CSA funding were published in 2007-2008 in Space Astronomy and Exploration, Solar-Terrestrial Relation, and Physical and Life Sciences.

Indicator 1 – Performance Analysis

Missions	Status	Field
BLAST (2007)	Completed	Astronomy
FUSE (1999)	Completed (2008)	Astronomy
ICE-First (2004)	Completed	Life Sciences
WISE (2005)	Completed	Life Sciences
PMDIS/TRAC (2006)	Completed (2008)	Life Sciences
**eOSTEO (2007)	Completed (2008)	Life Sciences
**SCCO (2007)	Completed/objectives met	Physical Sciences
**MVIS (2006-07)	Launched in 2008	Physical Sciences
* CADC/Hubble (2008)	In operation	Astronomy
CCISS (2007)	In operation	Life Sciences
* CGSM (2007)	In operation	Solar-Terrestrial Relation
ELERAD (2006)	In operation/objectives met	Life Sciences
Matroshka-R (2006)	In operation/objectives met	Space Medicine
MOST (2003)	In operation/objectives met	Astronomy
**Phoenix (2007)	In operation	Planetary Exploration
THEMIS (2007)	In operation	Solar-Terrestrial Relation
APXS (2009)	In development	Planetary Exploration
BISE (2009)	In development	Life Sciences
Cambium (2009)	In development	Life Sciences
CASSIOPE-ePOP (2008)	In development	Solar-Terrestrial Relation
* CHENNS (2009)	In development	Life Sciences
CIMEX (2009-10)	In development	Physical Sciences
EOEP/Swarm (2009)	In development	Solar-Terrestrial Relation
* FPEF (2011)	In development	Physical Sciences
Herschel-HIFI/Spire (2008)	In development	Astronomy
ICAPS (2010)	In development	Physical Sciences
IVIDIL (2009)	In development	Physical Sciences
JWST-FGS (2013)	In development	Astronomy
NEOSSAT (2009)	In development	Planetary Exploration
NEQUISOL (2010)	In development	Physical Sciences
ORBITALS (2012)	In development	Life Sciences
Planck (2008)	In development	Astronomy
UVIT-ASTROSAT (2008)	In development	Astronomy
Vascular (2009)	In development	Life Sciences
EVARM	Under review	Life Sciences
Insect Habitat	Under review	Life Sciences
MIMBU/ATEN	Under review	Physical Sciences

(Year) = Actual or projected launch date or date of completion if in the "Status" column.

* = New missions in 2007-2008

** = A mission listed in 2006-2007 but counted for the first time in the mission success rate.

Indicator 2 – Performance Analysis

For the purpose of this indicator, a mission is considered partly or totally successful when the status reads: objective met, in operation, completed or launched. Analysis of the last three fiscal year, starting April 1, 2005 and ending on March 31, 2008 shows a cumulative mission success rate of 43% (16 out of 37) when all initiated missions are taken into account. Using the same method of calculation, counting only the missions reaching for the first time the status listed above, the 2007-2008 mission success rate is a respectable 16% (6 out of 37) compared to the exceptional rate of 28% (9 out of 33) in 2006-2007 and the 2005-2006 rate of 12% (3 out of 24). It is important to note that all successful missions have either met or are in the process of meeting their mission objectives.

Indicator 3 – Performance Analysis

In 2007-2008, 383 peer-reviewed papers, reports and conference proceedings acknowledging CSA funding were published. It is a significant decrease in comparison to the 711 publications reported in 2006-2007 and it is partly due to a 14% decrease of investment in Space Astronomy and Exploration, Solar-Terrestrial Relation, and Physical and Life Sciences.

2007-2008 - Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
138.5	136.6	124.1
2007-2008 - Human Resources (FTEs)		
Planned	Total Authorities	Actual
185.0	N/A	166.6

To learn more about Space Science and Exploration, go to:
<http://www.asc-csa.gc.ca/asc/eng/sciences/default.asp> and,
<http://www.asc-csa.gc.ca/eng/exploration/default.asp>

The programs under this Program Activity are divided into three Sub-Activities: Enabling Research, Space Mission Development and Space Mission Operations.


ENABLING RESEARCH – SPACE SCIENCE AND EXPLORATION

Four Science and Exploration Enabling Research Programs with a combination of accomplishments demonstrate how the following expected results were measured and attained.

1- SE Mission Concepts – Objective: Assume leadership and provide support in enabling research and development of new space mission concepts leading to the realization of CSA or international SE missions.

EXPECTED RESULT:
Industry, government and/or academia conduct mission and payload concept and feasibility studies to establish the technical and/or scientific feasibility and relevance of missions or payloads in order to enable CSA decisions on future SE space missions of interest to Canada.

Indicators	Performance
1. Number of concept (mission and payload) or feasibility studies initiated, pursued or completed. (Target: 49)	Target Exceeded: 56 concepts (mission and payload) or feasibility studies initiated, pursued or completed.
2. Number of new missions (Phase 0/A) retained for further implementation. (Target: none)	Target Exceeded: 1 new mission (Phase 0/A) retained for further implementation.

PERFORMANCE ANALYSIS:	
<p><u>3-Year Trend</u></p> <p>All indicators met their targets within planned limits.</p> <p><u>Indicator 1</u></p> <p>The 56 concepts (mission and payload) or feasibility studies initiated, pursued or completed are divided as follows:</p> <p>Solar Terrestrial Relations: 3 Planetary Exploration: 5 Space Astronomy: 2 Life Science: 21 Physical Science: 12 Joint Disciplines: 13</p> <p>Source: Internal document.</p>	 Satisfactory

Indicator 2

The new mission retained for further implementation is a feasibility study for a satellite designed for research on the radiation belts surrounding Earth called the Outer Radiation Belt Injection, Transport, Acceleration and Loss (ORBITAL).

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
2.0	1.3
2007-2008 - Human Resources (FTEs)	
Planned	Actual
2.5	5.8

2- ESA Programs in SE – Objective: Through key international partnerships, allow the participation of Canadian academia and the demonstration of Canadian space technologies in European SE missions.

EXPECTED RESULT:

Successful development and demonstration of advanced technologies, systems, components, or studies provided for in the contracts awarded by ESA to Canadian firms under European Physical and Life programs.

Indicators	Performance
1. Canadian industrial return coefficient in ESA optional programs in SE. (Target: 0.84 or higher)	Target Partially Met: 0.64 ELIPS Program: 0.49 Aurora Preparatory Program: 1.04 Aurora Core Program: 0.37

PERFORMANCE ANALYSIS:3-Year Trend

For the second year, the indicator did not meet its planned target.



Unsatisfactory

Indicator 1

The ELIPS program is ramping up. With the launch and commissioning of the European Columbus module to the ISS, European experiments should increase substantially. Similarly for Aurora, the program has been re-baselined by ESA and suffers from a slow ramp up. As evidenced by the good results obtained during the preparatory phase, similar results for the main program are anticipated.

The return coefficient corresponds to the ratio between the actual number of weighted contracts given to a country and the ideal number of contracts to be given to that country according to existing rules. Canadian industrial return coefficients are by Program Activity. The SE optional programs are Aurora and ELIPS.

Source: European Space Agency Council. Paris, Agency Key Performance Indicators. ESA/IPC, December 31, 2007. Document available since March 2008, in English only.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
8.3	6.9
2007-2008 - Human Resources (FTEs)	
Planned	Actual
NIL	NIL

3- SE Programs – Objective: Coordinate the Canadian SE community in order to pursue world-class research space missions to advance our knowledge of basic physical and chemical processes, the near-Earth space environment and Earth's electromagnetic field, our solar system, the universe and its evolution, as well as the adaptation of humans and other life forms in the weightless environment.

EXPECTED RESULT:

Identified opportunities for Canadian scientists to advance exploration readiness and scientific knowledge through CSA, national and international research missions.

Indicators	Performance
1. Number of scientific publications, reports and conference proceedings acknowledging CSA funding. (Target: 400)	Target Partially Met: 383 scientific publications, reports and conference proceedings acknowledging CSA funding.
2. Number of Highly Qualified Personnel (HQP) involved in the program. (Target: 480)	Target Exceeded: 699 Highly Qualified Personnel (HQP) involved in the program.
3. Number of operating or approved space science research missions. (Target: 20)	Target Exceeded: 22 operating and/or approved space science research missions.
4. Number of scientific presentations. (Target: 420)	Target Exceeded: 780 scientific presentations.
5. Number of research partnerships (nationally and internationally). (Target: 80)	Target Exceeded: 144 research partnerships (nationally and internationally).
6. Number of awards granted under the CSA Grants and Contributions Program. (Target: 20)	Target Exceeded: 31

PERFORMANCE ANALYSIS:

3-Year Trend

Nearly all indicators significantly exceeded their planned targets.



Superior

Indicator 1

Many space science missions are currently producing excellent results. Some of the publications were based on contracts already completed. Previous year adequate levels of funding greatly helped, in this case, nearly meeting targets. CSA funds are highly leveraged by funds provided by universities and the National Sciences and Engineering Research Council of Canada (NSERC).

Source: CSA annual survey with scientists currently funded by the Space Science Program.

Indicator 2

The term Highly Qualified Personnel (HQP) includes undergraduate, graduate and postdoctoral fellows, as well as research assistants, research associates, faculty and non-faculty staff.

Source: CSA annual survey with scientists currently funded by the Space Science Program.

Indicator 3

The 22 operating and approved research missions are made up of 19 research missions in development phase and three in operating phase.

Source: Internal document.

Indicator 4

Many space science missions are currently producing excellent results. Some of the presentations were based on contracts already completed. Previous year adequate levels of funding greatly helped, in this case, exceeding targets. CSA funds are highly leveraged by funds provided by universities and the National Sciences and Engineering Research Council of Canada (NSERC).

Source: CSA annual survey with scientists currently funded by the Space Science Program.

Indicator 5

Targeted efforts to build a large and diverse network of national and international partners were successful.

Source: Internal document.

Indicator 6

Twenty-seven new grants were awarded through the Space Science Enhancement Program (SSEP): 13 directly under the program and 14 supporting Canadian Analogue Research Network (CARN). In addition, 2 grants were awarded through the NSERC Industrial Chairs program and 2 others went to the Scientific and Technical Space conferences program.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
8.6	8.0
2007-2008 - Human Resources (FTEs)	
Planned	Actual
18.9	20.9


4- Human Space Flight Expertise – Objective: Maintain a trained, experienced and versatile Astronaut Corps to meet the needs of the Canadian space science and human exploration community and while doing so increase access to space opportunities for Canadian scientists.

EXPECTED RESULT:

Continue to develop and maintain human space flight expertise to meet the requirements of the CSA's space science and human exploration programs.

Indicators	Performance
1. Canadian astronauts are qualified on all flight vehicles such as Shuttle, Soyuz and ISS. (Target: 4 on Shuttle, 2 on Soyuz and 1 on ISS)	Target Met: 4 Canadian Astronauts are qualified on Shuttle; 2 Canadian Astronauts are qualified on Soyuz; and, 2 Canadian Astronauts are qualified on ISS.
2. Canadian Astronauts are recruited according to recruitment plan. (Target: Basic training developed)	Target Not Met: Basic training development was postponed.
3. Number of space flights and missions to which Canadian Astronauts participate. (Target: One: STS-118)	Target Met: One mission successfully completed.

PERFORMANCE ANALYSIS:

<p><u>3-Year Trend</u></p> <p>The comparison was only possible for 2007-2008 and 2006-2007. Most targets were met within planned limits.</p>	 Satisfactory
<p><u>Indicator 1</u></p> <p>Similar to last year, all Canadian Astronauts maintained their qualifications on flight vehicles. However, 1 more Canadian Astronaut obtained his qualification on ISS.</p> <p>Source: Internal document.</p> <p><u>Indicator 2</u></p> <p>The postponement of the training development plan was caused by the delay to 2008-2009 of the recruitment campaign launch for selecting new Canadian astronauts. Two new astronaut candidates will join the CSA in May of 2009.</p> <p>Source: Internal document.</p> <p><u>Indicator 3</u></p> <p>The mission STS-118 flew in August 2007 with Astronaut Dave Williams onboard as Mission Specialist. Totalling 17 hours and 47 minutes, Dave Williams now holds the Canadian record for the number of hours spent outside in space.</p> <p>Source: Internal document.</p>	

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
2.1	2.3
2007-2008 - Human Resources (FTEs)	
Planned	Actual
6.0	7.0

Highlights of Main Accomplishments – Enabling Research (SE)

- The CSA held a workshop in January 2008 to look at the prospective application of converging technology/science (biology, informatics and nanotechnology) for the health and safety in isolated, confined and extreme environments. The event attracted individuals from four other government departments and several companies. The results are being used in the strategic planning of the Life and Physical Sciences program. In addition, the Life and Physical Sciences community was brought together for a workshop aiming at identifying the technological needs for the future. Earlier this year, diverse communities were gathered to discuss these studies and subsequent applications for space and Earth.
- The CSA released several announcements of opportunity to develop the next generation of Canadian scientific investigations, space instruments and/or space science missions and to engage Canadian scientists in "low mass, low volume" research onboard ISS and other free-fall platforms. The research competition resulted in the selection of eight science experiments for the ISS. Two have already begun and will be completed over the next year.
- CSA continued the research program in planetary exploration utilizing sites in Canada, such as the Haughton crater on Devon Island in Nunavut, geologically analogous to the Moon and Mars. Several scientific research projects and operational activities were carried out to help us better understand the history of our own planet while preparing Canada for robotic and human exploration of the Solar System. International partnerships were initiated with NASA, the Spanish and Italian space agencies to jointly fund research projects and provide access to analogue sites to Canadian researchers all over the world. Formal collaboration with other Government of Canada departments such as Indian and Northern Affairs Canada, Natural Resources Canada, Industry Canada Communications Research Center has been established to facilitate analogue research in the High Arctic.
- Through Canadian participation in European Space Agency's Physical and Life Sciences Program (ELIPS-2), Canadian scientists were able to participate in six space missions slated to fly on the ISS, a Chinese-recoverable satellite and a Russian recoverable satellite.

