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Chair: The Honourable John McKay





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Monday, May 6, 2024

• (1100)

[English]

**The Chair (Hon. John McKay (Scarborough—Guildwood, Lib.)):** Good morning.

I'll remind colleagues and witnesses of the audio feedback problem that we've been having. I'm not going to go through the entire script again, but it is a pretty serious problem. If we could keep these earpieces away from the microphones and when they're not in use, put them on the dot, that would be very helpful.

We have three witnesses with us today, colleagues.

We have Mike Greenley, from MDA Space.

We have Brian Gallant coming to us virtually.

Brian, it's good to see you. I think I saw you on Sparks Street mall last week.

We have Michele Beck and Stephen Hampton from Telesat.

This is turning out to be really quite an interesting study, folks. I'm anticipating that each one of you will have something really insightful to say.

First of all, I'll ask Mr. Greenley for his opening five-minute statement. Then we'll have Mr. Gallant and then Madam Beck.

**Mr. Mike Greenley (Chief Executive Officer, MDA Space):** Good morning. Thank you for the opportunity to speak today on the essential topic of space defence in Canada.

My name is Mike Greenley. I'm the CEO of MDA Space, Canada's largest space company, and the chair of the board of Space Canada, Canada's industry association for all of our space companies. Brian is the CEO, and he'll speak next.

Today I get to lead Canada's largest space company and export our capability globally with over \$1 billion in annual sales forecast this year. I get to do that because Canada made three key strategic decisions. Canada decided to be the third country to put a satellite into space to better understand how satellites could enable telecommunications across our country. As a result of that, on a long journey, today MDA Space is a world leader in digital low-earth orbit communication satellite constellations.

Canada also decided to develop synthetic aperture radar, or SAR, satellites to monitor our country and our coastlines. Today MDA Space is the world leader in broad-area SAR satellites globally, based on the legacy RADARSAT heritage.

Third, Canada decided to contribute space robotics, initially in the form of the Canadarm to the space shuttle program and subsequently to the international space station, where it has been operating for 25 years. Now MDA Space is working on the third generation of the Canadarm for the moon, work that has enabled us to launch our own commercial product line, MDA SKYMAKER, to the global space market.

These moves by Canada were critical. They established Canada as a space leader in civil and military space capability. They gave Canada relevance, generated via contributions to the allied team, which added to Canada's sovereignty and geopolitical power. Today's space capability is increasingly important in military operations and is increasingly important to everyday civilian life. It must therefore be protected and defended.

In my opinion, Canada has fallen behind from a military space capability perspective and is not engaging its industrial base effectively. As a result, our relevance in a rapidly changing geopolitical world is declining, and along with it our ability to protect and defend Canadians from a space perspective. Our single largest key challenge, and our single largest opportunity to reverse this trend, is to take a whole-of-Canada approach to defence military capability delivery. To achieve this, there are several things we urgently need to do.

First, we must establish a classified dialogue between the defence department and the industrial base on the true threats in space and the future military need. Military space activity occurs at the top secret level of security and above. The military and industry must be able to talk about the threat and talk about the capability requirements well in advance of procurement and well in advance of operational need. Today we cannot do that. As a result, industry cannot be prepared to innovate and have defence solutions ready for procurement and operational need when procurements suddenly appear decades later.

Second, we must establish a commercial partnership between defence and industry. The Canadian Forces continue to be stuck in a procurement pattern from the past, ensuring that the Canadian Forces own and operate all defence space capability themselves. Today many nations, including the United States Department of Defense and the United Kingdom, have established a policy of “build only what you cannot buy” as a service, with the intent to purchase vast amounts of space-based earth observation data, communications services, launch services, and other space operational support, including counter-space, as a service from industry.

Canada must start to do this or they will significantly delay the establishment of critical military capability while waiting for their procurement processes to complete. It is faster and cheaper in many cases to procure via commercial service from industry, and it leverages a deep knowledge base that does not historically exist inside the Canadian Forces.

Third, Canada must focus on engaging the Canadian space industrial base, which is world-leading, to purchase technology and services in support of space operations in defence of the country. Interoperability and interdependency with the United States is important, especially in such combined operations as NORAD, but Canada must do this in a manner that engages the domestic industrial base. In doing this, Canada will ensure sovereignty and economic stability and re-establish our relevance and geopolitical power that comes from contributing capability to a combined team.

- (1105)

All nations engage their domestic industrial base on defence and security as a first priority, and Canada needs to do the same. Global fairness is not required. It is not conducted in other nations, and it results in Canada negotiating with itself on the global stage.

Lastly, we need to move faster. We are missing opportunity. For example, you'll hear from Telesat today. Canada needs communications in the north. Canada has identified procurement spending to purchase space capability for communications in the north circa 2038. Meanwhile, Telesat will launch a global communications capability with satellites built by MDA Space in 2027. If we had a conversation today, it could potentially be configured to deliver military communications in the Arctic a decade faster as a commercial service. We must think like this. We must start to behave like the rest of the western world about the establishment of military space capability through a whole-of-Canada approach.

Thank you for the opportunity.

**The Chair:** Thank you, Mr. Greenley.

Mr. Gallant, you have five minutes, please.

[*Translation*]

**Hon. Brian Gallant (Chief Executive Officer, Space Canada):** Hello, everyone. Thank you so much for inviting me here today.

[*English*]

Space systems and solutions are an essential part of Canada's defence strategy, contributing directly or indirectly to virtually all defence operations. That is why the team at Space Canada, an organization that represents the Canadian space ecosystem, is so pleased

to see this committee undertake this study of Canada's space defence.

Mr. Chair and members of the House of Commons Standing Committee on National Defence, thank you for undertaking this study, and thank you for inviting Space Canada to be a part of this exercise.

Our organization represents over 80 Canadian space innovators that collectively play an essential role in protecting the environment, combatting climate change, bridging the digital divide, enabling humanity to explore beyond our planet, and safeguarding Canada's security and sovereignty.

Indeed, 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.

The Canadian space sector contributes nearly \$3 billion to the Canadian economy every year, sustaining thousands of jobs—largely in STEM—that pay, on average, 64% more than the Canadian average and 32% more than other jobs in the aerospace sector. Moreover, the space sector is very R and D intensive, with over \$500 million of annual investment. This is 18 times higher than other manufacturing sectors.

The global space sector is projected to grow exponentially between now and 2040, and it is estimated to reach over \$1 trillion per year.

- (1110)

[*Translation*]

Space 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, and has the potential to deliver dual-use spinoff technologies for commercial export growth and increases opportunities for partnership with our allies and partners.

It is for these reasons 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.

[English]

Although Canada is a leader in space, the competition is getting tougher. Canada's space industry risks being left behind in the face of the increasingly competitive global landscape at a time when space capabilities have never been more important or strategic.

Space Canada is, therefore, emphatically supportive of the Government of Canada's recent commitment in the tabled budget to create a national space council. Inspired by the U.S. example, a national space council will deliver a whole-of-government approach to space. It should be an internal government body led by ministers who meet at least biannually—if not quarterly—to, among other things, undertake a review of space systems procurement, including a benchmarking study to compare how other nations employ rapid procurement practices and serve as key customers for innovative space technologies.

[Translation]

This government agency should also modernize the space regulatory framework that builds on the 2023 consultation by the Canadian Space Agency, leveraging Canada's space industrial base with its world-class capabilities, workforce, innovation and track record of delivery.

Finally, this government agency should guide the development and implementation of a whole-of-government national civil, defence and commercial space policy.

This would position Canada at the forefront of the New Space Economy, and deliver associated economic, social, environmental, defence and national security benefits.

[English]

I look forward to further discussing the pivotal role space plays in securing Canada's defence and security with you all today.

[Translation]

Once again, thank you for inviting me.

[English]

**The Chair:** Thank you, Mr. Gallant.

We go now to Madam Beck, for five minutes, please.

**Ms. Michele Beck (Senior Vice President of Sales, Canada, Telesat):** Good morning, Mr. Chair and members of the committee. Thank you for inviting Telesat to participate today.

[Translation]

My name is Michele Beck and I am Telesat's senior vice-president of sales for Canada. With me this morning is Mr. Stephen Hampton, head of public policy and strategic accounts.

[English]

Telesat is one of the world's largest and most innovative satellite operators, operating for over 55 years from our headquarters in Ottawa. As a proud Canadian company, we play a central role in Canada's commercial and defence connectivity infrastructure. Today, we connect over seven million households to high-definition television; provide broadband and other lifeline services to rural, remote and indigenous communities; and deliver mission-critical

services to Canada's national security and public safety community. We offer these same types of services all around the world.

This study comes at a pivotal time for Canada and our sector. There is a global high stakes space race under way and it is critical to Canada's sovereignty and national security.

Critical sovereign communication, whether in air, at sea, or on the ground, is fundamental to Canada's national security and that of our allies. This can only be achieved through advanced satellite communications networks, specifically, global, ubiquitous, interoperable satellite communications networks that are not only sovereign and secure, but that are also allied by design and capable of delivering joint allied operations in key regions like the Arctic and the Indo-Pacific.

That's why we've undertaken the most ambitious and innovative project in our proud history, a \$6-billion state-of-the-art LEO satellite constellation, known as Telesat Lightspeed. It will initially consist of nearly 200 highly advanced satellites and will deliver affordable, secure and resilient fibre-like broadband connectivity and enable 5G everywhere on earth, including all of Canada and the Arctic. It's the largest space program ever conceived in Canada and will shape the domestic space sector for decades to come.

Telesat Lightspeed will be designed, manufactured and operated in Canada. Telesat Lightspeed is a true Canadian flagship program. It will help bridge the global digital divide; create and sustain thousands of high-quality jobs in Canada; spur domestic innovation, investment and exports; and ensure that Canada is at the forefront of the rapidly growing and highly strategic new space economy.

Today's global defence landscape is changing rapidly, both on earth and in space, driven by climate change, new geopolitical dynamics, emerging technologies and rising security threats to our national sovereignty.

● (1115)

[Translation]

The defence of our country and of our geographically strategic areas such as the Arctic is now more important than ever.

To adapt to these changes, governments around the world are placing an increasing emphasis on the role of space in their defence infrastructure. The world space industry has also radically changed since the turn of the century. More dynamic and innovative, it is becoming increasingly critical.

[English]

Traditionally, defence projects in space were directed and developed exclusively by government. The pace of technological change was incremental, oftentimes bogged down by procurement processes, cost overruns and a fundamental lack of urgency.

Today, a new space race is emerging with commercial companies developing space-based assets and capabilities for both commercial and defence purposes. Over the past several years, we have seen generational leaps in technological capabilities with many calling this sea change the transition from “old space” to “new”.

