

## Recommendations for Growth and Innovation - Budget 2017:

As Canada contemplates how best to focus national investments to make Canada a nation of innovators, the space industry exemplifies the core characteristics of innovation: scientific achievement, global technology leadership, proven experience in national and international collaborative partnerships, high quality jobs and outstanding export performance.

Space and satellite based technologies are a fundamental pillar of Canada's political, economic and social infrastructure. There is hardly an element of daily life that does not in one way or another hinge on space and space related applications, particularly in a nation with the large and diverse geography of Canada. However, Canadian government investment in space lags behind that of other OECD nations, being currently less than half the OECD average.

AIAC and its member space companies have long maintained that this situation will not be reversed until Canada has a long term, balanced and affordable plan for Canada's presence in space. AIAC is working with CSA, ISED and other stakeholders to develop this plan. As Canada's spending in space has continued to deteriorate since 2013, there is an urgent need for targeted investment to bring Canada's space sector into alignment with other OECD nations. This will require an increase in the civil space budget to roughly \$750M per year by 2021. We applaud the government's action in Budget 2016 to provide up to \$379 million over eight years for Canada's participation in the International Space Station to 2024, as a first step. While this investment is welcome, we also strongly believe that it must be accompanied by immediate funding for crucial preparatory activities to ensure that Canadian industry is positioned to return Canada to its place at the forefront of global space innovation, science and exploration.

To this end, AIAC has identified the following key elements of a balanced plan to be implemented in the 2017-18 budget:

- 1. Increase Funding for Space Technology Development and Innovation** – An additional \$55M should be allocated over the next two years for research and development of innovative Canadian space technologies including satellite communications, space based radar, and optical systems and robotics through competitive, broad based programs such as CSA's Space Technologies Development Program (STDP); or participation in other ESA technology development programs. Investment in "preparatory activities" such as STDP would be \$45M; with an additional \$10M to spur the development of "downstream applications" that exploit space data as a growing component of the "big data" revolution.
- 2. Commitment to Developing New Canadian Space Missions and Operations** – Space missions are the heart of innovation and renewal for Canada's space industry. New innovative technologies developed for space can only be validated if they are actually launched into orbit as a space mission, therefore, new space missions are essential. The AIAC recommends that Canada immediately initiate a program for the definition, design, development and execution of new Canadian space missions. With a budget of \$27.5M over the next two years, initial mission development activities could be undertaken that will result in missions that address government priorities in the areas of communications and connectivity, monitoring climate change, weather, water management, security, cyber security, resource management, international collaboration, space science and exploration. These missions should be competitively selected and provide the flight opportunities to demonstrate Canadian space technologies that are the essential prerequisite for commercialization and international export. The scope of these missions would include stand-alone missions, Canadian-led contributions to larger international space missions, or the utilization of Canada's access to the International Space Station for research experiments or demonstration instruments.
- 3. Continued Support for Flagship Programs and Capabilities** – Canada is the world leader in space radar and robotics because of decades-long investments in the RADARSAT Earth Observation program and our partnership with NASA for space exploration programs. These unique capabilities brand Canada on the world stage as an advanced technology leader and an instrumental partner for global security cooperation and international space science and exploration missions.

Important decisions need to be made now about how to maintain and grow Canada's leadership in both of these strategically important areas. In order to support these decisions, \$17.5M in funding is required over the next two years.

- 4. Develop and Maintain a Balanced Approach for Space** – It is important to recognize that investment required to continue and extend marquee programs and industrial capabilities over the long term cannot be accommodated within the current budget of the Canadian Space Agency without displacing other critical activities and programs. A balanced approach that supports both legacy programs and a range of emerging innovative space initiatives in remote sensing, telecommunications, science and exploration is essential. Over the next decade Canadian space companies are confident that it will be possible to double Canada's share of global markets and the sector's economic contribution to the Canadian economy. The industry is working with ISED, CSA and other stakeholders to develop a realistic and affordable long term plan to achieve this goal. The 2016 budget commitment to ISS renewal is an important part of that long term plan. However, achieving this goal will also require a sustained increase to the CSA's budget over the long term. As a bridge to the future Space Plan, an investment of \$100M over the next two years is required.

#### *Opportunity to Reverse a Declining Balance Sheet: Fostering Our Capacity to Innovate*

Canada's space program has a long, proud heritage. From its inception in the early 1960s, Canada's space program and the industry that grew to meet its needs have consistently led the world in the development of key niche technologies. Canada's space sector is recognized for scientific and technological excellence, export performance and global innovation leadership. Space and particularly satellite-delivered services are now essential pillars of the economic infrastructure of Canada and the world. Our day-to-day existence is now so dependent on satellites that it is impossible to consider sustaining our social, economic and political existence without them.