- Four Canadian research teams have gained access to short, medium and long bed rest studies initiated by the European Space Agency International Bed rest-working group. In addition, a Canadian scientist has been designated as one of three “leads” for all the bed rest studies.
- Canadian astronauts have been and will continue to be trained to conduct Canadian experiments while on space missions. Dave Williams participated in one Canadian experiment on Perceptual-Motor Deficits In Space. At the end of 2007-08, the Minister of Industry kicked off a Recruitment Campaign for 2 new Canadian Astronauts.

SPACE MISSION DEVELOPMENT – SPACE SCIENCE AND EXPLORATION

One Science and Exploration Space Mission Development Program, with a combination of accomplishments, demonstrates how the expected result outlined below was measured and attained.

1- SE Projects – Objective: Ensure the development, delivery and commissioning of space-qualified systems for SE missions through effective project, quality and engineering management.

EXPECTED RESULT:
SE projects' deliverables meet mission objectives at critical steps.

Indicators	Performance
1. Safety and Mission Assurance (including Configuration Management) requirements are identified and met for each project. (Target: 100%)	Target Met: 100%
In accordance with Treasury Board approved Project Approval and Management Framework (PAMF):	
2. Mission objectives are met at critical steps of the projects. (Target: 85%)	Target Met: 100%
3. Project cost is maintained within authorized levels. (Target: 100%)	Target Met: 100%
4. Risks are identified and mitigation plans prepared for each project. (Target: 100%)	Target Met: 100%
5. Number of approved projects associated with science support. (Target: 15)	Target Exceeded: 25 approved projects associated with science support.

PERFORMANCE ANALYSIS:

3-Year Trend

All indicators met their targets within planned limits.



Satisfactory

Indicator 1

Safety and Mission Assurance and Configuration Management (S&MA and CM) requirements are implemented on all SE projects: Phoenix, HIFI, APXS, JWST and eOSTEO.

S&MA and CM requirements are implemented for phases relate to preliminary design definition, detailed design definition and manufacture and acceptance implementation.

Source: Internal document.

Indicator 2

Instead of conducting a client satisfaction survey, as in 2005-2006, other administrative means were used this year to capture and document performance information. A "Client Satisfaction" report indicated that bilateral meetings and project reviews had been held and that a service standard (including a complaint mechanism) was developed to capture information on clients' satisfaction.

Source: Internal document located in Livelink – Document #9881933.

Indicator 3

All SE project costs were maintained within authorized level. As soon as it became evident that the JWST project's Phase C was reaching its authorized limit, a stop work was issued and increased authorities were sought from Treasury Board.

Source: Annual Table of Projects Milestones, internal document in English only.

Indicator 4

All SE project risks have been identified and a mitigation plan has been prepared for each project. The project risk matrix is reviewed monthly at each project review and discussed in more detail during Space Program Risk Committee meetings, which take place three times a year.

Source: Internal document.

Indicator 5

The 25 approved projects associated with science support are divided as follows:

Solar Terrestrial Relations: 2
Planetary Exploration: 3
Space Astronomy: 7
Life Science: 3
Physical Science: 9
Operational Space Medicine: 1

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
58.9	46.4
2007-2008 - Human Resources (FTEs)	
Planned	Actual
27.8	17.8

Highlights of Main Accomplishments – Space Mission Development (SE)

- The CSA has completed the production and has supported the assembly, test and launch of the Canadian meteorological station for NASA's Phoenix mission. The Phoenix spacecraft landed on Mars on May 25, 2008. The station provides basic scientific knowledge of the Martian atmosphere. This contribution permits Canadian scientists to have access to all data from the mission and has positioned Canada as a respected and reliable provider of planetary science instrumentation.
- Canadian scientific teams contributed to an Electric Field Instrument (EFI) for the Swarm Earth Explorer mission. The teams calibrated the instruments in the laboratory and on orbit as well as developed the instrument simulator and data reduction algorithms. These instruments will precisely measure the electric field at satellite altitudes in order to correct the measurements of the Earth's magnetic fields as well as to better understand the distribution of ions in the near-earth magnetosphere. The Canadian scientific teams have continued the development of the Electric Field Instruments including calibration in the laboratory.
- The Enhanced Polar Outflow Probe (ePOP) instruments was completed and delivered to the spacecraft contractor for integration. The launch of ePOP instrument with the CASSIOPE Mission is now scheduled for launch in 2009. It will probe the upper atmosphere and ionosphere region where solar variability exerts influence on global change in various time scales. The scientific data

collected by ePOP will help scientists understand particle exchange and energy coupling processes between the Earth's atmosphere and space environment.

- The CSA has agreed to provide the Indian Space Research Organization with the Flight Detector Subsystem, the Ground Test Subsystem, the Calibration Subsystem, and required flight spares for the UltraViolet Imaging Telescope (UVIT) onboard the ASTROSAT satellite. The development of UVIT continued during this period. The satellite is scheduled for launch no earlier than spring 2009. The CSA participation will guarantee 5% of the observing time for Canadian scientists and obtain ASTROSAT astronomic data.
- The CSA has continued the detail design and manufacturing of the Alpha Particle X-ray Spectrometer (APXS) for the Mars Science Laboratory to be launched by NASA in 2009. The Canadian contribution will help scientists to determine the chemical composition of various soil, dust and rock samples on the planet.
- The CSA is participating in the James Webb Space Telescope (JWST), a major facility-class space observatory that will be launched in 2013. The JWST is a successor to the highly successful Hubble Space Telescope (HST). Canada is responsible for the design and construction of the Fine Guidance Sensor (FGS), a critical element of the mission, which ensures the very precise pointing of the telescope and the provision to the international astronomical community of simultaneous images. The design of the FGS was completed while the manufacturing of the Engineering Test Unit started in 2007. The system detailed design completion is expected in 2008. The contractor encountered major difficulties with the design and development of the FGS. The project required a complete review following anticipated cost growth. A revised Effective Project Approval (EPA) was required. The project became a Major Crown Project. The project still supports a 2013 launch date. By virtue of the CSA's contribution, Canadian astronomers will have guaranteed access to 5% of the observing time of the James Webb Space telescope.
- The CSA has delivered the Local Oscillator Source Unit (LSU) to the European Space Agency and it is being integrated in the Heterodyne Instrument for the Far Infrared (HIFI) of the Herschel satellite. The satellite scheduled to be launched in 2008 will carry an infrared telescope and three scientific instruments that will allow scientists to address key science questions such as how galaxies were formed in the early universe and how stars have been forming throughout the history of the universe.
- The CSA and the Department of National Defence partipate in the joint NEOSSAT mission combining the Near Earth Space Surveillance (NESS) and the High Earth Orbit Surveillance (HEOS) projects. It is expected that 50% of NEOSSAT time will be used to observe the inner portion of the solar system to discover, track and study asteroids and comets. The other 50% of the operating time will be used to track satellites in high-Earth orbit to update the orbit parameters of known satellites flying over the Canadian territory. NEOSSAT is using a multi-mission bus design suitable for many future payload/instrument

types and can also serve to fly technology demonstration payloads. The preliminary design was completed in March 2008, the detailed design will proceed during 2008, and the construction and testing of the spacecraft will occur in 2009. Launch is scheduled in 2010.

- The three eOSTEO experiments successfully flew in September 2007. The eOSTEO hardware performed perfectly and the analysis of the upcoming results focus on bone loss in space that is one of the major obstacles to long duration space flight. The knowledge acquired will also enhance our understanding of bone loss in general and will have potential applications to osteoporosis. The CSA was given this flight opportunity by the European Space Agency in return for CSA lending some hardware for European scientists to repeat the bone experiments that were lost in the tragic loss of Columbia in 2003.

SPACE MISSION OPERATIONS – SPACE SCIENCE AND EXPLORATION

Three Science and Exploration Space Mission Operations Programs with a combination of accomplishments demonstrate how the following expected results were measured and attained.


1- International Space Station (ISS) – Objective: Provide required CSA operations, training and engineering services to the ISS Program.

EXPECTED RESULT:

CSA robotics operations and engineering services meet ISS Program (ISSP) and Canadian Space Station Program (CSSP) stakeholders' expectations in accordance with the Intergovernmental Agreement (IGA) and the Memorandum of Understanding with NASA.

Indicators	Performance
1. Percentage of active participation of the CSSP team in the various ISS multi-lateral boards and panels managing the ISSP. (Target: more than 95%)	Target Exceeded: The CSSP Team exceeded the target of 95%.
2. Availability of Operations Centre. (Target: at least 99%)	Target Exceeded: More than 99.8%
3. Rate of training delivered vs. training requested. (Target: more than 95%)	Target Exceeded: CSA Training exceeded the planned training requirement.
4. Percentage of MSS system(s) and operational support availability for planned and unplanned events. (Target: more than 95%)	Target Exceeded: 100%
5. Percentage of software and flight products delivered as required/scheduled. (Target: more than 95%)	Target Exceeded: 100%

6. Rate of payload operational support availability for planned and unplanned events. (Target: 100%)	Target Met: 100%
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PERFORMANCE ANALYSIS:	
<p><u>3-Year Trend</u></p> <p>The indicators were consistently achieved and the targets, set at the International Space Station Program level, exceedingly met.</p>	 Superior
<p><u>Indicator 1</u></p>	
<p>The CSSP Team participated in all multilateral meetings where CSA participation was required. Active participation in ISS multilateral program meetings and boards allows Canada to position the CSA in the ISS management structure and ensures proposals and decisions are determined accordingly to Canada's delivery capacity and are properly communicated to all partners.</p> <p>Source: International Space Station Program Control Boards and Panels, document in English only.</p>	
<p><u>Indicator 2</u></p>	
<p>Systems availability is measured in system response time during operational activities as required by NASA counterparts. Overall the Operations Centre surpassed the target objective. The Remote Multi Purpose Support Room availability exceeded 99.9% for commanding, 99.8% for telemetry and 99.9% for voice.</p> <p>Source: Remote Commanding Monthly Availability Report, Internal documents in English only.</p>	
<p><u>Indicator 3</u></p>	
<p>CSA Training actually accommodated 100% of the requirements including schedule changes. Achievements are monitored against set requirements and certified by NASA counterparts.</p> <p>Source: International Training Control Board and Internal documents in English only.</p>	
<p><u>Indicator 4</u></p>	
<p>Systems availability is measured in system response time during operational activities as required by NASA counterparts. All planned and unplanned events were supported including the uplink of 24-hour software patches.</p> <p>Source: Internal weekly Mission Operations Reports, Internal documents in English only.</p>	

Indicator 5 and 6

Achievements are monitored against set requirements and certified by NASA counterparts. Delivered all scheduled software builds and even delivered the MSS5, out of which one software package was delivered ahead of schedule. All (100%) Payload support was provided.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
49.6	51.6
2007-2008 - Human Resources (FTEs)	
Planned	Actual
105.4	97.7

2- SE Mission Operations – Objective: Operate the space and ground segment for SE mission operations.

EXPECTED RESULT:

SE Space Mission Operations meet mission objectives and user / client expectations.

Indicators	Performance
1. Sponsoring organization's requirements for payload projects are met at critical steps of the operations. (Target: 95%)	Target Exceeded: 100%
2. Number of missions in operational phase associated with science support. (Target: 7)	Target Exceeded: 10 missions in operational phases associated with science support.

PERFORMANCE ANALYSIS:3-Year Trend

All indicators met their targets within planned limits. Note that indicator 2 was only measured once.



