The Need For Canadian Sovereign Space Launch

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Summary: Canada has long lacked a sovereign space launch capability, which has slowed the growth of its space sector, left it reliant on partners for critical space infrastructure, and has left the nation's economic interests vulnerable to foreign actors. Canada must stand as an equal among its peer nations in the G7 and develop its own space launch capability. This policy whitepaper lays out the defence and economic benefits of building a sovereign space launch capability and proposes concrete actions that the Government of Canada, provincial governments, and other participants of the Canadian space sector can take today to promote and realize this capability.

The Canadian Space Sector's Past & Present

Canada was an early participant in the space age and in rocketry. In 1956, prior to the launch of Sputnik, the Canadian Armament Research and Development Establishment (CARDE) began a project to develop solid propellant rockets. The resulting project with Canadair, based in Quebec, and Bristol Aerospace, based in Manitoba, led to the first flight of the Black Brant rocket, variants of which are still in use today [Shepherd and Kruchio, 2008]. Canada continued its early achievements in space by becoming the third nation to manufacture and operate its own satellite. One of the major contributors to these early achievements, John H. Chapman, envisioned a wide-ranging Canadian space program, which would include the capability to manufacture and operate spacecraft, as well as launch those spacecraft using small launch vehicles [Chapman et al., 1967]. As was stated in a 1967 report authored by Chapman and others:

"The field of space activities should, in Canada, include all activities directly associated with rockets and other launch vehicles, with spacecraft, and with those ground-based activities which relate directly to upper-atmosphere and space phenomena [Chapman et al., 1967, p. 109]."

Unlike other recommendations in the report which led to the creation of the Canadian Space Agency, the recommendations related to the development of space launch vehicles were never adopted.

There was an attempt to restart Canada's space launch industry in the 1990's. Akjuit Aerospace tried to start a sounding rocket business launching from Churchill, Manitoba. The company ultimately folded after its only launch in 1998 [Braga, 2014]. The Canadian space sector is still without a space launch capability today. This leaves a gap in the middle of the Canadian space sector's value chain which forces

all Canadian spacecraft operators to go abroad for space launch and permanently slows and devalues the space economy within Canada's borders.

The problem is understood by formulating Canada's space industry in terms of the industry value chain[1] as depicted in Figure 1. On the left side of the chain are upstream providers, including spacecraft manufacturers, subsystem and component manufacturers, and various service providers dedicated to supporting the development of spacecraft. Canada already has a rich environment of such upstream providers. MDA Space and the University of Toronto Institute for Aerospace Studies Space Flight Laboratory both manufacture whole spacecraft, spacecraft buses and spacecraft payloads. Honeywell, ABB, and Sinclair Interplanetary[2] all provide the necessary components and payloads for these spacecraft.

[1] The industry value chain is a way of representing an industry that follows the creation of value from the raw materials stage to the finished products stage. Value flows in the direction of the arrows on the value chain and monetary payments flow in the opposite direction.

[2] Sinclair Interplanetary was acquired by Rocket Lab, a foreign launch provider, in 2020 [Rocket Lab USA, 2020].

On the right side of the value chain are the downstream providers. They focus on activities like spacecraft operations, processing spacecraft data, or services to add value for end customers. Spacecraft operators include Telesat, Kepler Communications, GHGSat and Wyvern, among others. The data or communications infrastructure provided by these operators is further refined by Value-Added Resellers. These are firms like Intelsat, who create terminals which take advantage of Telesat's large geostationary satellites, Skywatch, which processes and resells Earth observation data, or EarthDaily Analytics, which provides analytics and analysis services for Earth observation data. There already exists the infrastructure in Canada to develop, manufacture, and provide value to customers from the operation of Canada's own in-space resources.

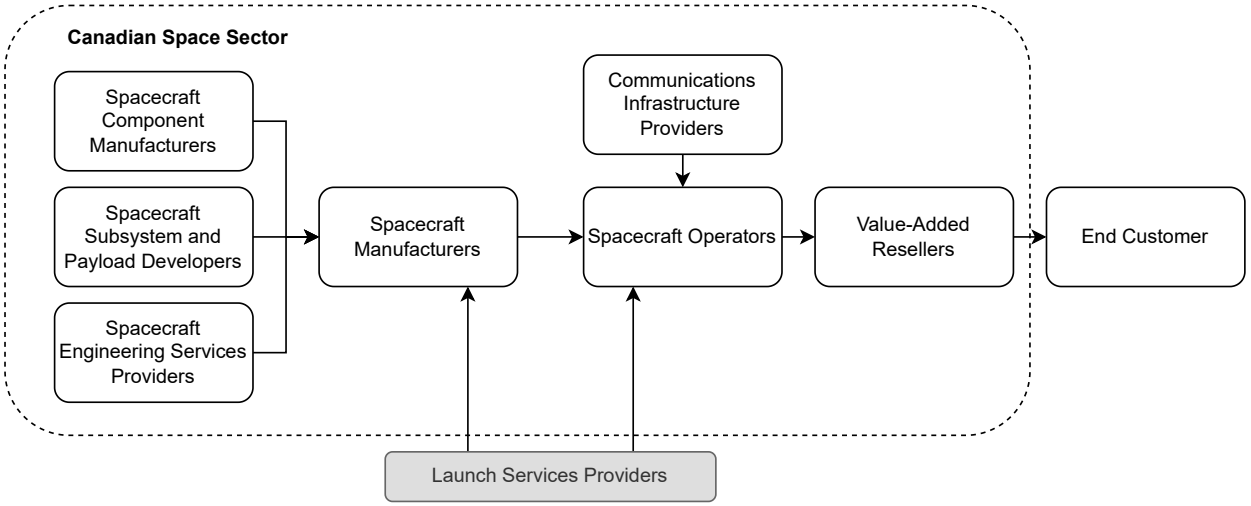

Figure 1: An illustration of the Canadian space sector value chain.

Lacking in Canada's space sector value chain is any sort of launch capability. Every Canadian payload that has reached orbit has launched on a foreign rocket from foreign soil. This is

significant, especially given that launch is an essential piece of the value chain: *without launch, there could be no space industry*. Given that deriving value from space is only possible with launch, it follows that Canada's space sector is wholly reliant on foreign services for its continued existence and growth. This is different from countries like the United States, France, or China, which engage with foreign partners to enhance the output of their space sectors, but are not reliant on foreign partners for the end-to-end functioning of their space sectors. This state of affairs critically undermines the Canadian Government's support for its space sector and any continued civil or defence space programs that it may wish to execute.

This policy whitepaper will explore the benefits of developing and maintaining a sovereign space launch capability with four overarching arguments:

1. A sovereign space launch capability strengthens and enhances national security;

2. A sovereign space launch capability is, on its own, beneficial to the Canadian economy in terms of the direct, indirect and induced effects which it provides;

3. A sovereign space launch economy protects Canada from foreign monopolies and protectionism which may hurt the Canadian economy and weaken its security; and

4. A sovereign space launch capability enhances the whole national space economy by making it self-reliant, allowing for lower risks and costs and increased resiliency in national space sector supply chains.

This policy whitepaper will also provide recommendations to be acted on, both by the Canadian Government and by Canadian space sector participants, to enable the creation of such a capability.

The Defence Necessity of Sovereign Space Launch

RADARSAT-2 was ready for launch on a Boeing Delta II rocket in 2003. However, American intelligence agencies objected to the launch, arguing that the imaging resolution provided by RADARSAT-2 could threaten national security[3]. The launch was delayed four years and Canada resorted to launching with a Russian Soyuz rocket [European Space Agency, 2012], an outcome that would be unthinkable and impossible today. Besides delaying a program which was beneficial for Canada's economy and national security by almost half a decade, the delay also cost the government $191 million CAD [Boucher, 2011].

