THE CANADIAN SPACE AGENCY

2006-2007 Estimates

REPORT ON PLANS AND PRIORITIES

Maxime Bernier
Minister of Industry

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SECTION 1: OVERVIEW

1.1 MINISTER'S MESSAGE

As Minister of Industry, I am proud to present this report on the Canadian Space Agency anticipated achievements and results over the next three years. Through the efforts of the Canadian Space Agency and its Portfolio partners, we are working to ensure that Canada has the necessary business and innovation environment to foster a culture of discovery and creativity to fuel economic success and support our enviable quality of life.

Today, we operate in a globalized economy where electronic commerce drives complex and interconnected supply chains from around the world and anyone can be our competitor. To thrive, we need a dynamic and adaptable economy — one with a highly trained work force and nimble businesses striving for competitive growth and development.

Looking ahead, we see the need to enhance Canada's business environment, including improving the critical ground rules that ensure stability, equitable conduct and competition for consumers, investors and businesses. Used strategically, these efforts can encourage investment in innovation, afford easier access to capital, support risk-taking and entrepreneurship, and ensure the efficient and productive allocation of resources.

The Industry Portfolio consists of:

- Business Development Bank of Canada [1]
- Canadian Space Agency
- Canadian Tourism Commission [1]
- Competition Tribunal
- Copyright Board Canada
- Industry Canada
- National Research Council Canada
- Natural Sciences and Engineering Research Council of Canada
- Social Sciences and Humanities Research Council of Canada
- Standards Council of Canada [1]
- Statistics Canada

[1] Federal Crown corporations do not prepare Reports on Plans and Priorities.

We are working to reduce barriers to and within our markets and to encourage more domestic and foreign investment. We are supporting and defending our industries. We are working to improve business and consumer confidence. And we are supporting science, technology, research and development to encourage our industries, our businesses and our workforce to keep pace with technological change and drive innovation throughout our economy. And the demand for innovation across the Canadian economy — including in the areas of health care, climate change, productivity and the competitiveness of Canadian firms — continues to rise.

As presented in this report, the Canadian Space Agency initiatives will help make Canada a better place to innovate and do business. It is my pleasure to present the *Report on Plans and Priorities* for the Canadian Space Agency.

Maxime Bernier
Minister of Industry

1.2 MANAGEMENT REPRESENTATION STATEMENT

I submit, for tabling in Parliament, the 2006-2007 Report on Plans and Priorities (RPP) for the Canadian Space Agency.

This document has been prepared based on the reporting principles contained in the *Guide to the Preparation of Part III of the 2006-2007 Estimates – Reports on Plans and Priorities*.

- It adheres to the specific reporting requirements outlined in the Treasury Board Secretariat (TBS) guidance;
- It is based on the department's approved Program Activity Architecture (PAA) structure as reflected in its Management Resources and Results Structure (MRRS);
- It presents consistent, comprehensive, balanced and reliable information;
- It provides a basis of accountability for the results achieved with the resources and authorities entrusted to it; and,
- It reports finances based on approved planned spending numbers from the TBS in the RPP.

Name:

Carole Lacombe, Acting President

1.3 SUMMARY INFORMATION

RAISON D'ÊTRE

The mandate of the Agency is "*to promote the peaceful use and development of space, to advance the knowledge of space through science and to ensure that space science and technology provide social and economic benefits for Canadians*."

The Canadian Space Agency (CSA) is achieving this mandate by implementing the Canadian Space Program (CSP) in co-operation with other government departments/agencies, industries, and universities, as well as international partners. In addition to delivering its own programs, the CSA is responsible for co-ordinating all federal civil space-related policies and programs pertaining to science and technology research, industrial development, and international co-operation.

To learn more about the mandate of the CSA, go to:
http://www.space.gc.ca/asc/eng/about/mission.asp

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	374.1	331.1	337.1
HUMAN (FTEs)	690	687	687

CSA STRATEGIC OUTCOMES

The CSA contributes to the three following Strategic Outcomes in line with the Government of Canada's top priorities:

Environment and Sustainable Development: A Space Program that helps Canada understand and protect the environment, and develop its resources in a sustainable manner.

Knowledge, Innovation and Economy: A Space Program that generates knowledge and pushes innovation, while leading (where appropriate) to increased productivity and economic growth through commercialization.

Sovereignty and Security: A Space Program that supports recognition of Canada's sovereignty and the security of its communities.

CSA CONTRIBUTIONS TO GOVERNMENT OF CANADA OUTCOMES

GOVERNMENT OF CANADA OUTCOMES		
Economy	**Social**	**International**
1. Strong economic growth 2. An innovative and knowledge-based economy 3. Income security and employment for Canadians 4. A clean and healthy environment	1. Healthy Canadians with access to quality health care 2. A vibrant Canadian culture and heritage 3. Safe and secure communities	1. A strong and mutually beneficial North American partnership 2. A prosperous Canada through global commerce 3. A safe and secure world through international co-operation

CSA Strategic Outcomes

Environment and Sustainable Development:

A Space Program that helps Canada understand and protect the environment, and develop its resources in a sustainable manner.

Knowledge, Innovation and Economy:

A Space Program that generates knowledge and pushes innovation, while leading (where appropriate) to increased productivity and economic growth through commercialisation.

Sovereignty and Security:

A Space Program that supports recognition of Canada's sovereignty and the security of its communities.

CSA Contributions to Canada Economic Outcomes

The CSA's three strategic outcomes contribute to the development of Canada's economy as measured against the following outcomes outlined in *Canada's Performance* report:

- strong economic growth;
- an innovative and knowledge-based economy;
- income security and employment for Canadians; and,
- a clean and healthy environment.

The space industry contributes to Canada's economic well being and helps achieve a higher standard of living and quality of life for all Canadians.

Through its R&D investments and the resulting transfers of applications to the private and public sectors, the CSA's programs and activities attract highly skilled labour that contributes to Canada's knowledge-based economy; helps enhance the Canadian space industry's competitiveness by encouraging dynamic trade relationships with other nations; and increases Canada's ability to compete in the global marketplace.

Earth Observation missions drive some of the changes that are improving our quality of life by helping our government deliver on priorities such as protection of the environment, sustainable development, management of natural resources, understanding climate change, and providing support for disaster management.

Satellite communications missions are a key element in linking all Canadians in a communication network including the remote and northern communities.

CSA Contributions to Canada Social Outcomes

The CSA three strategic outcomes contribute to Canada's social foundations as measured against the following outcomes outlined in *Canada's Performance* report:

- healthy Canadians with access to quality health care;
- a vibrant Canadian culture and heritage; and,
- safe and secure communities.

As part of the *Connecting Canadians* priority, space infrastructure allows access and dissemination of timely health, cultural, security and safety related information to all Canadians no matter where they live in Canada.

Earth Observation, communication and navigation satellites drive some of the changes that are improving our quality of life by helping our government deliver on environment, safety and security priorities, by allowing timely monitoring and maintenance of a healthy physical environment over the Canadian territory, and by providing support for disaster management in such situations as floods, forest fires and earthquakes. They also allow the essential communication tools to support law and order enforcement interventions and enhance search and rescue capabilities.

Fundamental research in physical and life sciences, space exploration, and technology attracts the bright minds of a nation in participating in visionary endeavours. It encourages science and technology literacy, particularly among our youth, inspired by the role model of Canadian astronauts inviting them to reach for their highest aspirations. Satellite communication is a powerful channel that plays a significant role towards sharing Canadian culture and heritage.

Satellite communication is essential to provide all Canadians, no matter where they live in Canada, with timely access to expert knowledge and expertise related to health and education through a range of non-commercial services including: e-government, e-learning, tele-justice, tele-education, as well as tele-medicine disciplines such as tele-psychiatry, tele-radiology, tele-surgery, and tele-consultations.

CSA Contributions to Canada International Outcomes

The CSA's three strategic outcomes contribute to establishing Canada's international presence as measured against the following outcomes outlined in *Canada's Performance* report:

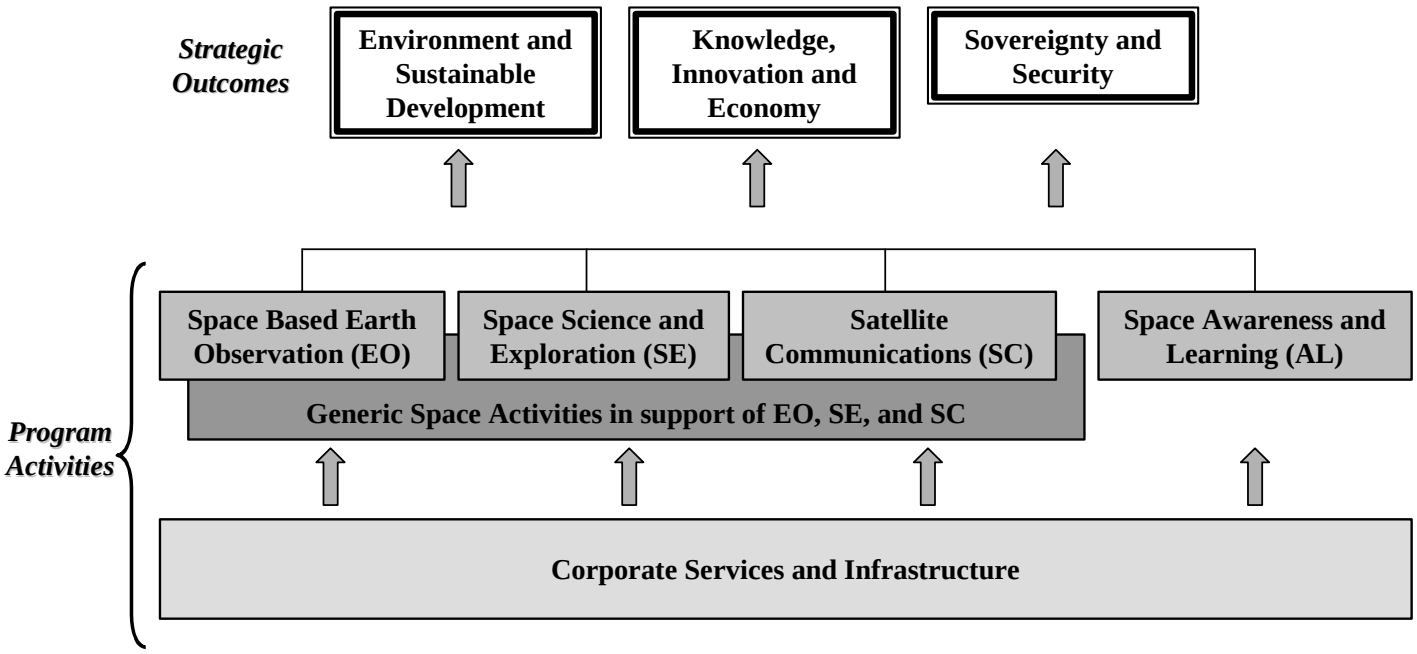
- a strong and mutually beneficial North American partnership;
- a prosperous Canada through global commerce; and,
- a safe and secure world through international co-operation.

Space is now recognized by industrialized nations as an essential and strategic tool to meet social, economic and foreign policy objectives. Canada must therefore possess a space infrastructure, not only to meet its specific national needs, but also to play a tangible and visible role in responding to the issues that interest the international community.

With its space exploration, science and technology endeavours, which often involve international partners, the CSA plays an influential role in building bridges between an increasing number of space-faring countries. In striving to become one of the most advanced, connected and innovative nations in the world, Canada offers and shares tremendous opportunities for the development and safety of the global community through the peaceful use of space.

1.4 PROGRAM ACTIVITY ARCHITECTURE

The CSA manages the Canadian Space Program according to the Canadian Space Strategy (CSS) approved by the Government of Canada in February 2005. The CSS greatly influenced decision-making at the CSA as it streamlined its Strategic Outcomes and set the long-term priorities for all activities under the revised Program Activity Architecture (PAA). The PAA is divided into six Program Activities that contribute to the CSA's three Strategic Outcomes. The first four are in line with the CSS thrusts: *Space Based Earth Observation, Space Science and Exploration, Satellite Communications, and Space Awareness and Learning*. The fifth Program Activity, *Generic Space Activities*, supports the three scientific and technology thrusts. All Program Activities are supported by the services provided under the *Corporate Services and Infrastructure* Program Activity.



To learn more about Canadian Space Strategy, go to:
http://www.espace.gc.ca/asc/eng/resources/publications/default.asp#strategy

PROGRAM ACTIVITY ARCHITECTURE (PAA) CROSSWALK			
2005-2006		**2006-2007**	
Program Activities	**Resources**	**Program Activities**	**Resources**
Space Based Earth Observation (EO)	131.1	Space Based Earth Observation (EO)	124.0
Space Science and Exploration (SE)	145.0	Space Science and Exploration (SE)	133.2
Satellite Communications (SC)	30.5	Satellite Communications (SC)	32.3
Space Awareness and Learning (AL)	5.3	Space Awareness and Learning (AL)	5.9
N/A		Generic Space Activities in support of EO, SE, and SC (GSA)	44.3
Corporate Services, Strategic Development and Infrastructure	29.8	Corporate Services and Infrastructure	34.5
TOTAL	**341.6**	**TOTAL**	**374.1**

The Main Estimates for the Canadian Space Agency amounts to $374.1 million, a net increase of $32.5 million over 2005-2006. The major changes are due to an increase of $21.0 million to meet the cash flow requirements for the new Synthetic Aperture Radar (SAR) Constellation Program; a net reprofiling of $13.4 million affecting the budgets of major projects such as RADARSAT-2, Chinook and CASSIOPE in order to adjust expenditure profiles with development work progress; and, an additional decrease of $2.0 million to contribute to the government-wide reallocation exercise.

In 2006-2007 a Program Activity called Generic Space Activities in support of Earth Observation, Space Science and Exploration, and Satellite Communications is being added in order to better reflect the generic technology research and space qualification operations that support scientific and engineering programs. The budget allocated to this Program Activity in the 2006-2007 Main Estimates amounts to $44.3 million, which is drawn from the Program Activities Earth Observation, Space Science and Exploration, and Satellite Communications.

DEPARTMENTAL PRIORITIES: The CSA has developed a Departmental Priority for each Program Activity.					
PRIORITY BY PROGRAM ACTIVITIES	**TYPE**	**EXPECTED RESULTS**	**PLANNED SPENDING** ($ in millions)		
			2006-2007	**2007-2008**	**2008-2009**
Space Based Earth Observation (EO) Develop and operationalize the use of Space Based Earth Observation for the benefits of Canadians.	Ongoing	Delivery, directly or in partnership, of Space Based EO data, products and services in response to operational and scientific user requirements in the field of Environment, Resource and Land Use Management, and Security and Foreign Policy, supported by access capacity development.	124.0	103.2	119.1
Space Science and Exploration (SE) Understand the Solar System and the Universe, expand our knowledge on the constituent elements and origins of life, and strengthen a human presence in space.	Ongoing	1) 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 relation as well as physical and life sciences.	133.2	113.8	97.8

DEPARTMENTAL PRIORITIES: The CSA has developed a Departmental Priority for each Program Activity.

