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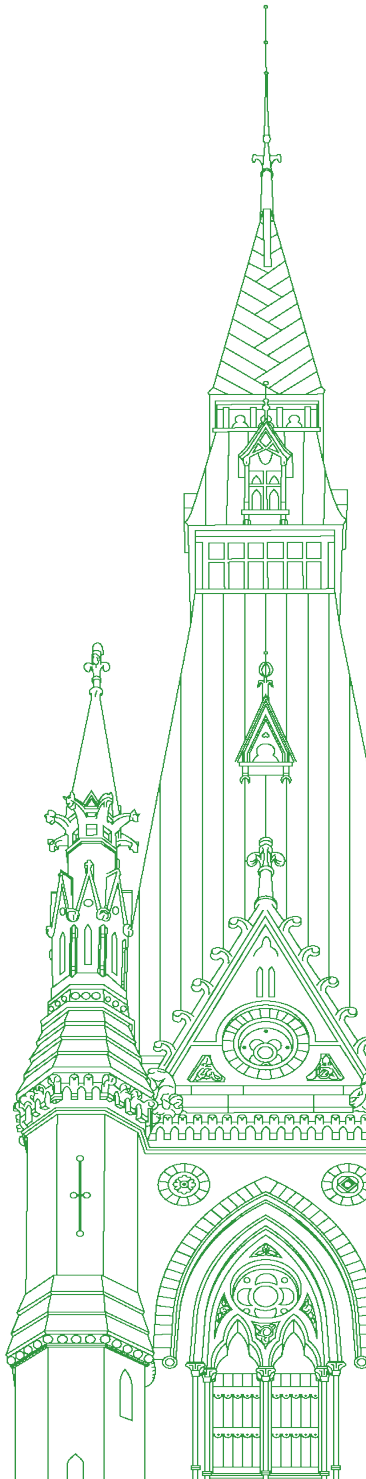

Chair: Mrs. Sherry Romanado

# Standing Committee on Industry, Science and Technology

**Monday, June 1, 2020**

● (1105)

[*English*]

**The Chair (Mrs. Sherry Romanado (Longueuil—Charles-LeMoyne, Lib.)):** Good morning, everyone. I now call this meeting to order. Welcome to meeting number 20 of the House of Commons Standing Committee on Industry, Science and Technology. Pursuant to the order of reference of Saturday, April 11, the committee is meeting for the purpose of receiving evidence concerning matters related to the government's response to the COVID-19 pandemic. Today's meeting is taking place by video conference and the proceedings will be made available via the House of Commons website.

I would like to remind you, members and witnesses, before speaking to please wait until I recognize you by name. When you are ready to speak, please unmute your microphone and then return to mute when you have finished speaking. When you are speaking, I'd ask that you do so slowly and clearly so that the translators can do their work. As is my normal practice, I will wave the yellow card when you have 30 seconds remaining in your intervention. When you see the red card that means you have run out of time.

I would now like to welcome our witnesses. With us today we have Dr. Arthur McDonald, professor emeritus, Gordon and Patricia Gray chair in particle astrophysics, Nobel Prize in Physics laureate 2015, Queen's University.

From Bidali we have Mr. Eric Kryski, chief executive officer and co-founder.

From Dynamite Network, we have Mr. Jeff Musson, president and chief executive officer.

From StarFish Medical, we have Mr. Scott Phillips, chief executive officer, and John Walmsley, executive vice-president, strategic relationships.

From Canadian Nuclear Laboratories, we have Mr. Joe McBrearty, president and chief executive officer.

From SNOLAB, we have Mr. Nigel Smith, executive director, and from TRIUMF, we have Mr. Jonathan Bagger, director.

The first five witnesses will be giving testimony, and SNOLAB and TRIUMF are here to provide support in responding to questions. Each witness will present for seven minutes followed by the rounds of questions. We will begin with Dr. Arthur McDonald.

You have the floor for seven minutes.

**Dr. Arthur McDonald (Gordon and Patricia Gray Chair in Particle Astrophysics, Professor Emeritus, Nobel Physics Laureate 2015, Department of Physics, Engineering Physics and Astronomy, Queen's University, As an Individual):** Thank you very much for this opportunity to testify.