[3] These concerns likely arose during the interagency consultation process of the payload review under 14 Code of Federal Regulations §415.57. This review is still a part of launch licensing for all payloads launched from the United States [Federal Aviation Administration].

Modern military operations and defence are now heavily reliant on space assets. Earth observation satellites monitor national borders and battlefields alike[4], communications satellites allow for the near-instantaneous transmission of orders across the globe and allow for the remote control of unmanned assets, and signals intelligence satellites monitor the communications activity of adversaries. The Royal Canadian Air Force's 3 Canadian Space Division manages these kinds of space-based activities for Canada, but without launch, it cannot establish new capabilities or improve current capabilities without relying on other nations.

[4] RADARSAT-2 was one such satellite, using radio-waves to gather geospatial intelligence regardless of cloud cover or time of day.

The United States, with its long history of space launch, has articulated the most extensive vision around National Security Space Launch (NSSL)[5]. Foreign nations are now beginning to recognize the need for space launch as a defence imperative. Most importantly, the Council of the European Union (EU) has recognized that access to space is key to their defence and security needs, as outlined in the *Council Conclusions on the EU Space Strategy for Security and Defence* [Council of the European Union, 2023]. EU member nations and others have also independently recognized this need and stated it in their own national policies.

[5] This program was referred to as the Evolved Expendable Launch Vehicle (EELV) program from 1994 to 2019.

Germany has specifically recognized the need for a sovereign space launch capability to serve its national security needs in its 2023 Space Strategy. They have established that Germany requires "its own, independent access to space, along with independent, reliable access to strategically relevant space-sector capabilities and space-based infrastructures." This likely refers to the ability to launch to space, and is supported by Dr. Robert Habeck, Federal Minister for Economic Affairs and Climate Action, who writes in the foreword to the Strategy that "in the key areas tied to our sovereignty, we in Germany and Europe need to have our own capabilities, such as capabilities for launching satellites." Germany believes that this access is necessary to maintain effective and independent space capabilities and infrastructure for communications, navigation, and Earth observation. The Strategy also elaborates on the German Federal Government's participation and continued efforts to support German small-launch companies, especially through the European Launcher Competition [Federal

Ministry for Economic Affairs and Climate Action, 2023].

France finds itself in a slightly different position. As the third nation to successfully develop a space launch vehicle, and as the nation home to the space launch company ArianeSpace, one of the world's premier space launch providers, France is already a leader in space launch. While the French Armed Forces Ministry understandably reiterates its support for the Ariane 6 launch vehicle in its 2019 Space Defence Strategy, they leave the door open for new launch methods as well, especially small launchers which the Ministry believes will open the door for a "quick-launch" capacity. Critically, France views the ability to place assets in orbit as a critical pillar of their own strategic autonomy [French Armed Forces Ministry, 2019].

The United Kingdom has also recognized the importance of sovereign space launch for national security. In its 2022 Defence Space Strategy the United Kingdom's Ministry of Defence (UKMoD) recognises launch as a necessary priority to maintaining an integrated defence space capability. The priority however, is to maintain assured access to commercially developed launch capabilities, without developing those capabilities specifically for the UKMoD. This is an important recognition by the UKMoD of space launch as a dual-use capability, as they go on to state that they will support the United Kingdom's Space Agency[6] in their development of commercial space launch capabilities [United Kingdom Ministry of Defence, 2022].

Beyond Europe, Australia has identified space launch as critical to their national defence as well. This presents a useful comparison with Canada as the nations are near-peers, with similar population, gross domestic product, and military capability. The Australian Defence Forces (ADF) Defence Space Command was established in 2022 with the goals of enhancing Australia's sovereign capabilities so that it "can be self-reliant in the detection of threats and collection of information for the defence of our nation" and to "to assure Australia's access to space" [Australian Government Defence, 2022]. The Australian Department of Defence's 2022 *Space Power E-Manual* specifically identifies launch[7] as a mission area in which the ADF will conduct space operations, stating specifically that "in a defence context [space launch] also encompasses the efforts to achieve sovereignty and assured access to launch services, as well as the regulatory and safety investigation frameworks required to authorise space launches" [Defence Space Command, 2022].

Gampala and Nguyen, writing for the journal Contemporary Issues in Air & Space Power in 2024, state that sovereign space launch is now critical to Australia's space defence capability as the cost to develop such capabilities has been significantly reduced and the ability for hostile nations to target and disable space assets has proliferated. The ability of foes to easily disable space assets is a particular strong driver for the need for sovereign launch. Gampala and Nguyen further identify the synergies between defence and

[6] The United Kingdom's Space Agency states in their 2022-2025 Corporate plan that they have the goal of delivering a sustainable commercial UK launch market by 2022 [United Kingdom Space Agency, 2022]. The United Kingdom's 2023 National Space Strategy also aims to capture the European market in commercial small launch as the very first point on its ten-point plan [Government of the United Kingdom, 2023].

[7] The manual uses the term "Space Lift" to refer to space launch capabilities.

sovereign launch, including the support and development of long-range strategic and tactical missiles, solid rocket motors for short-range ordnance, and the development of a highly-skilled and defence-focused workforce [Gampala and Nguyen, 2024].

Overall, nations who support space launch recognize that national security space launch is a critical enabler. Space launch may enable the following direct and indirect benefits:

1. Ensuring timely and reliable access to space for national security payloads;
2. Ensuring responsive launch to rapidly replace damaged or destroyed space assets in wartime, without the need to rely on allies who may have other priorities[8];
3. Enabling the related capability to disable or destroy hostile space assets;
4. Enabling related capabilities in developing and manufacturing advanced long-range munitions, such as ballistic or hypersonic missiles; and
5. Creating and maintaining a workforce of Highly Qualified Personnel with the necessary skills for launch, missiles, and other related capabilities.

[8] Creating a responsive space launch capability has the additional benefit of increasing the resiliency and cost-effectiveness of large communications constellations, allowing them to maintain resiliency and service levels without excess spending.

Canada's most recent defence budget priorities and defence strategy include items that would be significantly assisted by the development of a sovereign space launch capability. Budget 2024 includes key defence items, including space-based surveillance capabilities to further protect the North [Government of Canada, 2024]. As well, Canada's latest defence strategy, *Our North, Strong and Free: A Renewed Vision for Canada's Defence*, lists several critical items which would be supported or enhanced by a sovereign launch capability including enhancing Canada's defence industrial base, contributing to North American missile defence[9], acquiring long-range missile capability[10], and acquiring a comprehensive worldwide satellite communication capability. Furthermore, a sovereign launch capability would align with the priority areas identified for further investment by Canada, including hypersonic and advanced cruise missile defence, and novel and robust space systems in low Earth orbit [National Defence Canada, 2024].

[9] With the proliferation of advanced hypersonic weapons, explicitly mentioned in *Our North, Strong and Free: A Renewed Vision for Canada's Defence*, the development of launch and rocket propulsion technologies which can intercept such weapons becomes even more critical.

[10] An industrial value chain that includes launch capabilities can facilitate the development of national long-range missile technology.

The North Atlantic Treaty Organization (NATO) is also increasingly rife with tension, especially relating to the 2% GDP defence spending guideline. These tensions, and Canada's inadequate defence spending, make it more difficult for Canada to rely on its allies [Brewster, 2024]. While a launch capability would certainly make Canada more self-reliant in terms of its own security, it could also be used to bring Canada closer to its allies, especially the United States. Launch sites in the United States have increasingly limited capacity for launch. Today, Cape Canaveral in Florida and Vandenberg in California account for almost all space

launches in the United States and the world. They are also increasingly congested and further subject to risks from natural disasters[11] [Maidenberg and Fernandez, 2025]. Furthermore, Canada's Department of National Defence has recognized the need for launch sites to support its allies and reduce its reliance on foreign launch [Pugliese, 2025]. Specifically recognizing the utility of the Maritime Launch Services launch site, the Department of National Defence writes:

[11] Cape Canaveral is often put at risk by hurricanes and Vandenberg is at an increasing risk from wildfires.