PRIORITY BY PROGRAM ACTIVITIES	TYPE	EXPECTED RESULTS	PLANNED SPENDING ($ in millions)		
Satellite Communications (SC) Provide all Canadians with the means to participate in and fully benefit from the global information age.	Ongoing	1) Increased access for Canadians to state-of-the-art space communications systems and services to meet their social and economic needs. 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 and organizations in delivering services to Canadians.	32.3	28.7	30.4
Space Awareness and Learning (AL) Further public understanding and engagement with regards to space-related issues, ultimately leading to improving the scientific literacy of Canadians.	Ongoing	Increased public awareness of Canada's activities in space and space benefits positively affecting the quality of life of Canadians.	5.9	6.0	7.4
Generic Space Activities in support of EO, SE, and SC (GSA) Provide leadership, co-ordination and support to EO, SE, and SC through space activities that are generic.	Ongoing	Innovative space technologies, techniques, and design and test methodologies in response to advanced developments required for future space missions and activities.	44.3	44.4	47.8
Corporate Services and Infrastructure Implement the government's commitment to modern public service in accordance with the Management Accountability Framework's (MAF) expectations.	Ongoing	1) Corporate Services provide an added value to CSA managers in the performance of their duties. 2) Key corporate risks are addressed and mitigated.	34.5	34.9	34.5

1.5 DEPARTMENTAL PLANS AND PRIORITIES

Strategic Context of the Canadian Space Agency

International Environment

In the global context, space is recognized by industrialized nations as an essential and strategic tool to meet their social, economic and foreign policy objectives. Accordingly, many governments around the world, traditional and newly emerging space-faring nations, are increasing their investments in space activities, looking for increased consolidation and advancement of their space capabilities. Canada must therefore possess a space infrastructure not only to meet its specific national needs, but also to play a tangible and visible role in responding to the issues that interest the international community.

International co-operation is critical to the implementation of the Canadian Space Program. Canada can leverage its resources and maximize its return on investment by working in partnership with other space-faring nations. Such partnerships allow for sharing of technical expertise, knowledge and infrastructure, and allow access to areas where Canada has chosen not to invest due to its limited resources. In addition, increasing concerns over issues such as space debris and climate change that transcends national borders favour increasing cooperation between nations with common goals. Canada co-operates with a number of international partners and has ties to various space agencies. Although the United States National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA) remain Canada's longstanding international partners, we are increasingly developing relationships with other foreign space organizations in Japan, India, Sweden, Norway, Germany, and Russia.

To learn more about Canada's international partners, go to:
http://www.space.gc.ca/asc/eng/resources/links_agencies.asp

Canada is regarded as a reliable partner possessing unique technical and scientific capabilities, and as a nation that can meaningfully contribute to the initiatives of foreign space agencies. In particular, emerging space-faring countries in Asia and South America may offer great potential for future co-operation. Consequently, Canada maintains its efforts to establish a foothold in these emerging markets. It is of paramount importance that the CSA continue to work with its stakeholders to ensure that our research community and industry remain active and competitive vis-à-vis world standards and markets.

The perception of Canada's space industry as being internationally competitive is confirmed by the results of the 2004 Annual Survey of the Canadian Space Sector. With annual revenues of $2.4 billion of which exports represent 49% ($1.2 billion)[1] of the

[1] State of the Canadian Space Sector 2004; Overall Revenues, Domestic v. Export Revenues
http://www.space.gc.ca/asc/eng/industry/state.asp

industry's total revenues, Canada has a higher percentage of exports than any other major space-faring nation. It is interesting to note that the destination of Canadian space exports is balanced, with 46% generally destined to the US, 36% to Europe, and 8% to Asia.[2]

National Environment

The Canadian Space Agency recognizes that the best means of turning scientific and technological advancements into innovative products and services is through partnerships with Canadian universities and industry. The CSA firmly believes that industry is the best vehicle for providing a broad range of services to diverse groups of users – from individuals to public and private organizations. With its highly skilled workforce, the space industry in Canada not only generates wealth in our economy, but also provides Canadians with competitive products and services that would otherwise have to be obtained from foreign sources.

In 2004, Canada's space industry generated $2.4 billion in revenues.[3] Satellite Communications continued to generate the lion's share of the Canadian space sector's revenues with a total of $1.83 billion. A breakdown of the revenues by sectors of activity is as follows: Satellite Communications: 74.8% ($1.83 billion); Earth Observation: 8.6% ($211 million); Navigation: 8.7% ($212 million); Robotics: 5.0% ($122 million); Space Science: 2.5% ($61 million); and all space-related activities in areas other than those mentioned above: 0.4% ($9 million).[4] While small in number of firms, the Canadian space sector is knowledge-intensive and at the forefront of research and innovation. Building on the strengths of 7,445 highly skilled workers,[5] Canadian firms have acquired world-leading capabilities in niche areas such as earth observation, space robotics, satellite communications and navigation.

Given that the national market is relatively small, it is critical that the Canadian industry be able to leverage foreign investments and generate export sales. Capitalizing on export revenue depends on the industry's ability to commercialize highly competitive products and services, and establish local partnerships. The Government of Canada plays a key role in helping to establish such partnerships, facilitate trade relations and export opportunities, and secure a strategic role for Canadian industry and academia on important international space initiatives.

The CSA works very closely with the Canadian space industry and scientists in over 20 Canadian universities on the planning and implementation of the Canadian Space Program.

To learn more about Canadian space-related organizations, go to:
http://www3.espace.gc.ca/asc/eng/industry/csd.asp

[2] State of the Canadian Space Sector 2004; Export Revenues
[3] State of the Canadian Space Sector 2004; Overall Revenues
[4] State of the Canadian Space Sector 2004; Revenues by Sectors of Activity
[5] State of the Canadian Space Sector 2004; Space Sector Workforce, Workforce Groups
http://www.space.gc.ca/asc/eng/industry/state.asp

Government Environment

The Canadian Space Strategy (CSS) is the framework that guides the CSA in leading Canada's national Space Program.

The CSS is a concise overview that serves as a tool for planning purposes, and provides our stakeholders and partners with insight on Canada's strategic directions regarding space. In keeping with its objective to be an open and transparent organization, the CSA's strategic planning was done in full consultation with Government of Canada organizations and with its Canadian stakeholders, particularly through the use of the CSA Advisory Council and several program advisory groups. The CSS will be reviewed regularly, and will evolve with the environment that characterises and influences Canada's space activities.

Over the coming year, the CSA will participate to the development of a science and technology strategy, initiated by the Minister of Industry in collaboration with the Minister of Finance, that will encompass the broad range of government support for research, including knowledge infrastructure. The CSA also carries out ongoing consultations with Government of Canada organizations to identify where and how space technologies could be used to enhance the delivery of their mandates and provide new or more efficient services to Canadians. More specifically, the CSA is constantly seeking ways to contribute significantly to the effective and efficient delivery of government programs and services in the fields of: communications, environment and sustainable development, security, intelligence, emergency preparedness, industry development and space science.

The list of partnerships between the CSA and other federal organizations includes: Natural Resources Canada (in particular the Canada Centre for Remote Sensing (CCRS)), which operates satellite data ground receiving stations, and the Communications Research Centre (CRC) of Industry Canada, which manages satellite communications programs on behalf of the Agency. The CSA also has close co-operation links with Industry Canada, Environment Canada, National Defence, Public Safety and Emergency Preparedness Canada, Foreign Affairs Canada, International Trade Canada, Fisheries and Oceans Canada, Agriculture and Agri-Food Canada, Indian and Northern Affairs Canada, the National Research Council Canada, the Natural Sciences and Engineering Research Council of Canada (NSERC) and others.

Priorities of the CSA under the Canadian Space Strategy

The strategic context outlined above lends some perspective to the priorities of the Canadian Space Agency. The CSA manages the Canadian Space Program according to the Canadian Space Strategy (CSS). The CSS is instrumental in decision-making at the CSA as it streamlines its Strategic Outcomes and sets the long-term priorities for all activities under the revised Program Activity Architecture (PAA). A priority was set for each of the four CSS thrusts related Program Activities and two supporting Program Activities that collectively contribute to the success of the Canadian Space Program.

Priority for the Program Activity – Space Based Earth Observation (EO)

The priority for the Program Activity Space Based Earth Observation, is to achieve a long-term overarching objective stated in the CSS thrust strategy as: "to develop and operationalize the use of space for the benefits of Canadians by tapping into the unique vantage point it offers for observing the Earth and its environment".

Given Canada's geo-political situation, our immense territory, our rich natural resources, the changes now occurring in our climate, and our international stature as champions of democracy, innovative Earth observation technologies will become increasingly important for our country.

Space Based EO enables environmental understanding, monitoring and prediction with unparalleled coverage and scope. Space Based EO enables sustainable management and development of natural resources, land use, fisheries and agriculture. Productivity and efficiency gains create jobs, maintain the competitiveness of the resource sector and generate wealth for Canadians. Space Based EO also offers cost-effective wide-area surveillance of land, ice and sea. This is especially true in areas difficult to access like the northern sea passage. Satellites are critical to Canada's security and foreign policy. In doing so, this priority contributes in many ways to all CSA's Strategic Outcomes: Knowledge, Innovation and Economy, Sovereignty and Security, and Environment and Sustainable Development.

At the forefront of EO data use since the early 1970s, Canada has became a world leader in Synthetic Aperture Radar (SAR) data collection, operations and services with the launch of RADARSAT-1 in 1995 and is about to demonstrate its continued leadership with RADARSAT-2, to be launched in March 2007. Canada's RADARSAT-2 will provide substantially enhanced data products and services, as well as contribute to C-band SAR data continuity. Canadian government users are expected to be Environment Canada, Fisheries and Oceans Canada, Canadian Ice Services, Natural Resources Canada, the Department of National Defence, and the provinces and territories.

For the coming years, RADARSAT-2 and the design of a constellation of next generation radar satellites will be the CSA's main focuses in EO. The CSA will also continue its involvement in the ESA's Envisat Environmental Satellite mission and pursue its mission development effort related to stratospheric wind transport studies through the Chinook project.

Priority for the Program Activity – Space Science and Exploration (SE)

The priority for the Program Activity Space Science and Exploration, is to achieve a long-term overarching objective stated in the CSS thrust strategy as: "to better understand the Solar System and the Universe, expand our knowledge on the constituent elements and origins of life, and strengthen a human presence in space".

This priority consists of using research and space exploration activities to answer a series of fundamental questions posed by the international scientific community. The Canadian scientific community relies on the CSA to contribute the means to answer these fundamental questions and ensure a dynamic environment for scientific research in Canada. This fundamental research attracts the bright minds of a nation and challenges them to surpass themselves with visionary science and technology endeavours. This priority directly contributes to the following CSA Strategic Outcomes: Knowledge, Innovation and Economy, and Sovereignty and Security.

The Space Science and Exploration activities have been regrouped under two pillars: Space Astronomy and the Solar System, and Physical Sciences and Life Sciences.

Over the next three years, Space Astronomy missions, such as the space-borne telescopes Far Ultraviolet Spectroscopic Explorer (FUSE), Balloon-borne Large Aperture Sub-millimetre Telescope (BLAST) and Microvariability and Oscillations of STars (MOST), will continue to contribute to a better understanding of the early Universe and the internal structure of Sun-like stars. In parallel, the CSA is developing a key element of the James Webb Space Telescope planned for launch in 2013, as well as contributions to two European Space Agency space astronomy missions – Herschel and Planck. The CSA will also be providing the ultraviolet detectors for the UltraViolet Instrument Telescope (UVIT) to the Indian Space Research Organization (ISRO) for the ASTROSAT mission.

As for planetary exploration, participating in a robotic mission to Mars within the next decade remains the focus. The Canadian space science and exploration community will continue working on the development of a meteorological station for the NASA's Phoenix Scout Program and the Alpha Particle X-Ray Spectrometer (APXS), two key opportunities in the international collaborative missions to explore Mars and the Moon. The CSA, in partnership with Defense Research and Development Canada (DRDC), has initiated the Near Earth Orbit Surveillance Satellite (NEOSSat) project for a micro-satellite to survey and track the population of near-earth asteroids, comets and satellites. An important goal of this micro-satellite project is to provide a multi-mission micro-satellite bus to enable more frequent and affordable Canadian science and technology missions in the future.

Life and Physical Sciences have maintained research activity despite the challenges of maintaining access to the International Space Station (ISS). Over the next three years, Canadian scientists will use Canada's allocation on the ISS to carry out microgravity experiments in fluid physics, human physiology, materials processing in a combination of basic and applied research in this unique laboratory, as well as in other vehicles as the opportunities arise. For example, the CSA will participate in a Foton mission with the Enhanced OSTeoporosis Experiments in Orbit (eOSTEO) to study and quantify bone cell activity and evaluate potential anti-osteoporosis.

With a trained and versatile Astronaut Corps, the CSA will continue to develop and maintain human space flight expertise to meet the requirements of the space sciences and human exploration programs. Canadian Astronauts will also perform science experiments

on behalf of the Canadian and international research communities and continue to participate in the assembly and maintenance of the International Space Station through three upcoming missions STS-115/12A, STS-118/13A.1 and mission 1J/A that will launch Dextre, the Special Purpose Dexterous Manipulator.

To secure access to the unique science laboratory that the ISS provides, CSA will fulfill its responsibilities for the ISS Mobile Servicing System (MSS) operations: maintaining and supporting MSS hardware and software; performing necessary repair and overhaul work on MSS assemblies; operating MSS training facilities in Canada; planning and supporting MSS missions; and conducting robotics. The initial implementation of a ground control capability for Canadarm2, which enables movement of the robotic arm by ground operators without the involvement of the on-orbit crew, will continue to evolve over the next three years. This new and highly anticipated MSS capability for the ISS will eventually allow for more efficient utilization of the Dextre robot when it is launched in late 2007 or early 2008.

Priority for the Program Activity – Satellite Communications (SC)

The priority for the Program Activity Satellite Communications, is to achieve a long-term overarching objective stated in the CSS thrust strategy as: "to provide all Canadians with the means to participate in and fully benefit from the global information age".

Satellite technology has dramatically changed the world of communications. By offering instantaneous global access and global broadcasting, SC technologies have begun to erase the notion of distance, bringing remote regions into a global village and enabling new business models based on broadband services, enhanced personal communications, global navigation, and positioning and localization services.

For this priority, the CSA intends more specifically to increase the connectivity of Canadian communities, support federal government departments in the delivery of programs and services and support Canadian sovereignty and foreign policy objectives. In doing so, this priority contributes to the following CSA Strategic Outcomes: Knowledge, Innovation and Economy, and Sovereignty and Security.

With the launch of Anik F2 in 2004, the rural and remote areas of Canada are closer than ever to benefiting from tele-services using broadband (Ka-band) capabilities. A range of non-commercial services will be supported including: e-government, e-learning, tele-justice, tele-education, and tele-medicine disciplines such as tele-psychiatry, tele-radiology, tele-surgery, and tele-consultations. This satellite technology will permit specialists located in main centres to use high definition real-time links, thereby reducing the cost of travel and improving the access and quality of care for every Canadian.

Over the next three years, the operation and use of the Ka-band payload will be one of the main focuses for this priority. Another focus will be the development of a high-speed, high-capacity space messaging experimental payload called Cascade of interest to resource exploration firms, industrial clients, and remote research communities.

Among other activities contributing to this priority will be the continued efforts deployed through Canada's participation in Europe's navigation satellite program, GalileoSat, a major undertaking by the European Space Agency (ESA) and the European Union, and to support Canadian industry's participation in the ESA ARTES program to advance and demonstrate new telecommunications products and services.

Finally, the CSA will enhance its Satellite Communication Ground Segment Technologies and Applications Development program to develop, in co-operation with Canadian industry and other government departments, a selection of products and services that will increase the efficiency and effectiveness of satellite communication systems and the delivery of satellite communications related services.

Priority for the Program Activity – Space Awareness and Learning (AL)

The priority for the Program Activity Space Awareness and Learning, is to achieve a long-term overarching objective stated in the CSS thrust strategy as: "to further public understanding and engagement with regards to space-related issues, ultimately leading to improving the scientific literacy of Canadians".

The Government of Canada is committed to building a 21st century economy through a new focus on science and technology. If Canada is to meet the challenge posed by a truly global economy, Canadians must be encouraged to pursue careers in science and technology, as a skilled pool of human capital is at the heart of an innovative economy. We must encourage science and technology literacy today, particularly among our youth. Canadians' interest in science and technology must also be engaged by sharing our discoveries and breakthroughs in meaningful ways that relate to their daily lives. Space has always inspired individuals, communities and entire nations to reach for their highest aspirations and challenge the best of their abilities.