My story today is about a team of talented Canadian scientists and engineers working with international collaborators and Canadian industry who were inspired by the opportunity to apply their skills to make a difference in the COVID-19 pandemic.

When confronted by a daunting world situation, we all ask ourselves, “What can I possibly do to help?” I personally was presented with just such an opportunity back in March when I was contacted by my colleague, Professor Cristiano Galbiati in Milan, Italy, in the midst of the worst region for COVID-19 at the time, who said, “I think that we can use the skills that we have developed for our experimental search for dark matter particles to build ventilators and save lives.”

It was apparent to me that our skills in gas handling for the large liquid argon baths used in our underground experiments at SNOLAB and, in the future, in Italy, could be directed in this way if we could build a diverse and dedicated team to work on the project. I immediately called the directors of Canadian national labs, who are with us today: TRIUMF in Vancouver, where researchers were already collaborating on our dark matter research; Canadian Nuclear Laboratories, Chalk River, where I knew that there were very skilled engineers working on nuclear reactors and their safety systems; SNOLAB, our world leading underground laboratory in Sudbury; and the McDonald Institute, a Canada First Research Excellence Fund project with skilled scientists at universities across the country. I received an immediate positive response from the lab directors and an equally positive response from the scientists and engineers, who proceeded to work night and day, seven days a week, to create a straightforward, easy-to-construct and relatively inexpensive ventilator.

Our international team, led by Professor Galbiati, including INFN in Italy and Fermilab in the United States, created a working model on the benchtop in about 10 days and took it to a hospital in Monza for testing on a human breathing simulator. Our simplified ventilator requires fewer than 40 parts, as compared to traditional ventilators that can require over 1,000 parts. We received immediate and very valuable feedback from doctors in Italy, Canada and the United States on how to improve the design and meet the requirements for safety necessary for patient use.

We immediately began working with an Italian manufacturer, Elemaster, on industrializing the design, and with a Canadian partner company, Vexos, in Markham, and their sub-contractor, JMP Solutions in London, Ontario, to optimize the manufacturability and reliability of the device.

The ventilator concept is simple. You wish to deliver oxygen-enriched air to a patient in a careful, regulated way. This is done by an inhalation valve and an exhalation valve that are opened and closed sequentially with precise control of the pressure and timing of the cycle. Our device accomplishes this with the valves controlled by readily available, programmable microcomputers and interactive display units, which are very familiar to our scientists and engineers for their normal work.

Of course, in practice, ventilator design becomes more complicated. You must make the device safe in all conceivable situations, so many safety valves and other auxiliary equipment must be added. The programming must make sure to meet all the patient's needs and be easily displayed and controlled by doctors and respiratory technicians. In this, we were greatly helped by the skills of our electronics and programming specialists at TRIUMF and our mechanical engineers and safety experts at Chalk River working with our international team—from home, in most cases.

Of course, our team is very used to collaborating via the web. You may remember that the World Wide Web was actually invented by a particle physicist working at the CERN laboratory in Geneva, to enable effective communication and collaboration with his colleagues. We have used the Internet daily in our collaborations for many years.

So our team produced a ventilator, which we called the Mechanical Ventilator Milano, MVM, tested it extensively, and received United States Food and Drug Administration's emergency use authorization in about six weeks—quite a remarkable achievement.

● (1110)

Our Canadian model, as manufactured by Vexos and JMP, must receive Health Canada authorization before deployment here to ensure that any small part differences from the Italian base model due to supply chain availability will have no significant adverse effects. We're confident that we will meet the Health Canada requirements, because many of these requirements are very similar to those that passed testing for the U.S. FDA authorization.

From the beginning, we as scientists have taken an open licence approach to our work, publishing scientific papers on the basic design and testing as the design progresses. Our open presentations are similar to what one would present for a patent application, but we will not seek a patent. Rather, we're making the information available under an open licence for maximum international value in our current crisis situation. Our Canadian and international companies have put a lot of effort into translating this design into an industrialized product and obtaining medical authorization, and that would also be necessary for companies picking up this design in any other country.