Satisfactory

Indicator 1

Ongoing engineering and operational support was provided successfully to meet 95% of MVIS (15 key activities), PMDIS-TRAC (12 key activities) and eOSTEO.

Source: Internal document.

Indicator 2

The 10 missions in operational phase associated with science support are divided as follows:

Solar Terrestrial Relations: 2

Planetary Exploration: 2

Space Astronomy: 2

Life Science: 4

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
3.3	4.5
2007-2008 - Human Resources (FTEs)	
Planned	Actual
1.4	2.7


3- Human Space Flight Missions Support – Objective: Manage human space flight missions assigned to the Canadian Astronaut Corps to optimize returns of scientific data and on-orbit operational knowledge.

EXPECTED RESULT:

Ensure and maintain Canadian Astronauts' health and safety for space flight missions.

Indicators	Performance
1. Number of activities and R&D targeted at maintaining Astronauts' Health and Safety. (Target: 4 - Radiation, Nutrition, STS-118 support, Cross-cultural study)	Target Exceeded: 6 activities and R&D targeted at maintaining Astronauts' Health and Safety.
2. Percentage of participation in ISS Medical Boards, Panels and Working Groups. (Target: 100%)	Target Met: 100%

PERFORMANCE ANALYSIS:

<p><u>3-Year Trend</u></p> <p>The comparison was only possible over a 2-year period. All indicators met their targets within planned limits.</p>	 Satisfactory
<p><u>Indicator 1</u></p> <p>The 6 activities and R&D targeted at maintaining Astronauts' Health and Safety are:</p> <p>Biodosimetry program; Menu for ISS/C-1 being developed and tested; Medical support to STS-118 provided to include Flight Surgeon support; Family Support and Contingency Plan support developed; Cross-Cultural training requirements developed and approved; and, R&D on the delivery of remote care and on the medical autonomy concept.</p> <p>Source: Internal document.</p> <p><u>Indicator 2</u></p> <p>All ISS Medical Boards, Panel and Working Group meetings supported. Active participation in ISS Medical Boards, Panel and WG meetings allows the CSA to position itself in the ISS management and ensures proposals and decisions are determined accordingly to Canada's delivery capacity and are properly communicated to all partners.</p> <p>Source: Internal document.</p>	

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
2.4	2.3
2007-2008 - Human Resources (FTEs)	
Planned	Actual
10.0	9.4

Highlights of Main Accomplishments – Space Mission Operations (SE)

- Dextre, the Special Purpose Dexterous Manipulator, was launched to the International Space Station (ISS) on 11 March 2008, was then assembled and underwent successful activation. Dextre began its commissioning activities during the flight and will continue to execute commissioning activities through 2008-2009 until its first scheduled use. Dextre is Canada's third element of the Mobile Servicing System (MSS). Canada has now delivered the final element of its hardware obligation to the ISS program and is now in full operational and sustainability mode.
- CSA continued to operate the MSS in support of ISS assembly and maintenance missions. During the year, Canadarm2 installed the Node 2 element, the European Columbus module, the Japanese Pressurized Logistics Module, and the Japanese Kibo Laboratory to the ISS. These installation activities involved the preparation and certification of flight products and procedures to support operations, the training of new astronauts, cosmonauts and ground support personnel, and around the clock technical provision of support for the MSS. Operations were conducted in conjunction with the NASA Houston flight control room from the Remote Multi-Purpose Support Room, a CSA facility directly supporting robotics operations from St-Hubert, Quebec.
- Software planning and development continued throughout the year to implement the necessary functionality to support future MSS and ISS missions. A number of software enhancements and modifications were made throughout the year. A major software planning and development activity that was initiated was the MSS-6 software build that is intended to provide a major enhancement to the capabilities of the Canadarm2 in order to better facilitate the capture of free flying vehicles. Canadarm2 will be required to capture the first such vehicle, the Japanese free flying H-II Transfer Vehicle, in September 2009.

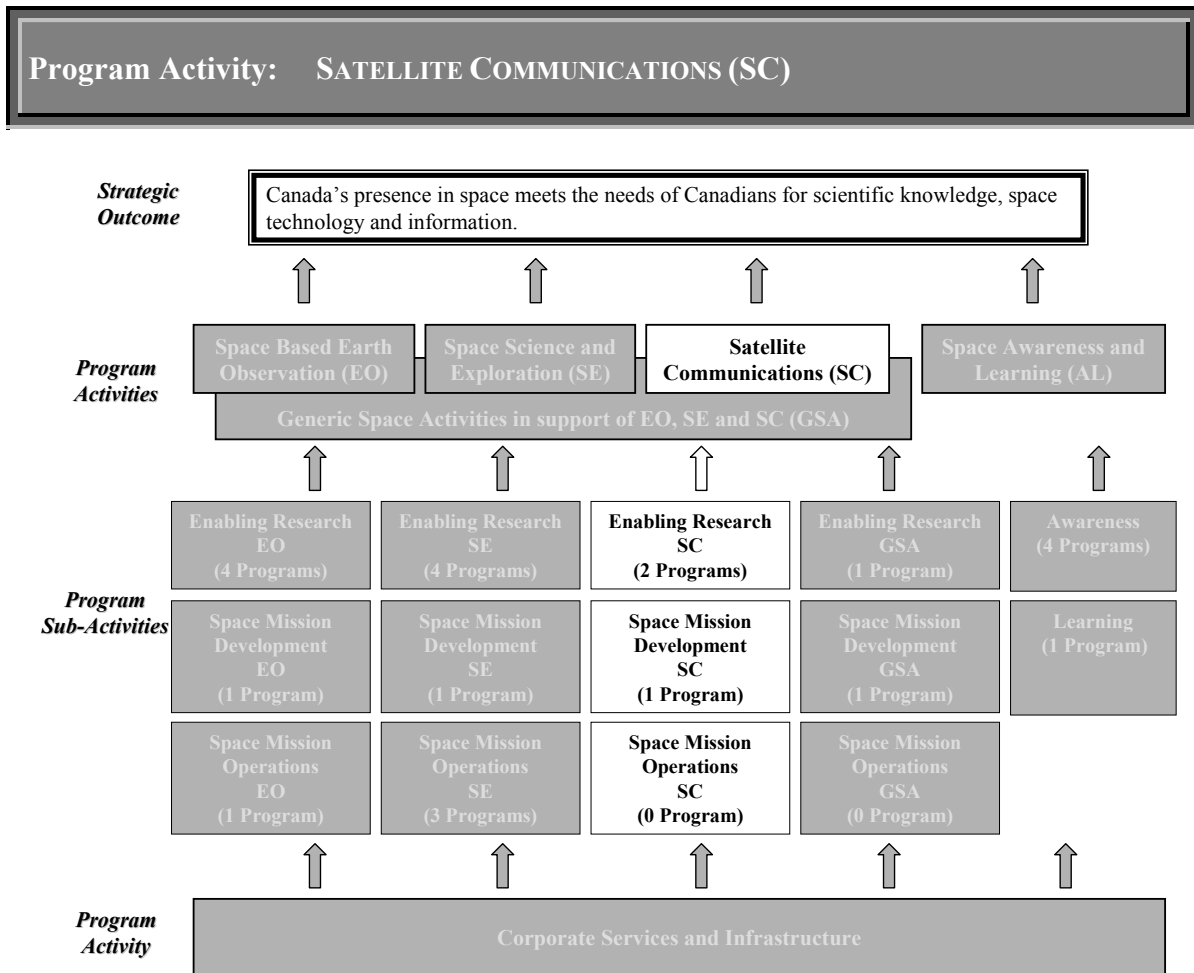
- Canadian astronaut Dave Williams made his second trip into space as part of the Space Shuttle STS-118 crew. He performed three Extra Vehicular sorties (space walks) to install a third starboard truss segment and to relocate solar panels in order to increase the capacity of the ISS to generate power to support science and operational activities.
- CSA extended Canadarm2's ground control capability to include loaded operations in which the ground can now issue commands to move payloads without the need to have on-orbit crew in the loop. In addition, CSA also extended ground control operations to include Dextre operations in free space (away from structure). The expansion of these ground control capabilities to Dextre will enable a more efficient on-orbit commissioning which will significantly reduce the astronaut time required for operational tasks. Canada is the first country to implement and use this type of technology in space.
- CSA launched an additional Canadarm2 joint to pre-position it on-orbit in case of a Canadarm2 failure. The importance of pre-positioning strategic spares is more critical at this time since the means to get them on-orbit is limited after the planned Shuttle retirement in 2010.
- The Perceptual Motor Deficit in Space (PMDIS) has been completed and the results are to be published in a peer-reviewed journal in 2008. The experiment will demonstrate the cause of the hand-eye coordination dysfunction seen early in space missions and indicate countermeasures to reduce or eliminate the problem. PMDIS is the first experiment to use the ISS allocation rights.
- The CSA-developed Microgravity Vibration Isolation System (MVIS) was delivered to the European Space Agency for integration into the Columbus Fluid Science Laboratory. MVIS is now onboard ISS and is ready for full commissioning. Canadian experiments are now in preparation that will require its unique capabilities.
- Operations for the Microvariability and Oscillations of STars (MOST) micro-satellite space telescope, launched in June 2003, have continued. Scientists using the MOST space telescope have made a major astronomical discovery contradicting previous observations made from Earth-based telescopes on the formation and aging of the Sun and other stars and has made unique contributions to exo-planetary science in characterizing known transiting exo-planet.
- NASA's Far Ultraviolet Spectroscopic Explorer (FUSE) mission terminated in October 2007 after nine successful years of operations. Canadian scientists have obtained the data from the participation in the mission and from the CANOPUS ground-based array of geophysical instruments that complement international solar-terrestrial space probes. Since the initiation of this array, in the late 1980's, over 1000 peer-review scientific papers have been published.

- The CSA is funding the participation of Canadian scientists in the NASA THEMIS mission comprised of a system of 5 satellites and associated ground-observing array for the study of northern lights phenomena. The Canadian ground-observing array is fully operational and is providing high-quality data. These data combined with observations from the THEMIS satellite have already led to new insights into the northern lights phenomena.
- During the Devon Island Nunavut field season 2007, the Space Medicine Group focused on concepts of operation and technology necessary to achieve greater medical autonomy in remote, extreme and isolated communities (space and terrestrial). Lessons learned will be further pursued in the Devon Island Field Season 2008.
- In collaboration with Agri-Food Canada, a one-day bonus menu is in development for the ISS thus providing a greater variety of nutrition food to astronauts on long-duration missions. Four of six food items were selected and partially tested. The menu may not be fully developed within the time constraints for the first Canadian long duration mission to the ISS. A second collaboration with Agri-Food Canada, CSA and an academic researcher to develop a space probiotic was awarded funding by Natural Sciences and Engineering Research Council of Canada.
- The CSA collaborated with Russia on one ISS study looking at astronaut radiation exposure. Final report on the results were reviewed and accepted. Scientific articles were submitted for publication and will be presented at Committee on Space Research of the International Council of Scientific Unions.
- The CSA has undertaken a study, in collaboration with international partners, to evaluate cross-cultural training requirements for the ISS environment. The results of the study have been presented to and received support from the International Partners. Recommendations for Human Performance and Behaviour training have been presented to the ISS International Training Control Board and training requirements identified.

To learn more about Space Science and Exploration, go to:

<http://www.asc-csa.gc.ca/eng/sciences/default.asp> and,
<http://www.asc-csa.gc.ca/eng/exploration/default.asp>

2.4 SATELLITE COMMUNICATIONS



Priority: Provide all Canadians with the means to participate in and fully benefit from the global information age.

Performance Status: 88% (7/8) of the Program Sub-Sub-Activities targets were met in 2007-2008. It is a 10% increase over 2006-2007 achievements.

The Program Activity results and indicators were thoroughly reviewed during the annual 2008-2009 Performance Measurement Framework update. The revised set of results and indicators is listed in the Report on Plans and Priorities 2008-2009. Next year's Departmental Performance Report will be based on these new performance measurements.

SATELLITE COMMUNICATIONS

2007-2008 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT

Expected Result 1

Increased access for Canadians to state-of-the-art space communications systems and services to meet their social and economic needs.

MAIN ACCOMPLISHMENTS IN 2007-2008

As part of the CASSIOPE Mission Contribution Program initiated in 2004-2005, the construction of the telecommunication satellite subsystem Cascade by Canadian companies continued. The launch is planned for 2009.

Trials and demonstration of innovative government services to remote northern communities using the Ka-Band on Anik F2 continued and some applications for telemedicine and mobile communications were successful. The trial campaign was extended to December 2008.

A definition Study for a Next Generation Advanced Payload onboard a future Telesat satellite was launched in May 2007. As a result from this recently completed study, the CSA has identified V-band as a critical new technology for an early SatCom mission, including the ground segment.