"It would also contribute to the broader defence and security goals across North America, and would further raise Canada's standing in the eyes of allies, in particular the [United States], who has been critical of Canada's insufficient investments in defence ... Canada adding a launch capability on the east coast of North America will allow access to a range of key orbits of interest to the [United States] and would add to Canada's relevance and credibility in the international space community by also offering additional launch options to other allies and partners [Pugliese, 2025]."

This is further supported by the United States Space Force's own assessment, which wrote in a November 2023 memorandum to the National Space Council that a Canadian spaceport could support American security objectives by increasing space access agility, capacity, and resilience.

Maintaining space assets is critical to the defence of any nation. Further, it is reasonable to assume that the unwritten conclusion of the defence policies of the United Kingdom, Germany and other nations aspiring for space launch is that *if a nation is unable to launch their own satellites, then another nation is making national security decisions for them.* This has already happened once to Canada and a sovereign space launch capability would prevent it from happening again.

The Economic Benefits of Supporting Space Launch

Space launch is a critical part of a national space economy and has the ability to confer significant economic growth for a nation. This comes not only in the form of revenues from launch being near-shored, but in additional revenues generated indirectly from the acceleration of other national programs, and from services rendered to foreign customers.

The plain fact is that every launch that needs to use foreign assets and capabilities to reach space represents revenues not generated within Canada. For government projects this means tax-payer dollars spent outside of Canada.

Canadian-owned spacecraft are comprised almost entirely of small satellites. Between 2019 and 2024, 50 fully Canadian-owned spacecraft were launched, massing as much as 1450 kg and as little as 2 kg or less. The 1450 kg satellites are primarily the three RADARSAT Constellation Mission spacecraft launched in 2019. Excluding these three spacecraft, the average mass of most Canadian-owned spacecraft is approximately 14 kg. Kepler Communications and GHGSat are the most prolific Canadian spacecraft owners and operators.

Every one of these spacecraft needed to launch outside of Canada. This is best understood as a foreign import, as a Canadian company would be paying for a foreign service. Table 1 summarizes the estimated lost value of all launch campaigns over the past 6 years.

	2019	2020	2021	2022	2023	2024
Est. Mass Launched	4350 kg	174 kg	165 kg	109 kg	164 kg	6 kg
Spacecraft Launched	3	6	11	9	18	3
Est. Launch Revenue Lost	$67.0 M	$20.5 M	$3.6 M	$2.4 M	$5.3 M	$0.54 M
Est. % Canadian Public Funds	100%	38%	0%	15%	35%	100%

Table 1: All values are estimated using the best available public data [McDowell, 2025]. Payloads hosted on larger satellites, such as Northstar's SSA payloads which were hosted on Spire's Lemur-2 satellite, are excluded for simplicity. Launch cost is roughly based on the mass of the spacecraft launched. All dollar values are in 2025 USD.

The estimated value lost in the past six years totals over $100 million USD. Of this, over $80 million USD may have been Canadian taxpayer dollars. These figures are skewed by the launch of the RADARSAT Constellation Mission in 2019. Not accounting for this mission, approximately $36 million USD was spent abroad with approximately $11 million USD possibly being taxpayer funds. While these numbers are small, they are reflective of two trends: first, the falling cost of launch[12] and second, the diminishing number of Canadian payloads launched[13].

Table 1 only shows past expenditures. In the future, there are likely to be further and more extensive losses as space becomes more critical in modern economies. A single example of how this will hurt Canada in the future and send tax dollars overseas is the launch of the Telesat Lightspeed constellation. In September of 2023 Telesat announced an agreement with SpaceX for 14 launches

[12] Almost every spacecraft in the studied period was launched on a Falcon 9 rocket.

[13] 47 Canadian spacecraft were launched between 2019 and 2023, compared to 8815 for the rest of the world, only 0.5%.

[Telesat Corporation, 2023], worth an estimated $977 million USD or $1.41 billion CAD. It bears mentioning that Canada recently loaned Telesat $2.54 billion CAD to develop its Lightspeed constellation [Telesat Corporation, 2024b], meaning a good portion of the money that Telesat will be spending abroad to launch its satellites is Canadian taxpayer dollars.

Near-shoring launch in Canada would both preserve these revenues in Canada, as well as positively impact the Canadian economy. NASA has estimated that, as of 2021, commercial launch providers based in and around the Kennedy Space Center have provided a total of 9,134 jobs, with an average labor income per employee of $85,760 USD and an average output per employee of $285,275 USD [Slotkin et al., 2022].

These high incomes and economic outputs are further reinforced by economic data across the United States. Average labor income across the United States in 2016 for industries identified as part of the Commercial Space Industry was $102,000 USD, 73% higher than the national average labor income of $58,800 USD. Furthermore, data showed that the average income in the Guided Missile and Space Vehicle Manufacturing NAICS[14] category was $167,854 USD per year, potentially putting space launch jobs as one of the highest remunerated professions, even within the space sector. Finally, that same NAICS category saw a 3.05 industry multiplier, meaning that a dollar growth in this industry would result in more than 3 times more output from the economy as a whole[15] [Kelly, 2019].

[14] North American Industry Classification System.

While these estimates show the potential for economic returns created by a space launch industry, these are results from a nation with a developed and established space launch capability. How would this affect nations with new or developing space launch capabilities?

[15] In Comparison, the Canadian Space Agency has estimated that Canada's current space sector economy (without a sovereign space launch capability) provides a 1.93 GDP multiplier and a 2.00 workforce multiplier [Canadian Space Agency, 2023].

With a relatively small population and international footprint, New Zealand managed to successfully develop its own sovereign space launch capability, provided through the company Rocket Lab. As of 2023, Rocket Lab employs approximately 1,650 people, has almost $250 million USD in annual revenues and has launched more than 170 spacecraft across 38 launches [Rocket Lab USA, Inc., 2024]. As of the end of 2024, the company's market cap sits at over $12 billion USD.

Rocket Lab's economic effects have been profound. The creation of New Zealand's own space agency was due, in part, to the company's presence in the country. Furthermore, the company has catalysed New Zealand's space sector, with $1.75 billion NZD in revenues reported in 2019 [Meade et al., 2019]. As of 2021, Rocket Lab also supports a supply chain of over 300 companies in New Zealand [Rocket Lab USA Inc., 2021]. Rocket Lab was able to receive most of its revenues not from New Zealand, but from other nations, especially the United States. 124 of the 146 paid payloads launched between 2020 and 2024 were from American customers. Only 2 payloads were from New Zealand. The ability to launch

made it possible for New Zealand to reap the benefits of the United States' insatiable need for launch, as shown in Table 2.

	2020	2021	2022	2023	2024	*Total*
United States	47	10	35	19	13	*124*
New Zealand	1	-	1	-	-	*2*
Others	7	5	7	2	20	*41*

Table 2: National ownership of payloads launched by Rocket Lab [McDowell, 2025].