Under this priority, the CSA intends to enhance public understanding and engagement, especially among youth and their families, through its national Learning Program and a range of awareness initiatives. In doing so, this priority contributes to the Strategic Outcome: Knowledge, Innovation and Economy.

The Learning Program is reaching out to a greater number of partners and has forged solid relationships with other government departments, science centres and museums, youth and science associations, the private sector, and the education community across Canada. To ensure Canada's capacity to conduct breakthrough science and maintain its leadership in technological innovation, we must be able to attract, develop and retain highly qualified personnel in science and engineering, including those fields related to space.

Other activities supporting this fourth priority include media relations and information services, exhibitions and creative services, and awareness and learning events with astronauts, scientists and engineers.

Plans of the Canadian Space Agency

The CSA will achieve its priorities by focusing on the following five elements:

1) a strong science capacity;
2) a proficient technology base;
3) qualified test and infrastructures;
4) dynamic space industry and expanded markets; and,
5) national and international partnerships.

Strong Science Capacity

Canada must possess the critical mass of intellectual capital to create and use knowledge. The increasing importance of space in our day-to-day lives makes it imperative for our country to have a strong space-science community capable of generating knowledge within our own borders, and be able to share and exchange knowledge with our international partners.

In terms of concrete action, the plan for the CSA to contribute to a strong science capacity, in co-operation with national granting councils and other funding partners, consists of:

- encouraging the entry and emergence of new space science researchers in Canada, particularly through small, short-term projects;
- continuing to support researchers with the proven potential to become world leaders in their field; and,
- stabilizing long-term support to a critical mass of the best research teams, particularly those in fields identified as Canadian priorities.

Proficient Technology Base

Canada must have its own core technology base to meet our unique requirements, as well as the skills and capabilities that will make us an appealing partner for other countries. Hence, Canada must remain discerning in the technologies we decide to pursue. Our technology base must take into consideration the niche sectors where Canada has established and intends to retain world leadership, but must also be dynamic and innovative to evolve with the changing nature of our national needs and objectives in space, as influenced by national and international environments.

The CSA is developing a Technology Plan that will guide the development of new technologies. As part of this plan, a series of consultations are taking place to define the key technology areas where Canada should invest. The plan for the CSA is to promote and stimulate co-operation and complementary research among academic institutions, industry and government organizations, particularly when it supports government policy decisions or the development of new technologies and products in Canadian industry.

The CSA Technology Plan will maintain a leading edge and proficient technology in the following areas:

- sensor systems;
- communication technologies;
- intelligent system and control;
- platform technologies;
- mechanisms;
- system engineering and technologies; and,
- data analysis and application.

Qualified Test Infrastructures

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. In order to maintain an appropriate level of space infrastructure, the CSA will encourage private-public partnerships to maximize the efficient utilization of the DFL facilities and equipment based in Canada, as well as increase their access to our international partners (provided Canadian interests and requirements are protected).

Dynamic Space Industry and Expanded Markets

The CSA recognizes that Canada’s space industry must be sufficiently large and diverse to meet our needs and goals in space. Canada's space industry must also maintain the high calibre of products and services it has demonstrated to date. However, given that the Canadian market is relatively small, it is critical that industry be able to leverage foreign investments and generate export sales in order to remain sustainable. Capitalizing on export revenue depends on industry’s ability to commercialize highly competitive products and services, as well as the Government of Canada’s ability to preserve open trade relations with its closest international partners. In order to help industry meet and succeed in these challenges, the CSA will align its programs and actions to build synergies that will bolster Canadian industry's competitiveness and market development efforts. The CSA will continue to support technology and application R&D and innovation in industry through Space Technology Development and Commercialization Programs.

National and International Partnerships

Co-operation between scientists in government and academia; co-ordination between industry and the CSA to establish the most relevant technology base; and the alignment between R&D, hardware manufacturers and service providers, are among the many partnerships that must exist in Canada to ensure that we continue to have a dynamic national space program. Given the potential of space science to provide applications directly related to the public good, one of the CSA's most important objectives is to accelerate the pace and depth at which Government of Canada departments and agencies use space science, technology and applications to help fulfill their mandates.

To this end, the CSA's plan consists of:

- seeking new and existing government department requirements in which space science can make a positive contribution;
- developing the means to satisfy these needs in co-operation with Canadian industry; and,
- harmonizing its investments and activities with those of client departments as part of an integrated and user-oriented approach.

International co-operation channels are also important to complement our domestic capabilities and strengthen relationships between Canada and foreign governments, scientists and private sector organizations. The CSA plans to continue making a concerted effort to strengthen strategic international partnerships of interest to Canada, while ensuring that our national expertise, products and services make Canada a partner of choice for other nations and private entities.

Management Priorities

The CSA will continue to improve its management practices by implementing the revised Program Activity Architecture, by carrying on with a comprehensive approach to program management, and by putting forward modern corporate management initiatives.

A new Program Activity

Generic technology research and space qualification operations that support scientific and engineering programs were regrouped under a single Program Activity called *Generic Space Activities (GSA) in support of Earth Observation (EO), Space Science and Exploration (SE), and Satellite Communications (SC).* The priority is to provide leadership, co-ordination and support to EO, SE and SC Program Activities through space activities that are generic in their nature, since they contribute to all three program activities.

The support for Enabling Research is provided by the development of high-risk technologies by industry academia and not for profit organizations, and through the maintenance of in-house technical capabilities by conducting advanced R&D projects that meet the criteria of excellence and relevance to the implementation of the Canadian Space Program.

The support for Space Mission Development is provided by the David Florida Laboratory which carries out 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.

Comprehensive Approach to Program Management

The CSA manages its Program Activities by organizing its scientific and engineering programs into three large clusters: Enabling Research, Space Mission Development, and Space Mission Operations. Each cluster carries out a specific objective in line with the CSA's priorities and stakeholder expectations:

- Through Enabling Research, the CSA provides leadership, co-ordination and support to basic and applied research and experimental development in order to increase the knowledge base, devise new applications through space missions, and allow the transfer of intellectual property and proven technologies to Canadian industry, academia, and government organizations.

- Through Space Mission Development, the CSA provides co-ordination and support to the development of space missions through the definition, critical design, manufacturing, integration, testing and delivery phases leading to launch and early operations of space systems.

- Through Space Mission Operations, the CSA operates manned and unmanned space missions through crew and ground support personnel training, mission analysis and planning, on-orbit ground control operations, system monitoring, maintenance and logistic support, as well as data-handling and delivery.

The CSA co-ordinates its activities from initial research phases to the final operational phases with this comprehensive end-to-end approach. The synergy between the clusters is meant to optimize the effectiveness and expertise of employees coming from different core functions and promote an integrated team and multi-functional approach to projects and services.

Modern Management Initiatives

During the planning horizon of this Report on Plans and Priorities (RPP), the Canadian Space Agency will manage the Canadian Space Program under its revised Program Activity Architecture (PAA) and the Management Accountability Framework (MAF).

The priority is to implement the government's commitment to modern public service in accordance with the MAF expectations.

Based on the MAF self-assessment of spring 2005, the CSA has completed the following:

- approving a strategic plan for each of the four thrusts of the Canadian Space Strategy with a budget horizon of ten years;
- developing a Program Activity Architecture linking the Strategic Outcomes to program activities;
- setting-up management planning and reporting structures supported by systems that integrate financial and performance information on a three-year horizon;

- developing a learning program for managers leading to the acquisition of modern management competencies;
- implementing targeted staffing initiatives under the Human Resources Action Plan;
- approving a corporate risk profile; and,
- implementing an organizational structure that includes a *Chief Information Officer* (CIO) that integrates Information Technology with Information Management functions; and includes a *Policy, Planning and Relations Director General* that encompasses the Strategic Development, External Relations and Government Liaison functions.

For 2006-2007 the CSA will focus on *Governance and Strategic Direction,* and *Results and Performance* expectations by:

- developing an Integrated Long-Term Investment Plan*;*
- establishing socio-economic indicators for each thrust of the Canadian Space Strategy; and,
- improving specific management practices in order to mitigate the four risks of highest priority identified in the corporate risk profile: Stakeholder Support, Values and Ethics, Workforce Competencies, and Function/Process Integration.

CSA will also focus on implementing the Public Service Modernization Act (PSMA). This includes:

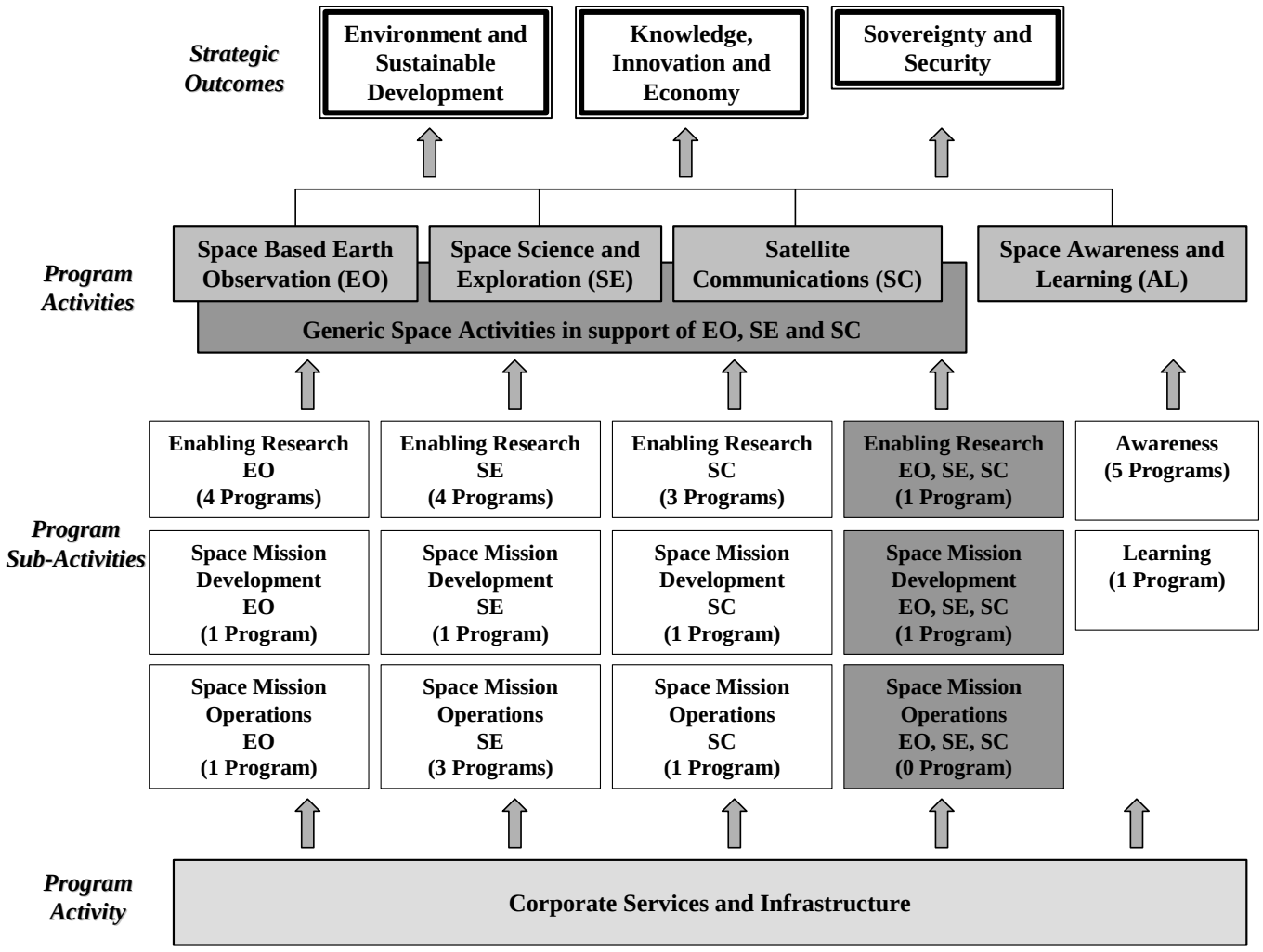
- training for all managers and employees;
- putting in place new policies and practices for work relations, classification and staffing in accordance with the Staffing Management Accountability Framework (SMAF); and,
- initiating the development of a new Strategic Human Resources Plan.

The specific activities and the expected results for 2006-2007 are detailed in the Section entitled Corporate Services and Infrastructure.

To learn more about the CSA self-assessment of April 2005, go to:
http://www.space.gc.ca/asc/eng/about/maf.asp

SECTION 2: ANALYSIS OF PROGRAM ACTIVITIES BY STRATEGIC OUTCOME

The priorities and plans outlined previously demonstrated how Program Activities contribute in various degrees to the attainment of the three Strategic Outcomes. The following detailed analysis outlines the chain of expected results, how key programs and services contribute to Program Activity priorities, and how the CSA will report on its performance over the coming years.



Space Based Earth Observation

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

Through its Earth Observation Program Activity, the Canadian Space Agency (CSA) recognizes that space offers a unique vantage point for observing the Earth and its environment and improving the quality of life of Canadians. Canada's vast geography and low population density make Spaced Based EO a cost-effective means to ensure understanding, management and protection of our environment, resources and territory. Sustainable development requires considerable quantities of scientific information. Earth Observation Satellite data is crucial to helping scientists, policy and decision-makers to understand weather, climate, oceans, land, geology, natural resources, ecosystems and hazards better. It is also crucial to enhancing human safety and welfare, alleviating human suffering, and protecting the global environment.

In doing so, this priority contributes in many ways to all CSA Strategic Outcomes: Knowledge, Innovation and Economy, Sovereignty and Security, and Environment and Sustainable Development.

SPACE BASED EARTH OBSERVATION (EO) **PROGRAM ACTIVITY PERFORMANCE MEASUREMENT**	
Expected Result #1	**Performance Indicators**
Delivery, directly or in partnership, of Space Based EO data, products and services in response to operational and scientific user requirements in the field of Environment, Resource and Land Use Management, and Security and Foreign Policy, supported by access capacity development.	1. Number of RADARSAT operational users and applications; 2. Number of active missions supported directly and indirectly by Canada; 3. Growth in the federal government departments' and agencies' budget allocated to the exploitation of Space Based EO data, derived information and services in the fields of the Environment, Resource and Land Use Management, and Security and Foreign Policy; and, 4. Number of annual hits on the Canadian Geospatial Data Infrastructure (CGDI) related to CSA-sponsored (directly and/or indirectly) scientific and operational missions.

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	124.0	103.2	119.1
HUMAN (FTEs)	76.2	76.9	76.7

The programs under this Program Activity are divided into 3 clusters: 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 will be measured and attained.

1- EO 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 EO space missions.

Expected Result #1	Performance Indicators
Mission Feasibility and Concept studies by industry, government and academia, enabling CSA decisions on future EO space missions of interest to Canada.	1. Feasibility studies and mission and payload concept studies are initiated and completed (Target: 1); and, 2. New Missions developed (Phase 0/A) and successfully retained for implementation (Phase B, C, D) (Target: 1).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	6.8	1.1	1.0
HUMAN (FTEs)	5.6	8.1	8.0

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 #1	Performance Indicator
Successful development and demonstration of advanced technologies, systems, components, or studies provided for in the contracts awarded by ESA to Canadian firms under EO programs.	1. Canadian industrial returns in ESA optional programs in EO. (Target: 0.80 or higher).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	12.4	13.2	7.0
HUMAN (FTEs)	-	-	-

3- Science Programs for EO – Objective: Co-ordinate 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 #1	Performance Indicators
Opportunities identified for Canadian scientists to advance understanding and scientific knowledge of atmospheric environment through the use of space-based observations.	1. Number of scientific publications/ reports/conference proceedings acknowledging CSA funding (Target: 50); 2. Number of Highly Qualified Personnel (HQP) involved in the program (Target: 130); 3. Number of operating or approved space science research missions (Target: 6); 4. Number of scientific research projects supporting the development of future space science research missions (Target: 5); 5. Number of scientific presentations (Target: 100); 6. Number of research partnerships (nationally and internationally) (Target: 15); and, 7. Number of awards granted under Space Science Grants and Contributions Program (Target: 5).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	3.3	2.6	2.9
HUMAN (FTEs)	6.5	6.5	6.4

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

Expected Result #1	Performance Indicators
Increasing the use of EO data in public and private sectors through the development and demonstration of applications.	1. Number of new EO applications operationally used (Target: 20); and, 2. Number of new field of applications using EO data (Target: 8).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	13.6	14.0	13.8
HUMAN (FTEs)	9.7	9.7	9.7

Highlights of Expected Accomplishments – Enabling Research (EO)

- Finalize user and mission requirements and the initial system concept of a three-satellite synthetic aperture radar mission (SAR Constellation) as follow-on to RADARSAT-2, and improvement of the satellite revisit time.

