



CANADA'S INNOVATEURS
SPACE DE L'ESPACE
INNOVATORS DU CANADA

INNOVATING AT HOME, DEFENDING OUR INTERESTS:

CANADA'S SPACE INNOVATORS' CONTRIBUTION TO NATIONAL DEFENCE

POSITION PAPER



ACKNOWLEDGEMENT

Space Canada wishes to thank the members of its **Public Policy and Advocacy Committee** for their expertise and assistance throughout the development of this report.

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MESSAGE FROM THE CEO

The new space economy is an emerging sector poised to create enormous economic opportunities. In fact, the global space sector is expected to grow to a multi-trillion-dollar-a-year industry over the next two decades. Plus, advancements in space play an important role in combatting climate change, mitigating its effects, and addressing the digital divide. Prioritizing space will create a more innovative and competitive, equitable and inclusive, and sustainable and resilient Canada.

Moreover, investments in new space innovations are essential for defence and national security.

Numerous countries recognize the tangible benefits stemming from the prioritization of space. Space systems will be increasingly important for defence and national security as more countries and companies launch space platforms. **Canada should accelerate the delivery of identified space defence programs; engage directly with Canada's space innovators, expand defence research and development programs; and establish a National Space Council to coordinate space priorities across the Government of Canada.**

The space programs identified in Strong, Secure, Engaged and highlighted in the 2022 announcement on Continental Defence Modernization are important for Canada's defence and national security. These should be accelerated. By committing to developing and fielding new space capabilities, Canada will renew its commitment to continental defence, support communications and situational awareness for the Canadian Armed Forces, and support operations around the world.

Engagement with Canada's space innovators is important to sustaining a dialogue on what the ecosystem can deliver, and where industry can focus innovation to meet Canada's defence capability requirements.

Canada is well positioned to harness the power of space to enhance Canada's national security. Canada's space innovators are already leading the way. We can do this. Canada can do this. We must do this because space needs more Canada.



Brian Gallant
CEO, Space Canada



WHO IS SPACE CANADA

Space Canada represents Canada's space innovators and ecosystem to convey the value of space technology, research, and investment to domestic and international audiences.

Space Canada was launched in March of 2022 by nine founding members, and now has over 50 leading Canadian space innovators and organizations from coast to coast from the private sector - from startups to large global companies - academic institutions, and not-for-profit organizations.

Organizations with fewer than 100 employees make up over 70% of Space Canada's membership, providing a diverse set of members.

There is rapid growth of the global space economy, a growing awareness of how space technologies help solve today's most pressing economic, societal, and planetary challenges, and an increasing strategic importance being placed on space by governments worldwide.

Space Canada members are investing billions of dollars here in Canada and have facilities across the country employing thousands of people in Canada and around the world with a strong emphasis on STEM and innovation. The work Canadian space innovators do in orbit and on the ground puts people to work and consistently pushes and expands the envelope of Canada's potential.



OVERVIEW

The international rules-based order is under pressure, with significant challenges and uncertainty driving a renewed sense of urgency to ensure Canada's national security and defence capabilities remain relevant, including strategic contributions internationally as an engaged ally and partner. The impacts of the COVID-19 pandemic are still with us, strategic competition is evolving, renewed war in Eastern Europe is challenging global stability and the impacts of climate change are increasing. As a G7 country and core member of NATO, NORAD, the 5-Eyes and other multilateral organizations, Canada needs to keep pace with global threats to national security and defence, the defence of North America, and international strategic contributions alongside our allies and partners.

Continental defence and Canada's collaboration with the United States through NORAD is a renewed priority for the Government of Canada. The development of modernized ballistic and new hypersonic missiles by potential adversaries is also concerning for Canada, especially with the risk of nuclear payloads. All approaches to North America – including Canada's northern airspace – are potential vectors for missile strikes, emphasizing the importance of investing in capabilities to mitigate these threats. Space capabilities are essential for monitoring the northern, maritime, and aerospace approaches to North America to maintain situational awareness of potential threats. Technological advantages are vital to developing and maintaining situational awareness, tracking potential incursions into Canadian waters or airspace, supporting timely decision-making, and protecting Canadian sovereignty.