Indicators	Performance
1. Gap between current capabilities and future needs of Canadians for satellite communications and available or expected system capacity.	Studies on communications satellite service needs and opportunities were postponed to 2008-2009 in order to refine their scope. The studies need to identify which " key incentive factors " would improve the rate of utilisation of space-based communication and navigation services by federal departments and agencies in the delivery of their mandates.
2. Percentage of coverage over Canada by satellite and ground systems in place for commercial and governmental usage.	The coverage over Canada for commercial and governmental usage is near 100%. While service is provided to commercial users, the provision of Government services to northern and remote communities is at the demonstration and trial stages.

<p>3. Utilization rate of Anik F2 Commercial Ka-Band payload for Multi-Media Services and for the service delivery utilizing the \$50 million government capacity credit.</p>	<p>Anik F2 now has 47,500 customer subscribers (74,000 basic service equivalents) in Canada in addition to the commercial services offered by Telesat to corporations. Thirty-three percent of the Canadian satellite beams have reached maximum capacity. Another 500,000 U.S. customers are accessing multimedia services via Anik F2 through the U.S. service provider.</p> <p>Demonstration and trial campaign fostered great interest in the northern communities for accessing the Government of Canada Capacity Credit for the delivery of government services and applications.</p>
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Indicator 1 – Performance Analysis

Performance analysis will be performed once studies are completed.

Indicator 2 – Performance Analysis

The CSA has deployed hubs in Vancouver and Winnipeg to demonstrate Ka-Band applications and services using Anik F2's four northern beams. The ground segment infrastructure is being upgraded to accommodate the network for the Government of Canada capacity credit utilization phase by the northern communities.

Indicator 3 – Performance Analysis

Through its support of Anik F2, the Government of Canada has secured a Government Capacity Credit (GoC CC) access worth \$50 million over 11 years starting in May 2005. At the time, the GoC CC was included in National Satellite Initiative (NSI) to support the Government's connectivity agenda for remote and underserved northern rural communities. The deployment strategy under the NSI proved unfeasible as the GoC CC must be considered public property under the Financial Administrative Act. Consequently, the CSA has accepted the leadership role and a multi-year implementation plan for the utilization of GoC CC has been proposed.

So far, the GoC CC access has only been used for validation testing and concept demonstration purposes, resulting in a low rate of utilization since May 2005. The demonstration and trial of innovative government services to remote northern communities will be extended to the end of December 2008.

Expected Result 2

Better use of space communications, search and rescue, and global navigation satellite systems and applications to improve the efficiency and effectiveness of other government departments in delivering services to Canadians.

MAIN ACCOMPLISHMENTS IN 2007-2008

The CSA and Department of National Defence partnered to initiate and manage the Maritime Monitoring and Messaging Micro-satellite (M3MSat). This project will demonstrate satellite capability in maritime traffic identification. The launch is planned for late 2010 and end of mission demonstration in 2011.

Indicators	Performance
1. Number of joint studies and projects between the CSA and other government departments in the field of satellite communications, navigation and search and rescue.	<p>One joint study on polar communications via satellite has been initiated with the Departments of National Defence, Environment Canada and Indian Affairs.</p> <p>The CSA has started a technology development project on the next generation of Search and Rescue satellite systems named MEOSAR.</p>

Indicator 1 – Performance Analysis

As part of the Polar Communications and Weather (PCW) initiative, the CSA is studying how to provide high-speed communications to the extreme northern regions of Canada via satellite. This new communications infrastructure would cover for the first time the entire Canadian arctic region north of 72 degrees latitude. This would greatly enhance the Canadian government capacity to assert its sovereignty in the Arctic and would support the mandate of various government departments such as Department of National Defence, Environment Canada and Northern and Indian Affairs. The results of this feasibility study are expected for the second quarter of 2008-2009.

The CSA has started the development of an Engineering Qualifying Model (EQM) of a Middle-Earth Orbit Search-And-Rescue (MEOSAR) payload. MEOSAR represents the next-generation of Satellite-Aided Search-And-Rescue infrastructure that will greatly enhance the rescue time and reduce the search zone following a distress call. This infrastructure will also reduce the costs of Search-and-Rescue operations for the Department of National Defence.

2007-2008 - Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
25.1	26.0	24.0
2007-2008 - Human Resources (FTEs)		
Planned	Total Authorities	Actual
11.8	N/A	12.7

To learn more about Satellite Communications, go to:

<http://www.asc-csa.gc.ca/asc/eng/satellites/default.asp?page=observation>

The programs under this Program Activity are divided into three Sub-Activities: Enabling Research, Space Mission Development and Space Mission Operations.

However, no Space Mission Operations are mentioned in this report since CSA is not operating communication satellite.

ENABLING RESEARCH – SATELLITE COMMUNICATIONS

Three Satellite Communications Enabling Research Programs with a combination of accomplishments demonstrate how the following expected results were measured and attained.

1- SC Mission Concepts – Objective: Assume leadership and provide support in research and development of new space mission concepts leading to the realization of CSA or international SC missions.

EXPECTED RESULT:

Industry, government and/or academia conduct mission and payload concept and feasibility studies to establish the technical and/or scientific feasibility and the relevance of missions or payloads in order to enable CSA decisions on future SC missions of interest to Canada.

Indicators	Performance
1. Number of concept (mission and payload) or feasibility studies initiated, pursued or completed. (Target: 1 initiated)	Target Exceeded: 2 missions concept studies initiated.
2. Number of new missions (Phase 0/A) retained for further implementation. (Target: 1 mission developed)	Target Partially Met: 1 mission identified.

PERFORMANCE ANALYSIS:3-Year Trend

The comparison was only possible over a 2-year period because there was no activity in 2005-2006. All indicators met their targets within planned limits.



Satisfactory

Indicator 1

Two mission concepts have been prepared. The Next Generation Payload study has been successfully completed. A New Spectrum Monitoring mission concept has been initiated at the fourth quarter of 2007-2008 and the completion is expected by 2008-2009.

Source: Internal document.

Indicator 2

The Polar Communication and Weather mission has been initiated in the third quarter of 2007-2008 and was still ongoing at the end of 2007-2008. It is expected to be completed in the second quarter of 2008-2009.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
1.7	0.1
2007-2008 - Human Resources (FTEs)	
Planned	Actual
NIL	0.2

2- ESA Programs in SC – Objective: Through key international partnerships, enhance the Canadian industry's technological base and provide access to European markets for value-added products and services in the field of SC.

EXPECTED RESULT:

Successful development and demonstration of advanced technologies, systems, components, or studies provided for in the contracts awarded by ESA to Canadian firms under SC programs.

Indicators	Performance
1. Canadian industrial return coefficient in ESA optional programs in SC. (Target: 0.84 or higher)	Target Exceeded: 1.03

PERFORMANCE ANALYSIS:3-Year Trend

The analysis showed exceptional achievements and the annual targets were exceedingly met.

Indicator 1

Successful development and demonstration of advanced technologies, systems, components, or studies provided for in the contracts awarded by ESA to Canadian firms under the following ESA Telecommunications and Navigation programs: ARTES 1,3,4,5,8 and GalileoSat.

The return coefficient corresponds to the ratio between the actual number of weighted contracts given to a country and the ideal number of contracts to be given to that country according to existing rules. Canadian industrial return coefficients are by Program Activity. The SC optional programs are: ARTES and GalileoSat.

Source: European Space Agency Council. Paris, Agency Key Performance Indicators. ESA/IPC, December 31, 2007. Document available since March 2008, in English only.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
12.8	13.7
2007-2008 - Human Resources (FTEs)	
Planned	Actual
NIL	NIL

Highlights of Main Accomplishments – Enabling Research (SC)

- A multi-year implementation plan for the utilization of the Government of Canada Capacity Credit at Ka-band on Anik F2 satellite has been proposed. Additional demonstrations and trials of innovative government services to remote northern communities continued during 2007-08: the Remote Tele-Ultrasound experiments, the Wild Life tele-training for students in Arviat (Nunavut) and support to field research in analog sites in the Arctic are typical examples of government's applications and services that have generated a huge interest for potential capacity credit users in the North. Full deployment of Government's services is anticipated in mid-2009.
- Demonstrations of telemedicine and mobile (stop and deploy) communications systems using Ka-band technologies have been successfully concluded.

- The CSA has concluded a preliminary phase 0/A system definition study for Next Generation experimental communications payload. The proposed advanced payload would not only enhance Canada's security and emergency response capability over North-America and more specifically over the increasingly sensitive North-West passage but also provide flight heritage to new Canadian space technology needed to expand Canadian expertise in satellite communication services and export sales.
- Canada's participation in the European Space Agency telecommunications programs allowed our industry to access forward-looking studies on new telecommunications services, to develop new technologies, equipment and applications in multi-media, optical inter-satellite and mobile communications; and to demonstrate satellite-based communications. For example:
 - A Canadian company has designed novel space antennas for satellite communications to better manage the coverage according to the number of users present and the power available from the satellite;
 - Another company successfully demonstrated the feasibility of novel filter.

SPACE MISSION DEVELOPMENT – SATELLITE COMMUNICATIONS


One Satellite Communications Space Mission Development Program, with a combination of accomplishments, demonstrates how the expected result outlined below was measured and attained.

1- SC Projects – Objective: Ensure the development, delivery and commissioning of space-qualified systems for SC missions through effective project, quality and engineering management.

EXPECTED RESULT:
SC projects' deliverables meet mission objectives at critical steps.

Indicators	Performance
1. Safety and Mission Assurance (including Configuration Management) requirements are identified and met for each project. (Target: 100%)	Target Met: 100%
In accordance with Treasury Board approved Project Approval and Management Framework (PAMF):	
2. Mission objectives are met at critical steps of the projects. (Target: 85%)	Target Met: 100%
3. Project cost is maintained within authorized levels. (Target: 100%)	Target Met: 100%

4. Risks are identified and mitigation plans prepared for each project. (Target: 100%)	Target Met: 100%
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PERFORMANCE ANALYSIS:	
<p><u>3-Year Trend</u></p> <p>All indicators met their targets within planned limits.</p>	 Satisfactory
<p><u>Indicator 1</u></p> <p>Safety and Mission Assurance and Configuration Management (S&MA and CM) requirements are implemented on all Satellite Communications projects: NEOSSAT, CASSIOPE and M3MSat.</p> <p>S&MA and CM requirements are implemented for phases relate to preliminary design definition, detailed design definition and manufacture and acceptance implementation.</p> <p>Source: Internal document.</p> <p><u>Indicator 2</u></p> <p>Instead of conducting a client satisfaction survey, as in 2005-2006, other administrative means were used this year to capture and document performance information. A "Client Satisfaction" report indicated that bilateral meetings and project reviews had been held and that a service standard (including a complaint mechanism) was developed to capture information on clients' satisfaction.</p> <p>Source: Internal document located in Livelink – Document #9881933.</p> <p><u>Indicator 3</u></p> <p>All Satellite Communications project costs were maintained within authorized level.</p> <p>Source: Annual Table of Projects Milestones, internal document in English only.</p> <p><u>Indicator 4</u></p> <p>All Satellite Communications project risks have been identified and a mitigation plan has been prepared for each project. The project risk matrix is reviewed monthly at each project review and discussed in more detail during Space Program Risk Committee meetings, which take place three times a year.</p> <p>Source: Internal document.</p>	

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
10.6	8.1
2007-2008 - Human Resources (FTEs)	
Planned	Actual
11.8	8.0

Highlights of Main Accomplishments – Space Mission Development (SC)