- Continue the Preparatory Program for the use of RADARSAT-2 Canadian government data allocation valued at $445 million. This program will generate several Requests for Proposals from industry, pilot and demonstration projects within the government, as well as opportunities targeting the university research community and international partners.

- Continue satellite data application development and utilization, technology transfer and demonstration to support the growth of Canada’s Earth Observation capabilities and value-added industry.

- The CloudSat mission will for the first time, measure the global properties of clouds in order to improve climate-change forecasts. As part of our agreement with NASA relating to CloudSat, the CSA is collaborating with the Meteorological Service of Canada (MSC) to run a comprehensive validation campaign in the Great Lakes region during the winter season.

- As part of the Earth Observation for Sustainable Development for Forest program, a Canada-wide forest map will be used to support the completion of the National Forest Inventory and as a baseline in the greenhouse gas international reporting activities. These five-year long initiatives were co-funded by the CSA, the Canadian Forest Service in collaboration with other government departments, the ten provinces and three territories, and several universities across Canada.

- The implementation of a Coordinated Earth Observation Marine Surveillance project (CEOMS) that will provide an exhaustive understanding of EO needs and requirements for the Marine Surveillance and Security operational stakeholders among the Government of Canada.

- Canada's support of the TIGER initiative will demonstrate the usefulness of Space Based Earth Observation for water management applications in Africa.

- As part of the CSA-Mekong River Commission collaboration, a Canadian team will deliver a WEB portal consisting of customized applications focusing on wetland monitoring and image acquisition in the context of flood forecasting and management.

- Ensure Canada's commitment, as an official member of the International Charter on Space and Major Disasters, to use EO satellites in response to disasters. The CSA regularly contributes RADARSAT data and strategic EO-derived information products upon charter activation.

- Develop advanced space-borne instruments and user-oriented applications by Canadian companies through the participation of Canada in ESA Programs. For example:

    - Canadian scientific teams will contribute to an Electric Field Instrument (EFI) for the Swarm Earth Explorer mission and to the Calibration and Validation activities of the Earth Explorer Soil Moisture and Ocean Salinity (SMOS) mission; and,

    - Canadian companies received contracts and will develop applications in the field of aquaculture, forestry and subsidence, global wetland and Polar monitoring.

- The CSA will continue the technology development and explore partnership for a hyperspectral Earth Observation mission. Hyperspectral data would enable the identification of terrestrial features with greater accuracy than the current spaceborne sensors.

SPACE MISSION DEVELOPMENT – EARTH OBSERVATION

One Earth Observation Space Mission Development Program with a combination of accomplishments demonstrates how the following Expected Results will be 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 #1	Performance Indicators
EO projects' deliverables meet mission objectives and user expectations.	1. Safety and Mission Assurance (S&MA) and Configuration Management (CM) requirements are identified and met for each project (Targets: Guidelines are completed and implemented on all projects phase A to E); In accordance with Treasury Board approved Project Approval and Management Framework (PAMF): 2. Mission objectives and user requirements are met at critical steps of the projects (Target: 90% satisfaction); 3. Project cost is maintained within authorized levels (Target: 75% of projects delivered on time and on budget); and, 4. Risks are identified and mitigated for each project (Target: Up to 75% of risk budget is used).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	68.0	57.4	79.9
HUMAN (FTEs)	9.9	8.0	8.0

Highlights of Expected 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, will be completed in time for a launch on a Soyuz rocket in March 2007. The initial phase of the commissioning of RADARSAT-2 is expected to be completed by June 2007. Equipped with advanced technologies, RADARSAT-2 will be the first commercial radar satellite to offer multi-polarisation (an important aid in identifying a wide variety of surface features and targets), produce images with a resolution of down to 3 metres, and access an area of 800 kilometres to either side of the sub-satellite track.

- The CSA will award a contract to a prime contractor for the preliminary and detailed design of the Chinook mission, which will use a small satellite bus and carry two experiments: SWIFT (Stratospheric Wind Interferometer for Transport studies), designed to help scientists better understand the global atmospheric circulation and thereby provide the means to validate complex climate and weather models, and ARGO (Atmosphere Research with GPS Occultation) to measure humidity levels in the lower troposphere, temperature in the stratosphere, and electron density perturbation in the ionosphere. The three-year mission is currently planned for 2010-2012.

- The CSA will award a contract to a prime contractor for the preliminary, detailed design and manufacturing of the first satellite for the Canadian Synthetic Aperture Radar (SAR) Constellation, the follow-on program to RADARSAT-2. It will further improve Canada's ability to manage its resources and environment and improve security by providing up to twice daily all weather, day and night coverage of Canadian territory. It will also provide up to twice daily coverage of most of the world. Increased efficiency in forestry, agriculture, water and fisheries management can save Canada millions of dollars and increase Canadian global competitiveness. Three small satellites will be flown in the configuration of a constellation for environment-monitoring, maritime surveillance and disaster management. The launch of the first satellite is planned for late 2011, followed by the other two satellites in 2012 and 2013 respectively.

SPACE MISSION OPERATIONS – EARTH OBSERVATION

One Earth Observation Space Mission Operations Program with a combination of accomplishments demonstrates how the following Expected Results will be measured and attained.

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

Expected Result #1	Performance Indicators
EO Space Mission Operations meet user/client needs as per mission requirements.	1. System performance, as per mission requirements and resources (Target: 90%); and, 2. Volume of data acquired or delivered as per mission requirements and resources (Targets: 350 Gbytes of SCISAT-1 and 20,000 SAR minutes of RADARSAT-1).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	17.7	12.7	12.5
HUMAN (FTEs)	30.0	30.0	30.0

Highlights of Expected Accomplishments – Space Mission Operations (EO)

- RADARSAT-1 operations will continue with the same level of high performance for satellite reliability and image production, ensuring the supply of data until full commissioning of RADARSAT-2 in early 2007. A contingency plan is in place to prescribe the use of foreign sensors as backup to RADARSAT-1 in order to continue to meet the needs of operational users until RADARSAT-2 data becomes available. Ongoing operation of RADARSAT-1 provides useful information to both commercial and scientific users in such fields as disaster management, interferometry, agriculture, cartography, hydrology, forestry, oceanography, ice studies and coastal monitoring.

- Canada's SCISAT-1 Atmospheric Chemistry Experiment, launched in August 2003 and operated by the CSA, is yielding an excellent data set and articles are being published in peer-review scientific journals. There are expectations of significant scientific results that will ultimately enhance Canada's understanding and recognized leadership in stratospheric ozone studies. The satellite, which measures numerous trace gases, thin clouds and aerosols in the stratosphere, will continue to operate for at least the next two years.

- 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 on-board 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.

- Many scientific teams will continue with projects exploiting the data generated from the Envisat satellite. For example, scientists from Meteorological Service of Canada are leading an international consortium for the development of coupled chemistry dynamic data assimilation models.

To learn more about Earth Observation, go to:
http://www.space.gc.ca/asc/eng/satellites/default.asp?page=observation

Space Science and Exploration

Program Activity Priority: Understand the Solar System and the Universe, expand our knowledge on the constituent elements and origins of life, and strengthen a human presence in space.

Through this Program Activity, the Canadian Space Agency will sustain and increase Canada's contribution to scientific knowledge, as well as the exploration of our solar system and the Universe. The CSA will advance our fundamental and applied knowledge of chemistry, physics and life sciences by carrying out leading-edge experiments in the unique environment of space. The scientific community and industry will continue to achieve worldwide recognition for scientific excellence and unparalleled expertise and capabilities in specific research and development activities. Space Science and Exploration (SE) activities will encourage people at an early stage to pursue education and careers in science and engineering, an essential source of expertise and skills in the innovation-based economy.

To best achieve this priority, it is also important for the CSA to strategically deploy its Astronaut Corps and actively participate in activities that will leverage Canadian Astronauts' experience, knowledge and skills for flight opportunities. The CSA will develop and maintain a versatile, experienced and healthy Astronaut Corps to further enable science and exploration activities and be a source of inspiration and pride for those watching from Earth.

In doing so, this priority contributes in many ways to the following CSA Strategic Outcomes: Knowledge, Innovation and Economy, and Sovereignty and Security.

SPACE SCIENCE AND EXPLORATION (SE) **PROGRAM ACTIVITY PERFORMANCE MEASUREMENT**	
Expected Result #1	**Performance Indicators**
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 relation, as well as physical and life sciences.	1. Number of participations in Canadian and international space science missions. 2. Rate of successful missions (Total or partial successful Canadian missions/total missions with Canadian participation); and, 3. Number of peer-reviewed papers over the next three years 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).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	133.2	113.8	97.8
HUMAN (FTEs)	191.9	189.0	186.9

The programs under this Program Activity are divided into 3 clusters: 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 will be 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 #1	Performance Indicators
Mission Feasibility and Concept studies by industry, government and academia, enabling CSA decisions on future SE space missions of interest to Canada.	1. Feasibility studies and mission and payload concept studies are initiated and completed (Target: 1); and 2. New Missions developed (Phase 0/A) and successfully retained for implementation (Phase B, C, D) (Target: No new mission for 2006-2007).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	0.7	0.4	0.2
HUMAN (FTEs)	3.1	3.2	2.5

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 #1	Performance Indicator
Successful development and demonstration of advanced technologies, systems, components, or studies provided for in the contracts awarded by ESA to Canadian firms under SE programs.	1. Canadian industrial returns in ESA optional programs in SE (Target: 0.80 or higher).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	5.7	3.9	3.5
HUMAN (FTEs)	-	-	-

3- SE Programs – Objective: Co-ordinate 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 #1	Performance Indicators
Identified opportunities for Canadian scientists to advance SE understanding and scientific knowledge through CSA, national and international research missions.	1. Number of scientific publications/ reports/conference proceedings acknowledging CSA funding (Target: 200); 2. Number of Highly Qualified Personnel (HQP) involved in the program (Target: 470); 3. Number of operating or approved space science research missions (Target: 20); 4. Number of scientific research projects supporting the development of future space science research missions (Target: 60); 5. Number of scientific presentations (Target: 400); 6. Number of research partnerships (nationally and internationally) (Target: 60); and, 7. Number of awards granted under the Space Science Grants and Contributions Program (Target: 11).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	17.4	15.4	22.9
HUMAN (FTEs)	24.3	24.3	24.3

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 the opportunities of access to space for Canadian scientists.

Expected Result #1	Performance Indicators
Continue to develop and maintain human space flight expertise to meet the requirements of the CSA's space science and human exploration programs.	1. Canadian astronauts are qualified on all flight vehicles such as Shuttle, Soyuz and ISS (Targets: 4 on Shuttle, 2 on Soyuz and 1 on ISS); 2. Canadian Astronauts are recruited according to recruitment plan (Target: no activities for 2006-2007); and, 3. Number of space flights and missions in which Canadian Astronauts participate (Target: 1).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	0.6	0.7	2.6
HUMAN (FTEs)	-	-	-

Highlights of Expected Accomplishments – Enabling Research (SE)

- Conduct a series of national and international workshops to encourage scientific and technical teams to explore future national and international opportunities relating to space science.
- Release a series of Announcements of Opportunity to the various space science research communities for Concept and Advanced Studies in order to develop the next generation of scientific and instrumentation ideas for inclusion in future Canadian and/or international space science missions.
- Continue the program of international analog opportunities in planetary exploration utilizing Canada's unique northern environment (e.g., Haughton crater on Devon Island, Nunavut, as a site analogous to the Moon and Mars). Scientific research will be carried out to help us better understand the history of our own planet while preparing us for robotic and human exploration of the Solar System.
- Establish a partnership with the European Space Agency (ESA) relating to their planetary exploration program (Aurora). The CSA's participation in this program will position our scientific and industrial partners in future scientific and technological developments relating to this new initiative.

- Establish a partnership with the ESA relating to their European Life and Physical Sciences Program (ELIPS-2). The participation in this program will increase opportunities for scientists and industrial partners to explore life and physical phenomena in the space environment.

- Engage Canadian scientists in "low mass, low volume" research on-board ISS and other free-fall platforms. The idea is to develop a repertoire of science on the shelf to take advantage of all available flight opportunities. An announcement of opportunity is being prepared.

- Review the Insect Habitat facility project's scope as part of its development as an ISS facility. When operational, this facility will provide researchers with the opportunity to study insects as model organisms in space.

- Develop the Canadian Biotechnology Facility to enable protein crystals to replace those grown on the ISS is expected to begin in 2006. The original experiment was lost with Space Shuttle Columbia. A precise knowledge of protein structure is important in the design of more efficient medication for better treatments with fewer side effects.

- Evaluate how best to adapt the development strategies of the Microgravity Isolation Mount Base Unit (MIMBU), to meet its objectives within the new ISS context. A Space Science study is currently underway. A similar study is planned for the ISS Furnace (ATEN).

- Maintain a trained and versatile Astronaut Corps to develop and maintain human space flight expertise to meet the requirements of the CSA's space sciences and human exploration programs. One Canadian Astronaut is currently training in preparation for assignment to a long-duration space flight on the ISS. When not actively training for a space flight, Canadian Astronauts perform additional duties for NASA and with the International Space Station Program.

- The CSA will continue to prepare for an eventual Astronaut Recruitment Campaign, but such recruitment will not take place until new flight opportunities, over and above those currently existing, materialize.

- The Canadian Astronaut Office will continue the use of space-analog facilities (e.g. Aquarius underwater habitat/Haughton-Mars) to further scientific knowledge, develop scientific and medical technologies, develop mission operation concepts and train crew and support personnel.

- As part of the Shuttle based ISS Assembly and Maintenance mission STS-115/12A Canadian Astronaut Steve MacLean will perform at least 2 space walks (extra vehicular activities) to install solar panels thus increasing the capability of the ISS to generate power to support science and operational activities.

- Efforts are underway to include a study of cardiovascular adaptation to the space environment in the STS-118/13A mission with Canadian Astronaut Dave Williams. This mission will likely happen after July 2006.
- Collaborate with Russia on two ISS studies; one to study astronaut/cosmonaut performance reliability and skill dynamics during long-term space flights, and the other to study astronaut radiation exposure. This collaboration is already underway.
- Evaluate cross-cultural training requirements for the ISS environment. Canada has undertaken a study, in collaboration with international partners.
- CSA is pursuing discussions with the German Space Agency for a joint mission that would demonstrate the robotic on-orbit servicing capability. Canada would provide the client satellite, advanced software for autonomous operation and potentially an active vision system.