The pace of technology development and the emergence of "big data" and the "internet of things" are already prompting massive growth in demand for satellite-based capacity. In 2013, the last year that comprehensive global data is available, Euroconsult reports that Canada's space sector is comprised of 226 organizations, with the private sector firms making up the largest segment and research institutions making up the rest. Annual revenues are \$5.37 Billion, including broadcasting that is enabled by satellite communications technologies. When broadcasting is excluded, the annual revenues of the space sector are \$3.7 Billion. This represents annual revenue growth of 3.7% per year for over the past five years – well ahead of the average growth in the national economy of only 1.8%.

The economic impact of the space sector is significant, both in relation to its contribution to Canada's GDP and its contribution of tax revenues. The space sector contributes upwards of \$2.9 Billion to Canada's GDP. As a source of tax revenues, the space sector contributes upwards of \$750 Million. Interestingly, the SME community makes a major contribution to direct GDP at 45%. Employment is one of the most positive contributions of Canada's space sector. Canada's space sector is growing six times faster than Canada's job market generally, and in 2013, the sector's contributed 24,354 jobs. For every job created in Canada's space sector, another 1.5 jobs are created indirectly through the supply chain and the broader economy. And, of most significance, 53% or the jobs created are for highly qualified STEM workers.

Over the past decade, Canada has seen its global competitive advantage in space eroded. Unfortunately, this reduction has coincided with increasing investments by other nations and the entry of disruptive innovative technologies financed from public and private sector investment. For instance, NASA's budget is set to increase by \$1.3 billion in the next year and the budget of the European Space Agency has grown by 18% in the past year. The French Government has also just announced a further €100M annual investment in satellite communications technologies.

Unfortunately, Canada's dearth of investment in space innovation comes at a time when there has never been more opportunity and a greater imperative to leverage the economic and social benefits of space. Without immediate renewed investment in the Space program, Canada is at risk of marginalising its space industry and is in danger of failing to seize

the significant opportunity for innovation, economic growth, wealth and job creation that will emerge from the new big data, digital driven economy.

Space based assets are already pivotal tools of Government's ability to safeguard the environment, connect all regions of the country, secure national borders, and contribute to international cooperation. Canada's space sector is uniquely positioned to provide the tools required to monitor and manage our environmental commitments, from monitoring CO<sub>2</sub> levels and damage to the ozone, to assessing the impact of efforts to reduce global emissions under COP 21 or more localized challenges in Canada's north or to Canada's water resources. Canada's heritage of supporting such capability in collaboration with international space agencies provides a platform for Canadian leadership in an area of global responsibility.

In areas of economic and national security, space-based assets have become essential infrastructure for a modern economy. Canada's challenge to monitor the coastal approaches to North America can only be effectively and efficiently achieved using space technology. Similarly, military satellite communications and surveillance are critical to securing Canada's Arctic and northern border. In addition to the direct benefits to Canadian society, Canada's technology leadership has led to substantial economic benefits when compared to the initial technology investment, largely derived from global exports from Canada. For example, satellite communications technologies have generated export revenues of 30 times the original investment.

#### *New Opportunities: Economic Growth from Space Innovation*

Canada must not only frame its investment in space to fulfill its policy objectives under the Canadian Space Agency's Space Policy Framework, but must also harness the immense potential for substantial innovation, economic growth and export competitiveness through market informed investments. Space has the potential to be an economic, technological and industrial powerhouse, which if well supported, can deliver significant and sustainable benefits for Canada well into the future. The collateral opportunities for growth are nothing short of remarkable if Canadian industry can secure a strong role in the development of innovative, disruptive technologies.

Our recommendations for Budget 2017-2018 are designed to be the start of a cohesive, scalable plan to re-establish Canada's space sector as a force multiplier for job creation, socio-economic benefit and GDP growth. We are recommending investment of \$100M over two years in the Canadian space sector. The goal of this funding is to reinforce existing broad based technology development programs and to deploy investment quickly to prevent imminent gaps in industrial capabilities as technology development drops below levels needed to sustain Canada's existing industrial research and development infrastructure.

A balanced portfolio of investment would ideally focus on facilitating access to affordable opportunities to secure space qualification, through domestic and cooperative initiatives with international partners; coupled with modest initiatives to validate and flight-test promising new technologies. These mission opportunities should also serve to foster long-term relationships between academia, government, industry and foreign collaborators. To be effective, government investment must be of a magnitude sufficient to kick-start the development of new and innovative technologies. The investments proposed will consolidate Canada's position in this expanding global market and provide opportunities to develop innovative funding mechanisms that will allow the government to invest in new business models where government uses its purchasing power as a means of encouraging the private financing and development of new space infrastructure that will then generate increased commercial activity in space.

Canada's leading space industry firms are looking forward to working with the government to define, confirm and execute Canada's next generation of space technologies and programs. We are convinced that timely investment in space innovation and technology development will have a positive multi-sector impact on Canada's prospects for industry led innovation, commercialization, national infrastructure for science, security, resource management, environmental responsibility and economic growth.