Contemporary threats include more than just missiles and weapons systems. The recent incursions of balloons and possible aircrafts into Canadian and American airspace have been widely reported and show an evolution of the range of possible threats. Potential hostile objects moving through North American airspace are raising concern among Canadians and international observers alike.

Protecting sovereignty has been a top defence and national security priority in Canada's defence policy since the advent of long-range bombers and missiles. Protecting sovereignty means establishing and maintaining awareness of what is in Canada's airspace, having the ability to inform decision-makers, and taking necessary action. These activities are essential for protecting the aerospace and maritime approaches to North America through our NORAD partnership. Space systems and capabilities are essential to providing early warning against all potential threats to North American airspace – from missile threats to surveillance balloons. Surveillance and sensing technologies are vital to identifying threats, and command and control tools allow the passage of information to present options to decision-makers. This chain of events depends on space technologies and space-enabled communications infrastructure.

Protecting Canadian sovereignty also means maintaining awareness of the changes to our landscape. The impacts of climate change are becoming more obvious, as winter Arctic ice sheets get thinner, and ice shelves melt faster. This makes Canada's northern waterways more navigable to all shipping, including that of potential adversaries. The militarization of the Arctic has accelerated, as potential adversaries invest in Arctic infrastructure, build more platforms for Arctic use, and challenge Canada's historic claims to the Arctic. Extreme weather events driven by climate change are also creating a greater demand for Canadian Armed Forces (CAF) domestic response.

Strong, Secure, Engaged (SSE) provided the blueprint for Canada's defence strategy, objectives, capability, and investment priorities in 2017, along with funding targets to realize the vision. For space programs, SSE prioritized investment in a range of space capabilities including surveillance of space, space-based Earth observation, maritime domain awareness, satellite communications with Arctic coverage, and command-and-control systems. In addition, SSE highlighted the emergent requirement to contribute to the defence and protection of space capabilities in lockstep with the evolution of a congested, contested, and competitive space domain.

Space capabilities also enable observation and measurement of the impacts of climate change on the navigability of Canadian waters. Space capabilities are central to Canadian sovereignty, and Canada is at risk of being outpaced by both its allies and potentially hostile states or non-state actors in developing and fielding the latest space technologies or exploitation of proliferating space data.

From an international perspective, the European Union (EU) sees the challenges of integrating civil and defence space capabilities to support their sovereignty and collective defence. The need for horizontal information sharing and collaboration is clearly identified as essential for a coherent EU-wide defence and military effort in the space domain. This means harmonizing security protocols, sharing and deconflicting space defence capability requirements, and sharing the use of space capabilities between EU members for things like positioning, navigation, timing, secure communications, and sensing technologies. The EU has identified challenges and taken action on breaking down barriers between EU members to bring greater coherence and synergy to the space enterprise. This approach can be applied domestically in Canada, to bring greater coherence to Canada's defence space enterprise by leveraging defence and civil capabilities.

In a rapidly changing world, Canada should prioritize and accelerate key space capabilities (including commercial integration opportunities) for Canada's national security and defence, including space programs identified in SSE that will contribute to the modernization of NORAD and continental defence. Canada should establish a National Space Council to coordinate the development and delivery on Canada's space strategy and innovation priorities to bring coherence across defence, civil, and commercial space objectives.

DEFENCE POLICY REVIEW

The reinforcement of Canada's national defence was a key focus of the Federal Government's 2022 Budget entitled "A Plan to Grow Our Economy and Make Life More Affordable". Indeed, Budget 2022 announced a defence policy update and earmarked \$6.1 billion over five years, bringing the total to \$8 billion in new funding over five years to strengthen Canada's national defence, including

"...our continental defences, commitments to our allies, and for investments in equipment and technology to immediately increase the capabilities of the Canadian Armed Forces."

Budget 2022 speaks to investments in NORAD modernization and indicates that the federal government will invest in the following options as ways to fulfill the priorities agreed upon with the United States in August 2021: Advanced all-domain surveillance and intelligence, modernized command, control, and communications, improved capabilities to deter and defeat threats; and, increased research, development, and innovation.

Budget 2022 speaks to the importance of Canada doing its part to contribute to global collective security through NATO, with new investments announced to help achieve that goal. The June 2022 announcement on continental defence investment provided a 20-year pathway for modernizing Canada's northern sovereignty. However, the specific priorities and timelines for programs that will allow Canada to realize this vision have not yet been clearly articulated.