We have benefited greatly by strong assistance from ISED and Health Canada. Following their initial review of our project, they issued a letter of intent to Vexos that inspired them to devote resources to the development work, which has now culminated in a signed contract with the federal government for 10,000 of these ventilators. The ventilators will be supplied starting at the end of June, ramping up to a rate of over 800 a week shortly thereafter.

We are also very grateful for donations from philanthropists, including the Donald R. Sobey Foundation, the Lazaridis Family Foundation, Josh Felker and a number of other donors who have made it possible for us to meet a number of research needs during this work and to achieve our design within a short time window.

We're very proud of the way that Canadian scientists, engineers, national labs and manufacturers have come together so effectively for this humanitarian effort. I'm continually amazed at the skill and dedication of members of our team in their work on our project. It's clear that Canada's continued investment in national laboratories and universities has created tremendous expertise in science, engineering and leading-edge manufacturing. Our strengths in all—

● (1115)

**The Chair:** Dr. McDonald, my apologies—

**Dr. Arthur McDonald:** I have one more sentence.

**The Chair:** Okay. Go ahead.

**Dr. Arthur McDonald:** Our strengths in all these areas make it possible for us to be an innovative nation and to provide rapid assistance in areas of need. I hope that our efforts will save lives and that we can contribute to our country's positive response to this daunting world challenge.

Thank you very much.

**The Chair:** Thank you very much.

Our next presenter is Mr. Kryski from Bidali.

You have the floor for seven minutes.

**Mr. Eric Kryski (Chief Executive Officer and Co-Founder, Bidali):** Thank you very much.

Distinguished members of the House, thank you for the opportunity to speak to you today. I'm the CEO and co-founder of Bidali, a financial technology start-up based in Calgary, Alberta, that is using blockchain technology to reduce fraud and increase efficiency in payments. We are backed by some of Canada's most prominent angel investors. We recently released a white paper that evaluates how blockchain technology could save costs, reduce fraud and provide the government with better visibility into the effectiveness of stimulus efforts.

In January I had the opportunity to speak about the future of money during the World Economic Forum week in Davos, Switzerland. Our company also participated in this year's blockchain innovation stream provided by Canada's top-tier accelerator Creative Destruction Lab in Toronto. We are also advising various governments on their digital currency initiatives.

First, I would like to thank all government officials and employees for their recent efforts in response to this pandemic. The pace at which programs and policies have changed has been astounding—truly a team Canada effort. In particular, I would like to thank ministers Joly, Ng and Bains for their consultations with small businesses and technology companies. These have been critical to implementing the measures that, thus far, have prevented the collapse of the technology sector, which is critical to Canada's recovery...as well as Madam Rempel Garner's past efforts in developing the precursor to Western Economic Diversification's business scale-up and productivity program, which has been instrumental in supporting businesses in the west.

In a report produced by the Startup Genome project, globally, technology start-ups are the number one engine of economic growth and job creation. In 2018 we saw a total of $3.7 billion of VC investment in Canadian start-ups. According to the OECD, Canada now ranks number three in the world for venture capital investments. Furthermore, some of the most valuable companies in the world, such as Amazon, Google, Facebook, Airbnb and Uber, were born during a financial crisis.

Considering our increasing national debt, in order to secure the future of Canada's economy, we need to take bold and rapid action, as we have already seen is possible. This will undoubtedly require continued investment into frontier technologies. It would be prudent to enable Canadian taxpayers to benefit from the upside potential beyond employment and corporate taxes paid. However, the biggest challenge that many Canadian start-ups face is raising capital. Due to their historical fund performance, Canadian venture capital funds tend to be more risk-averse compared with those of their foreign counterparts, and just aren't investing as often as is required. As a result, many Canadian start-ups need to raise capital from VCs outside of Canada or from angel investors and family offices.

According to reports from NACO and Alberta Enterprise Corporation, on average over 85% of early-stage start-up investment comes from angel investors; and from the CVCA, venture capital funding fell 7.5% in the first quarter of 2020. Furthermore, modelling by the IEC shows that a 25% drop in employment for tech start-ups would wipe out 274,000 high-skilled jobs across Canada.

