

Opportunity is Knocking

Creating a Fertile Environment for the
Growth of a New Industry in Canada.

New Space

SPACE 1 SYSTEMS INC.

Submission to the AeroSpace Review
June 2012





Introduction – Opportunity is Knocking

Space 1 Systems Inc. (S1S) is a small startup New Space company located in Barrie, Ontario. We have the benefit of being a second generation New Space company (All of its principals were key members of an X-Prize team www.xprize.org) and as such have a unique perspective on a new opportunity of unprecedented scale, New Space.

As such, we respectfully submit the following proposals for opening the door to the Opportunity that is New Space, and make Canada the fertile ground for this new Industry to take root and flourish.

Recognize New Space as a Priority

The New Space model is defined as;

A model, where commercial space companies, acting upon analysis of existing or prospective free markets, design, develop and operate space related products, including spacecraft, launch means and ground-based infrastructure, and use these products to create space-related services and sell them to a variety of private and public sector companies, including the government.

We recommend that the government of Canada (the government) make it a policy to explicitly recognize New Space as an industry with significant benefits to Canada and a national priority for development and growth within all departments of the government.

The New Space model is the current priority for NASA and the American government.

The American New Space Industry Association, the Commercial Spaceflight Federation (CSF) (www.commercialspaceflight.org) has over forty members, including MacDonald, Dettwiler and Associates Ltd. (MDA a Canadian Aerospace company) and deliver products and services ranging from design and manufacture of components and equipment to sub-orbital flights to the delivery of cargo to the International Space Station (ISS). NASA is working closely with CSF members and demonstrating the New Space model to be a successful method of purchasing services from private companies instead of developing the systems in house via a traditional “cost plus” procurement model as was historically done.

The success was the NASA Commercial Orbital Transportation Services (COTS) program that was just recently met by SpaceX for delivering cargo to the International Space Station (ISS). A new program, Commercial Crew Development (CCDev), was created based on the COTS. CCDev is a program to purchase seats for crew delivery from private companies.

The Americans governments push towards purchasing services from private companies has many benefits. It is capitalistic by nature and therefore creates an environment that is competitive and creative. The jobs that are created, by the nature of being in the Space half of AeroSpace, are protected from export. These “service for sale” companies drive export, paradoxically, by importing their customers.

Canada can and should vigorously pursue this path to create these same job opportunities in Canada.

Review and Update of Regulatory and Legal Environments

By reviewing and updating the programs listed below, the government can prepare the fertile environment small to midsized startups require to stand on an even ground with companies in America. As such the government should facilitate a more efficient and streamlined process to allow small and midsized companies in Canada, to be competitive with companies in other countries also vying to create and attract lucrative New Space companies.

- **Controlled Goods program**, with the aim of easing pressure on companies new to the business. (Note that CGP is much stricter (in Canada) than ITAR is (inside the US), for non-exporters).
- **Export controls:** should be updated to allow New Space companies access to foreign markets where available.
- **Transport Canada:** create a regulatory mechanism for certifying experimental manned launch vehicles as commercial vehicles --- currently these can be launched as experimental vehicles, but not as commercial, which precludes selling flight opportunities and making revenues. Also, current approach is on a case-by-case basis, which, granted, is being reviewed in a reasonable manner, but provides no predictability.
- **DND cooperation:** Create a policy that allows Canadian New Space companies to access DND facilities (runways, equipment, personnel, etc.). Specifically for companies aiming for manned suborbital launches, but could extend to orbital launch endeavors as well. This access should not be at zero cost, but, should be AT COST and NOT become a profit centre for DND.
- **Legal:** under tort law, the lack of informed-consent law is an impediment to manned flight, as any current waivers don't really waive liability.
 - Informed consent must become part of tort law reform. Change laws and regulations to limit liability, so that insurance becomes affordable.
 - Government can become a global leader in creating a framework that allows clear, transferrable title to extraterrestrial mining claims and resources.
- **Communications:** need to make it possible for such launch vehicle developers to gain predictable access to communications spectrum for flight-testing operations, and eventually for commercial flight operations. The high altitude of such flights might raise the need to coordinate frequencies with the FCC; it would be very useful to find a way to pre-allocate spectrum on an on-going basis for such operations. At the moment, the Space bands are for satellites, and the Aviation bands are for aircraft. What bands should be used for suborbital rocketry or MicroSatellites? Small to mid-sized companies can ill afford the staggering amount of red tape required to acquire the necessary licensing on a case by case basis.
- **Technical:** The government will change its policy to support the development of propulsion technologies, equipment, systems and launch vehicles, contrary to a *de facto* Canadian government policy, that has been entrenched since the 1960s, that Canada will *not* support rocket propulsion development of any kind, or indeed any sort of spacecraft propulsion at all.
- **Tax Code:** Transferrable Tax Credits should be implemented in special circumstances to allow accumulated tax credits to be sold as a means of raising capital. This was done by the State of Oklahoma to allow Rocketplane (an American X-prize entrant) access to 18 million dollars of capital.