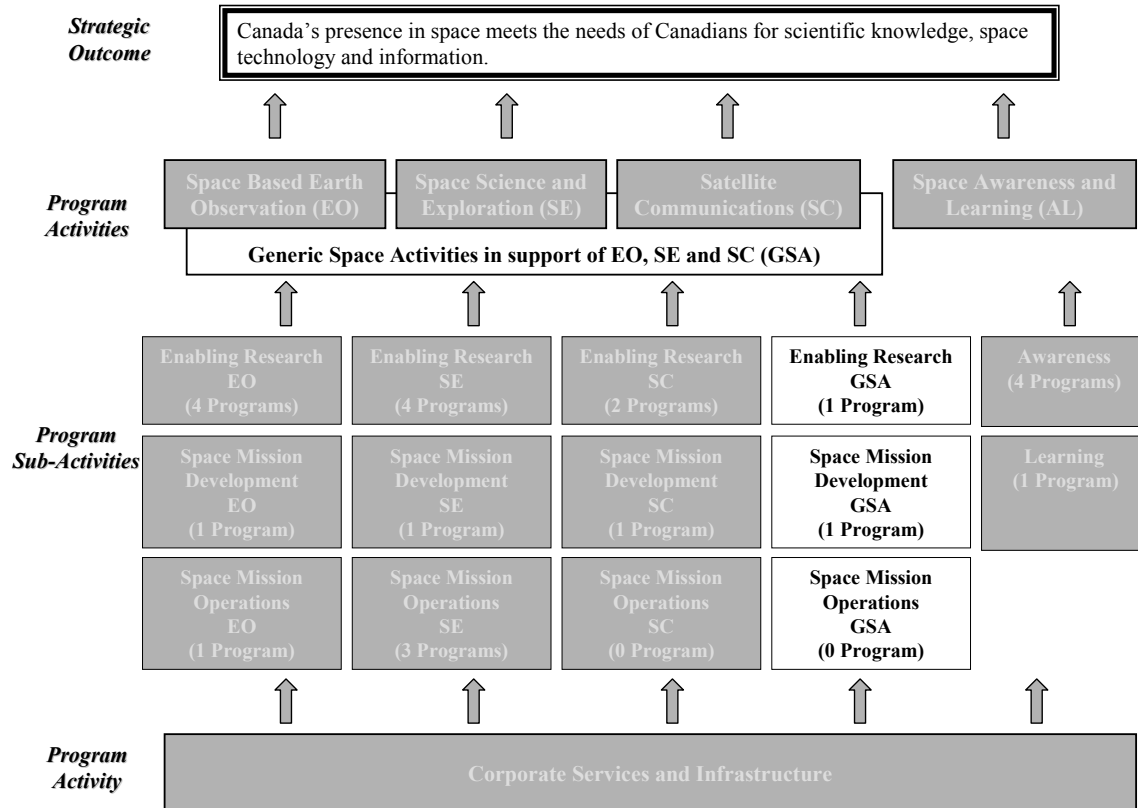
- In 2004-2005, as part of the CASSIOPE Mission Contribution Program, the CSA initiated the development and demonstration of the Cascade telecommunications payload on a small satellite bus fully designed and constructed by Canadian companies. Cascade is the precursor of a communication satellite constellation that will help position Canadian industry on the international market, both as a supplier of advanced components and as a service provider of high-volume, high-data-rate telecommunications anywhere in the world. The program encountered delays due to problems with the development of critical components as well as the Falcon launch vehicle. After detailed reviews of all the mission components, the schedule and milestones were modified to fit the new program schedule and the cash flow projections were adjusted accordingly. The launch date was moved from November 2008 to June 2009.
- CSA and the Department of National Defence (DND) partnered to initiate and manage the Maritime Monitoring and Messaging Micro-satellite (M3MSat), whose payloads will be an Automatic Identification System (AIS) and a Low Data Rate System (LDRS), both supported on a microsatellite bus. This project will demonstrate and further develop a multi-mission microsat bus capability; will establish micro-satellites as operationally cost effective; will allow optimization of single-satellite AIS payload in maritime traffic identification; will significantly support Canadian industry business development strategies in a global market context; and will provide complementarities with CSA's RADARSAT Constellation program and with DND's Polar Epsilon program. Preliminary Project Approval was received from Treasury Board in June 2007. The launch is planned for late 2010 and end of mission demonstration in 2011.

To learn more about Satellite Communications, go to:

<http://www.asc-csa.gc.ca/asc/eng/satellites/default.asp?page=observation>

2.5 GENERIC SPACE ACTIVITIES IN SUPPORT OF EO, SE AND SC

Program Activity: GENERIC SPACE ACTIVITIES IN SUPPORT OF EO, SE AND SC (GSA)



Priority: Provide leadership, coordination or support to Earth Observation (EO), Space Science and Exploration (SE), and Satellite Communications (SC) Program Activities through technology research and space-qualification activities that are generic in their nature.

Performance Status: 88% (7/8) of the Program Sub-Sub-Activities targets were met in 2007-2008. It is a 2% increase over 2006-2007 achievements.

The Program Activity results and indicators were thoroughly reviewed during the annual 2008-2009 Performance Measurement Framework update. The revised set of results and indicators is listed in the Report on Plans and Priorities 2008-2009. Next year's Departmental Performance Report will be based on these new performance measurements.

GENERIC SPACE ACTIVITIES IN SUPPORT OF EO, SE AND SC

2007-2008 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT

Expected Result

Innovative space technologies, techniques, and design and test methodologies in response to advanced developments required for future space missions and activities.

MAIN ACCOMPLISHMENTS IN 2007-2008

The CSA continued to enhance Canada's space capabilities by awarding technology R&D projects to industry and research organizations on a competitive basis through its Space Technology Development Program.

The CSA developed high-risk space technologies and maintained in-house technical capabilities through its Space Technology Research Program. A total of 8 new patents applications were filed out of 11 projects and 2 patents, filed last year, were granted.

The David Florida Laboratory provided world-class, cost-effective environmental space qualification services for the assembly, integration and testing of spacecraft systems and sub-systems to all of the CSA's programs as well as commercial programs.

Indicators	Performance
1. Number of technologies supported through one of the generic R&D programs that are used in a space mission or activity.	From the 34 projects that brought to higher readiness levels, a total of 4 technologies were chosen to enable new space missions and 5 technologies were integrated into commercial products.
2. Number of space missions making use of the David Florida Laboratory (DFL).	Eight of the CSA's space missions and 54 external programs were supported by DFL.
3. Number of peer-reviewed papers as a result of CSA generic technology R&D programs.	The CSA's scientists and engineers wrote a total of 84 peer-reviewed papers and conference presentations as a result of 2 CSA generic technology R&D programs.

Indicator 1 – Performance Analysis

The 2 technologies chosen from the Space Technology Research Program (STRP) to enable space missions are the Phoenix Ground Station and MIRAD.

The 2 technologies chosen from the Space Technology Development Program (STDP) to enable space missions are Proba 2 and MOPITT.

Indicator 2 – Performance Analysis

In addition to the 8 CSA’s space missions, the David Florida Laboratory supported 54 external programs for 38 private companies.

Indicator 3 – Performance Analysis

Harmonized performance measurement indicators for 2 Space Technology Programs — Space Technology Research Program (STRP) and Space Technology Development Program (STDP) — demonstrated that the research community does not use publications to share early findings with its peers in order to protect industrial secrecy and know-how.

2007-2008 - Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
47.5	54.5	47.1
2007-2008 - Human Resources (FTEs)		
Planned	Total Authorities	Actual
139.9	N/A	126.1

To learn more about Generic Space Technology Supporting Earth Observation, Space Science and Exploration, and Satellite Communications, go to:

<http://www.asc-csa.gc.ca/asc/eng/industry/technology.asp>

To learn more about the David Florida Laboratory, go to:

<http://www.asc-csa.gc.ca/eng/df/default.asp>

The programs under this Program Activity are divided into three Sub-Activities: Enabling Research, Space Mission Development and Space Mission Operations.

However, no Space Mission Operations are mentioned in this report, since CSA is not carrying out generic operation activities.

ENABLING RESEARCH – GENERIC SPACE ACTIVITIES IN SUPORT OF EO, SE, AND SC

One Generic Enabling Research Program, with a combination of accomplishments, demonstrates how the expected results outlined below were measured and attained.

1- Generic Space Technology Supporting Earth Observation, Science and Exploration, and Satellite Communications – Objective: Assume leadership and provide support in research and development of space-related high-risk technologies leading to the realization of CSA or international EO, SE, and SC missions.

EXPECTED RESULT 1:

Development and transfer of advanced space technologies by industry, government, academia and non profit organisations in support of EO, SE, and SC activities of interest to Canada.

Indicators	Performance
1. Number of publications. (Target: TBD*)	Cancelled: The indicator is not applicable.
2. Number of patents. (Target: TBD*)	Target Met: 8
3. Number of technologies brought to higher readiness levels. (Target: TBD*)	Target Met: 34
4. Number of technologies chosen to enable future space missions and/or commercial products retained by industries. (Target: TBD*)	Target Met: 9
5. Number of Highly Qualified Personnel. (Target: TBD*)	Target Met: 186

PERFORMANCE ANALYSIS:3-Year Trend

The comparison was only possible over a 2-year period for 3 out of the 5 indicators. The reported indicators presented small increases, benchmarks for all indicators will be established in the RPP 2009-2010.



Satisfactory

Indicator 1

The industry does not use publications to share early findings with its peers in order to protect industrial secrecy and know-how. In 2008-2009, this indicator was replaced by a new one that demonstrates better the output produced by the programs: *Number of licenses granted for space technologies generated by the CSA.*

Indicator 2

Only issued patents are counted. The 8 patents issued for 5 technologies are distributed as follows:

- technology 50404: 4 patents: in Japan, Germany, France and United Kingdom
- technology 50692: 1 patent in U.S.
- technology 50394: 1 patent in Canada
- technology 50408: 1 patent in U.S.
- technology 50412: 1 patent in U.S.

In 2008-2009, this indicator was modified to become: *Number of licenses granted for space technologies generated by the CSA.*

Source: Internal document.

Indicator 3

Space Technology Research Program: Out of 11 projects that ended in 2007-2008, 6 technologies increased in maturity.

Some 54% of R&D projects that were completed in 2007-2008 demonstrated an increase in technology maturity levels indicating progress toward set objectives. It is of interest to note that 74 highly skilled positions were maintained or created in relation to the 11 projects that ended in 2007-2008.

Space Technology Development Program: Out of 32 projects that ended in 2007-2008, 28 technologies increased in maturity

Some 87% of R&D projects that were completed in 2007-2008 demonstrated an increase in technology maturity levels indicating progress toward set objectives. It is of interest to note that 84 highly skilled industrial positions were maintained or created in relation to the 32 projects that ended in 2007-2008.

Source: STRP 2007-2008 Achievements; 2007-2008 STDP Performance Indicators Values Report; internal documents in English only.

Indicator 4

Out of the 9 technologies chosen, 4 were retained to enable future space missions (Proba 2, MOPITT, Phoenix Ground Station and MIRAD) and 5 were retained for commercial products by industries.

Source: Internal document.

Indicator 5

The term Highly Qualified Personnel (HQP) includes: graduate and postdoctoral fellows, as well as research assistants, research associates, faculty staff and industry R&D staff.

Source: Internal document.

*All targets were calibrated in the RPP 2008-2009 in the context of the development and implementation of new management and performance frameworks for Generic Space Technology programs.

EXPECTED RESULT 2:

Successful development and demonstration of advanced technologies, systems, components or studies provided for in the contracts awarded to Canadian firms under mainly two ESA Programs.

Indicators	Performance
1. Canadian industrial return coefficient in ESA optional programs, and at the overall level. (Target: 0.85 or higher)	Target Exceeded: 1.00

PERFORMANCE ANALYSIS:3-Year Trend

The comparison was only possible for a 2-year period. The analysis showed exceptional achievements; the targets were exceedingly met.

Indicator 1

The return coefficient corresponds to the ratio between the actual amount of weighted contracts given to a country and the ideal amount of contracts to be given to that country according to existing rules. Canadian industrial return coefficients are by Program Activity. The mandatory program is: General Support Technology Program (GSTP).

Source: European Space Agency Council. Paris, Agency Key Performance Indicators. ESA/IPC, December 31, 2007. Document available since March 2008 in English only.

EXPECTED RESULT 3:

Increased number of university scientists and engineers with Ph. D's and/or Master's degrees with research experience addressing real space problems faced by industry and/or government institutions.

Indicators	Performance
1. Number of partnership projects involving industry, universities and the CSA. (Target: 5 ongoing projects)	Target Exceeded: 10

PERFORMANCE ANALYSIS:3-Year Trend

The comparison was only possible over a 2-year period. The reported indicator presented a small increase.



Satisfactory

Indicator 1

There was at the end of March 2008, 2 ongoing projects and 8 new projects based on a partnership approach.

Note that this expected result and indicator no longer appears in the RPP.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
39.7	41.1
2007-2008 - Human Resources (FTEs)	
Planned	Actual
97.9	86.8

Highlights of Main Accomplishments – Enabling Research - Generic Space Activities in support of EO, SE, and SC

- Through the Space Technology Development Program, CSA has pursued the enhancement of Canada's capabilities by awarding new technology development contracts to industry (mainly to small and medium-size companies) and research organizations through annual Request for Proposals. Examples of technologies developed in 2007-2008 are:
 - Development of a pico-second laser source with low weight, volume and power consumption intended for future missions to Mars, Moon, and probably asteroids;
 - Development of a novel computer vision algorithms using three dimensional (3D) models and images to improve the reliability of tracking objects in space;

- Development of a drill superstructure, drill rod handling, and system autonomy towards a low mass and power efficient design capable of deployment in various planetary exploration scenarios;
 - Development and demonstration of small satellite autonomy technologies in the following three targeted areas: onboard mission task scheduling, onboard fault recovery, and onboard sensor calibration;
 - Development of a satellite navigation technology demonstrator receiver, which will serve as a test bed to assess the feasibility of aviation safety-of-life requirements for air transport; and, Development of an adaptive capacity optimization emulator capable of performing capacity planning and quality of service without incurring large capital expenses. This work resulted in the world's first intelligent telecommunication beam management with constraints based or revenue simulator.
- Through the Space Technology Research Program (STRP), CSA developed long-term high-risk space technologies and maintain in-house technical capabilities by conducting advanced R&D projects that meet the criteria of excellence and relevance in support of the implementation of the Canadian Space Program. For example, the program includes the development of:
 - A unique Imaging Sensor Evaluation System that performs tests and characterizes visible and infrared imaging sensors;
 - A high fidelity facility on testing the surface mobility of rovers in planetary exploration;
 - A shape memory alloy based compact actuator that replaces the traditional switches on telecommunications satellites; and,
 - A data simulator that is now being used to support investigations on the RADARSAT Constellation. A licence agreement has been signed with European Space Agency to use CSA's software for the assessment of Sentinel-1 mission.
 - The transfer and commercialization of space technologies and their applications to other sectors of the economy continues to enhance Canada's industrial competitiveness. This is being achieved by managing the CSA portfolio of patents and intellectual property licenses, by conducting commercialization assessments and developing marketing plans for technologies developed in-house. Four patents were issued for three different technologies and three new licences were executed. The complete technical information of the Quicksat micro-satellite platform developed at the CSA was licensed to a Canadian space company.