SPACE MISSION DEVELOPMENT – SPACE SCIENCE AND EXPLORATION

One Science and Exploration Space Mission Development Program with a combination of accomplishments demonstrates how the following Expected Results will be 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 #1	Performance Indicators
SE projects' deliverables meet mission objectives and user expectations.	1. Safety and Mission Assurance (S&MA) and Configuration Management (CM) requirements are identified and met for each project (Targets: Guidelines are completed and implemented on all projects phase A to E); In accordance with Treasury Board approved Project Approval and Management Framework (PAMF): 2. Mission objectives and user requirements are met at critical steps of the projects (Target: 90% satisfaction); 3. Project cost is maintained within authorized levels (Target: 75% of projects delivered on time and on budget); and, 4. Risks are identified and mitigated for each project (Target: Up to 75% of risk budget is used).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	48.2	32.6	14.5
HUMAN (FTEs)	19.7	18.2	16.8

Highlights of Expected Accomplishments – Space Mission Development (SE)

- The CSA will continue the design and production of a Canadian meteorological (MET) station for NASA's Phoenix Scout Program mission. To have this instrument launched on this mission will position Canada as a respected and reliable provider of planetary science instrumentation and will provide basic scientific knowledge of the Martian atmosphere. This program will also include benefits for Canada in science and industrial competitiveness. The CSA MET will be developed, delivered and flown on the Phoenix mission in 2007.

- The Enhanced Polar Outflow Probe (e-POP) mission, now integrated with the CASSIOPE Mission Contribution Program, is scheduled for launch in early 2008. 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 e-POP 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 (ISRO) with: the Flight Detector Subsystem, the Ground Test Subsystem, the Calibration Subsystem, and required flight spares for the UltraViolet Imaging Telescope (UVIT) on-board the ISRO ASTROSAT satellite. The ASTROSAT mission is scheduled for launch no earlier than 2007. The CSA participation will guarantee 5% of the observing time for Canadian scientists and obtain ASTROSAT astronomic data.

- The CSA is planning to initiate the design of the Alpha Particle X-ray Spectrometer (APXS) for the Mars Science Laboratory. The Canadian contribution will help scientists to determine the chemical composition of various soil, dust and rock samples.

- The CSA is upgrading the existing Enhanced OSTeoporosis Experiments in Orbit (eOSTEO) design to be flown on a Foton spacecraft in partnership with ESA. The science experiment will study and quantify bone-cell activity and evaluate anti-osteoporosis treatments. The launch is scheduled in 2007.

- Canada 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 with simultaneous images. By virtue of the CSA's contribution valued at $55 million over ten years, Canadian astronomers will have guaranteed access to 5% of the observing time of this approximately $1.8 billion (USD) project.

- The HIFI Local Oscillator Source Unit (LSU) project is Canada's contribution to the Herschel Space Observatory, a European Space Agency (ESA) satellite with an on-board telescope that will be launched no earlier than 2007. The Herschel satellite will carry an infrared telescope and three scientific instruments, one of which is a high-resolution spectrometer, the Heterodyne Instrument for the Far Infrared (HIFI). Herschel 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 NEOSSat mission, a joint CSA-DND mission, is a combination of 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 has received full approval to proceed with the design, building, and testing of the spacecraft, which is scheduled to launch at the end of 2008.

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 will be measured and attained.

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

Expected Result #1	Performance Indicators
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.	1. Percentage of active participation of the CSSP team in the various multi-lateral boards and panels managing the ISSP (Target: 95%); 2. Rate of availability of Ops Centre (Target: 99%); 3. Rate of training delivered vs. training requested (Target: 95%); 4. Percentage of MSS system(s) and operational support availability for planned and unplanned events (Target: 95%);

	5. Percentage of software and flight products delivered as required/scheduled (Target: 95%); and, 6. Rate of payload operational support availability for planned and unplanned events (Target: 100%).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	53.1	53.3	46.4
HUMAN (FTEs)	115.1	113.5	113.5

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

Expected Result #1	Performance Indicator
SE Space Mission Operations meet mission objectives and user/client expectations.	1. Sponsoring organization's requirements for payload projects are met at critical steps of the operation (Target: 100%).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	0.6	0.4	0.5
HUMAN (FTEs)	-	-	-

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 #1	Performance Indicators
Ensure and maintain Canadian Astronauts' health and safety for space flight missions.	1. Number of activities targeted at maintaining Astronauts' Health and Safety (Target: 2); and, 2. Percentage of participation in ISS medical boards, panels and working groups (Target: 100%).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	2.1	2.1	2.1
HUMAN (FTEs)	11.3	11.3	11.3

Highlights of Expected Accomplishments – Space Mission Operations (SE)

- The implementation of a ground control capability for Canadarm2 will enable movement of the robotic arm by personnel on the ground without involvement of the on-orbit crew. This new capability will be progressively fielded for the Mobile Servicing System (MSS) to allow for more efficient utilization of the Dextre robot when it is launched.

- The completion of the end-to-end testing of Dextre (Special Purpose Dexterous Manipulator-SPDM), the third element of the MSS, for its launch is now expected at the end of 2007/early 2008. The CSA is also responsible for the training and qualification of all astronauts, cosmonauts and ground support personnel involved in the operations of the MSS including Dextre, for the mission controllers and planners, and for the dynamic analysis groups mandated to support robotics operations in orbit.

- The completion of the MSS-4 and the initiation of MSS-5 software loads are required to integrate the Dextre robot into the MSS to support the planned testing of Dextre, its launch, commissioning and early on-orbit operations.

- The responsibilities for MSS operations will be fulfilled: maintaining and providing technical support for MSS hardware and software; performing repair and overhaul work on the MSS hardware; operating MSS training facilities in Canada; planning and supporting operations of MSS missions; and conducting operations in conjunction with the NASA Houston flight control room from the Remote Multi-Purpose Support Room, a facility directly supporting robotics operations from St-Hubert, Quebec, with a reliable ground segment capability.

- The CSA is planning the launch of Perceptual-Motor Deficits in Space/Test of Reaction and Adaptation Capabilities (PMDIS/TRAC), the first experiment to use the Canadian International Space Station (ISS) allocation rights, for Mission STS-116/12A.1, with a return planned for Mission STS 119/15A. The missions are scheduled for the 2006 to 2007 timeframe.

- Operations for the Microvariability and Oscillations of STars (MOST) micro-satellite space telescope, launched in June 2003, will continue. Scientists operating 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.

- Canadian scientists continue to obtain data from our participation in NASA's Far Ultraviolet Spectroscopic Explorer (FUSE) mission (launched in 1999) and from the CANOPUS ground-based array of geophysical instruments that complement international solar-terrestrial space probes. Since the initiation of the CANOPUS

array in the late 1980's, over 1000 peer-review scientific papers have been published utilizing data from the array.

- The continuation of OSTeoporosis Experiments in Orbit (OSTEO) science will be accommodated with an enhanced system (eOSTEO). ESA has requested use of the eOSTEO hardware in return for providing a flight-mission opportunity on a Russian Foton scheduled for September 2007.

- The continued support of the Microgravity Vibration Isolation System (MVIS) delivered to the European Space Agency (ESA) for integration into its Fluid Science Laboratory (FSL), which will be flown on their Columbus module. Final integration into Columbus will be completed by May 2006 to allow shipment of the module to the Kennedy Space Center, in preparation for a launch in early 2007, on Space Shuttle Mission STS-122/1E.

- A Request for Proposal for a "Needs and Capacity Study" has been issued for the Advanced Astronaut Medical Support (ADAMS). Specifically, this study will identify: solutions to the delivery of health care on future long duration exploration-class missions, health care needs and solutions for space missions, overlaps with terrestrial remote medicine and capacity within Canada to meet those needs (industry, academic, government).

- Canada will continue to actively participate at the International Space Station Program medical boards to include: The Multilateral Medical Policy Board (MMPB), the Multilateral Space Medicine Board (MSMB) and the Multilateral Medical Operations Panels and Working Groups (MMOP).

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

Satellite Communications

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

The capability for widespread instantaneous communication of ideas and information across long distances enables economic growth and fundamentally changes how society operates. It also links people from diverse – or similar – cultures, regardless of where they may live. Satellites are the most economical way to connect users in remote communities to advanced communication services, since they eliminate the need for extensive, cumbersome, ground-based infrastructure—a particularly important factor for countries like Canada, with its large territory and sparse population. The design of new equipment and applications stimulate innovation within the world economy.

Through the Satellite Communications (SC) Program Activity, the Canadian Space Agency will uphold Canada's status as a world leader in satellite communications, and extend the most advanced products and services to all Canadians everywhere.

In doing so, this priority contributes in many ways to the following CSA Strategic Outcomes: Knowledge, Innovation and Economy, and Sovereignty and Security.

SATELLITE COMMUNICATIONS (SC) **PROGRAM ACTIVITY PERFORMANCE MEASUREMENT**	
Expected Result #1	**Performance Indicators**
Increased access for Canadians to state-of-the-art space communications systems and services to meet their social and economic needs.	1. Gap between current capabilities and future needs of Canadians for satellite communications and the available or expected system's capacity; 2. Percentage of coverage over Canada by satellite and ground systems in place for commercial and governmental usage; and, 3. Utilization rate of Anik F2 Ka-band payload and in particular of the service delivery utilizing the $50 million government Ka-band credit.
Expected Result #2	**Performance Indicator**
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.	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.

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	32.3	28.7	30.4
HUMAN (FTEs)	11.0	11.0	12.8

The programs under this Program Activity are divided into three clusters: Enabling Research, Space Mission Development and Space Mission Operations. However, no Space Mission Operations are mentioned in this report.

ENABLING RESEARCH – SATELLITE COMMUNICATIONS

Three Satellite Communications Enabling Research Programs with a combination of accomplishments demonstrates how the following Expected Results will be measured and attained.

1- SC 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 SC missions.

Expected Result #1	Performance Indicators
Mission Feasibility and Concept Studies by industry, government and academia, Enabling CSA decisions on future Satellite Communications' space missions of interest to Canada.	1. Feasibility Studies and Mission and Payload Concept Studies are initiated and completed. (Target: 1); and, 2. New missions developed (Phase 0/A) and successfully retained for implementation (Phase B, C, D) (Target: 0 for 2006-2007).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	2.8	3.0	1.0
HUMAN (FTEs)	-	-	-

2- ESA Programs in SC – 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 SC.

Expected Result #1	Performance Indicator
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.	1. Canadian industrial returns in ESA optional programs in Satellite Communications. (Target: 0.80 or higher).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	8.3	9.8	10.3
HUMAN (FTEs)	-	-	-

3- SC Application Development Programs – Objective: Enhance Canada's ground segment telecommunications technologies, develop and demonstrate SC applications for commercial use and Canadian government operations.

Expected Result #1	Performance Indicators
Development and demonstration of SC Applications for private and public sector clientele and the support and development of ground segment telecommunication technologies.	1. Number of new or improved applications (Target: 0); and, 2. Number of operational engagements (Target: 0).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	0.6	1.7	2.5
HUMAN (FTEs)	-	-	-

Highlights of Expected Accomplishments – Enabling Research (SC)

- Additional demonstration of Ka-band Technology will improve the use of Anik F2 by Northern Communities for trials of innovative government services throughout Canada's North and in specific areas of interest to other government departments. This will be done by deploying a Processor Hub, developed by the CSA and its industry partners, into a Telesat Teleport in Winnipeg that will provide expanded access to Ka-band user and government services in the northern area.

- New System Studies and Ground Segment Technologies and Applications Development programs will be put in place in preparation of the next-generation SC Mission that will start in 2007-2008. The programs will develop the necessary technologies that will provide Canadians with state-of-the-art satellite telecommunications services for Canadians users. It will also position the Canadian industry on the international market, both as a supplier of advanced components and as service providers of advanced satellite telecommunications.

- Canada’s participation in the European Space Agency (ESA) programs allows 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 services such as interactive communications services for remote communities and disaster management. For example, Canadian companies will:

- develop a Short Messaging Service System for the Galileo program to support missions in emergency services and an Automatic Identification Systems for monitoring marine traffic, including text messaging, fleet management, and inventory tracking/management on a global scale;
- complete studies on Medium Earth Orbit Local User Terminals (MEOLUT) and develop improved processing algorithms for ground stations and local user terminals to allow Search and Rescue to provide near instantaneous positions as well as significantly improved detections; and,
- demonstrate with the ESA project for on-board autonomy (PROBA) mission, new concepts in the field of optical communications technology for ultra-fast and reliable exchange of information within the satellite components.

SPACE MISSION DEVELOPMENT – SATELLITE COMMUNICATIONS

One Satellite Communications Space Mission Development Program with a combination of accomplishments demonstrates how the following Expected Results will be 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 #1	Performance Indicators
SC projects' deliverables meet mission objectives and user expectations.	1. Safety and Mission Assurance (S&MA) and Configuration Management (CM) requirements are identified and met for each project (Targets: Guidelines are completed and implemented on all projects phase A to E); In accordance with Treasury Board approved Project Approval and Management Framework (PAMF): 2. Mission objectives and user requirements are met at critical steps of the projects (Target: 90% satisfaction); 3. Project cost is maintained within authorized levels (Target: 75% of projects delivered on time and on budget); and, 4. Risks are identified and mitigated for each project (Target: Up to 75% of risk budget is used).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	20.5	14.2	16.7
HUMAN (FTEs)	11.0	11.0	12.8

Highlights of Expected 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. This small satellite spacecraft will be fully designed and constructed by Canadian companies by 2007. 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.

To learn more about Satellite Communications, go to:
http://www.space.gc.ca/asc/eng/satellites/default.asp

Generic Space Activities in support of Earth Observation, Space Science and Exploration, and Satellite Communications

Program Activity Priority: Provide leadership, co-ordination 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.

The support to Enabling Research is provided through the development of high-risk technologies by industry, academia and non-for-profit organizations and through the maintenance of in-house technical capabilities by conducting advanced R&D projects that meet the criteria of excellence in and relevance to the implementation of the CSP. The support to Space Mission Development is provided by the David Florida Laboratory which carries out 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.

In doing so, this priority contributes in many ways to all CSA Strategic Outcomes: Knowledge, Innovation and Economy, Sovereignty and Security, and Environment and Sustainable Development.

GENERIC SPACE ACTIVITIES IN SUPPORT OF EO, SE, AND SC (GSA) PROGRAM ACTIVITY PERFORMANCE MEASUREMENT	
Expected Result #1	**Performance Indicators**
Innovative space technologies, techniques, and design and test methodologies in response to advanced developments required for future space missions and activities.	1. Number of technologies supported through one of the generic R&D programs that are used in a space mission or activity; 2. Number of space missions making use of the DFL; and, 3. Number of peer-reviewed papers as a result of CSA technology generic R&D programs.

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	44.3	44.4	47.8
HUMAN (FTEs)	146.0	146.0	146.0

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 following Expected Results will be measured and attained.

1- Generic Space Technology Supporting Earth Observation, Science and Exploration, and Satellite Communications – Objective: Assume leadership and provide support in enabling 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	Performance Indicators
Development and transfer of advanced space technologies by industry, government and academia, in support of EO, SE, and SC activities of interest to Canada.	1. Number of publications (Target: Implement the measurement system and improve target of overall number of publications); 2. Number of patents (Target: Implement the measurement system); 3. Number of technologies brought to higher readiness levels to advance technological capacity (Target: Implement the measurement system and define target for overall number); and, 4. Number of technologies chosen for future space missions and/or commercial products by industries (Target: Define and implement the measurement system).
Expected Result #2	**Performance Indicator**
Successful development and demonstration of advanced technologies, systems, components or studies provided for in the contracts awarded to Canadian firms under ESA Programs.	1. Overall Canadian industrial return in ESA mandatory programs (General Budget, GSTP) (Target: 0.80 or higher).
Expected Result #3	**Performance Indicator**
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.	1. Number of partnership projects involving industry, universities and the CSA (Target: 3).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	37.6	37.8	41.2
HUMAN (FTEs)	103.5	103.5	103.5

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

- A new Technology Plan will provide roadmaps and a multi-year implementation plan to guide and prioritize CSA Technology Programs. Priority technologies are defined in consultation with industry and other stakeholders.