The positive economic impacts to New Zealand were predicted as far back as 2016. In a 2016 report prepared for the government of New Zealand, the Sapere Research Group predicted that at a launch rate of two vehicles per week, the direct benefits to New Zealand would be between $200 and $700 million NZD over 20 years[16], which is approximately $94 to $244 million USD per year[17]. Rocket Lab today launches far less than twice a week and may have already achieved or exceeded the predicted direct benefits from their activities. Furthermore, indirect, induced and catalyst benefits were estimated to be between $155 to $540 million NZD over 20 years[18] which is approximately equivalent to between $54 and $189 million USD per year[19], a conservative value which is already far exceeded by the New Zealand space sector revenues in 2019 [David Moore and Davies-Colley, 2016].

[16] figure in 2016 NZD and discounted at 8%.

[17] value extrapolated from 8% discount rate and converted to 2024 USD.

[18] figure in 2016 NZD and discounted at 8%.

[19] value extrapolated from 8% discount rate and converted to 2024 USD.

Similar input-output analyses have also been used to evaluate Canadian projects. The Conference Board of Canada estimated that the construction and eventual launch ramp-up at the Maritime Launch Services launch site will allow for $201 million to $214 million USD[20] in total benefits to the Canadian economy annually by 2027, of which $38 million to $45 million USD[21] are due to indirect and induced effects. The Conference Board of Canada's analysis focuses only on the launch site and employs more conservative assumptions than the Sapere Research Group. Even in this limited case, launch from Canada is still a net economic benefit, adding hundreds of millions in revenue and over a thousand additional jobs [Hermus et al., 2023].

[20] Expressed in 2024 USD, $284 million and $303 million in 2023 CAD.

[21] Expressed in 2024 USD, $54 million and $63 million in 2023 CAD.

Based on this evidence it is possible that, beyond its direct economic benefits, *a space launch industry in Canada could drive significant growth in the Canadian space sector and positively impact the Canadian economy.* The example of New Zealand shows how the effects of supporting launch ripple across the whole space economy value chain, creating opportunity for direct suppliers, space launch customers, and even academic participants. Further evidence from the United States also shows that growth in the launch sector promotes even greater indirect and induced effects within the larger national economy.

Launch in a Monopolized and Protectionist Market

Maintaining a sovereign launch capability provides more than improved national security and direct economic benefits for Canada. It also protects Canadian economic prosperity in an increasingly protectionist global market and insulates the Canadian space sector against foreign interference.

A critical aspect of the space industry is the question of whether SpaceX holds a monopoly in the launch vertical among western nations'[22] space sectors. A firm with a monopoly is generally understood to be able to exercise market power to control prices, make excess profits, close off the market from competitors, and control the cost of labor [Council of Economic Advisers, 2016]. No other western launch providers come close to rivaling the cadence or payload capacity of SpaceX. SpaceX is also the cheapest provider on the market. Table 3 compares SpaceX with other launch providers to show how large the gap between competitors is and how much launch volume SpaceX controls.

[22] "Western Nations" is used in this context to indicate nations which are closely aligned with the United States in terms of defence and trade.

Company	**Launcher**	**Cost** (Est. USD)	**Payload** (kg to LEO)	**2023 Launches**	**2024 Launches**
SpaceX	Falcon 9	$69.75M	Up to 22,800	91	132
	Falcon Heavy	$97M-150M	Up to 63,800	5	2
Rocket Lab	Electron	$7.5M	320	9	14
Firefly	Alpha	$15M	1,030	2	1
ULA	Atlas V	$110M-153M	Up to 18,800	2	2
	Delta IV Heavy	$350M	26,000	1	1
	Vulcan Centaur	$110M	8,800 to 26,900	-	2
Arianespace	Ariane 5	$157M-209M	Up to 20,000	2	-
	Ariane 6	$73M-120M	10,350 to 21,650	-	1
ISRO	GSLV	$47M	6,000	1	1
	LVM3	$47M	10,000	2	-
	PSLV	$21M-31M	Up to 3,800 kg	3	3
	SSLV	$3.5M-4.1M	500	1	1

Table 3: A comparison of operational launch vehicles accessible to western clients.

SpaceX has performed 84% of the launches in 2024 accessible to western clients, and they have likely flown over 95% of all mass launched. This gives SpaceX the ability to set prices and erect further barriers to entry against competitors. Examining SpaceX's only publicly traded competitor shows that Rocket Lab's revenue from launch activities compared with their adjusted cost of revenue and gross margin on their launch activities is extremely low (see Table 4).

	2023	2022
Launch Revenue	$71.9M	$60.7M
Cost of Launch Revenue (adj.)	$70.0M	$67.6M
Gross Launch Earnings	$1.9M	$(6.9M)
Gross Margin on Launch Earnings	2.6%	-11.4%

Table 4: Data taken for years where launch-specific revenue and cost data are available. Data based on Rocket Lab's 10-K filings for 2023 and 2022 [Rocket Lab USA, 2024].

Further, Table 5 shows SpaceX's best pricing on its small satellite rideshare service, compared with Rocket Lab's pricing for the same.

	Payload	**Cost**	**Price per kg**
SpaceX	1/4 (Up to 50 kg)	$0.3M	$6,000
	1/2 (Up to 100 kg)	$0.6M	
	Full (Up to 200 kg)	$1.2M	
	XL (Up to 300 kg)	$1.8M	
Rocket Lab	320 kg	$7.5M	$23,400

Table 5: Data comparing SpaceX's pricing for its rideshare program for small satellites with Rocket Lab's small satellite launch service pricing [Rocket Lab USA, 2024].

SpaceX is capable of offering far superior rates for launch to orbit for small satellites. As a result, they force Rocket Lab's prices to be as low as possible, squeezing Rocket Lab's margins. Rocket Lab even admits in its SEC filings that launch is less lucrative than its Space Systems business [Rocket Lab USA, 2024].

SpaceX's price per kilogram is certainly lower because they operate much larger launch vehicles, but there is more at play. The Wall Street Journal has reported that SpaceX operates with low margins, only having turned a bare profit in 2023 [Maidenberg et al., 2023]. This leads to the possibility that SpaceX is erecting barriers to competitors by using its superior access to capital[23] to price out the competition.

It is also possible that SpaceX may see its possible monopoly over launch as secondary or as a necessary pre-condition to establishing a more lucrative satellite communications monopoly via its STARLINK constellation. Both the Wall Street Journal and Bloomberg have reported that STARLINK has low to no profits [Maidenberg and Winkler, 2023][Porter et al., 2024]. STARLINK could be employing a "Blitzscaling[24]" strategy to gain a monopoly.

SpaceX's possible monopoly has the potential to harm the Canadian space sector and Canadians in several ways. First, as stated in the section *The Defence Necessity of Sovereign Space Launch*, it results in a single country, and in this case a single company in a single country, having unilateral control over Canada's access to space. This gives SpaceX the option to preference its own spacecraft (the STARLINK communications constellation) over telecommunications projects important to Canada. Telesat has already agreed to launch the initial satellites for its Lightspeed constellation with SpaceX [Telesat Corporation, 2023], exacerbating the risk of possible anti-competitive moves by SpaceX. Second,

[23] SpaceX has been able to raise at least $769 million USD (though the undisclosed total is certainly much higher) at a maximum valuation of $350 billion USD over 9 rounds since the start of 2023 [Crunchbase Inc., 2025].

[24] Blitzscaling is a growth practice employed by new companies, where investor capital is used to fund extremely rapid growth and customer adoption, at the cost of the company's short-term profitability, with the goal of extracting immense profits later, either through netwrok efficiencies, economies of scale, or monopoly power [Kuratko et al., 2020].

monopolies in launch or satellite communications could further harm upstream businesses in Canada which manufacture components and sub-systems for spacecraft or launch vehicles. As downstream companies are put out of business or consolidate with SpaceX or STARLINK Canadian suppliers will see their customer base shrink and will be forced to lower their prices.