- The CSA has launched the Research Partnership Program with the Natural Sciences and Engineering Research Council of Canada to foster closer industry/university collaboration in space research and development. Eight projects were started. An announcement for a new round of opportunities was posted in February 2008.

SPACE MISSION DEVELOPMENT – GENERIC SPACE ACTIVITIES IN SUPPORT OF EO, SE, AND SC

One Generic Space Mission Development Program, with a combination of accomplishments, demonstrates how the expected result outlined below was measured and attained.

1- David Florida Laboratory (DFL) supporting the Canadian Space Program – Objective: Provide world-class space qualification services on a national scale, including facilities and expertise in support of the Canadian Space Program and international EO, SE and SC missions.

EXPECTED RESULT 1:

Development, provision of expertise and supply of space qualification services, functional and environmental testing of space hardware primarily for CSA sponsored programs and projects, and subsequently to the Canadian space industry and other private and public sector clients.

Indicators	Performance
1. Percentage of satisfied clients. (Target: 95% or better)	Target Exceeded: 99%

PERFORMANCE ANALYSIS:

3-Year Trend

The analysis showed exceptional achievements and the annual targets were exceedingly met.



Indicator 1

Survey responses indicate a client satisfaction of 99%, which exceeded expectations. In 2007-2008, 128 client feedback surveys were distributed and 22 were completed which represents an 11% return rate. Customers indicated that DFL delivered quality, cost-effective, timely service and provided technical expertise when and as needed. Minor issues were identified and addressed as part of DFL's ongoing quality improvement program and in consultation with its clients.

In addition, a separate Program Level Client Satisfaction survey was conducted upon the conclusion of the Phoenix Project. The Phoenix Program Office commented that the overall test services provided by the DFL either met or exceeded the expectations in all areas.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
7.8	6.1
2007-2008 - Human Resources (FTEs)	
Planned	Actual
42.0	39.3

Highlights of Main Accomplishments – Space Mission Development – Generic Space Activities in support of EO, SE, and SC

- David Florida Laboratory (DFL) provides world-class and cost-effective environmental space qualification services for the assembly, integration and testing of spacecraft systems and sub-systems to all of the CSA's programs. Work was carried out on the following projects:
 - Earth Observation: The environmental test campaign was completed for RADARSAT-2. Related activity included thermal vacuum, vibration, mass properties measurements, and electro-magnetic compatibility testing;
 - Science and Exploration: Modal testing was performed on three ePOP booms as part of CASSIOPE mission. The eOSTEO Program was supported through the vibration testing of three payload trays and the falcon tube container. Testing also continued on International Space Station orbital replacement units and flight support equipment, and on the orbital boom sensor system and laser camera system for Neptec Design Group. Significant upgrades were made to a Thermal Vacuum Chamber in preparation for extreme low temperature testing of the JWST-FGS;
 - Satellite Communications: Test support included subsystem level testing on Data Storage Units and a series of antenna tests on the Cascade mockup; and,
 - Commercial Programs: Test support was provided for a number of commercial satellite communication programs including MUOS for ComDev; Skynet V for ComDev, SICRAL 1-B for WL Gore and Associates; INMARSAT high gain antennas for EMS and CMC Electronics; CF-18 radome antenna project for DND/L3Communications; SatCom Bw Stufe 2 Program for MDA; NIMIQ 4 Program for MDA; Hotbird 10 top floor antenna deck for MDA, CMBStar and Telestar 11 spacecraft for MDA/Space Systems Loral.

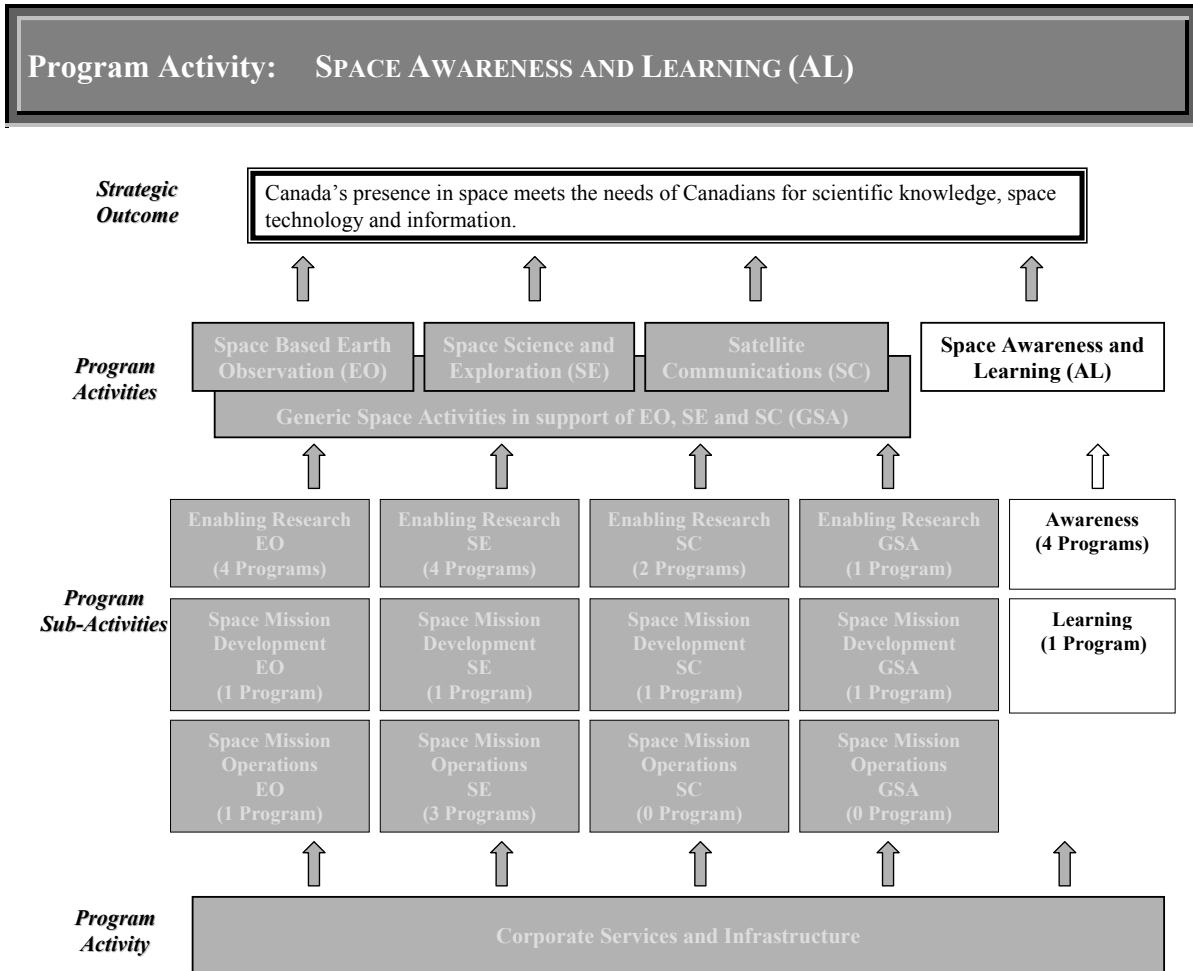
To learn more about Generic Space Technology Supporting Earth Observation, Space Science and Exploration, and Satellite Communications, go to:

<http://www.asc-csa.gc.ca/asc/eng/industry/technology.asp>

To learn more about the David Florida Laboratory, go to:

<http://www.asc-csa.gc.ca/asc/eng/dfl/default.asp>

2.6 SPACE AWARENESS AND LEARNING



Priority: Further public understanding and engagement with regards to space-related issues, ultimately leading to improving the scientific literacy of Canadians.

Performance Status: 94% (15/16) of the Program Sub-Sub-Activities targets were met in 2007-2008. It is a 6% increase over 2006-2007 achievements.

The Program Activity results and indicators were thoroughly reviewed during the annual 2008-2009 Performance Measurement Framework update. The revised set of results and indicators is listed in the Report on Plans and Priorities 2008-2009. Next year's Departmental Performance Report will be based on these new performance measurements.

SPACE AWARENESS AND LEARNING

2007-2008 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT

Expected Result

Increased public awareness of Canada's activities in space and space benefits positively affecting the quality of life of Canadians.

MAIN ACCOMPLISHMENTS IN 2007-2008

The number of visitors to the CSA's interactive Web site increased from 2,600,000 in 2006-2007 to 3,300,000 in 2007-2008.

Over 90 public events were conducted in communities throughout Canada to raise awareness of Canadian space science and technology.

The Space Learning Program conducted 280 learning events, combining in-class experiences, presentations and tele-distance education with primary and secondary students throughout Canada. A total of 10,661 students participated in these learning events compared to 3,226 the previous year.

A total of 1,140 educators participated in professional development workshops compared with 614 in 2006-2007.

Indicators	Performance
1. Awareness of Canadians measured by telephone survey every three years. The next survey will be conducted in 2008-2009.	<p>The last survey was conducted in 2005.</p> <p>Results indicated that 46% of respondents are aware of the Canadian Space Agency as champion of space activities and that 19% of respondents have moderate knowledge of Canada's space activities.</p>

Indicator 1 – Performance Analysis

The survey was conducted with the general public to assess awareness, knowledge, and attitudes toward Canada's space program and related activities. The survey was administered by phone to 1,628 Canadian adult residents, on February 4 to 11, 2005. Based on a sample of this size, the overall results can be considered to be accurate within +/- 2.5%, 19 times out of 20.

Several results contribute to determining levels of awareness. Other than the two results cited above, the following could also be considered:

- 47% identified Earth-related benefits that flow from Canada's space program;
- 67% cited images when thinking about Canada's involvement in space;
- 71% believed Canadians are proud of our activities in space, and that Canadian success in advanced space technologies contributes to our knowledge-based economy, innovation, and economic competitiveness; and,
- 65% felt that our space activities inspire youth in science and engineering.

Some 80% of Canadians surveyed think it is important for Canada to continue to have a space program and be active in the development of advanced technologies and science related to space.

Respondents were asked to rate the importance of a number of benefits that result from investment in the Canadian Space Program. A strong majority viewed all potential benefits as important. Some 90% felt that monitoring the Earth for natural disasters is an important benefit, followed closely by monitoring our oceans, forests, wetlands and farmlands (88%), and new medical discoveries (87%). As well, significant numbers attributed importance to better telecommunications (83%) and leadership in robotics (81%). Benefits that also received strong responses included advancing humankind's knowledge (74%), enhancing Canada's international reputation (71%), and exploring the solar system (67%).

2007-2008 - Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
6.5	5.7	4.5
2007-2008 - Human Resources (FTEs)		
Planned	Total Authorities	Actual
26.9	N/A	18.9

To learn more about Space Awareness and Learning, go to:
<http://www.asc-csa.gc.ca/asc/eng/media/default.asp>; and,
<http://www.asc-csa.gc.ca/asc/eng/educators/default.asp>

The programs under this Program Activity are divided into two Sub-Activities: Awareness and Learning.


AWARENESS

Two Awareness Programs with a combination of accomplishments demonstrate how the following expected results were measured and attained.

1- Strategic Communications – Objective: Ensure positioning of the CSA and information supporting the Awareness and Learning program.

EXPECTED RESULT 1:
Target audiences are reached through outreach activities.

Indicators	Performance
1. Number of initiatives according to targeted audiences. (Target: Confirm Benchmark)	Target Met: 36 Public Speaking/Presentation events.

