



Canadian Space Society

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SUBMISSION – BUDGET 2017
RECOMMENDATIONS INVOLVING THE
SPACE SECTOR

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On Behalf of The Canadian Space Society

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President
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SUBMISSION – BUDGET 2017 RECOMMENDATIONS INVOLVING THE SPACE SECTOR

EXECUTIVE SUMMARY

Canada has a unique position in the world – one that encompasses a free, democratic society that also includes the stewardship of vast natural resources. Since the 1960's, Canada has invested in space technologies that have helped Canadians and that have helped maintain Canada's position as a technological partner-of-choice for space exploration and utilization. Canada's increasing population and the impact of climate change are dramatically affecting Canada's potential for expanded growth and opportunities in the future.

Canada's ability to achieve and sustain a high quality of living for all Canadians is significantly enhanced through the investment in highly-paid careers, and the expansion of innovative policies and infrastructure. Currently, Canada can boast approximately 8000 aerospace professionals whose efforts generate about \$3 billion (BN) Cdn per year - the majority of which is via exports¹. Canada should make concerted efforts to achieve **specific** and **measurable** increases in both metrics. Canada should implement policies that:

- Increase the **space workforce** by **10%** per year;
- Increase **space-generated revenues** by 10% per year or achieves **\$5 BN Cdn per year after 5 years**;
- Works towards achieving **Whole of Government (WoG) investment targets** proportional to international allies/partners;
- Establishes **Space Centres of Excellence** across the country and including the Arctic; and
- Invest in **small satellite launching technology**.

Space as a Canadian Opportunity

Canada is at a crossroads as it approaches how to build upon its current space capabilities – something that has literally taken decades to develop and field. Ongoing successes by Canada's multi-purpose RADARSAT-2 and the development of RADARSAT Constellation Mission (RCM) beg the question: "where do we go from here?." From managing space debris, to managing space exploration expectations

¹ Aerospace Review, Volume 2, Part 2, www.aerospacereview.ca, 2012.

among the Moon, Mars and beyond, Canada is seeking more and more input from the private and academic sector, and international partners, as it wrestles to meet its rapidly changing priorities. Further, Canada must be vigilant to the opportunities that space can bring to the commercial sector: as of 2015, globally, **space is a \$200-300 BN (US) per year** industry with estimates of it reaching the trillion-dollar mark in the late 2020s². This is something Canada, as a growing and diversified economic centre, should not ignore.

Canada is currently the 2nd largest nation with borders on three oceans and a major market/superpower to its south. Besides the vast, and largely untapped, resources across this nation, climate change is beginning to 'open up' the northern latitudes and arctic sea routes. The Canadian population is approximately 36 million – an increase of at least 10% since 2006. The combination of large resources and increasing population is a key factor for economic growth, especially if investment is made to also increase the technical capacity of the population. Besides the possible exploitation of Canadian resources, Canada must increasingly become sensitive to the protection/stewardship of those resources, even from the perspective that such resources may soon become the object of competition (i.e., water) in the future. Canada must be prepared to rise up and meet the challenges of a resource-rich nation and thus reduce the risk of being vulnerable to outside forces. A strong space posture would provide additional benefit to Canada's security.

Increase Space Workforce

Even before it became the third nation with a satellite in space in 1962, Canada could rightly be proud of the high-level of homegrown technological expertise that was available to achieve such accomplishments. These and follow-on space experts became instrumental in the development of advanced satellite communication, remote-sensing, and robotic technologies. These professionals tend to represent a large number of highly-paid taxpayers who are also key to the generation of revenues from space exports. The building of this capacity begins in middle-to-high school environments, and is enhanced by the establishment of specific space programs at under-graduate and post-graduate levels. Increased coordination with industry will help to 'tailor/customize' the educated output and thus allow said industry to expand its options for building business within and outside of Canada. Strategic investments and planning, in conjunction with the various levels of government, can help to optimize those opportunities that would see greater involvement by indigenous Canadians, and those who are looking for greater employment options. Canada should leverage the Canadian space community to map out these connections and advise on their development.

Set Higher Space Revenue Target

Although related, an increase in the number of space professionals should also be matched by a targeted increase in space-generated revenues. The establishment of a

² Comprehensive Socio Economic Impact Assessment of the Canadian Space Sector, 27 March 2015, Euroconsult, pg 10.