Economic protectionism is also a significant challenge for the Canadian space sector. American President Donald Trump announced a 25% tariff targeting all Canadian imports shortly after his 2024 election victory [FitzGerald et al., 2024]. While these tariffs are not yet implemented, and if implemented may not last, there is evidence of increased protectionism globally. The firm Osler, Hoskin & Harcourt identifies that there have been increasing protectionist measures not just with the United States, but also with China [Goldman et al., 2024]. The firm Nuveen also identifies other factors and events that have led to more protectionist measures, such as the war in Ukraine, the COVID-19 pandemic, and increasing hostility with China [Bayaan et al., 2024]. Canadian space sector businesses will likely need to contend with protectionist and isolationist forces in the long-term.

The largest public Canadian space businesses are currently MDA and Telesat. MDA has reported in its 2023 Financial Results that 41% of its revenues come from the United States [MDA Space Ltd., 2024a]. Furthermore, MDA has reported in the third quarter of 2024 that its percentage of revenues from the United States were at a similar 42% of its total revenue [MDA Space Ltd., 2024b]. Similarly, Telesat reported in their 2023 annual report that their Revenue from sales in the United States was 35% [Telesat Corporation, 2024a] and 38% in the third quarter of 2024 [Telesat Corporation, 2024c]. In both cases, this represents hundreds of millions of dollars in revenues for the Canadian space sector. The CSA has also reported that a significant portion of Canadian Space sector revenues, a total of 24%, come from the United States [Canadian Space Agency, 2023]. Trade with the United States is critical for the Canadian Space Sector, especially for larger companies.

There are already grounds for the Government of Canada to protect domestic space businesses from foreign monopolies or protectionist measures. In September, 2024, Telesat announced that it had received a $2.54 billion CAD loan from the Canadian Government to support their embattled Lightspeed communications constellation [Telesat Corporation, 2024b]. The market for low Earth orbit communications is increasingly controlled by SpaceX's STARLINK. With new STARLINK satellites being launched on a weekly basis by parent company SpaceX, the company has rapidly dominated satellite communications. STARLINK has also shown the ability to rapidly innovate and develop new technologies[25] faster than their competitors. Despite the overwhelming competition, the Government of Canada and the Provincial Government of Quebec decided that it would still be worthwhile to

[25] A notable example are their Optical Inter-Satellite Links, which were brought online in less than a year, and are now sufficiently mature that the components are being sold to other manufacturers [Roulette, 2024].

invest in Canada's own communications infrastructure.

In terms of both protectionist measures like tariffs and aggressive monopolists like SpaceX, the Canadian space economy is vulnerable. While a sovereign space launch capability can never completely mitigate the harms of trade wars or foreign market power, it can at least serve to make Canada's space economy self-sufficient. *Self-sufficiency would protect the Canadian space sector from the worst effects of aggressive foreign action and make it a more secure and stable source of wealth and employment for Canadians.*

Space Canada's 40 Billion Dollar Space Sector

Space Canada, an industry group representing Canadian space companies, collaborated with Deloitte to publish the 2024 report *Reaching beyond: A $40 billion Canadian space economy by 2040*. One of the key claims in this report is that, with the correct action, the Canadian space sector could have $40 billion CAD in revenues by 2040. It is unlikely that this will be possible without a sovereign space launch capability.

As of 2023, the World Economic Forum estimated the global space industry generated as much as $630 billion USD in revenues [World Economic Forum, 2024]. Furthermore, the global space industry has been growing rapidly, at a rate of approximately 9% per year [World Economic Forum, 2024]. Canada may account for less than 1% of these revenues (see data in Figure 2). Further growth in the global space sector is predicted by multiple sources. These estimates are compared with the required growth rate predicted for Canada by Deloitte in Table 6.

Estimate	**CAGR**	**Source**
$40B by 2040	*12.19%*	[Deloitte, 2023]
$1.8T by 2035	9.14%	[World Economic Forum, 2024]
$1.1T by 2040	5.10%	[Morgan Stanley, 2020]
$2.7T by 2047	7.05%	Bank of America [Sheetz, 2017]

Table 6: Global space economy growth estimates.

Deloitte's estimate is undermined by the Canadian Space Agency's own reporting which shows revenues between 2014 and 2018 stagnating (with a CAGR[26] of only 1.3%) and declining from 2018 to 2022 (with a CAGR of -2.9%), as shown in Figure 2.

[26] Compound Annual Growth Rate.

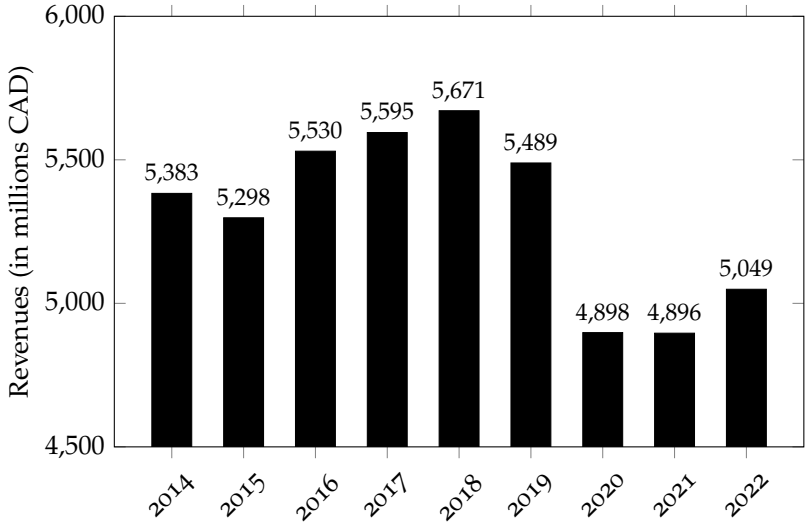

Figure 2: Canadian space sector revenues since 2014 [Canadian Space Agency, 2023][Canadian Space Agency, 2020].

It is reasonable to assume that the COVID pandemic may have had a hand in this decline. Our closest neighbor, the United States, also experienced this decline. However, it was marginal and short-

lived, with the economic output rebounding to pre-2020 levels by 2021. Similarly, the global space economy was largely unaffected by the pandemic, continuing to grow at a regular rate year-over year. This growth data is compiled in Figure 3.

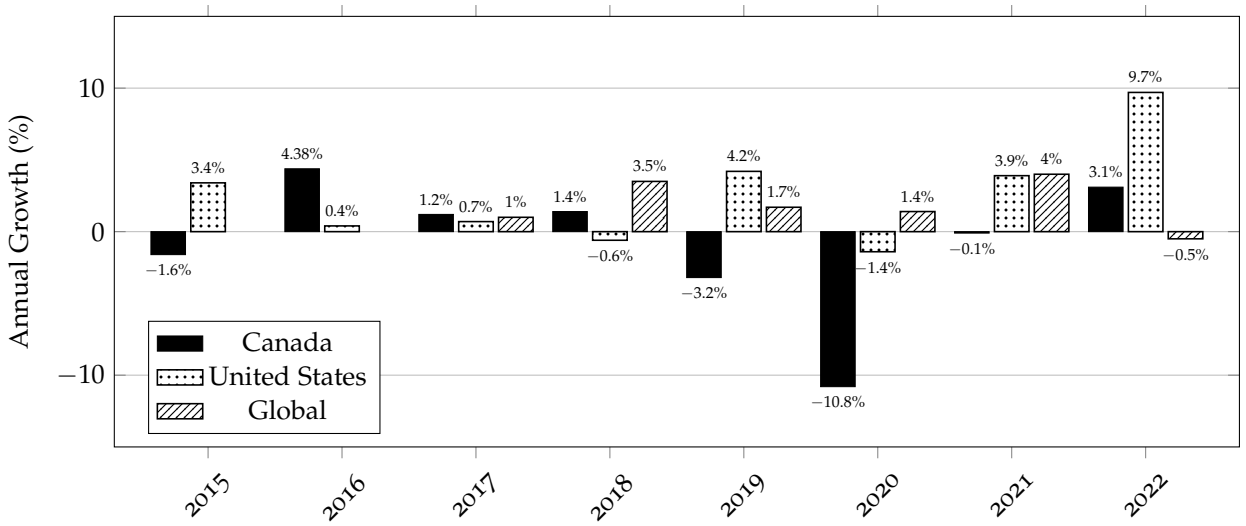

Figure 3: Global space sector growth comparing Canada with the United States [Highfill and Surfield, 2023] [Highfill et al., 2024] and the world [BryceTech, 2024]. Consistent growth data was not available for 2015 and 2016.