As Canada looks toward NORAD modernization and delivering the most advanced technology to its armed forces, it should follow the lead set by the U.S., the U.K. and other countries around the world that have moved beyond the legacy approach of exclusively relying on dedicated government-owned and operated defence systems to meet accelerating threats.

Instead, these governments are working hand in glove with their domestic private sector, leveraging significant commercial investments made in cutting-edge, allied by design, capabilities and are integrating these space-based assets into their defence systems.

Canada is a world leader in satellite communications. We have a clear competitive advantage, and it should be exploited to its fullest. The Government of Canada should look to partner with the space sector to rapidly ensure that the Canadian Armed Forces and our allies have access to the most cutting-edge technologies, like Telesat Lightspeed.

[Translation]

Thank you again for the opportunity to be here. We look forward to your questions.

Thank you.

[English]

**The Chair:** Thank you.

Ms. Gallant, you have six minutes, please.

**Mrs. Cheryl Gallant (Renfrew—Nipissing—Pembroke, CPC):** Thank you, Mr. Chairman. Through you, the first questions will be for MDA.

Since the revelation of Putin's willingness to use the nuclear weaponization of space, has any entity from the federal government approached you to discuss this?

**Mr. Mike Greenley:** To discuss that topic, no. No one has approached us to discuss that topic.

Various intelligence and security agencies from the federal government do approach us, and work with us on national security issues and our ability to ensure that we have very secure operations both domestically and in orbit, but on that topic, no.

• (1120)

**Mrs. Cheryl Gallant:** What about contacts you may have in the United States? Has anyone shared anything with you on this topic?

**Mr. Mike Greenley:** No. I think, in general, people might generally talk about those things in an unclassified manner, at conferences and the like, but no.

**Mrs. Cheryl Gallant:** How vulnerable are satellites and infrastructure relying on satellites to a potential nuclear explosion in low-earth orbit?

**Mr. Mike Greenley:** I think satellites are susceptible to any form of explosion in orbit. I think most nations are working hard to ensure we don't do that. I think space and efforts in counter-space...there's lots of bluster that's out there, but I think if folks go around exploding things in orbit, it does just as much harm to their own assets as it would to an adversary because the debris that would be created from that is in those orbital paths. You risk just as much your own operations as the next guy's.

I think people bluster a fair bit on these topics, but, in general, the business of messing around with somebody else's satellite capability would be more subtle than causing explosions.

**Mrs. Cheryl Gallant:** What should the federal government do to protect satellites from this new threat on the horizon?

**Mr. Mike Greenley:** I think, in general, the Canadian Forces, with their space operations, need to continue to work very effectively with their allies. It seems that is the case, and that it is increasing.

There is also the introduction of what's called a commercial integration cell that will occur in Canada—that also exists in the United States, as an example—whereby those commercial entities that operate significant space capability, like MDA or Telesat, which are here today, would work weekly, regularly, with the military on coordinating our space activities and ensuring that we're mutually aware of threats, and taking actions ourselves and with allies to be able to protect against those threats.

**Mrs. Cheryl Gallant:** The Financial Times noted that a leaked report indicated that China is developing sophisticated cyber-weapons that deny, control and hijack foreign satellites.

Potentially, China could take over satellites and gather data without our knowledge, or render them useless by disabling our access. From your expertise, how credible is this threat to Canadian national security if, indeed, it does exist?

**Mr. Mike Greenley:** In my remarks, I commented on the importance of our getting through the process of security clearances so that Canadian industry could engage properly with the Department of National Defence about the highly classified nature of the threats that are going on in space. I have limited awareness of that, because we have spent over three years engaging with the Government of Canada to try to get the necessary security clearances for government personnel and appropriate industry personnel so we can have conversations to discuss the types of topics you are mentioning.

Those will come soon, some day, but the bureaucracy is very bogged down in its ability to get the necessary clearances so we can have these conversations. However, I do think it is highly plausible that, given the general knowledge of electronic warfare measures and the ability to jam and interfere with electronic signals, people would have the ability to interfere with satellites. We definitely pay attention to that when we build and protect them today.

**Mrs. Cheryl Gallant:** With respect to RADARSAT additions, what progress are you aware of that's being made in adding more satellites to the constellation?

**Mr. Mike Greenley:** The RADARSAT Constellation Mission has three satellites in it. MDA built those and launched them in June 2019. As of last October, the government had announced an additional program called RADARSAT+, under which, at a minimum, one additional satellite will be procured to add to that constellation to provide resiliency and start the initiating studies to be able to plan the replacement of RADARSAT Constellation to ensure continuity.

To go back to my comments on collaborating commercially, MDA has invested over \$400 million over the last few years to build Chorus, our fourth generation of RADARSAT-capable satellites, which will be owned and operated by MDA and will provide an additional commercial service. If the government wanted to leverage that in partnership with industry, they could do so, as well, to provide additional resiliency to Canada's radar surveillance capability.

**Mrs. Cheryl Gallant:** Have you seen any movement on the part of the federal government to start moving this ahead?

**Mr. Mike Greenley:** On the RADARSAT+ procurement, yes. If you are talking about procurement of commercial services, we have not yet.

**Mrs. Cheryl Gallant:** Okay.

With respect to Telesat, there have been incidents in which airline Wi-Fi was used in an attempt to hack into avionics so they could take control of the aircraft.

How much of the price for an airline's in-air Wi-Fi service goes to cybersecurity, and has Telesat ever experienced such a cyber-attack?

• (1125)

**The Chair:** That's an important question. Unfortunately, Mrs. Gallant has not left you any time to answer it. Hopefully, you can circle back in on that.

Ms. Lambropoulos, you have six minutes. Go ahead, please.

**Ms. Emmanuella Lambropoulos (Saint-Laurent, Lib.):** Thank you, Chair.

I'd like to begin by thanking our witnesses for being here to answer questions today.

I'll start with Mr. Greenley. You spoke a little bit about interoperability. We've heard about this before, even in previous studies. I'm wondering what specific recommendations you could give the Government of Canada in order to help it promote its own made-in-Canada equipment and technology in order to ensure that Canadian companies are benefiting.

**Mr. Mike Greenley:** I think the important thing is to make sure we have interoperability in terms of the overall capability that allows us to, therefore, use Canadian systems and solutions and then contribute.

For example, on Sapphire, which is a space surveillance satellite that was built by MDA Space, we were contracted to operate it. DND contributes, on a daily basis, imagery in terms of what the satellites are doing in space as part of the overall picture in an interoperable way.

Through DND we contribute our radar satellites' imagery to the United States. These types of mechanisms, and of course the Telesat example that we used today, could contribute all kinds of communications capabilities.

We want to be able to ensure that our capability and our procedures are interoperable but also that the technical solutions come from Canadian industry in terms of building them and operating them in support of the Department of National Defence.

**Ms. Emmanuella Lambropoulos:** Are you of the opinion that Canada is already doing a good job of making sure that's happening or is there something more we could do to help promote what's being made in Canada?

**Mr. Mike Greenley:** We have had some good experience doing this in the past. I think there is a worry bead out there right now. If we look at domestic—like army, navy or air force—military activity right now, there seems to be a bit of a push to make sure that having interoperability and interchangeability with the United States means that we use U.S. systems a bit more. We're starting to see that with several procurements right now. We would not want to see that transition into space. We want to continue to leverage our space capability and to be interoperable using Canadian systems and not by procuring American ones.

**Ms. Emmanuella Lambropoulos:** I guess I'm going to open the floor to all the witnesses for this next question.

The Minister of National Defence came before our committee and noted that Canada's new defence policy is also an industrial policy. Earlier this year, at Aerospace on the Hill, Minister Champagne mentioned an aerospace strategy that would eventually come into play and that the government is starting to consider.

What role do you think your industry could play in this? How do you think this strategy would look for the companies represented here today? How would you contribute to this strategy?

**Ms. Michele Beck:** We were quite pleased to see the new defence policy being issued, and we're quite excited by the fact that the government recognizes as well the importance of space to the space defence policy. The industry is innovating at a very fast pace by making services, technology and capabilities available faster, at a lower price point, with probably greater capabilities than governments can move.

We feel that, from a supply perspective, we should be relied upon. We've got expertise that we have been developing for the past 55 years in the sector, and we can provide guidance, consultative services and insight in terms of these capabilities. We welcome the opportunity to work hand in glove with the government to advance these types of services and capabilities.

• (1130)

**Hon. Brian Gallant:** On the defence policy review, I just want to echo the comments of Michele. As an industry, we were very excited to see the way in which space is being talked about in the defence policy update and very happy to see that there's a clear recognition of the importance of space to national defence and security.

In terms of the strategy—the defence policy update, if you will—being an industrial plan, it isn't necessarily reflected in the written words of the plan, but I can certainly attest that in discussions with the department and even more specifically with the minister that clearly is the intent. It is certainly something that is supported. The idea that the defence policy update will be a way in which we can further engage and develop the industrial base for space we think would be important.

In terms of having an aerospace strategy, of course on paper the idea of having a strategy and a robust exercise to develop it certainly makes sense. One flag that we certainly would have is that space often risks being lost in the shuffle, as an afterthought, or as just not as much of a priority, when it's lumped in with the sort of general term of “aerospace”. That would certainly be a flag and a worry for industry.

**The Chair:** Unfortunately, we're going to have to leave it there.

“Space has the risk of getting lost in space.” That was really bad.

Madam Normandin, you have six minutes, please.

[*Translation*]

**Ms. Christine Normandin (Saint-Jean, BQ):** Thank you very much, Mr. Chair.

Thank you to all the witnesses.

Mr. Gallant, you said that Canada should among other things accelerate the implementation of identified space programs. I would like to know what exactly that means. What would that acceleration involve?

**Hon. Brian Gallant:** Quite simply, it means that the procurement process should be faster. I reference things happening outside our organization, but in terms of procurement related exclusively to defence, people are already complaining that it is too slow. For the space sector, the rapid pace of innovation is an additional challenge. If the procurement process takes ten years from start to finish, the service or space product that the government ultimately re-

ceives might be obsolete, unfortunately, given the rapid pace of innovation, and since other countries or individuals might have more advanced systems.

**Ms. Christine Normandin:** Thank you very much.

Ms. Beck, in your opening remarks, you said that Canada has a clear competitive advantage over other countries. What does that mean? In what way is Canada competitive? We know that Canada does not have a launching station for military satellites, for instance, so what is Canada's advantage?