- Through the Space Technology Development program enhance Canada's capabilities in supporting national and international space missions or activities of Canadian interest by awarding new technology development projects to industry (mainly to small and medium-size companies) and research organizations through an annual Request for Proposal (RFP) process. For example, Canadian organizations will:

    - investigate critical technologies to reduce the risks of project implementation of the synthetic aperture radar (SAR Constellation) mission;

    - advance research in active vision system technologies to maintain the Canadian leadership and leading edge in this field for upcoming missions in exploration and/or on-orbit servicing;

    - advance research in subsurface acquisition and drilling technologies in support of Canada potential participation to space exploration missions;

    - demonstrate a novel radiation measurement technology in-orbit to provide new data on the space radiation environment and lead to a better understanding of this complex phenomenon;

    - develop a novel spacecraft charge monitor enabling early electrical fault detection that will be used as a scientific instrument to measure energetic electron activity and as an advanced failure warning device; and,

    - complete a frequency stabilized laser system for space-borne interferometers technology that will lead to the development of lower cost and smaller technology.

- Through the Space Technology Research Program develop 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 deployable membrane antenna to achieve significant mass savings for satellites;

- thermal control models and techniques to maintain satellite internal operating environment;

- a software technology for autonomous *rendez-vous* between satellites and control to support space satellite servicing that represents a promising field of expertise; and,

- an Optical Inter Satellite Link to provide a significantly higher data rate and security than existing radio-frequency links.

- The transfer and commercialization of space technologies and their applications to other sectors of the economy will 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, and for technologies developed within the Canadian industry.

- Launch of the Research Partnership Program and of the collaboration program with the Natural Sciences and Engineering Research Council of Canada to foster closer industry/university collaboration in space research and development.

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 following Expected Results will be 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	Performance Indicator
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.	1. Percentage of satisfied clients (Target: 95%).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	6.6	6.6	6.6
HUMAN (FTEs)	42.5	42.5	42.5

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

- David Florida Laboratory 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. Many priority projects will benefit from DFL support, such as for:

    - Earth Observation: RADARSAT-2, Chinook, a Canadian-led mission carrying two experiments; Stratosphere Wind Interferometer for Transport studies (Swift), and Atmosphere Research with GPS Occultation (ARGO);

    - Science and Exploration: CASSIOPE e-POP mission; SmallSAT BUS; QuickSat; eOSTEO; James Webb Space Telescope Space Telescope (JWST); and the UltraViolet Imaging Telescope (UVIT);

    - Satellite Communications: CASSIOPE Cascade mission; and,

    - Commercial Programs: Skynet V, the Orbiter Boom Sensor System (OBSS) infrared camera, and the Hubble Telescope repair mission.

To learn more about Generic Space Technology Supporting Earth Observation, Space Science and Exploration, and Satellite Communications, go to:
http://www.space.gc.ca/asc/eng/industry/technology.asp

To learn more about the David Florida Laboratory, go to:
http://www.space.gc.ca/asc/eng/dfl/default.asp

Space Awareness and Learning

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

The Government of Canada is committed to building a 21st century economy by focusing on science and technology. If Canada is to meet the challenge posed by a global economy, Canadians must be encouraged to pursue careers in science and technology – a skilled pool of human capital is at the heart of an innovative economy. We must encourage science and technology literacy, particularly among our youth today. We must also engage Canadians' interest in science and technology by sharing our discoveries and breakthroughs in meaningful ways that relate to their daily lives.

In doing so, this priority contributes to the Strategic Outcomes: Knowledge, and Innovation and Economy.

SPACE AWARENESS AND LEARNING PROGRAM ACTIVITY PERFORMANCE MEASUREMENT	
Expected Result #1	**Performance Indicator**
Increased public awareness of Canada's activities in space and space benefits positively affecting the quality of life of Canadians.	1. Awareness of Canadians measured by telephone survey every three years (Target: Next survey in 2008-2009).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	5.9	6.0	7.4
HUMAN (FTEs)	25.4	25.4	25.4

The programs under this Program Activity are divided into two clusters: Awareness and Learning.

AWARENESS

Four Awareness Programs demonstrate how the following Expected Results will be measured and attained.

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

Expected Result #1	Performance Indicator
Targeted audience is reached through outreach activities.	1. Number of persons from the targeted audiences reached (Target: Implement speakers bureau engagement strategy and establish a benchmark.).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	0.5	0.5	0.9
HUMAN (FTEs)	2.6	2.6	2.6

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

Expected Result #1	Performance Indicator
Information is present in the media, particularly on television.	1. Quantity of media initiatives that resulted in coverage, particularly on television (Target: At least 2 events for Space Science, 2 events for Space Exploration, 2 events for Earth Environment, 1 for Space Technologies, 1 for Awareness and Learning, and 3 more to be determined).
Expected Result #2	**Performance Indicator**
Canadians visit the Canadian Space Agency Web site.	1. Number of Canadian visits (Target: Sustain or increase visits to the CSA Web site).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	1.1	1.1	1.3
HUMAN (FTEs)	6.0	6.0	6.0

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

Expected Result #1	Performance Indicator
Target audience has access to information through products and publications.	1. Number of products and publications distributed through different communications channels (Target: Identify key channels and products and establish a benchmark).
Expected Result #2	**Performance Indicator**
Target audience has access to information through outreach activities with partners (conferences and fairs).	1. Number of persons from targeted audience having access to information (Target: Establish a benchmark, evaluate and adjust indicator).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	1.7	1.8	1.9
HUMAN (FTEs)	5.0	5.0	5.0

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	Performance Indicators
Canadians are reached by awareness activities conducted by a Canadian Astronaut.	1. Number of participants reached/astronaut days invested (Target: Establish a benchmark); 2. Number of events/astronaut days invested (Target: 60 events for 55 days of astronauts); 3. Number of provinces and territories visited (Target: 6 provinces and 1 territory); and, 4. Percentage of accepted requests (Target: Approximately 50%).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	0.2	0.2	0.2
HUMAN (FTEs)	-	-	-

Highlights of Expected Accomplishments – Awareness

The CSA is implementing a proactive and balanced communications strategy focusing on important space achievements. The major communications activities will focus on the following:

- The launch of RADARSAT-2, Canada's next-generation Earth Observation satellite.
- The continued and expanded habitation and scientific use of the International Space Station.
- As part of a traveling exhibits program, the development of an exhibit to raise awareness of Canada's scientific expertise and satellite technology supporting sustainable development, sent with informational products to support museum activities.

- An increase in outreach activities by astronauts, scientists, engineers and staff taking part in speaking events, conferences or fairs, workshops and presentations.

- Promotion of STS-115 and STS-118. Canadian Astronauts Steve MacLean and Dave Williams will perform space-walks on these two important ISS Assembly flights.

LEARNING

The Learning Program demonstrates how the following Expected Results will be 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	Performance Indicators
Canadian educators and students further their learning related to science and technology through space theme.	1. Number of educators reached through professional development initiatives (Target: Maintain or increase the number); 2. Number of students reached through learning activities (Target: Maintain or increase the number); 3. Number of participating educators incorporating space into their learning environment (Target: Establish a benchmark); and, 4. Number of resources accessed by educators (Target: Maintain or increase the number).
Expected Result #2	**Performance Indicator**
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.	1. Number of students, fellows and medical residents supported through the Program (Target: 22).

RESOURCES	2006-2007	2007-2008	2008-2009
FINANCIAL ($ in millions)	1.9	1.9	2.3
HUMAN (FTEs)	5.8	5.8	5.8

Highlights of Expected Accomplishments – Learning

- An increase in educator and student participation in space-centred learning initiatives, which encourage youth to pursue studies and careers in the field of science and engineering.

- The enhanced use of targeted and educational space-based materials by not-for-profit and educational institutions, and increased requests for youth-oriented information across Canada.

- The promotion of professional development workshops and the development of teaching materials such as Web-based assisted learning opportunities to respond to the needs of educators.

- Regional tours and partnered initiatives with schools and youth organizations to expand student and educator access to the space science and technology community.

- The implementation of targeted grants, contribution and sponsorship programs in partnership with other federal departments and agencies to support awareness, research and training in space science and technology.

- Through an agreement with the NASA-JSC Aerospace Medicine Clerkship Program and the NASA-KSC Biomedical Office, the Canadian Space Agency's (CSA) Operational Space Medicine (OSM) Group will fund four Canadian medical students or residents to attend a four week Aerospace Medicine Elective each year.

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

Corporate Services and Infrastructure

Corporate services supporting the CSA's activities are grouped under one Program Activity entitled Corporate Services and Infrastructure which includes: Audit, Evaluation and Review, Communications, Finances, Human Resources, Information Management and Information Technology, Legal Services, Policy, Planning and Relations, President's Office, Security and Facilities.

Program Activity Priority: To implement the government's commitment to modern public service management in accordance with the Management Accountability Framework's (MAF) expectations. This priority contributes to all CSA Strategic Outcomes: Knowledge, Innovation and Economy, Sovereignty and Security, and Environment and Sustainable Development.

CORPORATE SERVICES AND INFRASTRUCTURE **PROGRAM ACTIVITY PERFORMANCE MEASUREMENT**	
Expected Result #1	**Performance Indicator**
Corporate Services provide an added value to CSA managers in the performance of their duties.	1. Services provided meet standards set under Government-wide and CSA policies as well as Management Accountability Framework's expectations.
Expected Result #2	**Performance Indicator**
Key corporate risks are addressed and mitigated.	1. Management and mitigation actions are implemented against the four highest priority risks identified in the CSA corporate risk profile.

RESOURCES	**2006-2007**	**2007-2008**	**2008-2009**
FINANCIAL ($ in millions)	34.5	34.9	34.5
HUMAN (FTEs)	239.0	239.0	239.0

The CSA's capacity to achieve its expected results and strategic outcomes 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 CSA 's goal is to reduce the likelihood and/or consequences of these risks by improving its capacity to address them. Nine key corporate risks have been identified that require management on a priority basis.

1- Modern Management – Objective: Increase the CSA capacity to mitigate the four risks of highest priority: Stakeholder Support, Values and Ethics, Workforce Competencies, and Function/Process Integration.

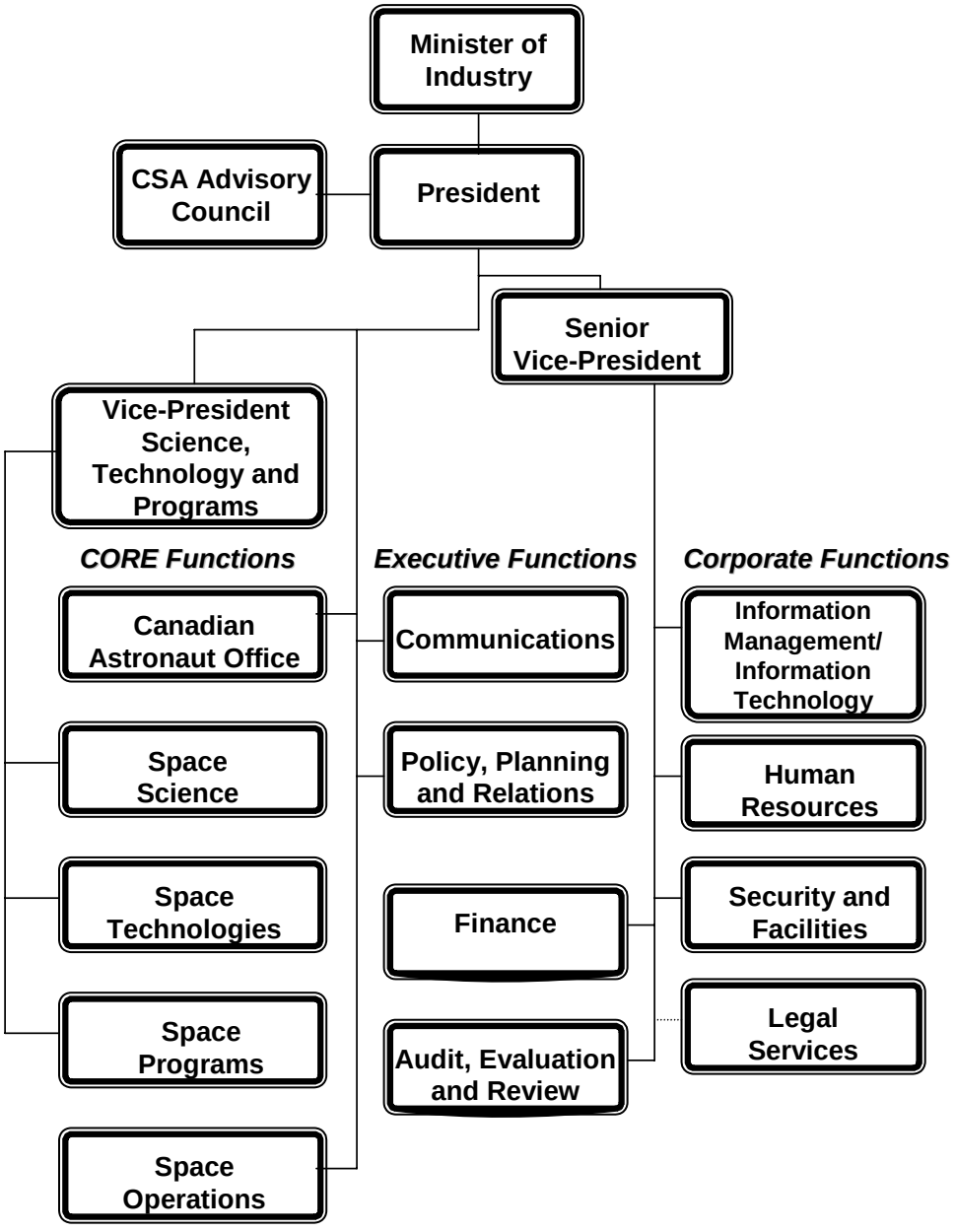
MODERN MANAGEMENT INITIATIVES **PERFORMANCE MEASUREMENT**	
Expected Result #1	**Performance Indicators**
Stakeholder Support: Increase the capacity of CSA to involve other government departments and universities in teaming up and creating a synergy in developing and implementing space activities for the benefits of Canadians.	1. An engagement strategy with stakeholders has been put in place; and, 2. Frequency of advisory committee meetings has increased.
Expected Result #2	**Performance Indicators**
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. Implement a Public Service Values and Ethics program; and, 2. A CSA structure of governance and delegation of authority is set and implemented in compliance with the Public Service Values of respect, integrity, honesty and transparency.
Expected Result #3	**Performance Indicators**
Workforce Competencies: Increase the capacity of CSA to maintain a qualified workforce of public servants to deliver CSA's mandate within the government legislative frameworks, policies and rules.	1. The profile of essential qualifications for managers to receive delegation of authority has been established; and, 2. The majority of CSA managers are recognized as being qualified for increased delegation of authority.
Expected Result #4	**Performance Indicators**
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.	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; 2. Financial and non-financial information is integrated in the CSA's workplans and supported by information management systems made available to managers; and, 3. Completed development of an Integrated Long-term Investment Plan.

Expected Result #5	Performance Indicators
Function/Process Integration: Initiatives under the Public Service Management Act are being implemented.	1. All managers are knowledgeable of the Staffing Management Accountability Framework (SMAF); 2. Human resources management policies, procedures and practices are considered in accordance with the SMAF; and, 3. The development of a Strategic human resources plan is initiated.

SECTION 3: SUPPLEMENTARY INFORMATION

3.1 ORGANIZATIONAL INFORMATION

Reporting to the Minister of Industry, the CSA Chief Executive Officer is the President, assisted by the Senior Vice-President and the Vice-President of Science, Technology and Programs. The Policy, Planning and Relations Branch, the Communications Directorate, the Canadian Astronaut Office, and the Space Operations Branch report directly to the President. Three of the core branches report to the Vice-President of Science, Technology and Programs. The five Corporate Services report directly to the Senior Vice-President. Legal Services are provided by the Department of Justice. The organizational chart below became effective as of April 1, 2005.