The overall conclusion is that there are existing internal challenges, and not exogenous factors, that are causing the Canadian space sector to stagnate and contract relative to the global space sector. These challenges may make reaching the stated goal of $40 billion CAD in revenue by 2040 difficult or impossible especially since an estimated 12.2% growth rate is required[27].

The data presented so far in this policy whitepaper strongly indicates that a space launch capability increases the size and competitiveness of any national space sector, while securing civil and defence interests. Without the inclusion of a launch capability, Canada will not be able to reach or exceed the "40-by-40" target proposed by Deloitte and Space Canada. Other OECD nations have recognized this fact and are supporting their existing or developing launch industries, as shown in Table 3. In fact, Canada is the only G7 nation without an existing national space launch capability or government-supported space launch capability development program.

Canada ranks fourth in terms of revenues behind large space economies like France, the United Kingdom, and the United States. It is also the only country in Table 7 *not* to have a sovereign space launch capability nor to have made a significant government commitment to developing a sovereign space capability. Canada's space budget is also low, coming last on Table 7. The Deloitte report correctly points out that Canada's space budget, as a fraction of GDP, is the lowest among G7 nations. As an example, in 2022 the United States spent at least $62 billion USD across all their space programs [Statista Research Department, 2024], accounting for at least 27% of the output generated by the space sector that year. In

[27] The Canadian Space Agency indicates that the 3.1% CAGR between 2021 and 2023 is a sign of an upwards trend in revenues [Canadian Space Agency, 2024]. This is better interpreted as an indicator of stagnation or contraction, as Canadian inflation in the same period was 6.8% [O'Neill, 2024].

OECD Country	Revenues	Civil Space Budget	Space Launch as a Gov. Priority
United States	211.6 B	35 B	Yes
United Kingdom	21.6 B (2020)	700 M	Yes
France	12.3 B (2020)	2.7 B	Yes
Canada	3.9 B	298 M	**No**
Germany	2.8 B	2.0 B	Yes
Japan	2.8 B (2022)	1.5 B	Yes
South Korea	2.8 B	500 M	Yes
Italy	2.3 B (2020)	1.2 B	Yes

Table 7: Civil space budget and industry revenues for 8 OECD nations, including all G7 nations, with large space programs, ordered by industry revenues, using 2021 figures in USD unless otherwise indicated [OECD, 2023].

the same year, Canada only spent $498.2 million CAD [Champagne, 2023, p. 26], accounting for only 10% of all revenues generated by its space sector.

Support for sovereign space launch is an accelerating trend among Canada's allies. The United States has long been the leading nation in terms of their support for launch. They often act as a first customer for launch companies, including SpaceX, Firefly, and others. For instance, Payload Space has estimated that of SpaceX's $3.5 billion USD in 2023 launch revenues, $1.5 billion USD, or 42%, came directly from government contracts [Islam and Kuhr, 2024], further emphasizing the critical need for public funding in space launch. The American Government has also instituted multiple government programs to stimulate their launch industry, including the DARPA launch challenge, Commercial Resupply initiative and various state and local incentives.

The European Space Agency (ESA) has already taken proactive steps with their Boost! program. This program aims to support the development of new launch vehicles in the European Union by supporting launch initiatives in ESA member states and funding launch services on a competitive basis [European Space Agency, 2024]. The first recipient of this funding was Germany's Isar Aerospace in 2021 [Deutsches Zentrum fur Luft- und Raumfahrt, 2021]. Other ESA member states have also funded new launch vehicles on their own. France has long operated the Ariane 5 rocket and has been working towards a first launch of their Ariane 6. However, France has decided that they no longer want to wait on a single company. In 2024, they committed to being the first launch customer to four French launch startups, which include HyPrSpace, Latitude, Sirius Space Services, and MaiaSpace [Parsonson, 2024].

The United Kingdom has also been supporting their launch companies, including Orbex and Skyrora. The United Kingdom's own National Space strategy, released in 2021, explicitly states that they intend to support space launch from its own soil with "the aim of becoming the leading provider of commercial small satellite launch in Europe by 2030." The Government of the United Kingdom intends to enable this by investing in spaceports and end-to-end

launch infrastructure [United Kingdom, 2022]. These plans are already being implemented, with recent investments in HyImpulse and Orbex as part of the European Space Agency's Boost! program [Dunlop, 2024].

Finally, South Korea has taken a slightly different approach. The South Korean Government has chosen to have its national space agency, KARI, develop and operate its own indigenous launch capability in collaboration with private partners. So far, their KSLV-2 launch vehicle has launched three times since 2021, two of which have been successful [Park Si-soo, 2023b]. The Government, in its recent budgetary announcement, has committed over $110 million USD to developing a larger launch vehicle, the KSLV-3 [Park Si-soo, 2023a].

A sovereign space launch capability would help grow the rest of the Canadian space sectors in two ways. First, a sovereign space launch capability would allow for a pan-Canadian space mission offering to national and international customers. A pan-Canadian space mission offering refers to a Canadian prime contractor being able to offer a space mission executed completely within Canada, from design and manufacturing, to launch, and finally to operations and sustainment. A sovereign space launch capability means that all contracted activities for the space mission can happen within Canada. Without the need to involve international partners, the mission offering can be more affordable, and will involve less risk from complex international supply chains. This would make Canada's space sector more competitive globally.

Second, sovereign space launch would make government investment in space a more attractive option for growing the economy. As shown in Table 1, Canada's few spacecraft launched have needed to spend abroad to reach orbit. Launch costs relative to overall program costs vary widely, but can comprise between 20 to 50% of program costs for a small satellite[28]. When choosing to fully or partially fund a space project, the government must decide if the economic benefits of a project will make it worth the investment. If as much as 50% of the money spent in the project must go abroad, the government is more likely to decide that the project will not yield positive economic benefits. Furthermore, as discussed in *The Defence Necessity of Sovereign Space Launch*, foreign launch adds risks to space missions, further increasing the likelihood of delay or interference. Even for defence, a domestic space launch capability will result in more space missions as the programmatic and supply chain risk is decreased.

Further government investments in the space sector is an absolute necessity if the Government of Canada and space industry associations would like to see space sector growth, and government investments in the space sector are only attractive if the defence and economic benefits of those investments are properly secured by a sovereign space launch capability.

[28] Based on examination of multiple small satellite programs and costing models. Program costs vary considerably based on mission and the organization executing the program. As a general rule, launch costs are a greater proportion of overall cost for smaller and simpler satellites.

Existing Canadian Launch Efforts

Canadians have not been sitting idly by and have instead been creating the foundations for a Canadian space launch capability. Today, there are at least five launch companies, two launch site providers, and a bevy of non-corporate actors who are seeking to create the technology, build the support infrastructure, and establish the businesses needed for Canadian space launch.