The government needs to create a flexible, responsible method of financing startup companies in New Space.

This financing method needs to address several key concerns of both government and New Space companies.

- Fiscal Neutrality
- Access to large sums for long durations of time during R&D phase of startup.
- Minimize risk of monetary losses by Canadian Taxpayers

A good model for this can be created by looking at the COTS financing model created by NASA during their attempt to privatize the ISS cargo resupply.

NASA solicited submissions from private American companies for concepts and cost estimates to provide a specific set of required services. NASA performed a set of audits, including technical and financial, and awarded Space Act Agreements with a set of payments based upon audited, completed milestones.

We propose that a New Space Entrepreneurial Research & Development Seed Fund be created with the express purpose of providing low interest, long term loans of substantial amounts to qualifying companies. This fund would take submissions from qualifying small to midsized private Canadian New Space companies and scrutinize the application based on several key components;

- Business Plan
 - o The Company would submit a business plan that would outline the project and its viability to compete in an open market. (not an artificial market with the government as the only customer). The government would evaluate the business plan and grade its potential for success using their own available experts.
- Technical Assessment
 - o The Company would submit a technical outline of the project including a timeline of the milestones and payments required at the completion of those milestones. The government's experts would analyze not only the merits of the technical milestones and the ability of the company to achieve those milestones, but, the reality of meeting the milestones in conjunction with the size of the financial draws in relation to successfully completing the project.
- Milestone Audits
 - o The company would submit milestone completion reports and submit to audits as required by the government to allow payout of the funds, in a timely manner, for the milestone(s).

The fund would meet the goals of;

Fiscal neutrality is achieved by ONLY providing low interest loans. This "risk capital" is repayable to the Canadian Taxpayer and provides them with a vibrant, non-exportable, new industry in Canada that exports business by importing customers.

Provide access to large sums of "risk capital" not available through any other method of capitalization currently available. These sums are required for long durations of Research and Development that make them unavailable to small to midsized startups.

Minimizing the risk of failure by these New Space startups is achieved via the business plan and technical audits. Once a project is greenlit, the company's performance is monitored via its compliance with its milestone completion timeline. The government can terminate its contract with the company if the company fails to complete any of its milestones within a reasonable period of its predicted point on the technical timeline.

By creating this fund as a repayable loan, it does not interfere with the company applying for other applicable programs including grants and tax credits.

Conclusion

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We believe that the government would be unwise to pursue any policy / program changes that do not shift government Space related procurement towards a model of contracting for goods/services instead of creating the systems themselves. The traditional model of "Cost Plus" contracting is an outdated model that will not be fiscally neutral and will not allow for the creation of the vibrant New Space companies that will provide a high tech industrial base that Canada requires.

The government does not need to create an indigenous launch capability. IF the market for such a launch system is real AND a company can show a business case in the free market for this launch capability, then the government should provide the required tools to companies will require to build and provide those launch services for itself, other companies and even government(s) and compete against other companies pursuing the same market opportunities.

The government must act now to support new companies looking to participate in New Space not in 20 or 30 years. This window of opportunity is present at this time only. If Canada does not act now to cultivate this industry in its infancy, other countries will. The United States has several states competing against each other to bring a limited number of these small New Space companies to their states, knowing the long term advantages that a non-exportable high-tech work force will bring.

An example of this was the fierce competition between states, such as Florida, California and New Mexico for the Sub-Orbital spaceport that Virgin Galactic would fly from. New Mexico won the right to build Spaceport America and even attained a local population to volunteer for a tax to fund the Spaceport that would bring New Space to their state.

Canada can be a world leader in New Space if it takes decisive action now to secure the small to mid-sized companies and by assisting them while in their infancy. If the government waits, the industry will move on to other countries listening more intently for opportunities' knock .

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