We look forward to seeing more specifics on Canada's defence priorities as a result of the Defence Policy Review process. This will help inform the innovation, R&D, and commercialization priorities for Canada's space innovators, and would welcome the opportunity to collaborate on this issue.

RECOMMENDATIONS

Canada's space innovators develop and deliver leading-edge space solutions. Innovation for space technology moves faster than the pace of procurement for large, capital programs. As a general principle, Space Canada is seeking a more collaborative and consultative relationship with the Government of Canada on showcasing the capabilities that Canada's space innovators can deliver. For example, disruptive technologies such as quantum computing, innovative sensor development that can help detect globally competitive critical mineral deposits or key climate change data from space, and rapid advancements in automation and downstream data analytics are all presenting space marketplace opportunities and challenges that can only be addressed by close collaboration across all national stakeholders.

Innovation and investment can be mobilized by Canada's space innovators toward meeting Canada's needs faster than current procurement protocols allow. More consultation and collaboration will bring more awareness of what the industry can deliver and provide an opportunity for more agility and flexibility in procurement.

Canada's space innovators comprise some of the world's most innovative, STEM-driven companies. Canada's space innovators have a long track record of supporting and delivering global remote sensing platforms, deep space exploration, and connecting the world through telecommunications and broadband. We are up to the challenge of delivering innovative and cost-effective solutions supporting shifting priorities in an uncertain world.

To deliver the best defence space capabilities, Space Canada has the following specific recommendations for defence priorities in Canada:

- 1 Accelerate the timetable for definition and delivery for the space programs that are already identified in Strong, Secure, Engaged;**
- 2 Engage directly with Canada's space innovators so industry can understand Canada's defence requirements, and so the Government of Canada can better appreciate the Canadian industry's R&D and technology development programs that can support modernization for continental defence;**
- 3 Expand and adapt current defence innovation programming like IDEaS to include increased or dedicated funding for space innovation, to increase the size and value of projects eligible for innovation investment, and to increase opportunities to scale successful initiatives. A greater commitment to R&D, innovation, and scaling opportunities are important to accelerating the pathway from innovation to commercialization to improve space capabilities for defence and national security applications; and,**

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Establish the National Space Council, chaired by the Prime Minister, to develop and orchestrate strategic space policy, directives and to coordinate space priorities across the Government of Canada (defence, civil, commercial, other key space stakeholders). The National Space Council should be the forum for coordinating strategies for civil space, defence space, and commercial space capability development, and for integration into the Government of Canada's space enterprise. This includes domestic capability development activities and supporting export growth priorities.

RECOMMENDATION #1

Accelerate the Timetable for Identified Space Programs (SSE)

Space Canada recommends the Government of Canada accelerate the timeline for the definition and implementation of all existing space programs identified in SSE as part of the defence strategic policy update. The Government of Canada should consider commercial procurement of space capabilities or services for space applications from Canada's space innovators.

DND identified many space programs in *SSE*. These include satellite communications programs (follow-on wide-band, follow-on narrowband, protected MILSATCOM – tactical and strategic, and Enhanced Satellite Communications Project - Polar), sensing programs (Polar Epsilon 3, Defence Enhanced Surveillance from Space, Surveillance of Space 2 and 3), space-based processing, exploitation and dissemination, and space command and control (C2) programs. The Canadian space industrial base has the capabilities to deliver these programs at a speed of relevance, either as a traditional capital project from concept to development through to implementation and in-service support, or as commercially procured capabilities and services. Canada's space innovators are ready to move forward with these programs now. The majority of these programs are moving through the development processes.

Based on the existing timetables, there is no progress planned for 2023 or 2024 for any satellite communications programs, for example, with deployment not beginning until the 2030s. **These timelines are simply too long** to address renewed state-based threats, and to keep pace with new space technologies being developed and fielded by innovative Canadian space companies and by potential adversaries. Like cyber, space is becoming an increasingly contested domain, with potential adversaries using new technologies for sensing, global communications, and counter-space activity. *SSE* space programs are vital to generating situational awareness of the maritime, and aerospace approaches to North America, and to ensuring secure communications for the Canadian Armed Forces (CAF) and allied personnel operating in Canada, North America and around the world. Space Canada supports the programs identified, their purpose, and their contribution to continental defence.