Launch companies

Avro Alberta-based Avro aims to reach orbit from Canada [AVRO Aerospace, 2023]. While their orbital plans are not detailed publicly, Avro has tested a small hybrid sounding rocket in collaboration with the University of Alberta [AVRO Aerospace, 2023]. This is being marketed on their website as the Mark 1, and it is being advertised as a sounding rocket to perform flight experiments, high-speed target missions, and atmospheric science [AVRO Aerospace, 2024].

C6 Launch Systems Based in Ontario, C6 aims to enter the space launch market by addressing the "smallsat revolution." Rather than developing their own component launch vehicle systems, C6 is designing a system based on proven and reliable commercial-off-the-shelf components, most notably using rocket engines developed by the American original equipment manufacturer Ursa Major Technologies. C6's launch vehicle will take 100 kg of payload to low Earth orbit and is intended to be launched from either Saxavord Spaceport in the United Kingdom or Alcantara Space Center in Brazil [C6 Launch Systems Inc., 2024].

NordSpace Based in Ontario, NordSpace aims to develop a space launch vehicle using its own Hadfield liquid bi-propellant rocket engine. The company has already conducted several successful tests of this engine and claims that their eventual launch vehicle will be able to execute a launch campaign in as little as 48 hours and deliver 500 kg of payload to low Earth orbit. The company also aims to use its manufacturing and engineering resources to develop a custom satellite bus, establish a satellite communications constellation, and develop robotic platforms for space exploration [NordSpace Corp., 2024]. NordSpace is also developing its own multi-user launch site in the Maritimes [NordSpace Corp., 2025].

Figure 4: NordSpace's metal 3D-printed Hadfield rocket engine on the test stand [NordSpace Corp., 2024].

Figure 5: Reaction Dynamics' Hybrid rocket engine on the test stand [Reaction Dynamics, 2024].

Reaction Dynamics Founded in 2017 and based in Quebec, Reaction Dynamics has been developing a Canadian launch vehicle with a novel and proprietary hybrid propulsion system. The company claims that its hybrid technology allows it to offer launches at a lower per kilo price than its competitors. It claims that its fuel and oxidizer are safer than traditional rocket propellants and do not require cryogenic handling. As a result, its Aurora rocket can be

fueled and stockpiled for immediate launch, which is particularly advantageous for defence applications. Reaction Dynamics is preparing for a sub-orbital demonstration flight in Australia and is developing variants of its propulsion system for in-space applications [Reaction Dynamics, 2024].

Space Engine Systems Established in 2011 and based in Alberta, Space Engine Systems (SES) claims to be pioneering the next generation of hypersonic Mach 5 to 8 transfer vehicles targeting payload delivery to low Earth orbit, Geo-synchronous Earth orbit, Lunar low orbit and the Lunar surface, and trans-Martian orbit. The company is developing a series of hypersonic spaceplanes to become the "Lowest Cost Space Trucking Company to Anywhere in Space Including the Lunar Mission". To achieve this goal, SES is developing a fully reusable vehicle using their proprietary multi-fuel propulsion system, in addition to multiple spin-off technologies [Space Engine Systems, 2024].

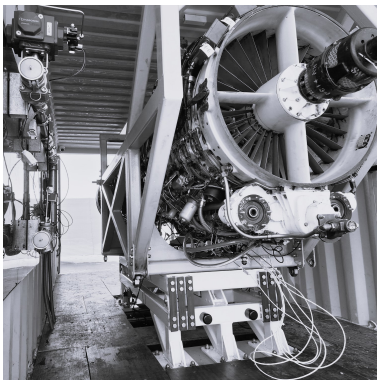

Figure 6: SES' engine test cell with engine installed.

Launch support infrastructure

Launch support infrastructure includes companies, agencies or other groups which provide the necessary ground-based physical infrastructure to support space launch activities. For the purposes of this policy whitepaper, this is understood to mean spaceports, integration facilities, communications or tracking equipment, and launch pads.

The current primary provider of launch infrastructure in Canada is Maritime Launch Services (MLS). MLS aims to become the world's first fully commercial orbital spaceport. The company offers services and facilities for space launch companies. The company also has the advantage of location: as opposed to most European orbital launch sites like Saxavord Spaceport in the UK or Kiruna in Sweden, MLS can offer a much wider array of orbital inclination and more efficient trajectories. The company's selected location also has the advantage of having low air-traffic in the downrange area, unlike major American sites like Vandenberg in California or Cape Canaveral in Florida. The company broke ground on its spaceport in 2022 and launched a sounding rocket to inaugurate the spaceport in 2023 [Maritime Launch Services, 2024].

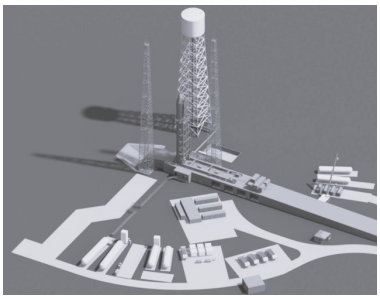

Figure 7: An illustration of MLS' planned launch facilities [Maritime Launch Services, 2024].

NordSpace has also entered this vertical and is attempting to establish a spaceport in the Maritimes. The company claims that this site will support multiple launch vehicles from multiple users, as well as providing access to a wide range of orbits [NordSpace Corp., 2025].

Not-for-Profit & Student Initiatives

The rapid pace of development of large space launch vehicles and other associated technologies for space exploration has inspired Canadian students to get involved in rocketry projects and learn

more about rocket engineering. Launch Canada, a not-for-profit organization, was created to give students the opportunity to pursue and demonstrate advanced rocket projects and to connect them with the resources and expertise they need to be safe and successful. Launch Canada performs multiple activities, including hosting a rocket engineering competition, running collaborative "special projects" to give students hands-on experience in complex rocket technology, and performing outreach to educate the public on space and engineering [Launch Canada, 2024].

Launch Canada's competition has been extremely successful, growing to over 30 Canadian schools with more than 1500 students participating since it was started in 2022. As a result of Launch Canada's work and advocacy, students have been able to engage in meaningful space launch technology development, creating new Canadian technologies and capabilities quickly and at low cost [Launch Canada, 2024].

Many of the companies mentioned in this section employ engineers who have participated in these student groups and, in some cases, rely on student-developed technology. Schools like the University of Toronto and the University of Waterloo have both used hybrid rocket propulsion systems[29] for a while with the latter school having developed a functional liquid bi-propellant rocket[30] [Launch Canada, 2024]. As well, MLS partnered with Launch Canada and the Arbalest student rocket team from York University to perform the first high-altitude suborbital launch from their Canso, Nova Scotia launch site. MLS used this launch to demonstrate critical launch processes involving Transport Canada and NavCanada [Maritime Launch Services, 2023].

Space Concordia is another example of successful talent and capability building in Canada. This group has developed Canada's first large liquid bi-propellant rocket engine[31] with thrust to rival the engines of companies like Rocket Lab[32]. The engine was recently tested at full-duration paving the way for a possible suborbital launch to space later this year. Space Concordia is now set to become the first Canadian group and the first student group to launch a liquid bi-propellant rocket to space [Boucher, 2024]. These achievements further highlight the incredible technology development capability of Canada's young engineers.

[29] Hybrid rocket propulsion systems refer to systems using a solid fuel and a liquid or gaseous oxidizer.

[30] With its successful launch at the 2024 launch Canada competition, this became the first successful liquid bi-propellant rocket launch in Canada.

[31] Development began in 2018 with the first successful ground test happening in mid-2021.

[32] At 40 kN of thrust, Space Concordia's rocket engine has 15 kN more thrust than Rocket Lab's Rutherford engine.