**Ms. Michele Beck:** Our advantage is in the telecommunications industry.

Our company has been in business for 50 years. We operate satellites for government and for commercial purposes alike. We are in the process of developing a low-earth orbit satellite constellation. This constellation will offer services that cannot be compared to those of the geostationary satellites that we had in the past. This is something new. We offer very secure and very resilient low-latency services that the government, and in particular National Defence, can use to support operations not only here in Canada, but right around the world. It is a global constellation. This capability already exists, and we are now developing the constellation. Being able to offer those services directly here, in Canada, gives us a competitive advantage.

• (1135)

**Ms. Christine Normandin:** I gather you are referring to Telesat Lightspeed, and I would like you to reassure us a bit about that.

Last year, the Globe and Mail reported that Standard and Poor's had downgraded Telesat's rating, and that various governments had invested a lot of money in the form of loans or equity capital. Some Standards and Poor's analysts have said that by focusing on Telesat Lightspeed, your company might have put all its eggs in one basket.

Where do things stand a year later, financially speaking? How is the company doing?

[*English*]

**Mr. Stephen Hampton (Head, Public Policy and Strategic Accounts, Telesat):** In August last year, we announced that we had entered into a contract with MDA Space to build 198 satellites. We have funding arrangements in place to be fully funded. Since August, we've hired almost 150 people. We're looking to do significantly more this year. We're investing tens of millions of dollars. I think our capex guidance for this year is almost \$1.4 billion, so we are off to the races, and very excited about the future.

Michele, Brian and Mike have spoken to how the space sector is exploding around the world. Having a global, low-latency broadband network is truly a differentiator. From customers here in Canada and all around the world, we're hearing, "We need this. We need this. We need this."

We're very excited and very optimistic about the future.

[Translation]

**Ms. Christine Normandin:** In one minute, can you tell us how much progress has been made on Telesat Lightspeed? How are things going? What is your timeline?

[English]

**Mr. Stephen Hampton:** We'll start launching satellites in mid-2026. We'll enter global service toward the end of 2027, and then we'll continue adding satellites from there. That's the timeline.

[Translation]

**Ms. Christine Normandin:** Thank you.

Mr. Chair, I will use my remaining 40 seconds later on.

[English]

**The Chair:** You have 30 seconds. I'll pass them over to your next round.

Madame Mathysen, you have six minutes.

**Ms. Lindsay Mathysen (London—Fanshawe, NDP):** Thank you all for attending today.

A lot of you have spoken about this incredible opportunity for Canadian jobs. I wanted to ask about the jobs that are currently held through MDA Space. Unifor has been on strike since April 8. Its members are incredibly proud to be part of the production of those satellites and putting them into orbit.

Can you talk to us about the fact that MDA Space won't meet their demands for a cost of living adjustment and a fair pension? Can you talk to us about what you're doing and what steps you're taking to get back to that table and provide the incredible workers who do those jobs what they're asking for?

**Mr. Mike Greenley:** MDA Space has a great workforce. We're up over 3,000 people now. We had about 1,700 people when I started six years ago. We crossed the 3,000 line this year. We hired 900 people last year. We'll hire over 1,000 people this year. Certainly, the growth in space is turning into good jobs.

We have a history, as a company, of being able to work with all kinds of employees, both represented and non-represented employees, and I feel we have a very good human resources framework in being able to do that in terms of total compensation, our salaries and our benefits programs, which are actually very good.

I won't comment specifically on an active negotiation, but we do respect, certainly, the represented workers' desire to go on strike and to express themselves that way as part of the process of dealing with represented workers. We're optimistic that we'll come to a solution here as we go through the next few weeks.

**Ms. Lindsay Mathysen:** One thing New Democrats have done recently was our motion on Palestine, which included ending military exports to Israel. Of course, many Canadian civil organizations

have tried to track and report on Canada's arms export and trade regime. A lot of what we export goes towards Israel's space program. Have you—and I think I'll take that to Mr. Greenley and Ms. Beck—received anything from the government in terms of what the government promised, that the House would issue the notice to exporters and the ending of those exports? If you have any indication, received any communications from government or have any connection with that, I'm just curious about progress on that motion.

• (1140)

**Mr. Mike Greenley:** For me personally, we have export control teams in the company that deal directly with the government every day. Anything we export has to have the appropriate export permits from the Government of Canada, so that interface is there. I don't see all that daily traffic, so I honestly can't answer. I have not personally seen anything, but I wouldn't, normally: The export control teams would see that.

**Ms. Lindsay Mathysen:** Is this something you can report back on to the committee so we that can see if the government is following through on their commitments on that?

**Mr. Mike Greenley:** I can certainly go and ask, yes.

**Ms. Lindsay Mathysen:** Ms. Beck.

**Ms. Michele Beck:** Yes, likewise we do have an export control working group as well at Telesat, but to our knowledge—and I just checked with Mr. Hampton—we haven't heard of anything coming in to the company, but we'll take an undertaking and get back to you.

**Ms. Lindsay Mathysen:** Thank you very much.

The relationship we have with the United States in terms of that space domain has been strained at times because of the Americans' policies on foreign entities, like Canadian companies, for example, accessing the infrastructure and technologies they have. I ask this in terms of some of the commentary around the national space council: Is that something you believe that council could help to negotiate? Do you have any other recommendations in terms of that limit on the barriers that, mainly, the U.S. government—because it is so dominant in this field—has in terms of Canadian participation, sharing of data, that sort of thing?

**Mr. Mike Greenley:** Really quickly from me, we have a lot of mechanisms to work with the United States. Often, we just have to have the fortitude to exercise them to stick up for Canadian interests, and in our negotiations with the United States, to stick up for Canadian-built systems in combined force and combined government solutions. I think we can do that. I think the national space council could certainly help.

I'm sure Brian has something to say about that.

**Hon. Brian Gallant:** Thank you, Mike.

If I may add, whether you think that—“you” in the general sense—we need to compete with the U.S. and try to put our elbows up when it comes to our space sector or you think we need to collaborate more with the U.S., a national space council will help us do that. A national space council will help us get organized, obviously, and make sure we can be as nimble and as holistic as possible.

If I may, from the previous question that I didn't have time to completely finish answering, my worry about an aerospace strategy is that it would make it a siloed strategy—meaning that, perhaps, it's ISED that's focused on the strategy. However, I think that, when it comes to space, we really need a whole-of-government strategy that embodies the way in which other departments can play a role and what space can do for other departments. A national space council will help us have that holistic approach that we need to be a big player on the international stage, for all the reasons already discussed as to why space is already important. We think that makes a lot of sense.

When it comes to collaborating with the U.S., the U.S. wants countries, especially allied countries, to step up and, for lack of a better way of describing it, get their acts together. They created a National Space Council to coordinate their efforts, and I think it would be very well-received, from a collaboration point of view, if we do the same.

**The Chair:** Mr. Gallant, I apologize for having to cut you off again.

Colleagues, we've got 15 minutes left and 25 minutes' worth of questions. This math doesn't work, so we'll have three minutes each, and Ms. Normandin, two minutes.

Mr. Kelly.

**Mr. Pat Kelly (Calgary Rocky Ridge, CPC):** Thanks.

I'd like to start with, you, Mr. Greenley, just by unpacking a little bit of your testimony in your opening round and in response to some of the questions from Ms. Gallant. You were somewhat dismissive of the threat of a nuclear explosion in space, under I guess the thought that any such event disrupts all sides and it's not possible to just target an adversary.

You characterized it as the bluster of certain people, and we're talking about the bluster of Putin. We've ignored his bluster at our own peril. He has a proven track record of comfort with “war of attrition”, where he sacrifices his own equipment and the lives of his own people.

What would be a prudent defence response? I think we've got to do better than just hope that such an event doesn't take place.

• (1145)

**Mr. Mike Greenley:** To be honest, I think that was me expressing my personal opinions before, and I think the topic we're into here is certainly one for the military. On my previous comments about us needing to make sure that we get the appropriate clearances so industry and the military can collaborate when we talk about these things being essential, I don't feel I would be informed enough at this time.

**Mr. Pat Kelly:** Okay, good. This takes us to the first ask in your response. Where would you get your information if you don't have that security clearance?

**Mr. Mike Greenley:** You're left with unclassified information that the general public would have from the media or participation in conferences. Often what happens with security clearances is that the system has been established: if you have a contract whereby you need to be secure, then you can get the appropriate clearance. However, in this case we need to have the clearances so we can have the conversations to develop the capabilities to then get the contract. The government has to do things differently.

**Mr. Pat Kelly:** How will Canada ensure domain awareness in the Arctic when RADARSAT reaches its end of life? We've had testimony at this committee and in an Auditor General's report that show there's a gap coming. How can we prevent this coverage gap?

**Mr. Mike Greenley:** I think the RADARSAT+ will help by adding additional satellite capability into the constellation. You'll get some resiliency from that. Leveraging commercial services, which I—

**Mr. Pat Kelly:** If I may, I've got really short time, what about non-maritime domain awareness? Does your company, or is there technology available that can give us...? We've heard of huge gaps in awareness in the Arctic. Are there solutions at hand commercially?

**Mr. Mike Greenley:** Yes, there are solutions for non-maritime domain awareness, yes. Our Chorus system, for example, which combines what's called C-band and X-band, two different types of synthetic aperture radar, greatly enhances our capability to do non-maritime domain awareness.

**The Chair:** Thank you, Mr. Kelly.

Mr. Collins, three minutes.

**Mr. Chad Collins (Hamilton East—Stoney Creek, Lib.):** Thanks, Mr. Chair.

I'll start with Mr. Gallant, if I could.

Mr. Gallant, you talked about the high wages and the amount of R and D in the sector. What recommendations do you have for the Government of Canada as it relates to attracting and retaining top talent? This is supports for colleges and universities, and immigration policies that might help us to ensure the labour force you require in the short, medium, long term is here for the companies that are driving innovation here in Canada.

**Hon. Brian Gallant:** Those are certainly policies that could ensure we have the strong workforce needed.

However, there are two things.

The first thing is that we need to make sure we've chosen this to be a priority sector for us. There's immense growth projected for the next few decades in space, but if we don't, again, get our act together and make sure we're set up to seize those opportunities, we may not have to worry about the workforce as much.

The national space council could help us with the first thing mentioned.

My next thing would be ensuring that we have consistent investment in space. As you can imagine, in the past it's been very peaks and valleys when it comes to major projects and investments in space. I won't belabour that point. It's pretty evident. It's hard to keep a workforce recruited, retained and as productive as possible when you have those sorts of peaks and valleys that affect our large space companies, but also the SMEs in the ecosystem as well.