10% per year targeted increase in such revenues should enable a WoG focus on its achievement, and thus facilitate synergistic policies among various government departments. Space-generated revenue, globally, is approximately \$200-300 BN US per year, and it is anticipated that this revenue base will only increase over the next 20 years. Canada should expect, plan, and execute to garner a significant percentage of this revenue source. It should be able to set an initial, and modest, target of \$5BN Cdn per year after 5 years for space-generated revenues. This target should also be reviewed at intervals with respect to global space revenues, and adjusted accordingly. The Canadian space community can and should be consulted to research, analyze and report on the state of global space revenues, and in particular how they relate to Canadian space capacity.

Establish Higher, But Proportional, WoG Space Investment

An important element of a coordinated WoG plan to achieve higher space revenues and an increased space workforce is an adequate initial and ongoing investment. This investment goes beyond the Canadian Space Agency's budget and should thus include many of the space 'stakeholder' departments such as defence, fisheries and oceans, natural resources, etc. Canada should leverage its current space community to properly characterize and identify the 'sources and sinks' of space revenues and expenses, and thus exploit this information to form realistic government funding targets. The central aim of this funding would be to assure sustainability and resilience of Canada's space capacity. Canada should look to other nations and their respective levels of space investment, from which reasonable targets can be established. Contemporary estimates place the return on investment (ROI) in space to be about \$7-14 US for every \$1 invested³. This means that to achieve a \$5BN Cdn space revenue target, the WoG should look to invest around **\$360 - \$710 MN Cdn annually** – a not unrealistic figure.

Establish Space Centres of Excellence Across Canada

Canada's geographic location and size, which permits viewing and access to large tracts of space, naturally positions it to be a wide-spectrum user/developer of space capabilities, including satellite communications, satellite navigation, remote sensing, astronomy, robotics - to name a few. Systematic development in these important space sciences has been largely ad-hoc and sporadic over many decades. Canada should look to develop specific space centres of excellence in each province and northern territories. These centres can then serve as innovative space education, research and incubator focal points to which the various levels of government can invest and thus develop the human capacities required.

Invest in Small Satellite Launch Capability

Currently, Canada does not have the capability to independently launch space systems, despite the fact that various studies and recommendations from those studies have outlined the technical and business cases for its development. At the very least, Canada

³ <http://www.21stcentech.com/money-spent-nasa-waste/>

needs to be able to field space systems that respond to the geographic and demographic needs of Canadian society. Further, Canada has an abundance of possible launch sites that would provide a great deal of flexibility for orbit insertion as well as many options to best protect the environment from such operations.

Contemporary Canadian industry is dis-incentivized to expand spacecraft design, development and production due to the risk in not being able to field (launch) the capability in a timely manner for its current and potential customers. Such systems can be initially employed to service Canadian needs with the ability to expand services to other partners and customers. According to a recent Euroconsult study, the **smallsat market** could be worth over **\$22 BN US** over the next ten years⁴. Due to the length of time to develop launch facilities and operations, Canada should look to invest now so that opportunities for Canadians are not missed. Increased access to indigenous launch will also **stimulate academic space** activity as opportunities to field and test new innovative systems to all Earth orbits and beyond will expand R&D options. As a resource-rich, growing national power, Canada would benefit from adding a space launch capability to its spectrum of space capabilities.

Conclusion

As a growing, resource-rich nation, Canada has almost limitless potential. This unique global position means that Canada also has a greater responsibility to invest and participate in those activities that once were only the purview of superpowers and command economies. Space is clearly one of those opportunities that could bring greater prosperity to Canadians. To do this, Canada needs to actively plan for and invest in the expansion of the space workforce, increase investment for industry while setting achievable ROI targets over the next 5 to 10 years. Canada's space technology breadth would be significantly expanded through the conscious introduction of space centres of expertise across Canada. And finally, Canada needs to invest in the full spectrum of space capabilities by fostering a smallsat launch capability. Significant movement in the above-mentioned areas would encourage a renaissance for Canadians and a new source of pride and hope for the future.

Thank you for your time and consideration.

Submitted on Behalf of the Board of Directors for the **Canadian Space Society (CSS)**.

About the Canadian Space Society

The CSS is a national charitable/non-profit organization made up of professionals and enthusiasts across Canada. The CSS works to promote the involvement of Canadians in the development of space through various technical and outreach projects.

⁴ "Euroconsult Study Says SmallSat Market Could be Worth \$22 Billion Over Next 10 Years". www.satellitetoday.com. July 7, 2016. Caleb Henry.