How Canadians Should Support Launch

In the 2024 Policy Brief *Connecting Canada's Strategic Vision with Commercial Space Capabilities*, Space Canada chairman Brian Gallant states that "Canada needs a national strategic vision that connects its broader national objectives to the capabilities and innovative potential of its space ecosystem and industrial base." Gallant further critiques the Government of Canada's 2019 Space Strategy, arguing that it is insufficiently broad and excludes capabilities and innovations developed or under development by Canada's space sector participants. He proposes that a whole-of-society or whole-of-government approach to developing a national space strategy is needed [Gallant and Miller, 2024].

Polaris Aerospace concurs with Brian Gallant's assessment. The primary advantage of space launch for Canada is that it completes the national space industry's value-chain, allowing for missions to be completed end-to-end within Canada. Space launch is needed as part of a wider space strategy which encompasses the whole space sector. Canada's space economy must be internally self-sufficient before it can be internationally competitive.

Canada has already made small, piecemeal efforts to support a sovereign space launch capability. The Canadian Space Agency has provided grants for launch companies under its Space Technology Development Program (STDP). In addition, Transport Canada announced that it would be creating modernized regulations for space launch from Canada in January of 2023. There has been little movement besides those actions and launch is still not explicitly supported as part of any cabinet-level strategy. The measures to address these shortcomings are presented below.

First, the Government of Canada should incorporate launch as part of a Whole-Value-Chain National Space Strategy[33]. This Strategy should, as part of its goals, commit to developing and supporting domestic capabilities for every vertical of the space sector value chain, allowing for civil or defence space missions to be executed completely within Canada if necessary. With this Strategy, each step along the space sector value chain outlined in Figure 1, *including space launch,* must be considered for investment and intervention. Funding and attention must be allocated based on a vertical's criticality to the sector and current level of development. A Whole-Value-Chain Strategy must have the goal of maintaining each vertical of the space sector value-chain in Canada and making the Canadian space sector wholly self-sufficient.

Second, the Government of Canada should adopt the measures recommended in Deloitte's and Space Canada's 2024 report[34] [Deloitte, 2023]. The measures proposed by Deloitte and Space Canada are definite improvements to key issues that have been observed by industry. They will improve the formation of new space companies and the rate at which these companies develop new and innovative space solutions. However, without explicitly

[33] The Whole-Value-Chain Strategy is the core of Polaris Aerospace's recommendations to support Canadian sovereign space launch capabilities. The following recommendations flow from the Whole-Value-Chain Strategy and can be implemented as part of this Strategy.

[34] These measures, briefly summarized, are:

1. Creating an integrated national governing body to steer space strategy;
2. Modernizing Canada's current legal framework governing space;
3. Improving funding and financial instruments for the Canadian space sector;
4. Streamlining procurement for space programs;
5. Expanding and facilitating collaboration between industry and government; and
6. Making Earth observation data widely available to Canadians.

integrating launch and the Whole-Value-Chain Strategy, they will remain band-aid solutions, unlikely to preserve Canada's status as a leading space-faring nation.

Third, Canada should accelerate and complete its modernized space launch regulations. Canada already has an existing regulatory system allowing for launch from Canadian soil but this has become outdated compared to regulatory systems adopted by other nations. The modernized regulations have been in work as early as 2018, when Transport Canada stated they had the regulations in development [Boucher, 2018]. These regulations were again announced by Transport Canada in early 2023 [Transport Canada, 2023]. With eight years in development, it is time that draft regulations were made available to the public and industry for comment and feedback.

Fourth, Canada should include space launch as part of its defence strategy, with additional funding earmarked for developing space launch technologies as well as for developing hypersonic and anti-hypersonic systems. As discussed in this policy whitepaper, the lack of space launch severely undermines the capabilities needed by the Canadian Department of National Defence. Their current goals which include contributing to North American missile defence, acquiring long-range missile capability, and acquiring a comprehensive worldwide satellite communications capability [National Defence Canada, 2024] would be significantly enhanced and strengthened by supporting a sovereign space launch capability.

Fifth, as the traffic jam at spaceports in the United States and the United States Space Force's interest in Canadian spaceports show, launch sites are a critical element in maintaining a sovereign space launch capability. Canada should designate spaceports and launch sites as critical national infrastructure and afford additional priority and funding to their development and upkeep. Additionally, Canada should include the development of spaceport infrastructure in any space funding programs proposed by the Department of National Defence, the National Research Council, the Canadian Space Agency, and others. Provincial Governments should also open up funding for the development of spaceports, committing to match any federal funding one-to-one.

Sixth, the Government Canada should commit to being a first launch customer for aspiring launch companies. Foreign launch providers receive a significant number of government contracts and grants, and Canada should make a similar commitment to supporting its own space launch capability.

Seventh, the government should take steps to improve talent and capacity building initiatives for space launch. This should include a new grant structure, administered by existing bodies like the Canadian Space Agency, the Department of National Defence, or the National Research Council, through which university student teams can be given grant funding to complete technical projects in the rocketry domain[35]. Similarly, the Canadian Government and

[35] These projects can be structured like industry contracts, including an RFP stage, project milestones, and final delivery presentations, to allow students to learn industry-standard engineering and project management processes. The grants should include a technical demonstration phase, where the technology could be flown at a competition like the Launch Canada competition or the Spaceport America Cup.

relevant provincial governments should commit to supporting teams and not-for-profit organizations that support student rocketry in their local jurisdictions.

Canadian space sector for-profit and not-for-profit members should also recognize the importance of space launch to the maintenance of their own specific verticals in the value chain. As such, efforts to promote space launch should go beyond those members who are solely occupied with that activity.

Eight, Space Canada and other space industry groups should adopt the framing of the Whole-Value-Chain Strategy, recognizing that their efforts are less effective in the long-term if they chose not to advocate for space launch as strongly as they advocate for other verticals of the Canadian space sector.

Ninth, Industry members should include space launch in their lobbying to government as an important but missing component of Canada's space industry. They should reiterate that a sovereign space launch capability would allow them to more quickly and cost-effectively execute their own projects to the benefit of Canada's economy and defence. They should link the need for space launch with the Canadian Government's "Team Canada" mandate.

Conclusion

A sovereign space launch capability would yield multiple advantages for Canada's defence and economy. Securing a space launch capability would allow for a more resilient in-space infrastructure, and would improve our contribution to our military alliances and international military partners. It would improve our economy, creating new jobs and opportunities, and it would increase the resiliency of the Canadian space sector, protecting it from overbearing foreign actors. Finally, a space launch capability would add new impetus for the Canadian Government to invest in the space sector as a whole and create new opportunities for contracts with foreign nations, as our ability to fully execute a space mission domestically would improve the cost and resiliency of the service.

Canadian engineers, entrepreneurs and innovators have long made the case that a sovereign space launch capability would be essential to Canada's future. While the Canadian Government has not participated in the development of space launch believing it to be expensive and risky, those in the field have understood what Canada risks by not investing in this linchpin capability.

Space launch is needed to tie the Canadian space sector together, and without it, Canada has only a set of companies which participate in other nations' space sectors. Canada has built world-class space expertise and capabilities, and without space launch, the Canadian space sector will remain second-class and continue to contract relative to others, affecting the prosperity of Canadians.

Disclosures

This white paper was written in consultation with, and with input from, several Canadian space sector participants including industry, academic and not-for-profit groups involved in building the Canadian space launch vertical. This paper was not sponsored or paid for by any group other than Polaris Aerospace. This policy whitepaper does not represent the views or opinions of any stakeholder indicated and remains the sole opinion and property of Polaris Aerospace.

Services & Contact

Polaris Aerospace offers a range of services focused on technical and business consulting for the space sector. Services include market research and evaluation, product-market fit analysis, technical consulting focused on spacecraft and space launch vehicles, and other services.

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