**Mr. Chad Collins:** Thank you for that.

Ms. Beck, we've heard testimony in this meeting and others that with increasing competition, there'll be more congestion in space. I think the Government of Canada needs to develop some policies relating to being a responsible actor in this space.

What policies or recommendations should we adopt to ensure that the Canadian companies we're working with are responsible actors in space?

What steps should we take to ensure that we're protecting the infrastructure that you have in the earth's orbit?

**Ms. Michele Beck:** Thank you.

I think the space council can help develop the right policies to ensure that space remains available and remains a protected area. The space council can also identify regulations for at least Canadian companies to operate in and abide by those specific regulations.

Today, we work through ISED and CSA in terms of the regulation, but a space council would bring together the global interests and ensure that space remains secure and available.

• (1150)

**The Chair:** Thank you.

Madam Normandin, you have one minute and 30 seconds.

[*Translation*]

**Ms. Christine Normandin:** Thank you very much, Mr. Chair.

Mr. Greenley, you have an impressive track record in the defence sector. You talked about the challenges relating to classified information, which prevent the industry from perfecting products for the defence sector.

Everyone has talked about dual-use goods and technologies. I would like to hear your thoughts on the relationship between the civilian and military sectors. Do dual-use goods and technologies help accelerate some aspects of procurement or, on the contrary, do the specific characteristics of the military sector slow down certain projects in the civilian sector? I would like to hear more about the interaction between the civilian and military sectors as regards space and telecommunications in particular.

[*English*]

**Mr. Mike Greenley:** I think that dual-use technologies would mean that they could be used for both civil and military purposes. We're increasingly seeing the opportunities for dual use. In space, we've talked about earth observation, which we use for climate change, climate detection, immigration detection or deforestation detection, for example. It's the same technology that we use to detect things for military operations.

Telesat's example of providing high-speed communications for civil purposes can absolutely be reused for military purposes.

Work that we do on servicing spacecraft with robotics and servicing satellites could also be used for military purposes someday in satellites.

The same technology can be used for both. I think the important thing in military procurement is recognizing what the core capability is and that they can benefit from dual use of civilian capability. We don't have to perfectly customize everything for military purposes every time.

**The Chair:** Thank you.

Ms. Mathysen, you have one minute.

**Ms. Lindsay Mathysen:** Throughout the Cold War, the International Space Station represented a shared project. It brought the world together in difficult times. Throughout the Apollo-Soyuz project, we saw it help in terms of co-operation throughout the Cold War detente.

As we are now seemingly moving away from the International Space Station towards commercialization of a space domain, what wider implications does that have for diplomacy? What can we do to ease that tension up in space that we feel here on the ground?

**Mr. Mike Greenley:** I think that the commercial space stations are going to be very international. A lot of different countries are going to want to get access to those. They'll be like large, commercial, collaborative industrial parks.

If we look at the moon, we have 36 countries now on the Artemis program. We had six countries collaborate on the International Space Station. For the Artemis accords, we have now had 36 countries sign up with the United States to collaborate on the moon.

The actual level of geopolitical collaboration on the next hardest problem.... The hard problem used to be having the space station. Now the hardest problem is going to live and work on the moon.

The amount of participation globally now—having 36 countries working together—is tremendous. We also have another group—

**The Chair:** Unfortunately, we're going to have to leave the answer there. Thank you.

Mr. Bezan, you have three minutes.

**Mr. James Bezan (Selkirk—Interlake—Eastman, CPC):** Thanks to our witnesses for being here.

Mr. Greenley, you talked about the Chorus satellite constellation. Is that in service already?

**Mr. Mike Greenley:** No, that's in development. It'll be launched in the fourth quarter of 2025.

**Mr. James Bezan:** Will it be commercially available when it is launched?

**Mr. Mike Greenley:** Yes.

**Mr. James Bezan:** Is it considered an ISR platform?

**Mr. Mike Greenley:** Yes.

**Mr. James Bezan:** Who would be able to use it outside of the Government of Canada, if it's an ISR platform?

**Mr. Mike Greenley:** We will have customers on our current RADARSAT-2, which we own and operate. We would have customers in 25 countries around the world. Defence and intelligence agencies around the world would contract us to provide them with surveillance.

**Mr. James Bezan:** Would that include near-peer and adversarial nations?

**Mr. Mike Greenley:** It includes countries for which we have export permits from the Government of Canada to deliver a service.

**Mr. James Bezan:** Okay, so that would be screened, and there's a safety check there that would come from Foreign Affairs.

**Mr. Mike Greenley:** Absolutely, all the time, and it changes based on the geopolitical situation.

**Mr. James Bezan:** Both you and Telesat have talked about security clearances. Is the government chronically overclassifying information to make it difficult for Canadians and for a Canadian industry to understand the needs and threats that we're facing?

• (1155)

**Mr. Mike Greenley:** No, I don't think so. The level of classification and information is appropriate. It just makes sure that the people who need access to that are cleared and approved.

**Mr. James Bezan:** That also provides more of a bureaucratic slowdown and red tape to get people cleared in a timely manner. We hear over and over again that not just industry representatives but also people who work for the Government of Canada, including the Canadian Armed Forces, can't get their security clearances.

**Mr. Mike Greenley:** Yes.

**Mr. James Bezan:** Go ahead, Ms. Beck.

**Ms. Michele Beck:** In some instances, there could be more open dialogue with the parties that are supplying the services. If it's just shared on a need-to-know basis, it would facilitate an exchange.

**Mr. James Bezan:** The problem with that is that, whenever the government has a need-to-know basis, they always determine that you don't need to know. That's the easy way out.

My question, then, comes down to this. You both have National Defence contracts already. Why were those security clearances that you had for those projects not continued forward on future contracts?

**Ms. Michele Beck:** We were asked to get security clearances two years ago. They were fast-tracked for Telesat. It was never indicated why we needed these top security clearances. We were told that we would be consulted shortly. That consultation never came. We're still waiting on the sharing of information.

We believe that it was associated with the creation of the commercial integration cell activity work that is about to launch, frankly. We do have clearances, and we're waiting to have these very open dialogues and exchanges of information pertaining to the security of satellite communications aspects at least.

**The Chair:** Thank you, Mr. Bezan.

For the final three minutes, we'll go to Mr. Fillmore.

**Mr. Andy Fillmore (Halifax, Lib.):** Thank you, Chair.

Thank you very much to the witnesses.

Time has become short, so we're going to go a little quickly here.

Mr. Greenley, it's nice to see you again.

In your limited time in your opening statement, you didn't have much time for detail to go into what you said about this notion of global fairness and Canada's seeming to be negotiating with itself. Could you take a little bit of time to expand on that?

**Mr. Mike Greenley:** It's a regular pattern internationally where-by countries, especially on defence and security issues, will leverage their domestic industrial base from a sovereignty and security perspective. As a result of this, they don't worry themselves with making sure that they have international competition and that other countries' firms can come in and compete. It is very natural to be able to say that you want to work with Canadian-domiciled companies, for example, to be able to deal with defence and security issues as a matter of first priority.

For example, if Canada were going to get communications, they wouldn't use Starlink or maybe OneWeb, which would be American-based or European-based. They would work with Telesat once it's operational, because it's Canadian-based, as an example, for a military purpose. It's very natural for countries to do that.

Often, Canada has a view, it would appear, on defence procurement that it's important to have global open and fair competition, which allows equal fairness to Canadian firms and international firms on defence and security issues. Canada tends to be a bit unique in that regard. Other countries don't worry about that. That's what I meant by Canada's negotiating with itself.

**Mr. Andy Fillmore:** Thank you very much.

Mr. Gallant, it's nice to see you again.

I wonder if you could talk about how industry in Canada is doing relative to industry in our allied and partner countries. Also, can you think about framing your answer in terms of recommendations? What can government be doing to ensure that Canada is keeping up and not lagging?

**Hon. Brian Gallant:** I won't repeat everything that we discussed today, because I think a lot of the conversation regarding developing the industrial base will be a big part of it.

For us, what would be really nice to see is Canada even just having the same share of the global space sector that it enjoys in the overall global economy. Right now, we're punching below our weight. When it comes to the global economy, we have a higher percentage than we have for the global space sector.

An interesting recent report published by Deloitte makes the case that if we look at the exponential growth that's predicted for the space sector from now until 2040, if we can grab the share of the global space sector economy by 2040 that we enjoy right now of the overall economy, we will have a \$40-billion space sector in Canada, which would be amazing.

That's just punching at our exact weight. It's not too much of a stretch.

• (1200)

**Mr. Andy Fillmore:** Thank you.

Ms. Beck, you mentioned the commercial integration cell. Brigadier-General Adamson, the commander of 3 Canadian Space Division, mentioned that last week as well.

What would you have the committee know and understand about the commercial integration cell so that we can help support the industry in Canada?

**The Chair:** Answer very briefly, please.

**Ms. Michele Beck:** I think it's really going to be forum to exchange information on threats relating to space operations.

For us, if we see anything that we feel is threatening either our current satellites or our future constellation, we will share that with DND. Likewise, whatever information they feel is appropriate to share, they will.

Hopefully, we can talk about some best practices and innovative ways to protect our fleet and telecommunication services just generally.

**The Chair:** Thank you.

Unfortunately, we have to bring this hour to a close. I would have preferred a more relaxed atmosphere, where I'm not running such a hard clock, but it is what is.

Colleagues, I would say that all of the conversations we've had about this have been very fascinating, and we may think of expanding this study.

With that, I want to thank each of you for your presence and your patience with us. You've been a significant contributor to our study.

Colleagues, I will ask the witnesses to leave so that they can be replaced with the new ones.

We'll suspend for a minute or two while that happens.

• (1200)

(Pause)

• (1205)

**The Chair:** We will bring this meeting back to order.

We have with us for our second hour from Maritime Launch Services, Stephen Matier, who is the president and chief executive officer. From NorthStar Earth and Space, we have Stewart Bain, who is the CEO and co-founder.

With that, I'll ask Mr. Matier for his opening five-minute statement, please.

**Mr. Stephen Matier (President and Chief Executive Officer, Maritime Launch Services Inc.):** Thank you very much.

I appreciate the opportunity to be here, Mr. Chair and honourable members of the Standing Committee on National Defence.

My name is Stephen Matier. I'm the founder, president and CEO of Maritime Launch. We're headquartered in Halifax, Nova Scotia.

I'm honoured to be here today to address the House of Commons Standing Committee on National Defence regarding the current state of Canadian space defence capabilities and programs, including the impact of advancements in space on Canada's sovereignty and national security. The perspective and focus that I will bring to this discussion is related to the crucial need to have assured access to space for Canada through the development of domestic launch capability and its significance to Canada's national defence.