PERFORMANCE ANALYSIS:	
<p><u>3-Year Trend</u></p> <p>The comparison was only possible over a 2-year period.</p> <p><u>Indicator 1</u></p> <p>A network of partners, including learning organisations, science centers, community organisations and other science and technology-driven organisations was developed to help with the achievement of the objective.</p> <p>Note that this expected result and indicator will no longer appear in the RPP.</p> <p>Source: Internal document.</p>	 Satisfactory

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
0.5	0.4
2007-2008 - Human Resources (FTEs)	
Planned	Actual
3.6	2.6

2- Media Relations and Information Services – Objective: Position information through the media and the Web.

EXPECTED RESULT 1:

Information is present in the media, particularly on television.

Indicators	Performance
1. Quantity of media initiatives that resulted in informative and positive coverage. (Target: Sustain or increase partnerships and initiatives that result in coverage in media)	Target Partially Met: 586 interviews completed. Target Met: 3 partnerships sustained.

PERFORMANCE ANALYSIS:

3-Year Trend

It was impossible to provide a trend analysis for this result because the indicators were modified yearly.

N/A

Indicator 1

A total of 586 interviews were completed, a decrease compared to the 700 completed in 2006-2007. During that period, 757 requests from the media were received, a slight decrease from last year, 27 media events were conducted and 17 press releases were issued.

The CSA sustained partnerships with: TVA-Salut Bonjour, CTV-Discovery (CTV), and SRC-Découverte.

Note that this expected result and indicator will no longer appear in the RPP.

Source: Internal document.

EXPECTED RESULT 2:

Canadians visit the Canadian Space Agency's Web site.

Indicators	Performance
1. Number of Canadian visits to the CSA's Web site. (Target: Sustain or increase visits to the CSA's Web site)	Target Met: Increase of more than 1.25 times.

PERFORMANCE ANALYSIS:3-Year Trend

The analysis shows a continuous increase over the past 3 years.



Satisfactory

Indicator 1

The number of visits to the CSA's Web site went up more than 1.25 times from 2,612,915 in 2006-2007 to 3,280,126 in 2007-2008.

Note that this expected result and indicator will no longer appear in the RPP.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
1.1	0.9
2007-2008 – Human Resources (FTEs)	
Planned	Actual
8.1	7.3

3- Creative Services, Marketing and Exhibitions – Objective: Position information through direct-marketing activities.

EXPECTED RESULT 1:

Target audience receives Canadian Space Agency information.

Indicators	Performance
1. Quantity of products and publications distributed to select audiences through different communications channels. (Target: Maintain or increase)	Target Exceeded: 971 requests received.

PERFORMANCE ANALYSIS:3-Year Trend

It was impossible to provide a trend analysis for this result because the indicators were modified yearly.

N/A

Indicator 1

Almost a double increase from 546 in 2006-2007. The main communication channel is through e-mails: 792 out of 971 requests.

Note that this expected result and indicator will no longer appear in the RPP.

Source: Internal document.

EXPECTED RESULT 2:

Target audience receives Canadian Space Agency information through outreach activities with partners.

Indicators	Performance
1. Number of initiatives focused on target audiences. (Target: Establish benchmark)	Target: Cancelled.

PERFORMANCE ANALYSIS:3-Year Trend

It was impossible to provide a trend analysis for this result because it was modified yearly.

N/A

Indicator 1

The indicator does not provide sufficient value-added information. The indicator was modified in RPP 2008-2009 to: "*Number of initiatives according to targeted audiences*".

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
1.8	0.9
2007-2008 - Human Resources (FTEs)	
Planned	Actual
5.0	3.7

4- Astronaut Awareness Tours – Objective: Increase awareness of the Canadian Space Program (CSP) through proactive public appearances by Canadian astronauts throughout Canada.

EXPECTED RESULT 1:

Canadians are reached through awareness activities conducted by a Canadian Astronaut.

Indicators	Performance
1. Number of participants reached per astronaut days invested. (Target: Gap analysis)	Target Exceeded: Nearly 31,000 Canadian participants.
2. Number of events per astronaut days invested - 10% videoconference and 90% visits. (Target: 80 events for 72 days of astronauts)	Target Partially Met: 64 events for an estimate of 55 days of astronauts.
3. Number of provinces and territories visited. (Target: 6 provinces and 1 territory)	Target Met: 8 provinces and 1 territory were visited.
4. Percentage of accepted requests. (Target: Approximately 50%)	Target Partially Met: 25%

PERFORMANCE ANALYSIS:3-Year Trend

All indicators met their targets within planned limits.



Satisfactory

Indicators 1 and 2

Nearly 31,000 Canadians participated in 64 Canadian Astronaut Tour events conducted in communities in eight provinces and one territory. It is an average of 464 Canadians at each event compared to a benchmark of 300 Canadians per event established in 2006-2007.

In 2007-2008, there was a 20% reduction in astronaut availability to support events than in 2006-2007 due to training and missions, which explains the reduced number of events.

In the future, the data collected will be reflected in the indicator for the Expected Result: *Target audience is reached through outreach activities.*

Source: Internal document.

Indicator 3

The 8 provinces and territories visited are: Québec, Alberta, Manitoba, Ontario, British-Columbia, Newfoundland, New Brunswick, Saskatchewan and Yukon.

Source: Internal document.

Indicator 4

A total of 64 events were supported by astronauts out of a total of 248 requests received. This is largely due to the fact that all active astronauts were on training for Space Shuttle and Space Station missions during a significant portion of this period.

Source: Internal document.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
0.2	0.2
2007-2008 - Human Resources (FTEs)	
Planned	Actual
N/A	N/A

Highlights of Main Accomplishments – Awareness

The major communications activities focused on the following:

- Astronaut Dave Williams' participation in STS-118 Mission to the International Space Station;
- Launch and installation of Dextre, Canada's last contribution of a two-armed robot to the International Space Station;
- Launch of Radarsat-2 from Baikonur;
- Launch of Canada's weather station on NASA's Phoenix lander to Mars;
- Launch of space science experiments on Russian Foton capsule;
- Announcement of launch of the Astronaut Recruitment Campaign;
- 36 speakers events in 7 provinces and territories, reaching a total of 14,599 people including 21 interactive public presentations on Canada's contribution to NASA's Phoenix Mars lander mission. And 64 astronaut events, reaching audiences in eight provinces and one territory;
- Key international space-related conferences: IAC-2007, Africa GIS 2007, and IGARSS-2007;
- CSA corporate traveling exhibit attracted over 21,000 visitors;
- New exhibits developed with partner Ontario Science Centre: Facing Mars;
- Discovery Channel Mars Exploration documentary and five-part series broadcast;
- A 25% increase in the number of visitors to the Agency's interactive Web site, increasing from 2,612,915 last year to 3,280,126 in 2007-2008; and,
- Six Canadian space science and technology success stories distributed by News Canada generated readership of 1,959,910 in daily and weekly publications across the country. Another 13,458,316 Canadians consulted the success stories on the Web site of News Canada.

LEARNING

Three Learning Programs with a combination of accomplishments demonstrate how the following expected results were measured and attained.

1- Space Learning Program – Objective: Provide Canadian educators and students with targeted educational resources and space learning opportunities to build knowledge and enhance interest in space science and technology.

EXPECTED RESULT 1:

Canadian educators and students further their learning related to science and technology through space theme.

Indicators	Performance
1. Number of educators reached through professional development initiatives. (Target: Maintain or increase)	Target Exceeded: 1140 educators took part in learning activities.
2. Number of students reached through learning activities. (Target: Maintain or increase)	Target Exceeded: 10,661 students took part in learning activities.

PERFORMANCE ANALYSIS:

3-Year Trend

All indicators met their targets within planned limits.



Satisfactory

Indicator 1

A total of 1,140 educators participated in professional development workshops, almost twice as many (1.86) compared with last's year 614 educators.

An increase in interest in space science and technology related curriculum, interactive tele-learning experiences and educator professional development is being met through formal agreements of collaboration.

Source: Internal document.

Indicator 2

The Space Learning Program conducted 280 learning events, combining in-class experiences, presentations and tele-distance education with primary and secondary students throughout Canada. A total of 10,661 students participated in these learning events compared to 3,226 the previous year, almost three times more (3.3).

The Space Learning Grants, Contributions and Sponsorship Program funded five organisations from Newfoundland and Labrador, Ontario, Manitoba and Alberta to carry out space science educational activities in their communities. At the same time, 19 graduate students from 13 Canadian Universities were supported to present their work at the prestigious International Astronautical Federation annual congress. Thirty-one post-secondary students, 16 secondary students and one educator were sponsored to participate in various space-focused learning events throughout the year.

Source: Internal document.

EXPECTED RESULT 2:

Enhance expertise of Canadian scientists, engineers and physicians in space science, space technology and space medicine through the learning components of the CSA Grants and Contributions Program.

Indicators	Performance
1. Number of students, fellows and medical residents supported through the programs. (Target: 19)	Target Met: A total of 27 students and fellows, and 4 medical residents supported through the programs.

PERFORMANCE ANALYSIS:3-Year Trend

All indicators met their targets within planned limits.



Satisfactory

Indicator 1Space Technology

Program in sunset mode: 3 fellows were supported. This was the last instalment for the 2005 competition for the Supplement Program.

Space Science

Seventeen post-graduate scholarships and fellowships were granted from the CSA Supplements to NSERC (Annex 1): 8 new and 9 ongoing. In addition, a total of 7 fellowships, 3 new and 4 ongoing, were supported through the CSA Fellowship in Space Science (Annex 2).

Through an agreement with the NASA-JSC Aerospace Medicine Clerkship Program and the NASA-KSC Biomedical Office, 4 Canadian medical students or residents attended a four-week Aerospace Medicine Elective program.

Source: Internal documents.

2007-2008 - Financial Resources (\$ in millions)	
Planned Spending	Actual Spending
2.3	1.7
2007-2008 – Human Resources (FTEs)	
Planned	Actual
5.2	3.8

Highlights of Main Accomplishments – Learning

- Forty thousands schools and over a million students learned about the science of spacesuits, space walking, physical conditioning and operating a robot on the Space Station as they followed Astronaut Dave Williams’ mission to the International Space Station.
- These same schools and students learned about Canada’s contribution of a weather station to NASA’s Phoenix mission that will plant the maple leaf on Mars.

- Another 300,000 students in more than 8,000 classes learned about science through their participation in the Tomatosphere project.
- The Space Learning Program conducted 280 learning events, combining in-class experiences, presentations and tele-distance education to reach 10,661 primary and secondary students throughout Canada.
- More than 1,100 educators took part in professional development workshops and conferences.

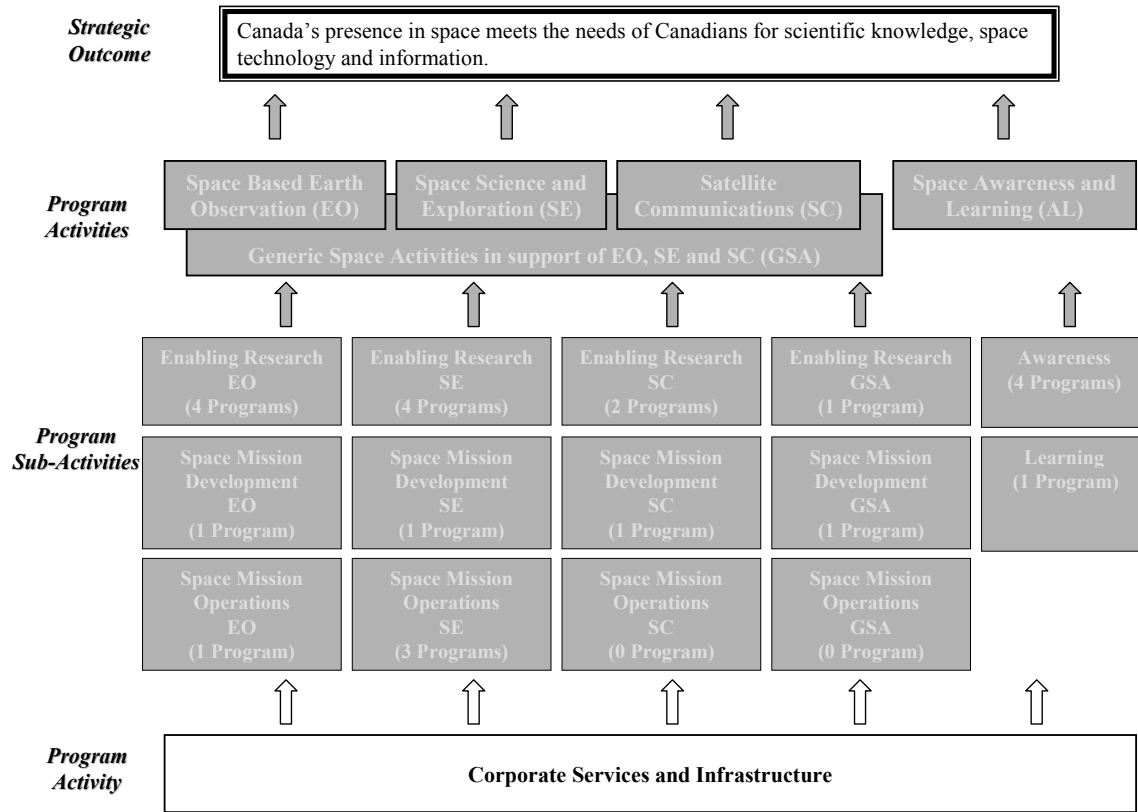
To learn more about Space Awareness and Learning, go to:

<http://www.asc-csa.gc.ca/asc/eng/media/default.asp>; and,

<http://www.asc-csa.gc.ca/asc/eng/educators/default.asp>

2.7 CORPORATE SERVICES AND INFRASTRUCTURE

Program Activity: CORPORATE SERVICES AND INFRASTRUCTURE



Priority: To implement the government's commitment to modern public service management in accordance with the Management Accountability Framework's (MAF) expectations.