3.2 FINANCIAL TABLES

1. Departmental Planned Spending and Full-Time Equivalents

($ $ in millions)	Forecast Spending 2005-2006	**Planned Spending 2006-2007**	Planned Spending 2007-2008	Planned Spending 2008-2009
Space Based Earth Observation	144.5	**136.8**	115.7	133.0
Space Science and Exploration	156.9	**146.5**	127.1	108.8
Satellite Communications	34.0	**35.5**	32.0	33.9
Space Awareness and Learning	6.2	**6.5**	6.7	8.2
Generic Space Activities	-	**48.7**	49.5	53.2
Budgetary Main Estimates (gross)[1]	341.6	**374.1**	331.1	337.1
Non-Budgetary Main Estimates (gross)	0	**0**	0	0
Less: Respendable Revenue	0	**0**	0	0
Total Main Estimates	341.6	**374.1**	331.1	337.1
Adjustments[2]:				
Governor General Warrants				
Royalties from activities related to the RADARSAT program	1.7			
Capital carry-forward (2004-2005 to 2005-2006)	1.8			
Collective agreements compensation	1.9			
Expenditures review procurement savings	(0.6)			
Additional operating costs	1.0			
Supplementary Estimates				
Royalties from activities related to the RADARSAT program		**4.1**	4.1	4.1
Expenditures review procurement savings		**(3.2)**		
Capital carry-forward (2005-2006 to 2006-2007)	(1.6)	**1.6**		
ARLU				
Reprofiling of funds	(54.5)			
Total Adjustments	*(50.3)*	***2.6***	*4.1*	*4.1*
Total Planned Spending	291.3[3]	**376.7**	335.2	341.2
Total Planned Spending	291.3	**376.7**	335.2	341.2
Less: Non-Respendable Revenue	4.3	**4.9**	4.9	4.9
Plus: Cost of Services Received without Charge	4.6	**5.0**	5.1	5.2
Net Cost of Program	291.5	**376.8**	335.4	341.5
Full-Time Equivalents	607	**690**	687	687

Note: Due to rounding, decimals may not add up to totals shown.

1. The Program Activities shown in this table include amounts for Corporate Services and Infrastructure.
2. Adjustments are to accommodate approvals obtained since the Main Estimates and include Budget Initiatives, Supplementary Estimates, etc.
3. Reflects the best forecast of Total Net Planned Spending to the end of the fiscal year.

2. Resources by Program Activities

2006-2007							
	Budgetary						
Program Activity ($ in millions)	Operating	Capital	Grants	Contributions	**Total Main Estimates**	Adjustments (planned spending not in Main Estimates)	**Total Planned Spending**
Space Based Earth Observation (EO)	56.6	67.6	0.2	12.4	**136.8**	1.1	**137.9**
Space Science and Exploration (SE)	94.9	43.9	0.6	7.1	**146.5**	1.5	**148.1**
Satellite Communications (SC)	9.1	0.1	0.0	26.3	**35.5**	0.0	**35.5**
Space Awareness and Learning (AL)	5.8	0.0	0.5	0.2	**6.5**	0.0	**6.5**
Generic Space Activities in support of EO, SE, and SC (GSA)	38.6	3.1	0.1	7.0	**48.7**	0.0	**48.7**
Total	**205.0**	**114.7**	**1.4**	**52.9**	**374.1**	**2.6**	**376.7**

Note: Due to rounding, decimals may not add up to totals shown.
The Program Activities shown in this table include amounts for Corporate Services and Infrastructure.

3. Voted and Statutory Items

2006-2007			
Vote or Statutory Item	Truncated Vote or Statutory Wording	**2006-2007 Main Estimates** ($ in millions)	2005-2006 Main Estimates ($ in millions)
25	Operating expenditures	**194.4**	173.4
30	Capital expenditures	**114.7**	105.4
35	Grants and contributions	**54.3**	53.3
(S)	Contributions to employee benefit plans	**10.7**	9.5
	Total Department or Agency	**374.1**	**341.6**

4. Services Received without Charge

($ in millions)	**2006-2007**
Accommodation provided by Public Works and Government Services Canada (PWGSC)	**0.2**
Contributions covering employers' share of employees' insurance premiums and expenditures paid by TBS	**4.5**
Salary and associated expenditures of legal services provided by the department of Justice Canada	**0.4**
Total 2006-2007 Services Received without Charge	**5.0**

5. Summary of Capital Spending by Program Activity

($ in millions)	Forecast Spending 2005-2006	**Planned Spending 2006-2007**	Planned Spending 2007-2008	Planned Spending 2008-2009
Space Based Earth Observation (EO)	23.3	**67.6**	58.5	80.4
Space Science and Exploration (SE)	31.1	**45.5**	28.3	10.4
Satellite Communications (SC)	0.8	**0.1**	0.1	0.0
Space Awareness and Learning (AL)	0.0	**0.0**	0.0	0.0
Generic Space Activities in support of EO, SE, and SC (GSA)	0.0	**3.1**	1.8	3.4
Total	55.3	**116.4***	88.7	94.3

Note: Due to rounding, decimals may not add up to totals shown.
The Program Activities shown in this table include amounts for Corporate Services and Infrastructure.
* The $116.4 million includes $114.7 million requested in Main Estimates 2006-2007, plus Capital carry-forward request to be sought through supplementary Estimates. (See Table 1)

6. Sources of Respendable and Non-Respendable Revenue

Respendable Revenue

($ in millions)	Forecast Revenue 2005-2006	**Planned Revenue 2006-2007**	Planned Revenue 2007-2008	Planned Revenue 2008-2009
Respendable Revenue	0.0	**0.0**	0.0	0.0
Total Respendable Revenue	0.0	**0.0**	0.0	0.0

Non-Respendable Revenue

($ in millions)	Forecast Revenue 2005-2006	**Planned Revenue 2006-2007**	Planned Revenue 2007-2008	Planned Revenue 2008-2009
Space Based Earth Observation				
Royalties from activities related to the RADARSAT program	3.2	**4.1**	4.1	4.1
Generic Space Activities in support of EO, SE, and SC (GSA)				
Testing facilities and services of the David Florida Laboratory	1.1	**0.7**	0.7	0.7
Satellite Communications				
Revenue of royalties from intellectual property	0.0	**0.1**	0.1	0.1
Total Non-Respendable Revenue	4.3	**4.9**	4.9	4.9

Total Respendable and Non-Respendable Revenue	4.3	**4.9**	4.9	4.9

Note: Due to rounding, decimals may not add up to totals shown.

7. Resource Requirements by Sector

2006-2007						
($ in millions)	Space Based Earth Observation	Space Science and Exploration	Satellite Communi-cations	Space Awareness and Learning	Generic Space Activities in support of EO, SE, and SC	**Total Planned Spending**
Space Programs	66.0	43.2	20.3	0.0	0.0	**129.6**
Space Technologies	33.3	6.3	11.9	0.3	37.6	**89.2**
Space Sciences	5.1	27.2	0.0	0.1	0.0	**32.4**
Canadian Astronauts Office	0.0	5.1	0.0	0.3	0.0	**5.3**
Space Operations	19.4	52.4	0.3	0.1	7.1	**79.3**
Corporate Services Sectors	13.0	12.4	3.0	5.9	4.0	**38.3**
Total	**136.8**	**146.5**	**35.5**	**6.5**	**48.7**	**374.1**

Note: Due to rounding, decimals may not add up to totals shown.
The Program Activities shown in this table include amounts from Corporate Services and Infrastructure Program Activity.

8. Details on Project Spending

($ in millions)	Current Estimated Total Cost	Forecast Spending to March 31, 2006	**Planned Spending 2006-2007**	Planned Spending 2007-2008	Planned Spending 2008-2009	Future Year Spending Requirement
Space Based Earth Observation						
(Q) RADARSAT-1 (MCP)	713.0	701.6	**11.4**			
(BC-Q) RADARSAT-2 (MCP)	421.6	389.3	**32.3**			
(TBD) SWIFT – CHINOOK (PPA)	105.5	6.1	**11.2**	14.0	28.6	45.6
(BC-M-O-Q) SAR CONSTELLATION (PPA)	200.0	6.4	**27.0**	39.8	46.7	80.0
(O-Q) HYDROS (PPA)	11.6	1.4	**1.5**	2.3	2.8	3.6
Space Science and Exploration						
(O) Herschel HIFI (EPA)	10.5	10.2	**0.3**			
(O) JWST (PPA)	65.9	15.2	**25.1**	17.9	6.8	1.0
(O) MARS PHOENIX (EPA)	23.9	17.0	**6.2**	0.7		
(TBD) NEOSSAT (EPA)	6.1	0.3	**2.3**	3.0	0.6	
(TBD) UVIT (EPA)	6.3	1.7	**3.5**	1.1		
TOTAL	1564.4	1149.2	**120.7**	78.8	85.6	130.2

Note: Due to rounding, decimals may not add up to totals shown.

Province where the capital project will be carried out:
O = Ontario
Q = Quebec
BC = British Columbia
M = Manitoba
TBD = To be determined

Class of Project:
MCP = Major Crown Project
EPA = Effective Project Approval
PPA = Preliminary Project Approval

Annexes

The annexes are linked to the Report on Plans and Priorities 2006-2007 posted on the Canadian Space Agency Web site at:
http://www.espace.gc.ca/asc/eng/resources/publications/default.asp#parliament

9. Status Report on Major Crown Projects
10. Details on Transfer Payments Program

9. Status Report on Major Crown Projects

RADARSAT-1

Description

RADARSAT-1, Canada's first Earth Observation satellite is the only fully operational civilian remote sensing satellite that carries Synthetic Aperture Radar (SAR). This technology, contrary to optical sensor satellites, has the capacity to image day and night, in all weather conditions, regardless of cloud cover, smoke, haze and darkness. Launched in November 1995, RADARSAT-1 was meant to operate for five years with an impressive 96% operational reliability, to consistently supply timely, high-quality data to RADARSAT International (RSI), a wholly owned subsidiary of MacDonald, Dettwiler and Associates (MDA) and other partners (federal and provincial government departments, NASA and the U.S. National Oceanic and Atmospheric Administration). RADARSAT-1 is now in its ninth year of operation.

RADARSAT-1 operations will continue with the same level of high performance for satellite reliability and image production, ensuring the supply of data until full commissioning of RADARSAT-2 in mid 2007. A contingency plan is in place to prescribe the use of foreign sensors as backup to RADARSAT-1 in order to continue to meet the needs of operational users until RADARSAT-2 data becomes available.

RADARSAT-1 acquires high quality images of the Earth, covering most of Canada every 72 hours and the Arctic every 24 hours. It has proven itself in gathering the data needed for more efficient resource management (e.g. support to fishing, shipping, oil and gas exploration, offshore drilling, mapping) as well as ice, ocean and environmental monitoring, disaster management, and Arctic and offshore surveillance.

Leading and Participating Departments and Agencies

Sponsoring Agency:	Canadian Space Agency
Contracting Authority:	Public Works and Government Services Canada
Participating Departments:	Environment Canada
	Natural Resources Canada (Canada Centre for Remote Sensing)

Prime and Major Sub-Contractors

Prime Contractor: - EMS Technologies (Now MacDonald, Dettwiler & Associates)	 - Ste.-Anne-de-Bellevue, Quebec
Major Sub-Contractors: - MacDonald, Dettwiler & Associates - SED Systems - EMS Technologies - COM DEV - Lockheed Martin	 - Richmond, British Columbia - Saskatoon, Saskatchewan - Ottawa, Ontario - Cambridge, Ontario - Longueuil, Quebec
Other Contractors: - Ball Aerospace - RADARSAT International (RSI)	 - Boulder, Colorado - Richmond, British Columbia

Major Milestones

Major milestones of the RADARSAT-1 Major Crown Project are now complete.

Major Milestones	**Date**
- Preliminary studies	Complete
- Feasibility and concept definition	Complete
- Systems requirement and preliminary design	Complete
- Development and testing up to qualification test review	Complete
- Manufacture of the prototype flight sub-systems up to acceptance testing of the sub-systems	Complete
- Assembly and integration of the sub-systems up to flight readiness review, plus post-launch and commissioning activities up to system acceptance	Complete
- First Antarctica mission - Second Antarctica mission - Original Mission Life of five years	Complete Complete Complete
- Satellite operations	April 1996 to December 2006

Progress Report and Explanation of Variances

Effective Program Approval was obtained for RADARSAT-1 in March 1991, with launch in November 1995 and beginning of operations in April 1996. The initial system included receiving stations for Synthetic Aperture Radar (SAR) data in Prince Albert (Saskatchewan), Gatineau (Quebec), Fairbanks (Alaska) and McMurdo (Antarctica). CSA and RADARSAT International (RSI) have since signed agreements with another 25 network stations distributed around the world: Argentina, Australia, Brazil, China, Japan, Korea, Malaysia, Norway, Puerto-Rico, Russia, Saudi Arabia, Singapore, Thailand, Turkey, the United Kingdom and the United-States. In addition to this list, agreements have been also signed with mobile stations for the direct reception of RADARSAT-1 data: four in the U.S., one in Taiwan and one in France. Presently, a fifth U.S. and an Italian mobile station are undergoing the certification process. Even more stations have joined the RADARSAT-1 network in 2005.

Following a commissioning period, routine operations of RADARSAT-1 commenced in April 1996. At the end of November 2004, 193,394 RADARSAT-1 user requests had been planned, and an estimated 349,584 minutes of SAR data had been acquired during more than 47,352 orbits. The average system performance is being maintained at 95.8%. The worldwide client base includes more than 600 commercial and government users from over 60 countries.

Several system improvements were made to the RADARSAT-1 operations planning system. First, the new Data Loss Information System (DLIS) database was integrated in the Mission Management Office database, providing visibility of data losses to Order Desk clients for the first time in the mission. The DLIS front-end interface was also improved to facilitate data entry and tracking of data losses. Second, the new OBR planning strategy was tested extensively with the Order Desk and made operational, thus optimising OBR usage by storing only user requested data on tape. Third, new functionality was added in the mission planning software and associated planning tools for allowing new network stations to the RADARSAT-1 network, well beyond the previous limit of 26 stations. In addition, the RSI Order Desk server was upgraded and successfully moved to CSA from RSI (Richmond, British Columbia) for improved performance, security, and maintainability. All four Order Desk servers are now located at CSA.

Moreover, in October 2000, the CSA became a signatory, along with ESA and the Centre National d'Études Spatiales (CNES) in France, to the International Charter on Space and Major Disasters. The emphasis of the Charter is on multi-satellite support for disaster response and mitigation efforts around the world utilising RADARSAT-1 and satellites of other Charter member agencies. Since its official launch, the Indian Space Research Organisation (ISRO) and the National Oceanic and Atmospheric Administration (NOAA) have also joined the Charter (September 2001) and participate fully in Charter operations. CONAE, or Argentina's Comisión Nacional de Actividades Espaciales, became the latest member when the Argentinean Foreign Minister signed the Charter on July 16, 2003, during a state visit of the President of Argentina to France. The operational integration of CONAE in the Charter has now been completed and CONAE has assumed its full responsibility under the Charter.

Japan's membership application has been accepted and Japan is expected to sign the Charter soon with operational integration to follow. So far, there have been 63 activations of the Charter on events such as: floods in France, Canada, Russia, Austria, Germany, Indonesia, Morocco, Argentina, Nepal, the Dominican Republic, the Philippines, Sudan, Haïti, Namibia, the Czech Republic, and Colombia; landslides in Slovenia, Italy, Nepal, Russia and the Philippines; earthquakes in El Salvador, India, Afghanistan, Turkey, Algeria and Iran; volcanic eruptions in Italy, Congo, Montserrat, Colombia and Spain; oil spills off the coasts of Ecuador, Lebanon, Denmark, Yemen and Spain; forest fires in France, Portugal, Canada and Bolivia; and, wind storms in India and Mexico. One of the recent Charter activations took place following devastating forest fires in British Columbia. RADARSAT-1 images and the CSA satellite operations team played a lead role, thus providing a great deal of international visibility for the Canadian Space Program.