If I may, I'll take a moment or two to give you a brief on my background and what brings me here.

I have 35 years of experience in the space launch industry. My career has been dedicated to advancing space exploration and ensuring mission safety. I've had the privilege of leading teams at the NASA White Sands Test Facility, where I worked on the space shuttle program and was awarded the esteemed astronauts' Silver Snoopy award and the Space Flight Awareness award for continued commitment to safety in human space flight. Following my tenure at NASA, I transitioned into consulting, focusing on spaceport development in the U.S. and internationally, supporting the regulation, development and operation of numerous sites, including at Spaceport America, Space Florida and others.

Drawing on my expertise, I was commissioned by a renowned launch company to explore potential locations for spaceport operations in North America, where most of the globe's satellites are manufactured. Through extensive research and analysis, it became evident that Nova Scotia, specifically near the town of Canso, offered unparalleled advantages for Canada's first commercial spaceport, Spaceport Nova Scotia.

Our geographic positioning in Nova Scotia provides an optimal launch site for our clients to place their satellites into the desired orbits by launching south and/or east over the Atlantic Ocean. This range of trajectories is highly desirable to these clients, and it is not easily replicated anywhere else in the North America. Spaceport Nova Scotia can place satellites exactly where satellite operators need them to be for global broadband connections, near-earth imaging, security services, etc.

We expect the construction alone to contribute \$171 million to Canada's GDP and boost employment by an annual average of 1,600 full-time jobs across Canada, with 748 of those within Nova Scotia. Once operations are fully ramped up, we expect it will add around \$300 million to Canada's GDP annually, boost revenue to governments by more than \$100 million and create close to 1,000 full-time jobs across Canada.

Developing Canadian launch capability is an economic opportunity that we can't afford to miss, but there is another key factor that raises the importance even more and is my reason for being here today. That is the importance of domestic launch capability to Canada's national defence strategy.

Canada depends on the performance of its own technologies in space in our everyday life. We rely on satellite technologies for communication, surveillance, reconnaissance, navigation, farming, greenhouse gas and weather monitoring, etc., but we've always relied on other countries for launch. Given the turbulent world we live in, with threats and opportunities in space, there is a clear imperative for domestic launch infrastructure. Coupling this with the rapid growth of the commercial space sector, as well as the saturation of existing launch capabilities in other countries, specifically the United States, the necessity for our own launch capability has become a vital piece of transportation infrastructure. If the launch sites we have used internationally over the decades are overloaded or are disabled for any extended period of time, we would not have any means to deploy our technologies. Our global partners are looking for us to be there for them as well. Our location in North America is unique.

Orbital space launch is the missing piece.

In January 2023, Maritime Launch was extremely pleased to attend the Government of Canada's announcement to enable commercial launch at the Canadian Space Agency. This announcement committed to modernizing Canada's launch regulations.

We also learned recently that the Government of Canada is finalizing negotiations on a technology safeguard agreement with the United States. This agreement is critical to the advancement of launch capability in Canada, as its approval will allow for access to mature U.S. launch technology and, importantly, for U.S. satellites to be able to launch from Canadian soil.

• (1210)

Not only does this bring direct foreign investment into the Maritimes; it also provides for the controls to be able to support the joint interests of secured access to space for our joint North American defence. Economic opportunity is the first, national security is the second and alliance strengthening is the third major reason.

**The Chair:** Thank you, Mr. Matier. I apologize for having to rush you.

Mr. Bain, you have five minutes, please.

[*Translation*]

**Mr. Stewart Bain (Chief Executive Officer and Co-Founder , NorthStar Earth and Space):** Good afternoon, Mr. Chair and distinguished members of this Standing Committee on National Defence. It is my honour and pleasure to testify before you today in support of your work on the state of Canadian defence space capabilities.

Today, I am here as the founder and CEO of NorthStar Earth and Space. I was born and raised in Montreal. I am an aerospace engineer and began my career in the space sector here in Ottawa, in the late 1980s. At that time, I was working on the RADARSAT mission for CAL Corporation, which became MDA Space, in Montreal, and Honeywell, in Ottawa. Since then, my work has taken me all over the world many times to pursue innovative business opportunities and to develop new and innovative products and technologies.

Headquartered in Montreal, NorthStar is a Canadian company that has leveraged more than \$140 million, primarily from Telesystem Space, an alliance between Telesystem in Montreal and Rogers in Toronto. NorthStar has strong business interests in the United States, Europe and Japan, and soon in New Zealand as well, but it will continue to represent Canadian values.

[*English*]

The global space economy was estimated to be \$550 billion in 2023. According to the U.S. Space Foundation, this economy will be worth nearly \$2 trillion U.S. by 2035, of which 80% qualifies as commercial activity. With this, I encourage the Canadian government to embrace the challenge mentioned earlier by witness Mr. Gallant and presented in a report by Deloitte of maintaining its 2% economic role in the global economy within the rapidly growing space economy to achieve \$40 billion by 2040, or 40 by 40.

This is achievable and critically necessary to provide Canadians the security and economic benefits expected from, and Canada's role in, the global space economy. Broad and positive trends created in and from space are increasingly at risk, from both natural and man-made space debris and increasingly nefarious actions in space.

[Translation]

NorthStar's mission derives from the following question: How can the 300 billion cubic metres of space close to Earth be effectively monitored, accurately and in a timely manner?

To achieve that, NorthStar's multidisciplinary team creates products that go far beyond data collection. NorthStar builds on global advancements in data fusion, artificial intelligence and advanced modelling and simulation technologies to transform the data collected into information that is usable in real time.

• (1215)

[English]

Currently, space surveillance is accomplished mainly through government and commercial ground-based systems, which are inherently limited by atmospheric and geography. On January 31 of this year, NorthStar launched the first-ever constellation of space situational awareness satellites to actively survey all near-earth orbits from space. With a plan to achieve 12 satellites as soon as the end of 2025, NorthStar is years ahead of any competing system in the world. In this context, NorthStar serves as an active sentinel and early warning system capability for military and civil safety, giving all operators more timely, reliable and accurate information to assess risks and protect or manoeuvre valuable assets in a safe manner.

Recently, NorthStar was one of only two companies, from a pool of almost 60 American, to receive a contract from the U.S. national Defense Advanced Research Projects Agency, or DARPA, for their first-ever Space-Watch program. NorthStar is active in the U.S., Europe and Japan on many other commercial initiatives.

Commercial enterprise needs a strong signal from its domestic government about the utility of its capability. NorthStar's recent successes create a great opportunity for the Canadian government to leverage private capital and invoke the unique aspects of commercial business that the government must track to gain maximum leverage of innovative commercial space capabilities.

[Translation]

In closing, thank you for the opportunity to provide testimony today. NorthStar welcomes any and all efforts to enhance Canada's space future. That includes Canada's defence interests, both at home and in partnerships abroad.

I look forward to your questions.

Thank you for your attention.

[English]

**The Chair:** Thank you to both of you.

We do have a six-minute round, but I don't think we're going to do six. We'll go to five and then hopefully in the second round we can get closer to where we should be on the second round.

Mrs. Gallant, you have five minutes.

**Mrs. Cheryl Gallant:** My questions are for NorthStar.

Were an adversary to detonate a nuclear device in low-earth orbit and knock out a satellite, how is your company equipped to track the damage from the space debris generated in the aftermath?

**Mr. Stewart Bain:** We've actually already done that. We've participated internationally with sprint advanced concept training, SACT, since 2019, which is organized by the Department of Commerce and the Department of Defense. NorthStar has been an active member on a volunteer basis to demonstrate our capabilities.

In November 2021, there was an anti-satellite test done by the Russians. They took out one of their own satellites and the world turned to NorthStar to track that debris.

We've already had experience doing that and we would continue to use that skill in such a circumstance.

**Mrs. Cheryl Gallant:** How prepared is Canada to deal with a nuclear detonation in space? Are you in regular contact with DND, CAF or the federal government?

**Mr. Stewart Bain:** How well prepared we are is dependent on how much we are monitoring the activity in space. My experience and my knowledge of that is more towards my interactions with the U.S.

If you'll permit me, I'll say that we don't have a wide field-of-view system.

To go a little technical, the way I describe NorthStar is that we are a wide field-of-view system. We see all the earth's orbits, from LEO to MEO or medium-earth orbit where the GPS satellites are, to geostationary, to cislunar, simultaneously. This capacity does not exist. We are not actually well prepared to track all activities in space generally amongst the allies.

NorthStar does maintain a relationship with the Department of National Defence here in Canada. We're looking forward to expanding on that now that our satellites are launched and our services available.

**Mrs. Cheryl Gallant:** What is the lag time between a space occurrence and the detection of any related space debris created?

**Mr. Stewart Bain:** If I understood the question, the debris is created instantaneously upon impact.

**Mrs. Cheryl Gallant:** How long does it take NorthStar to detect that?

**Mr. Stewart Bain:** You would detect it immediately if you had a sensor in place. The worst-case lag time for us would be a matter of hours. Typically, we can see something within minutes.

**Mrs. Cheryl Gallant:** What's the minimum detectable size of debris?

**Mr. Stewart Bain:** We can see one centimetre in low-earth orbit, seven centimetres in medium-earth orbit and 40 centimetres in geostationary orbit.

**Mrs. Cheryl Gallant:** Given that Chairman Xi is overturning the world's rules-based order, how likely is it that any treaties with respect to space debris would be adhered to?

• (1220)

**Mr. Stewart Bain:** I'll try not to wax political, but I wouldn't rely on a treaty to protect my assets in space.

**Mrs. Cheryl Gallant:** Does China have capabilities similar to those of NorthStar Earth and Space?

**Mr. Stewart Bain:** If they don't, they will have them soon.

**Mrs. Cheryl Gallant:** What is the reaction time to the occurrence of a space debris detection versus the time it takes a space asset to be aware of it?

**Mr. Stewart Bain:** You're speaking of data latency. It's a great question.

We just launched four satellites. We actually need a critical mass of 12 satellites to be able to detect with the sufficient latency that fits within the specifications of minutes. You're talking about minutes or seconds.

You need more satellites monitoring more often and picking up objects multiple times during their orbital pass to get low covariance, which is the error associated with where objects are in space.

It's a digression of a question, but the exact location of objects in space is a mathematical calculation, so it takes a while to figure that out.

**Mrs. Cheryl Gallant:** I have one for our other witness.

I understand that some low-earth orbit satellites can be launched from a C-17 now. They're going towards large aircraft for launch.