RECOMMENDATION #2

Engage with Canadian space innovators on Continental Defence Modernization

Space Canada recommends the Government of Canada engage directly with Canada's space innovators to allow industry to better understand the Government of Canada's defence priorities, and to showcase Canadian industry's R&D and technology development programs that can support the modernization of continental defence. This includes the development of brand-new systems and the integration of commercial solutions for continental defence and upgrading legacy systems.

Canada and the United States established NORAD as a formal continental defence organization to protect the maritime and aerospace approaches to North America. The renewed threat from states with long-range and high-speed missiles makes modernizing continental defence an urgent priority.

The Minister of National Defence made an important announcement in June 2022 about Canada's planned investment in continental defence. Canada had prioritized detection capabilities, improving the common operating picture, acquiring defensive capabilities, investing in new infrastructure for airfield and air operations, and in innovation for defence space systems. This will require a mix of sensors, capabilities, and systems including space-based, land-based, aircraft-based, and sea-based sensors, and over-the-horizon (OTH) radars to provide superior early warning and situational defence for continental defence. These sensors will all be linked together in a C4ISR network, delivering a near-real-time understanding of the overall picture of continental security and part of Joint All Domain Command and Control (JADC2).

Innovation is driven by tangible objectives and by the anticipated requirements for large capital programs. A meaningful dialogue between the Government of Canada and the space industrial base will enable industry to better understand the requirements and to share the current state of capability and the art of the possible for continental defence. This dialogue is important to develop a mutual understanding of the objectives and how the space industry can support the Government of Canada's objectives and help deliver for Canada.

The capabilities for modernizing continental defence will be delivered by the defence and space industrial bases. Many of these capabilities are competitive advantages for Canada, with information and systems well-guarded against unauthorized access from foreign powers or non-state actors. Security clearances are an important tool for ensuring the security of information and systems. Accordingly, the Government of Canada should allocate the appropriate resources so the highly skilled people in the space industrial base can apply for security clearances and have the process completed in a timelier manner.

Collaboration and dialogue with industry should begin as soon as possible to allow Canadian industry to better understand Canada's continental defence priorities, and to allow industry to showcase our emerging technologies and R&D potential that can support the modernization of continental defence.

Canada's space innovators provide the full range of capabilities that Canada has prioritized for continental defence. The industry is supportive of the recent announcement, and we are very eager to engage in open dialogue with the Government of Canada on the Canadian capabilities that can contribute to continental defence.



RECOMMENDATION #3

Expand Current Defence Innovation Programs for Space

Space Canada recommends the Government of Canada expand space-specific defence innovation programming with increased or dedicated funding to enable Canada's space innovators to work directly with DND to turn great ideas into operational solutions. This will support Canada's commitment to continental defence, and defence space capabilities more broadly.

Global competition in space is fierce and Canada risks missing the opportunity to fully participate in the highly strategic new global space economy. Companies around the world are seeking to bring new technology to market faster than their competitors. This is true for civil and defence applications. Defence Research and Development Canada (DRDC) is the innovation centre for defence in Canada, delivering research programs across a wide range of capability areas. DRDC is delivering the Innovation for Defence Excellence and Security (IDEaS) program, providing companies and academia the opportunity to test and mature new technology.

The Minister of National Defence's recent announcement in June 2022 about investment in innovation for continental defence capabilities was welcomed by Canada's space innovators. This recognizes the importance of innovation investment in maintaining Canada's technological advantage for continental defence. However, space systems have global reach, supporting the CAF's domestic and expeditionary operations. Investment in space innovation should be broadened to include space innovation to support Canada's defence capabilities overall—both for continental defence to sustain Canada's role in NORAD and the defence of North America, as well as to sustain Canada's strategic contributions to global operations through our role in NATO and other multilateral commitments.

Increased innovation investment for defence space programs will accelerate the development of defence space capabilities for Canadian defence writ large. These capabilities will deliver operational benefits for Canada's defence, will allow Canada to contribute those capabilities to continental and collective security through existing NORAD and NATO commitments, and will strengthen Canada's space industrial base. Developing solutions in Canada gives Canada priority access to innovation, sustains Canada's technological advantage over potential adversaries, and has the potential to deliver dual-use spin-off technologies for commercial export growth and increases opportunities for partnership with our allies and partners.