The RADARSAT-1 system has been improved to provide a less than 2.5-hour turnaround (on average) in the electronic delivery of images to the Canadian Ice Service (CIS) for the production of ice charts and bulletins for the Canadian Coast Guard and other marine clients. The CIS continues to be one of the leading users of RADARSAT-1 data since the first operational data began to flow in February 1996. Recently, the CIS has been collaborating with Noetix Research, CSA, and RSI on an ESA-sponsored Global Monitoring for Environment and Security (GMES) Project - The Northern View - to provide regular RADARSAT-1 images in support of a Floe Edge Service for two communities in the Canadian Arctic.

The RADARSAT-1 Background Mission has archived one of the largest microwave remote sensing data collections in the world. In fact, it is the first multi-mode uniformly collected database of its kind ever created. The data archive is the result of several Background Mission global coverage campaigns undertaken in the past seven years. These include a complete coverage of the world’s continents, continental shelves and polar ice caps, as well as complete coverage of a large majority of Earth's entire landmass with two RADARSAT-1 imaging beams for the first ever beam-pair stereo data collection. This is the world's largest radargrammetric dataset currently available. Some of the continents, including North America, were covered more than once to generate seasonal snapshots. Several time- and site-specific coverage types have also been done, such as remote oceanic island localities and major cities and capitals. A seasonal coverage of the tropical deltas is also underway. High-resolution RADARSAT-1 image mosaics of Canada, the U.S., Australia and Africa were produced with Background Mission data. The four-season continuous coverage of the Arctic basin is underway, to continue until the end of satellite operations. This coverage supports growing interest in the Arctic and climate change.

RSI continues to provide Earth-Observation data, derived information products, and leading-edge services to global clients. The broad range of RSI products includes geo-corrected imagery, digital elevation models, and application-specific products such as flood and ocean oil-seep vectors to meet the demands for new markets. Products are delivered to clients via Internet in near-real time for time-critical operations such as

disaster management and ship navigation. Other services include training, monitoring and emergency response services, and custom product generation, as well as Geographic Information Systems (GIS) project implementation.

Industrial Benefits

The Canadian Space Agency undertook a study to determine the achievements of RADARSAT data in support of ice mapping and related activities in Canada. To date, the Canadian Ice Services is the only Canadian Government operational user of RADARSAT-1 data. RADARSAT-1 provides observations over a wider geographical area, at much lower cost and risk, and in much less time than with an aircraft. As a result, CIS has been able to improve its operational efficiency. Over five years (1995 to 2000), the net average annual savings to CIS operations have been about $7.7 million per year ($38.5 million over 5 years), with the same per year benefits continuing up to and including the eighth year of operations for RADARSAT-1.

The Canadian Coast Guard (CCG), the largest direct customer of CIS products, has felt these benefits most significantly. The CCG Ice Operation Centres can provide improved routing information to commercial shipping, which allows for faster transit times. The shipping industry has benefited from the accuracy of RADARSAT information to produce ice charts. The shipping companies believe that as a result of RADARSAT-based ice charts, there have been savings in transit time through ice-infested waters. These commercial shipping savings are estimated to be $18 million a year. Other benefits included less damage to ships and a reduction in the need for CCG escorts. The CCG has estimated dollar savings in both operating costs and transit time to be between $3.6 million and $7 million a year, depending on the severity of ice conditions.

In the past, the prime contractor SPAR and its Canadian sub-contractors created over 2,000 person-years of high technology employment during the construction phase of RADARSAT-1. Ongoing mission operations employ 75 people at CSA headquarters in Longueuil (Quebec), 7 in Saskatoon (Saskatchewan), 15 at ground stations in Prince Albert (Saskatchewan) and Gatineau (Quebec), as well as more than 80 at RSI in Richmond (British Columbia). In the highly competitive marketplace for space-based information, RSI continues to capture roughly 15% of the world’s space borne remote sensing market. RSI has continued to process scenes and integrate RADARSAT data into information products for delivery to nearly 600 clients in 60 countries, and furthermore, RSI has signed up 80 international distributions, 18 RADARSAT-1 Network Stations and 11 Resources Centres. The market development for data archives is likely to be significant and an area in which new benefits may develop.

RADARSAT-2

Description

The next generation of Canadian SAR-based satellite, RADARSAT-2, will be the most advanced satellite of its kind in the world. RADARSAT-2 will continue to provide all-weather, day-and-night coverage of the entire globe to support fishing, shipping, oil and gas exploration, offshore drilling, mapping and ocean research. Equipped with a C-band radar system, it will be the first fully commercial SAR satellite to offer multi-polarization, an important aid in identifying a wide variety of surface features and targets. It will also have the capability to image both the right and left with a resolution down to three metres and to access an area of 800 kilometres on either side. This translates into a new range of products and services, which will contribute valuable new information on natural resources and the global environment.

The RADARSAT-2 Major Crown Project, in partnership with MacDonald, Dettwiler and Associates (MDA), is elaborating the design, development, testing, deployment and operations of a space-borne SAR satellite to provide global coverage of terrestrial phenomena as a follow-up to RADARSAT-1. Total project cost, including the launch, is estimated at $521 million, with the government contributing $430 million, and the balance of $91 million provided by MDA.

RADARSAT-2 design and construction improves upon RADARSAT-1, with new capabilities to ensure Canada's continued leadership in the satellite remote sensing global marketplace and to create a commercial industrial satellite remote sensing industry in Canada.

Leading and Participating Departments and Agencies

Sponsoring Agency:	Canadian Space Agency
Contracting Authority for the CSA/MDA Master Agreement:	Canadian Space Agency
Participating Departments:	Natural Resources Canada (Canada Centre for Remote Sensing) Environment Canada Industry Canada Fisheries and Oceans National Defence Foreign Affairs International Trade Agriculture Canada

Prime and Major Sub-Contractors

Prime Contractor: - MacDonald Dettwiler, and Associates	 - Richmond, British Columbia
Major Sub-Contractors: - EMS Technologies (Now MacDonald Dettwiler, and Associates) - Alenia Aerospazio - AEC Able Engineering Co. - RADARSAT International (RSI) - STARSEM	 - Ste.-Anne-de-Bellevue, Quebec - Rome, Italy - Goletta, California - Richmond, British Columbia - Baikonur, Kazakhstan

Major Milestones

The major milestones on Major Crown Projects, by phase, are the following:

Phase	Major Milestones	Date
A and B	Requirement Definition	June 1999
C	System Design	May 2002
D1	Sub-system Construction	September 2005
D2	Integration and Testing	January 2007
E1	Pre-launch Preparations	March 2007
E2	Launch System Commissioning	March 2007 June 2007
E3	Operations	2007 to 2014

Progress Report and Explanation of Variances

In June 1994, the government directed the CSA to develop an arrangement with the private sector for the development and operation of a RADARSAT follow-on program to maintain continuity of data following RADARSAT-1. In February 1998, following a formal Request for Proposal, MDA was selected to construct and operate RADARSAT-2.

The CSA and MDA signed a Master Agreement in December 1998 for the RADARSAT-2 mission, under a firm price agreement in which the government contribution was $225 million, in exchange for data. MDA was to invest $80 million. The Master Agreement between the CSA and MDA was updated in January 2000 to reflect changes in the schedule and the latest cost estimates. The company (MDA) is responsible for spacecraft operations and business development, while the CSA is responsible for arranging the launch and maintaining the long-term national archive of RADARSAT-2 data. The CSA

will also provide an additional "in-kind" contribution of certain assets, plus the services of its David Florida Laboratory and the NRC Institute of Aerospace Research Laboratory for spacecraft integration and testing.

In November 1998, Treasury Board approved the RADARSAT-2 Major Crown Project with a funding envelope of $242.2 million. In March 2000, Treasury Board approved an increase of $47.1 million to cover the cost of changing bus suppliers, required by U.S. - government restrictions imposed on the U.S. bus supplier at that time, and an increase of $12.3 million for upgrades to existing satellite ground station infrastructures. In June 2000, Treasury Board approved an increase of $108 million to cover the cost of procuring a commercial launch as a result of NASA withdrawing from the agreement to provide launch for RADARSAT-2 in exchange for data, as it did for RADARSAT-1. In June 2001, Treasury Board approved an increase of $6 million to cover the cost of critical modifications to be made to the RADARSAT-2 spacecraft in order to accommodate a potential future tandem mission with RADARSAT-3.

The development of the RADARSAT-2 satellite has progressed, though at a slower pace than planned. Delays encountered by the main contractor and sub-contractors in the production of some of the satellite components have resulted in a significant delay in the assembly, integration and testing of the spacecraft. The Extendible Support Structure (ESS), one of the primary spacecraft sub-systems, was delivered to the Assembly, Integration and Test (AI&T) site at the David Florida Laboratory (DFL) in October 2003. The Solar Arrays and the Bus were delivered to DFL in April and May 2004, respectively. The SAR antenna was delivered in September 2005. 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 and launch campaign in Baikonur, Kazakhstan, will be completed in time for a launch on a Soyuz rocket in March 2007. The initial phase of the commissioning of RADARSAT-2 is expected to be completed by June 2007.

Any additional costs to complete the construction and launch of RADARSAT-2 will be at the main contractor's expense. However, these additional delays will require that the CSA RADARSAT-2 project office remain operational beyond the time for which funding is available for this purpose, at an additional cost of $1.8 million. This will increase the current estimated total expenditure from $414.6 million to $416.4 million. This risk has been previously indentified and the necessary funding to cover the additional cost has been set aside in the CSA Five Year Risk Assessment and Source of Funds Plan.

Industrial Benefits

Significant industrial benefits in the space and earth observation sector are expected from this next-generation satellite system. The RADARSAT-2 program will generate employment growth in the Canadian knowledge-based economy, mostly from export sales, and spur the growth of small- and medium-sized businesses as the Canadian infrastructure and services industry continues to grow.

A major objective of this project is the transition of the Earth Observation industry from the public sector to the private sector. The intention is to build on the SAR data and value-added markets established with RADARSAT-1 to strengthen the Canadian industry's position as a supplier of SAR-related technology, systems and value-added products and services. Specifically, manufacturing potential and competitiveness will be encouraged in Canadian industry in the areas of phased array antenna design/manufacture, high performance receiver/transmitter design and manufacture, and enhanced structure design. Moreover, opportunities will be created for the export of ground station systems. The new capabilities also make new applications possible, creating new and expanded markets for data sales and value-added products.

As of October 31, 2003, the Canadian Space Program has funded $185.9 million worth of work to Canadian industry directly attributable to the RADARSAT-2 Major Crown Project (MCP). Direct industrial benefits from the construction of the RADARSAT-2 system will benefit all regions of Canada. The regional distribution of direct industrial benefits is shown in the following table.

Regional Distribution of RADARSAT-2 Contracts
(as of March 2005)

PROGRAM	British Columbia	Prairie Provinces	Ontario	Quebec	Atlantic	Total Canada
RADARSAT-2	52.1%	0.2%	5.2%	41.9%	0.6%	100%

Note: Due to rounding, decimals may not add up to totals shown.

Summary of Non-Recurring Expenditures ($ in millions)
(as of February 2006)

	Current Estimated Total Expenditure	Forecast to March 31, 2006	Planned Spending 2006-2007	Future Years
RADARSAT-2	421.6	389.2	31.7	0.7

10. Details on Transfer Payments Program

CASSIOPE Mission	
Start Date: November 1, 2003	**End Date:** Mars 1, 2009
Description Support the integration of two payloads, the CASCADE telecommunications Ka-band component and the enhanced Polar Outflow Probe (e-POP) scientific instrument, on a single generic Canadian small satellite bus.	
Strategic Outcomes **Environment and Sustainable Development:** A Space Program that helps Canada understand and protect the environment, and develop its resources in a sustainable manner. **Knowledge, Innovation and Economy:** A Space Program that generates knowledge and pushes innovation, while leading (where appropriate) to increased productivity and economic growth through commercialisation. **Sovereignty and Security:** A Space Program that supports recognition of Canada's sovereignty and the security of its communities.	
Expected Results (Program Activity Level) 1) Satellite Communications: Increased access for Canadians to state-of-the-art space communications systems and services to meet their social and economic needs. 2) Space Science and Explorations: Increased Canadian participation in international astronomy and space exploration opportunities in order to expand the scientific knowledge base made available to Canadian academia and R&D communities. **Expected Accomplishments** Development and demonstration of the CASCADE Ka-band telecommunications payload designed and built by Canadian companies. CASCADE is the precursor of communication satellite constellations that will help position Canadian industry on the international market as a supplier of advanced components and as a service provider. Development of a small Canadian scientific satellite, the enhanced Polar Outflow Probe (e-POP), which will probe the upper atmosphere and ionosphere region where solar variability influences global change in various time scales. Development of a generic Canadian small satellite bus that could also be used for future Canadian missions.	

($ in millions)	Forecast Spending 2005-2006	**Planned Spending 2006-2007**	Planned Spending 2007-2008	Planned Spending 2008-2009
Space Science and Exploration	3.2	**1.8**	1.0	0.8
Satellite Communications	14.5	**18.0**	8.0	2.5
Total Contributions	17.7	**19.8**	9.0	3.3
Total Program Activity	**17.7**	**19.8**	9.0	3.3
Planned Audits & Evaluations	An audit will begin on February 15, 2006			

Note: This table details contribution programs with funding in excess of $5 million per annum.

Contribution to European Space Agency (ESA)	
Start Date: January 1, 2000	**End Date:** December 31, 2009

Description

Enhance Canadian industry's technological base and provide access to European markets for value added products and services in the field of Earth Observation (EO) and Telecommunications, allow the participation of Canadian academia and make possible the demonstration of Canadian space technologies in European Science and Exploration missions.

Strategic Outcomes

Environment and Sustainable Development: A Space Program that helps Canada understand and protect the environment, and develop its resources in a sustainable manner.

Knowledge, Innovation and Economy: A Space Program that generates knowledge and pushes innovation, while leading (where appropriate) to increased productivity and economic growth through commercialisation.

Sovereignty and Security: A Space Program that supports recognition of Canada's sovereignty and the security of its communities.

Expected Results (Program Activity Level)

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

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

3) Space Science and Exploration: Increased Canadian participation in international astronomy and space exploration opportunities in order to expand the scientific knowledge base made available to Canadian academia and R&D communities.

Expected Accomplishments

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 EO programs: ENVISAT, EOEP/ EOPP, GMES Service Element, and GMES Space Component.

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 programs: ARTES 1, 3, 4, 5, 8, Artemis, and GalileoSat.

Growing utilisation of data obtained from ESA on markets and Earth Observation/ Telecommunications technologies as strategic information for government departments, agencies and industries in Canada.

Demonstration of space-qualified technologies and products developed by Canadian firms for the space exploration markets via our participation to Europe's space exploration program Aurora.

Development of new alliances and/or strengthening of established alliances between Canadian and European companies, to diversify Canada's international space partnerships and complement its long-standing relationship with the U.S.

($ in millions)	Forecast Spending 2005-2006	**Planned Spending 2006-2007**	Planned Spending 2007-2008	Planned Spending 2008-2009
Space Based Earth Observation	13.4	**12.4**	13.2	7.0
Space Science and Exploration	5.6	**2.6**	2.6	0.6
Satellite Communications	10.8	**8.3**	9.8	10.3
Generic space activities in support of EO, SSE & SC		**7.0**	7.1	6.8
Total Contributions	29.9	**30.3**	32.7	24.7
Total Program Activity	**29.9**	**30.3**	32.7	24.7
Planned Audits and Evaluations	An audit of the ESA program along with an action plan was completed in 2005. The departmental Audit & Evaluation sector will review the progress achieved against the action plan in January 2006.			

Note: Due to rounding, decimals may not add up to totals shown.
This table details contribution programs with funding in excess of $5 million per annum.