Will this impact the necessity or any of the business that you have lined up with respect to your company?

**Mr. Stephen Matier:** It doesn't, in that the market is so large.

As Stewart pointed to, with the size of the market now with the tens of thousands of satellites that people are intending to put into low-earth orbit to provide services to the world, we're not looking to take any sort of large work share associated with that.

Then there's the entire aspect of logistics and cost associated with a C-17 or some other transport doing it.

**Mrs. Cheryl Gallant:** Are there any plans to launch military-purpose satellites from your spaceport in Nova Scotia in the near future or will it launch strictly commercial satellites into space?

**Mr. Stephen Matier:** We certainly have interest from DND in what we are doing here. We also have interest from the United States Space Force.

**Mrs. Cheryl Gallant:** Thank you.

**The Chair:** Thank you, Mrs. Gallant.

[*Translation*]

Ms. Lapointe, you have the floor.

Welcome to the committee.

**Ms. Viviane Lapointe (Sudbury, Lib.):** Thank you, Mr. Chair.

[*English*]

Mr. Bain, you and your company talked about meeting the challenges of the new space economy. Could you describe for us what you see those challenges are?

**Mr. Stewart Bain:** The challenges of participating in the new space economy are that it's moving very quickly, so traditional procurement techniques and the ability to transform research and development into monetized commercial activity is the biggest challenge. When we talk about acceleration of activities in space, we talk about the ability to monetize early and quickly and then to grow. NorthStar as a private enterprise raised \$140 million not just to develop technology but also to build and launch four satellites. If you do that on a grassroots, bootstrap method, you end up being fairly slow at how you get there.

It really is accelerated by the adoption of those products and by having a strong signal. Having those products adopted by your domestic government is very helpful in doing work internationally. Barring that, you have to be pretty aggressive to get into other procurement cycles. This year, the procurement cycle in the United States has been fairly hampered by their budget issues. It all really comes down to how quickly we get from the identification of a demand from the government and the procurement plan, so the procurement plan is the weakest link.

**Ms. Viviane Lapointe:** In your opening statement, you talked about some strong signals that needed to be seen by government. Tell us what those strong signals look like. What would they be and constitute?

**Mr. Stewart Bain:** In a word: a contract.

**Ms. Viviane Lapointe:** Can you expand on that?

**Mr. Stewart Bain:** Buy our services.

I don't think I'm telling any secrets. The OECD has written reports for decades about how Canada does extremely well at developing R and D and then watching that go somewhere else. We are at the precipice of that point as NorthStar, as many other commercial entities are in Canada.

There was a question in the previous panel asking how we retain talent: Make sure there's a business here. People stay for economic reasons. They sound like complicated issues, but they're very simple. When there are good jobs to be had and there are good missions going on, we have no hard time attracting talent at NorthStar. Unfortunately, most of it goes to Luxembourg, where we have our European head office, and to the United States. Attracting people in Canada is a little bit more challenging, because it's not as commercially open in that context.

That's meant as a constructive criticism, by the way.

• (1225)

**Ms. Viviane Lapointe:** The previous witnesses talked about how Canada is falling behind and how we're at risk of declining relevance in this sector. What challenges do you foresee for Canada specifically in expanding its role in the space defence sector? How do you propose we overcome those?

**Mr. Stewart Bain:** It's not a secret either that Canada is by far—and I underline “by far”—the lowest contributor to space of all G7 nations. That's a huge impact to anybody who wants to start a company here, attract talent here or build innovative technologies here. I think that needs to be addressed at a policy level and at a strategic level.

The good news is the voice in the wilderness, me. My screaming for a few years now has managed to convince Space Canada, of which I'm a board member, to lobby the Canadian government to have a national space council.

The chairman of the board of NorthStar's U.S. entity is Kevin O'Connell, former director of the Office of Space Commerce under the previous administration. He helped set up or re-set up the National Space Council, and we brought him here several times to witness and testify to several people about the importance of having a national space council.

Setting that up properly is also very important. I want to emphasize, given the opportunity here, that it cannot be run by a specific government department. It must be run by the whole of government, and it must come from the Prime Minister's Office. That's the way it works in the United States, and that's the way it needs to work here. I'm very happy that we have a national space council, but if we bring it down to the departmental level, we don't get whole-of-government coverage, and we must have that.

We don't have time to waste on iterating and seeing if we can make it better. Space is moving too quickly. The actions are too menacing, and everyone is feeling it. I feel it in the questions that people are asking. You're quite aware of the challenges we're facing, so I would say that we need a national space council that has national recognition from the Prime Minister's Office.

**The Chair:** Thank you, Ms. Lapointe.

[Translation]

Ms. Normandin, you have the floor for five minutes.

**Ms. Christine Normandin:** Thank you very much, Mr. Chair.

Mr. Bain, my questions will be along the same lines.

Without saying so specifically, you let it be known that you are a prophet without honour in Canada. You have contracts all of the United States, Europe and Japan.

Is there one main reason that Canada has not yet signed a contract with your company? Can it be attributed to a combination of factors, such as the fact that Canada does not have a strong link to its industrial base, that it does not invest much, and that it tends to invest elsewhere, in products that are already on the market, for instance? Is it a combination of factors or is there one factor in particular that has not yet been mentioned?

**Mr. Stewart Bain:** There is a military saying that if you don't have a strategy, everything is a good idea. Canada does not have a strategy. I have been working with the Canadian Space Agency for more than 30 years, and the last time there was a long-term space strategy was 25 years ago.

There is frustration on both sides. The government is just as frustrated as private companies that there is no policy stipulating the priorities and areas that should be invested in. We take a more ad hoc approach. There is too much vagueness surrounding the decisions that have to be made. It is not entirely vague, but it is not fixed either. It is not something that can be followed properly, in a strategic way. That has to be corrected.

Once again, the answer to this kind of problem is to establish a national space council, develop a strategy, and provide the necessary tools.

If the government's commercial priority does not match what NorthStar sells or will be selling in the future, we will make strategic decisions accordingly. But when things are not clear, they are not clear.

**Ms. Christine Normandin:** You also answered a question from my colleague Cheryl Gallant, saying that debris can be detected very quickly when there is a collision.

To whom is that information forwarded? I imagine it would be sent to your clients. In that regard, I gather that Canada is completely in the dark when something happens in space. Is that correct?

**Mr. Stewart Bain:** I want to stress that Canada is very involved, that it works with the Americans on sites in the United States and with its allies in the Five Eyes and NATO, and plays very important roles in that regard.

Nationally, however, we are not in a position to sell our data directly to Canada.

**Ms. Christine Normandin:** On the other hand, I understand that the technology you have developed provides much more accurate data and detects objects much better, and that is all under Canada's radar right now. Is that correct?

**Mr. Stewart Bain:** Yes, that's correct.

• (1230)

**Ms. Christine Normandin:** Thank you very much.

Mr. Matier, you mentioned the fact that, since there is no launching station here, we have to use stations in other countries. You also said that the market is saturated right now.

How is it decided who has priority access to launching ramps? Is priority given to the government of the country where the launching ramp is located, or is it given to a company? How does that work?

[English]

**Mr. Stephen Matier:** There are two major points to that. One is that the location matters a great deal, the space close to Florida, where you can put them into a particular trajectory into orbit, where you need them, or at Vandenberg, for example, on the west coast. Finding those locations is difficult, so location really matters for those satellites and where they're going to go into orbit to be useful.

The second part, of course, is that all the other ones internationally, especially in the United States, are government ranges. Government ranges have priority. They will kick everybody else out. For SpaceX and so on, most of what they're doing is launching other people's government missions along the way and then, in their case, flying their own satellites along the way.

So the bottleneck is space. When you build satellites on the ground, there's only one way to get them into orbit and that's to launch them. They're launching two or three times a week out of Florida and they can't keep up that tempo. All of these new launch companies are coming online and new satellites are coming online, so how are we going to get them all up there to provide service? That's where I think that opportunity is.

[Translation]

**Ms. Christine Normandin:** Thank you.

I will save the rest of my speaking time for later on, Mr. Chair.

[English]

**The Chair:** Okay. That's 30 seconds again.

Madam Mathysen, go ahead for five minutes.

**Ms. Lindsay Mathysen:** Mr. Matier, the fact that Canada hasn't had a satellite launch capacity to date has been a significant issue. I know that in the research you've done and the building you've done, there have also been a lot of environmental and safety concerns from the area, from the residents around there.

Can you talk about what your company's doing to ensure we're within regulations? Or maybe there aren't enough regulations—not in terms of the company but certainly in terms of the people—so maybe you can talk about the conversation around that.

**Mr. Stephen Matier:** There is a nationally recognized regulatory framework associated with spaceports in particular. I came out of doing that in the United States, working on a number of spaceports, which I have actually licensed, including in terms of environmental assessments and how you can care for the territory. It's not just the land around it; it's the space, the water and everything that goes along with it.

So working to deliver on that environmental assessment and getting that approved in 2019 was a really big piece for us, and it was really modelled after the work I've been doing in the United States on a number of similar locations.

**Ms. Lindsay Mathysen:** Is there still work that needs to be done to further that in order to help industry, but also to ensure the safety of residents?

**Mr. Stephen Matier:** It's on the execution side now. We have the permission. They looked at every worst-case scenario for a launcher that can carry five tonnes to low-earth orbit. They “worst-cased” it, even using propellants that we're trying to move away from as a global industry.

Nonetheless, we got that qualified and found that we can do it safely, and we had both federal and provincial participation in that.

**Ms. Lindsay Mathysen:** In terms of what we've learned from the States, you talked about SpaceX and its domination of the private sector. What should we be worried about here in Canada on that end, with the government and regulations versus that monopoly over the launch industry?

**Mr. Stephen Matier:** We're behind the other Five Eyes countries, for sure. We started ahead, and the U.K.'s leapt ahead of us. It has a technology safeguard agreement. It has the regulatory framework. It's been making investments in the infrastructure for space for development, even though it's on the wrong side of the pond for launching a satellite.

We really have a huge advantage by being where we are and with the timing of it matching what the industry has in place right now.

Transport Canada is working to model after the U.S. part 450 regulations—that's great; that's the world I come from—and part 420 of those licensing regimes. I'm comfortable with those, and I think I can help bring and deliver there.

The agreement through the Minister of Transport is that we'll use existing CARs to be able to do the case-by-case launch, while we're maturing the rest of that regulatory framework over the years ahead.

**Ms. Lindsay Mathysen:** Mr. Bain, in the discussions around the nuclear detonation tests, I believe you were talking about what you saw through the American tests. That was only on other satellites and equipment up in space.