Performance Status: 76% (13/17) of the Program Sub-Sub-Activities targets were met in 2007-2008. It is an 11% increase over 2006-2007 achievements.

CORPORATE SERVICES AND INFRASTRUCTURE

2007-2008 PROGRAM ACTIVITY PERFORMANCE MEASUREMENT

Expected Result 1

Corporate Services provide an added value to the CSA managers in the performance of their duties.

Indicators	Performance
1. Services provided meet standards set under Government-wide and CSA policies as well as MAF expectations.	Ratings from the 2007 MAF assessments against the 19 indicators were: Strong = 1 Acceptable = 10 Opportunity for improvement = 7 Attention required = 1

Indicator 1 – Performance Analysis

Overall, the results are similar to the assessment in 2006. During the MAF period, the CSA has undergone two transitions at the presidency level, which has delayed the finalization of some corporate initiatives. Compared to 2006, 3 ratings have improved, 3 ratings have declined and 13 have remained the same.

The CSA's rating improved from "acceptable" in 2006 to "strong" in 2007 under the indicator "*Extent to which the workplace is fair, enabling, healthy and safe*".

Steady progress was made under the indicators "*Effectiveness of financial management and control*" and "*Effectiveness of information technology management*" with a rating rising from "opportunity for improvement" to "acceptable".

The rating declined from "strong" to "acceptable" under the indicator "*Effective project management*" and from "acceptable" to "opportunity for improvement" under the indicators "*Values-based leadership and organizational culture*" and "*Quality and use of evaluation*".

The Treasury Board assessment does not indicate management quality beyond MAF indicators. The CSA and Treasury Board had identified 3 management priorities for 2007-2008:

1. The completion of the Long Term Capital Plan: The completion was postponed to 2008-2009 in order to take into consideration the results of the priority review carried out by the CSA in response to the Canadian Science and Technology Strategy and the Treasury Board Strategic Review.
2. The development of an implementation plan for the new Internal Audit policy: The CSA has developed an implementation plan. While reasonable progress was made in implementing key elements of the Internal Audit Policy, the CSA has not complied with one central element: the reporting relationship between the Chief of Audit and Evaluation and the Deputy head.
3. The monitoring of the CSA external financial reporting information: The Agency has made progress in monitoring its financial reporting and ensuring compliance, and has improved the overall quality and timeliness of its external financial reporting information.

Source: Management Accountability Framework Assessment Round V 2007-2008.

Expected Result 2

Key corporate risks are addressed and mitigated.

Indicators	Performance
1. Management and mitigation actions are implemented against the four highest priority risks identified in the CSA corporate risk profile.	Planned management and mitigations actions were fully completed in response to 2 out of the 4 highest priority corporate risks, and partially completed for the other 2 priority risks.

Indicator 1 – Performance Analysis

All actions planned in the RPP 2007-2008 were completed in response to 2 of the four highest corporate priority risks, namely:

Function/Process Integration: Increase the capacity of the CSA to align its strategies, planning priorities, funding levels, operations and capacity to deliver and to obtain clear understanding and buy-in from managers and staff at all levels.

1. Development of socio-economic performance indicators: The CSA has approved the Performance Measurement Framework. It includes socio-economic indicators for the strategic outcome and for all program activities that were integrated in the Report on Plans and Priorities 2008-2009.

2. Integration of financial and performance information: The CSA has approved the first work plan created with a custom-built database integrating systematically financial and performance information. The electronic work plan database is fully implemented and functional in all sectors for the planning and monitoring of 2008-2009.

3. Development of a Long-term Investment Plan: A first version of the plan was developed. The approval of the plan was postponed to 2008-2009 in order to take into consideration the priority review carried out by the CSA in response to the Canadian Science and Technology Strategy and the Treasury Board Strategic Review.

Workforce Competencies: Increase the capacity of the CSA to maintain a qualified workforce of public servants to deliver CSA's mandate within the government legislative frameworks, policies and rules.

1. Established profile of essential qualifications for managers to receive delegation of authority: The necessary conditions to obtain full delegation and authority are identified in CSA's Human Resources Authority Delegation Document. Also, the leadership competency profile developed by the Canada Public Service Agency is the reference tool at the CSA.

2. The majority of managers are recognized as being qualified for increased delegation of authority: One hundred percent of managers have completed their mandatory training prescribed by the Treasury Board Secretariat and are registered in an continuous learning program. The majority of managers have followed the mandatory training to obtain full delegation authority. However, the Public Service Commissions of Canada continues to limit the delegation authority to Director General's level and above.

Actions planned in the RPP 2007-2008 were partly completed in response to 2 of the four highest corporate priority risks, namely:

Vision and Strategy: Create a capacity for the CSA to strategically plan and allocate its funds based on cutting-edge priorities and in line with Government's objectives:

1. Development of a strategic planning cycle aligned with the CSA's current management cycle: The planning cycle was developed but the implementation was postponed to 2008-2009.

Values and Ethics: Increase the capacity of the CSA to instil public service values, to develop a working environment free of harassment, and promoting respect for individuals, integrity and honesty:

1. Implementation of a Public Service Values and Ethics program: Some initiatives were taken to increase dialogue among managers on matters of values and ethics. Communication activities were initiated to make employees aware of the importance of values and ethics and of corporate mechanisms to deal fairly with government wrongdoing disclosure.

Source: CSA's Corporate Risk Profile (Internal document).

2007-2008 - Financial Resources (\$ in millions)		
Planned Spending	Total Authorities	Actual Spending
36.5	41.3	38.6
2007-2008 - Human Resources (FTEs)		
Planned	Total Authorities	Actual
252.6	N/A	219.7

To learn more about Corporate Services and Infrastructure, go to:
http://www.asc-csa.gc.ca/asc/doc/maf_f.doc, internal document in French only.

CORPORATE SERVICES AND INFRASTRUCTURE – RISK MANAGEMENT

1- Corporate Management Services

Corporate services supporting the CSA's activities include: Audit, Evaluation and Review; Communications; Finances; Human Resources; Information Management and Information Technology; Legal Services; Policy, Planning and Relations; President's Office; and Security and Facilities.

EXPECTED RESULT 1:

Corporate Services provide an added value to CSA managers in the performance of their duties.

Indicators	Performance
<p>Policy and Planning</p> <p>1. Canadian needs are identified through a number of strategic and socio-economic analyses. (Target: Completed socio-economic studies for future missions in EO, SE and SC) (Target: N/A)</p> <p>2. Senior management is accountable for the management of resources and results. (Target: PAA and performance measurement framework approved by TBS) (Target: All sectors' work plans are in accordance with the PAA and PMF)</p>	<p>Target Partially Met: Studies initiated will be completed by June 2008.</p> <p>Target Met: PAA was approved on May 31, 2007; PMF was approved on March 18, 2008.</p> <p>Target Met: All work plans were in accordance with the PAA and PMF.</p>
<p>Finance</p> <p>1. Financial statements audited by 2010. (Target: New guidelines set by the General Comptroller are implemented)</p>	<p>Target Partially Met: An action plan is being implemented to meet the new guidelines set by the General Comptroller.</p>
<p>Human Resources</p> <p>1. Activities, initiatives, guidelines, policies and tools, identified in the Staffing Management Accountability Framework, are drafted and implemented. (Target: 50% of all SMAF elements implemented)</p> <p>2. Human Resources Strategic Management Plan is developed and communicated throughout the CSA. (Target: Finalized plan and 25% of activities implemented)</p>	<p>Target Exceeded: 75% of all the SMAF elements are implemented in response to the Public Service Commission audit report recommendations.</p> <p>Target Exceeded: The Strategic Plan was approved by the CSA and 50% of the activities were completed. Two key elements remain: The professional development program for HR specialists and the action plan to prevent and process complaints.</p>

<p>Security and Facilities</p> <p>1. The Policy on Assets and Information Security is implemented by all CSA managers. (Target: The Policy is distributed to all managers)</p>	<p>Target Met: The Policy was distributed and communicated with success to all managers.</p>
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2- Risk Management

The CSA's capacity to achieve its expected results and strategic outcome is influenced by its ability to recognize, manage and mitigate risk. In accordance with its commitment to risk-based planning and the integration of risk management into all decision-making processes, the CSA has completed an intensive process of corporate risk identification and assessment. The objective of risk management is to increase the CSA's capacity to mitigate the four risks of highest priority in the area of Vision and Strategy, Values and Ethics, Workforce Competencies, and Function/Process Integration.

EXPECTED RESULT 1:

Vision and Strategy: Create a capacity for CSA to strategically plan and allocate its funds based on cutting-edge priorities and in line with Government's objectives.

Indicators	Performance
<p>1. Implementation of a strategic planning cycle aligned with the CSA's current management cycle. (Target: The 2009-2010 strategic planning cycle adopted in Spring 2007)</p>	<p>Target Partially Met: The planning cycle was developed but the implementation was postponed to 2008-2009 in response to TBS needs and due to a change of presidency.</p>

EXPECTED RESULT 2:

Values and Ethics: Increase the capacity of the CSA to instil public service values, to develop a working environment free of harassment, and promoting respect for individuals, integrity and honesty.

Indicators	Performance
<p>1. Implement a Public Service Values and Ethics program. (Target: TBD)</p>	<p>Target Partially Met: Some initiatives were taken to increase dialogue among managers on matters of values and ethics. Communication activities were initiated to make employees aware of the importance of values and ethics and of corporate mechanisms to deal fairly with government wrongdoing disclosure.</p>

EXPECTED RESULT 3:

Workforce Competencies: Increase the capacity of the CSA to maintain a qualified workforce of public servants to deliver its mandate within the government legislative frameworks, policies and rules.

Indicators	Performance
1. The profile of essential qualifications for managers to receive delegation of authority has been established. (Target: TBD)	Target Met: The necessary conditions to obtain full delegation authority are identified in CSA's Human Resources Authority Delegation Document. Also, the leadership competency profile developed by the Canada Public Service Agency is the reference tool at the CSA.
2. The majority of CSA managers are recognized as being qualified for increased delegation of authority. (Target: TBD)	Target Met: 100% of managers have completed their mandatory training prescribed by the Treasury Board Secretariat and are registered in a continuous learning program. The majority of managers have followed the mandatory training to obtain full delegation authority. However, the Public Service Commissions of Canada continues to limit the delegation authority to Director General's level and above.

EXPECTED RESULT 4:

Function/Process Integration: Increase the capacity of CSA to align its strategies, planning priorities, funding levels, operations and capacity to deliver and to obtain clear understanding and buy-in from managers and staff at all levels.

Indicators	Performance
1. Completed development of socio-economic performance indicators for each of the CSA's strategic outcome and program activity expected results in accordance with the Canadian Space Strategy. (Target: Socio-economic indicators are completed for all program activities and integrated in the RPP 2008-2009)	Target Met: The CSA has approved the Performance Measurement Framework. It includes socio-economic indicators for the strategic outcome and all program activities that were integrated in the Report on Plans and Priorities 2008-2009.

<p>2. Financial and performance information is integrated in the CSA's work plans by information management systems made available to managers. (Target 1: Create systematic links between Work Plan and Financial databases) (Target 2: The Work Plan database is fully implemented and functional for all sectors for the planning and monitoring of 2008-2009)</p>	<p>Target Met: The CSA has approved the first work plan created with a custom-made database integrating systematically financial and performance information. The electronic work plan database is fully implemented and functional in all sectors for the planning and monitoring of 2008-2009.</p>
<p>3. Completed development of a Long-term Investment Plan. (Target: The Plan is approved by CSA Executive Committee)</p>	<p>Postponed: A first version of the plan was developed. The approval of the plan was postponed to 2008-2009 in order to take into consideration the priority review carried out by the CSA in response to the Canadian Science and Technology Strategy and the Treasury Board Strategic Review.</p>

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