RECOMMENDATION #4

Establish the National Space Council

Space Canada recommends the Government of Canada establish the National Space Council, chaired by the Prime Minister, to develop and orchestrate strategic space policy, directives, and to coordinate space priorities across the Government of Canada (defence, civil, commercial). The National Space Council should be the forum for coordinating strategies for civil space, defence space, and commercial space capability development, and for integration into the Government of Canada's space enterprise. This includes domestic capability development activities and supporting export growth priorities.

The global space economy is fiercely competitive and accelerating, with companies in most industrialized countries receiving the support of their national governments given the strategic nature of the sector and the myriad of 'earthly' benefits and dependencies to our way of life. Canada has been supportive of space innovation through investment programs like the Strategic Innovation Fund, through post-secondary research investment, and by providing incentive programs to start-ups and small/medium enterprises that are developing innovative new solutions for space. These programs have been useful in expanding innovation. Keeping pace with the global market and the rate of new technology development now requires a broader, more ambitious commitment. Greater policy support and coordination are required to maximize the benefits to Canada from Canada's space industrial base.



**HIGH
OPPORTUNITY
HIGHER STAKES
FOR CANADA**

Canada is in a fiercely competitive global space race. As space becomes more accessible, countries around the world are prioritizing, investing, and partnering with their domestic space companies. Canada can win this race and Canada's space innovators are ready to lead the way.

The time is now to invest in space, Canada.

LEARN MORE AT: [SPACE-CANADA.CA](https://space-canada.ca)

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The space economy is growing faster every year, with new commercial services and products being developed and new defence systems being delivered to support security and defence policy objectives.

The speed of innovation today means that commercial systems increasingly have potential defence applications. Notwithstanding ongoing bottom-up or lateral inter-departmental collaboration, Canada lacks a unifying federal body to coordinate national space strategy and policy to keep Canada competitive in the new space economy.

The National Space Council will enable a whole-of-government approach to the development of space capabilities across government departments. Canada's space innovators are world leaders in the development and delivery of civil, defence, and commercial space capabilities ranging from leading-edge software and services, to launch platforms and capabilities, to space vehicles and sensing technologies. A strategic, federally led approach is vital to coordinate the Government of Canada's actions across all potential space applications, to clearly signal its intentions to Canada's space innovators about building and accelerating the space industrial base, and to take a cross-sector view of export growth in global markets.

Some of Canada's closest allies have implemented similar national-level councils to provide government-wide coordination of space policy and national strategy. For instance, the United States has a National Space Council, a White House policy council chaired by Vice President Harris, assisting the President in the development of space policy, strategy, and overarching directives in collaboration with other Cabinet secretaries. Canada should establish a similar body to coordinate Canada's space strategy and policy objectives.

CONCLUSION

From health crises to geopolitical instability and climate change, the world is going through a chaotic period. Canada is taking action by expanding its defence budget and revisiting capability and investment priority areas.

Space systems and solutions are an essential part of Canada's defence strategy, contributing directly or indirectly to virtually all defence operations. Space capabilities connect Canada's personnel when operating at home and around the world; they provide intelligence and information vital to decision-making; and allow Canada to contribute to the collective defence of North America and internationally with our NATO and other allies.

Prioritizing investment in defence space programs, therefore, is a part of the entire security and defence portfolio. Those programs already identified should move forward as soon as practical to sustain relevance, and engagement in modernizing NORAD and Continental Defence should begin now. To sustain momentum over the mid-term, Canada should also expand investment in innovation for space, and create dedicated policies for defence space innovators including mechanisms for the commercial procurement of defence space capabilities. Lastly, federal leadership is required to orchestrate a clear national strategy on space, to coordinate policy tools to deliver on a vision for Canada's place in space and the space economy, and to facilitate the integration of existing and emerging commercial space capabilities into Canada's defence space enterprise.

These investments will support Canada's national security and defence, help Canada expand its contribution to collective security alongside allies and partners, and grow a sustainable space industrial base for the future.



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