Is that correct?

● (1235)

**Mr. Stewart Bain:** Let me back up on the details.

The question was on a nuclear explosion in space and how would we detect that. I said in the same way we would have done it during the SACT drill that we were part of in 2021, when the Russians performed an anti-satellite test, ASAT, but they did it with a conventional weapon on their own satellite. They destroyed their own satellite.

Several countries have done this. NorthStar and many other companies around the world have signed anti-satellite treaties.

The experience we have was gained by them doing it with a domestic rocket, a traditional weapon, on their own domestic satellite.

**Ms. Lindsay Mathyssen:** There's no known understanding, then, of what a non-traditional weapon—

**Mr. Stewart Bain:** If you're going to use a nuclear weapon, it would be much more expansive in terms of the damage.

First of all, like anywhere else, a nuclear explosion in space is absolutely unacceptable at any level. It's the same with an ASAT test.

I'm an environmentalist. You don't want to put any explosives up in space, because the debris stays for decades. It goes up and it goes out, because you're shooting from the ground, and it tends to go up further. The further it goes up, the longer it takes to come down, based on gravity.

It's not acceptable. There are various orbits in space that are prime real estate. SpaceX occupies the most prime real estate. That's a chain they call the Starlink orbit. It's very heavily populated. Causing a chain reaction in that orbit would be devastating to communications.

**The Chair:** Thank you.

Mr. Kelly, you have five minutes.

**Mr. Pat Kelly:** In the same vein, how much existing debris currently inhibits potential low-earth orbits?

**Mr. Stewart Bain:** There are 130 million pieces of debris flying around in space uncontrolled. Each one poses a threat to operating satellites. I'll come back to the question, but our system is designed to help people navigate around that debris.

To put it in different terms, it's like Highway 401. Imagine every car that's ever had an accident on the 401 is still there, and you have to drive around it. That's the way space is operating right now.

**Mr. Pat Kelly:** The obviously exponentially larger space for potential satellite orbits is a factor.

I'm asking if there are prime pathways or prime orbits that are threatened by this debris. Are there areas where an operator would say, "I can't launch this satellite because of the debris hazard"?

**Mr. Stewart Bain:** It's already happened.

Our launch was delayed, other launches get delayed, because there was a debris cloud flying overhead. We never used to deal with that before, and I'm talking not so long ago.

**Mr. Pat Kelly:** What are the sources of debris? What creates debris?

**Mr. Stewart Bain:** It's man-made things that have expired in space or collisions in space, which are not as many. It's leftover pieces of equipment all the way back to Apollo.

**Mr. Pat Kelly:** In Ms. Mathyssen's question, she talked about weapons in space and about the potential of a catastrophe. We've had testimony about a nuclear explosion in space.

We've crossed over a lot of unthinkable events in fairly recent years, so we have to no longer accept that something is unthinkable.

You would have thought the war in Ukraine would be unthinkable, but it happened, so let's not be restrained by what we think is unthinkable.

How best can Canadian policy-makers deal with the threat? Is there a way to secure or to mitigate the risk of unthinkable events in the weaponization of space?

**Mr. Stewart Bain:** I like the way you're thinking. The answer is you can't move fast enough. Objects in space move at 16 kilometres a second. You don't have time to react; you have to predict in advance.

During the French part of my presentation, when I talked about what NorthStar does, we do what nothing else in the world can do. We'll look at space, and then we'll use artificial intelligence and algorithms to predict where objects are going to be in 48, 96 or more hours, giving people enough time to move out of the way.

This capability needs to be embraced generally. I'm obviously biased by saying buy NorthStar's capability, but you can't go buy it anywhere else. Canada is actually a world leader in this technology and this capability.

That is the type of system that must be adopted. My meetings with the Pentagon, again, we're non-classified. I can have as many discussions as I like about what the general problem is. I'm trying to monitor 300 trillion cubic kilometres of space.

• (1240)

**Mr. Pat Kelly:** We heard in the previous panel though that industry is being limited by the lack of getting classified briefings. In other words, industry doesn't know what the threat analysis of the government actually is because it's classified.

Do you see a loss of business opportunity for lack of the correct information from policy-makers about their actual defence needs?

**Mr. Stewart Bain:** I was in the Pentagon two weeks ago. I have no lack of information to know what my system needs to do to be able to deliver.

**Mr. Pat Kelly:** What about from the Canadian government, though?

**Mr. Stewart Bain:** I don't have those types of meetings with the Canadian government.

**Mr. Pat Kelly:** Would they be commercially beneficial?

**Mr. Stewart Bain:** To me, they would.

**Some hon. members:** Oh, oh!

**Mr. Pat Kelly:** But they're not happening.

You do understand this is not to be a platform to sell the business. For any defence contractor to be able to supply the Canadian military the services that it needs, do they get the information they need to be able to tailor products or create products?

**Mr. Stewart Bain:** You're asking a really deep question. I will not speak on behalf of DND; they have a policy and a procedure they have to follow when they set their priorities.

My stock answer on that question is, where's the national space council? Where's the national space policy? Where are the priorities that we can follow and identify so that we can move forward? Without that, we're floating in space.

**The Chair:** Thank you.

Madame Lalonde, you have five minutes, please.

[*Translation*]

**Mrs. Marie-France Lalonde (Orléans, Lib.):** Thank you very much, Mr. Chair.

[*English*]

Thanks to both of you for being here.

When you think about civil satellites in Canada, according to our notes, 1962 was the first launch from the United States. In 2013, we had another launch leaving from India, I understand.

Mr. Matier, I would really like you to take this time to formalize why it is so important that Canada create its own launching capabilities, and maybe leading to a recommendation as we are studying this. I'll then go to Mr. Bain.

**Mr. Stephen Matier:** In recent discussions with the United States Space Force, in their assured access to space initiatives that we're a part of as well, they've made clear, in memorandum as well to their National Space Council, that they would like to see Canadian launch capability.

There are two primary reasons for that. One is that Florida is a sitting duck for a category 5 or some other player. The loss of that launch capability means it would be for everybody, us included. The other is that launching twice a week, they're about maxed out. The air traffic industry is yelling and screaming. They're trying to expand as much as they can, but things are moving pretty quickly and they're congested, basically. It's because there is so much backlog of launch.

We've been affected by that. We've had to wait to launch satellites into orbit by a year or two because of a priority call by the U.S. government. Having our own priority for a launch capability and providing backup to the United States or a replacement if they're taken out are kind of the three main ones.

**Mrs. Marie-France Lalonde:** We talked a lot in the new DPU about the importance of the Arctic. For me, certainly, it's all about our sovereignty. How does that fit within your interpretation of how a launch within Canadian soil could help on the sovereignty piece of our defence strategy?

**Mr. Stephen Matier:** The beauty of our location is that we can do polar sun-synchronous orbits, which are the ones that go over the poles, basically. Polar-type orbits are what we can offer. Because we hang out over the top of the North Atlantic, we have a

launch due south, basically straight down, over Africa and into orbit. That access over the poles is what's so popular for many of these satellite developers. It's for just that kind of thing.

● (1245)

**Mrs. Marie-France Lalonde:** Thank you.

Mr. Bain, I don't want to go back, because I think you were very clear about who you represent and what it is, but I want to ask you about the debris. You mentioned a lot of numbers, including that 130 million pieces of debris are currently floating. Is there technology or something to look into that dynamic of actually removing that debris?

I remember years ago I had the privilege of visiting Telesat. They were talking already about the cemetery for that debris, which, as you said, is from years ago. As we're launching more, commercialization is needed. From a defence perspective, I think we absolutely need to. But there is debris there that also has a risk of impact.

**Mr. Stewart Bain:** Yup. You're right. Where do I start? I know that 131 million pieces of debris sounds like a lot, but they're in certain bands. They're not all over the place, but they're in the bands that are, as you would imagine, the most popular.

The honourable member asked me a question earlier that I didn't answer. There are specific bands in space and there are specific orbits in space that are much more desirable—polar orbits, sun-synchronous orbits where RADARSAT flies, and medium-earth orbits where the GPS systems fly. The hardest thing we deal with from the ground, just to give you something else to think about, is a spent rocket. Once it has taken a satellite to geostationary, there's a piece left that's about the size of a city bus. It moves at 16 kilometres a second in a highly elliptical orbit. It goes all the way out geostationary, comes all the way back to low-earth orbit and goes back out again. It's on the equatorial plane. It goes right past the GPS satellites every day, and there's no way to track it from the ground.

These things are happening without a lot of people being aware. These things are happening and they must be tracked, which is why NorthStar created our system.

**Mrs. Marie-France Lalonde:** That's great to track, and I completely agree, but should we also look at removing them? Should we look at technology to actually do something else other than sending them to a less desirable orbit circle?

**Mr. Stewart Bain:** That's a great question. In my business, you can break a lot of laws, but you can't break the laws of physics. You can imagine a city bus moving at 16 kilometres a second. I don't know what technology you could use to grab it, reorient it and bring it down out of its orbit. It has a tendency to want to stay there. It will degrade over time. What you're really doing is waiting for it to degrade and fall out and come back down to earth. It will do it eventually.

But there are other objects in space. There are a lot of technologies and a lot of companies. We work with a company in the United States. They're international and are called Astroscale. They do active debris removal. You maybe think of debris as just a piece of junk. A spent satellite that's still intact and can be picked up could be grabbed and pulled out of space, but now you're launching a satellite with a rocket to grab a satellite and bring it back down out of orbit. You have 130 million pieces to take care of. The technology has a long way to go to be able to do that kind of cleanup.

**The Chair:** Thank you, Ms. Lalonde.

Madam Normandin, you have two and a half minutes, plus 30 seconds.

[Translation]

**Ms. Christine Normandin:** Thank you very much, Mr. Chair.

Mr. Bain, I want to continue on the topic of space debris.

You talked about objects the size of a bus travelling at 16 kilometres per second. You also said you are able to identify objects that measure one centimetre, 10 centimetres or 40 centimetres, depending on the orbit.

I would think that an object the size of a bus could do a lot of damage if it were to collide with a satellite, but I would like to hear more about the damage that can be caused by small pieces of debris.

What is Canada exposed to by being unable to identify that small debris? What risk is it running?

**Mr. Stewart Bain:** It is an immediate risk.

I have worked on various commercial missions. I will not mention them all, but I can tell you that collisions happen every day. I would point out that satellites do not emit any vibrations because there is no atmosphere in space. There is nothing we can do to change the stability of satellites. They move through space. Why do they move? Because they are hit by debris every day. That means that satellites start moving through constellations. This is something we have to monitor and examine seriously because it poses an immediate threat.

So our system is designed with that in mind, in a sense. The question is whether we can navigate through all of that and provide enough information far enough in advance to ensure safe navigation.

• (1250)

**Ms. Christine Normandin:** In the future, is there likely to be an increase in the number of large or small pieces of debris, given that collisions create debris?

Is the number of small pieces of debris likely to increase more than the number of large pieces, or is the risk roughly the same for both kinds of debris?

**Mr. Stewart Bain:** The larger pieces of debris pose the greatest risk, of course. Small debris can be created by microcollisions, so to speak. That said, collisions between a satellite and an object that is of the same size or bigger can be catastrophic.

**Ms. Christine Normandin:** I have one last quick question for you since I have a bit of time left.

New technologies are being developed for new satellites. For example, Japan has built wooden satellites, which could degrade easily.

Are there aspects of those technologies that should be monitored in the future?

**Mr. Stewart Bain:** I know of one company here in Canada that is designing and manufacturing space launchers that use a renewable fuel source. Thanks to chemistry, plastic is being transformed into renewable energy. I find that very interesting.

**Ms. Christine Normandin:** Thank you very much.

[English]

**The Chair:** Thank you, Madam Normandin.

We now go to Ms. Mathysen for two and a half minutes.

**Ms. Lindsay Mathysen:** Mr. Bain, you talked about the space council and it being run from the PMO. Is that solely because of the priority you think you need and that can only come from the PMO? If that's the case, then fair enough.

A space council is meant to bring balance, neutrality and non-partisanship. How do we ensure that, in that case?

**Mr. Stewart Bain:** That's a great question.

It's all by representation. You want representation from the government, commercial enterprise and, non-government organizations. You want everybody to have a certain number of seats at the table to have a voice to be able to express concerns or raise issues, and work in an open manner.

I'll go back to the leadership question. It's by other people's experiences that we know it has to be run by the top. Efforts to do it in any other way were not successful. As an environmentalist wanting to protect the environment of space and wanting things to move quickly, I don't want to waste any time. We know the formula is that it must come from the top. It has to be from the PMO.

**Ms. Lindsay Mathysen:** Okay.

Mr. Matier, on the same question.

**Mr. Stephen Matier:** My experience is with the United States National Space Council and its effectivity, and the participation of the user advisory groups is really fundamental to that. Those are the commercial companies that participate in it. It's really getting the focus committees set up, populated and represented by the government. Then those committees are populated to really put the emphasis where it needs to be put.

**Ms. Lindsay Mathysen:** I have one minute.

The really big question, of course, goes back to that nuclear side of things. What is the bigger impact that the Canadian government has in terms of our responsibility to future generations and that environmental impact? Is it the push forward to that bigger détente of the bigger the weapon the more détente, or is it through negotiations on a non-nuclear proliferation?

**Mr. Stewart Bain:** I think you've touched on a lot of really interesting subjects.

**Ms. Lindsay Mathysen:** In a minute, yes.

**Mr. Stewart Bain:** You've done really well, because your other comments were the same.

I drove past the Russian embassy last night on Charlotte Street with my son and I pointed it out. My son said, why do they still have an embassy here? I said, because it's the only way you keep communicating with people to solve problems. You must keep the lines of communication open.

International collaboration is fundamental, and we will return to a normal and stable environment in space if we have faith in humanity to do that. NorthStar's tools and other people's activities in this area are fundamental to that. Military activity, the same as civil activity, has a role to play in securing a safe environment.

**The Chair:** Thank you.

Mr. Ruff, welcome to the committee. You have five minutes.

**Mr. Alex Ruff (Bruce—Grey—Owen Sound, CPC):** Thanks, Chair.

I have a set of questions for both witnesses.

First to Maritime Launch, it's too bad that you didn't exist and that you weren't up and running a number of years ago, because one of the Canadian competitors for SpaceX lost out in part because they wanted to launch from a Canadian launch station, and they missed that opportunity. They would have beaten out, and maybe we'd have something different from Starlink, everything tied to SpaceX and some of the other stuff if that had happened.

Specifically to you, I want you to get on the record on that military side. I get that there are certain capabilities. You do have a connection with, obviously, CAF and DND. What specific capabilities is Canada dependent upon or will be dependent upon by having our own domestic launch? Can you get that clearly, that specific military context?

• (1255)

**Mr. Stephen Matier:** Probably the key is earth observation. That's what it's all about with most of these satellites going into orbit, looking down. It's not about looking up.

It's the ability of those satellites to monitor activities on the ground, whether it's GHG or movement, as we've seen in Ukraine in the monitoring that we've been doing there, and our ability to do that ourselves unhindered.

**Mr. Alex Ruff:** Ms. Lalonde brought up the Arctic side, and obviously I think that's a huge advantage that can't be underestimated, the polar launches that we can have.

In a similar theme, to you, Mr. Bain with NorthStar, I understand fully what you're trying to do and the need for it, but convince Canadians and governments to put the necessary resources into all of these different space aspects that we need? In particular, what value do you bring to the table for an industry or another company similar to what you're proposing? What is the impact on and the benefit to not only military capabilities for Canada and our allies, but to industry if these collisions happened? Ultimately that's the challenge that governments are facing right now with limited money. How do we make Canadians understand that this is the value added by preventing these collisions, tracking the debris, etc.?

**Mr. Stewart Bain:** On a general note, I don't like to refer to it as space economy or the economy, because it's all the economy. The economy in space is the economy. Canada must maintain its position to be competitive in that market—that's an argument. It's about people keeping their jobs. It's about education, and it's about a cycle of training people, keeping people and building a sound economic base here in Canada and maintaining that.

I think it's pretty simple for Canadians to understand that we don't do anything. In the 1970s, we put up the GPS satellites, and nobody knew what to do with them. Now you can't do anything without them. That's what space is. It's fundamental to your life. There's nothing you can do on a given day, between a financial transaction at the bank or getting something delivered to your house to eat, that doesn't go through a system that involves a satellite. They're fundamental to the fabric, and very importantly, there's no backward compatibility. We can't go back to the old system of communicating, to the old system of navigating, to dial-up phones. It doesn't work. We're dependent on the space satellite systems, so let's make sure they stay there. The only way to do that is be a good environmentalist and protect the environment.

**Mr. Alex Ruff:** Tied to that, with the space companies that are launching right now—and this could go to either one of you, but I imagine maybe more to you, Mr. Bain—is Canada demanding, for anything that we're launching here domestically or that is a Canadian nexus or partner in the international community, that any new launches have end-of-life cycle planned into them with a mandatory degrade so that we're not leaving crap up there, for lack of a better word?

**Mr. Stephen Matier:** Yes, that initiative is certainly afoot, but it's not codified in any sort of way. There are new technology developments, mission extension kits for upper stages, for example, to be able to go and deploy and do other things, remove satellites from orbit or provide a fuelling platform to extend the life of satellites so that you don't have to keep launching more. There's that kind of thing.

**Mr. Stewart Bain:** The mechanisms that you can pull on are our own domestic policy but also the International Telecommunications Union in assigning frequency as though it may seem abstract. In order to get frequency, you should comply with certain performance criteria in terms of de-orbiting and removal. There are a lot of good guidelines involved in that.

At the United Nations Office for Outer Space Affairs, Aarti Hol-la-Maini, the director, is very active in making sure that global policy goes towards making sure that you don't launch before you have a set policy. Like we have "Call before you dig", I say, "Think before you launch".

• (1300)

**The Chair:** Thank you, Mr. Ruff.

This is the defence committee, and we've heard all kinds of testimony that we're a little late and a dollar short in our involvement in space. It seems to me that the vulnerabilities from being dependent upon operatives that are outside the country are pretty abundant. I'm sure Ukrainians get a little nervous, when they're dependent upon Elon Musk, as to whether they get or don't get their signals. Similarly, the geopolitics of the United States make one a little nervous about not having the ability to either launch or to do what you do, Mr. Bain. I don't think that message has sunk in with either the political class or Canadians writ large, so sketch out for us what military and security vulnerabilities we leave ourselves open to by not being as involved as we should be.

I'll start with you, Mr. Matier, and then go to Mr. Bain.

**Mr. Stephen Matier:** It's related to the recognition by the other Five Eyes countries that are stepping up. They are recognizing that vulnerability they have right now. Whether it's the U.K., Australia, New Zealand, plus two, even, these other countries are actively engaging to bring rocket-launch capability. Even if they're in the wrong place—the wrong side of the pond, as it were—they're trying to get something in place so they will have that ability to provide that backup capability.

It is a scary world down there. I bring my U.S. passport with me so I can speak openly about my feelings about the U.S. and that potential disruption, if you will, because of the politics there and

where things stand. It is a scary world we're living in. We really do need to get people's attention. When I look across the border, as a Canadian looking south to the U.S., it's like watching a train wreck going on, and not having access to that launch capability there on a day in and day out basis can be really fundamentally flawed...to just the kinds of things that he's talking about—going to an ATM or going to buy tickets to a football or hockey game. It's the cause and effect that I don't think is really well understood.

**The Chair:** Go ahead, Mr. Bain.

**Mr. Stewart Bain:** To paint a picture for you, in every threat there is an opportunity. You identified and acknowledged there's a tremendous threat. I heard it in previous testimonies. I listened to the videos in advance. There is a tremendous threat: It's an opportunity, and we must take that as an opportunity.

Henry David Thoreau said that the world is our canvas for our imaginations, so we need to get our imaginations in gear and move forward without restricting ourselves on what we think, "The way we used to do it is the way we need to do it now." Take a page out of Steve Jobs's book. Why are we doing it this way? It's the way we've always done it. We need to stop that. We need to create new ways, new policies, and we need to embrace... We need to err on the side of leaning in instead of on the side of, "Well, we need to study that." If I had a dollar for every time somebody told me I needed to slow down and be more patient, I wouldn't have \$140 million because I went and raised money anyway.

The answer is Canada must, if it wants to be a leader in space, lean in on its initiative. Lean in, listen and act outside its typical comfort zone or what policy used to say. That's why I asked and pushed, and so it's come through as a space council, with Space Canada aboard. We must have a national space council. We must have a policy, move quickly and be clear in our objectives. We must leave this planet—because what we do in this life echoes in eternity—for the future generations so they can have access to what I had access to, watching Neil Armstrong walk down the ladder. They don't have that, and they need it: It's our responsibility to make space safer.

• (1305)

**The Chair:** Thank you.

That's a good ending for our session.

Colleagues, we'll meet you on Wednesday afternoon, subject to the votes.

The meeting is adjourned.





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