This effect is compounded in the prairies, just when the start-up ecosystems were beginning to mature. In 2019 western Canada had the highest level of angel investments in the last decade. Many of those angel investors are now facing a liquidity squeeze as a result of the economic blow to the energy, real estate and agricultural sectors, where the majority of their wealth was created. As a result, this deal flow has ceased, and many innovative start-ups are at risk of failing. If this is not remedied soon, we will lose over a decade of progress and hundreds of millions of dollars in R and D investment.

The Canadian government can address this core issue by implementing an investment matching program similar to recent proposals in the United Kingdom and Germany. This could be administered via such regional programs as WD and FedDev, or Canada could develop a new sovereign wealth fund. While this would help ensure that Canadian companies remain Canadian owned, the intent is not to nationalize industries. This would simply be another funding option available for any qualifying start-up that would relieve the liquidity crunch we are currently experiencing, and attract more investment into Canadian technology companies from Canadian VCs and accredited and foreign investors.

Today Canadian taxpayers are already taking on the same risk via such funding programs as SR and ED, IRAP and ISED, which currently de-risk the returns primarily for the benefit of foreign investors. Why not have the opportunity to provide returns back to all Canadians, which could close the gap on our national debt?

● (1120)

This isn't a new idea. FedDev previously had the investing in business innovation program that successfully matched accredited angel investments up to $250,000. Over the last decade, as a technology entrepreneur, I have had the opportunity to see the future that Canadians are building today, and I can tell you that this future is bright, but I can also tell you that right now this future is at risk.

As a result of declining energy prices, Alberta in particular has been hit hard. This is not just an Alberta problem but a Canadian problem. Undoubtedly our energy and agriculture sectors need support but we also desperately need to diversify our economy, and developing front-tier technology companies in Alberta is critical to this. Now more than ever is the time for Canada to take bold action, which will propel us into the next decade as a world leader, and set up future generations in Canada for prosperity.

Thank you for the opportunity to share my opinions. I'd be happy to have further discussions about these proposals at your convenience.

Keep up the great work.

**The Chair:** Thank you very much.

Our next witness is Mr. Jeff Musson from Dynamite Network.

You have the floor for seven minutes.

**Mr. Jeff Musson (President and Chief Executive Officer, Dynamite Network):** Thank you.

Before I begin my remarks, I would like to thank the committee for allowing me the opportunity to speak today, but more importantly, I want to thank all members of our government for the work they've done during this pandemic.

In addition to being a tech entrepreneur, I'm also the founder of Coding for Veterans, a not-for-profit organization. It is from both these perspectives that I'm testifying before you today. My testimony focuses on how Canada can leverage cybersecurity as a driver of economic activity and growth in defence of our economy. Like all Canadians, I'm concerned about economic recovery post-pandemic. COVID-19 has given us an opportunity to not just rebuild our economy, but to reimagine it and rebuild it better than it was before.

Working from home, online medical appointments, live video conferencing and online retail have changed our lives forever. All those sectors require a secure cyber environment in which to operate.

As background, Coding for Veterans is a tech industry-led initiative, in partnership with the University of Ottawa, that retrains military veterans for jobs in Canada's cybersecurity sector. It is a unique program that delivers curriculum 100% online with professors and provides globally recognized cyber industry accreditation.

My team has learned a tremendous amount related to retraining of individuals that I believe can be applied to many Canadians who are unemployed as a result of COVID-19. Not only has our program continued without interruption during this pandemic, it has actually grown. Pre-COVID-19, studies showed that Canada had over 25,000 unfilled cyber jobs, and demand has increased for cyber talent during this pandemic. As we were seeking placement for the most recent grads from our program, I was intrigued by the number of calls I received from Canada's financial institutions, defence contractors and others. I asked them, “When everyone is laying off, how is it that you guys and your companies are hiring?” The simple answer was, “We don't have enough talent.”

There are many lessons to be learned from COVID-19. The N95 mask and PPE shortage taught us that we can't count on other nations to come to our rescue. Another lesson we learned from COVID-19 is that Canada and the world were brought to their knees without one missile being launched or one foreign soldier invading our country. My fear is that while we're focused on pandemics at our front door, we will leave our side door unlocked and be vulnerable to cyber-attacks that will cripple our economy just as we're on the road to recovery.

Earlier, this committee heard testimony from Scott Jones, who's the head of the Canadian Centre for Cyber Security. He and others stated that during the pandemic they have seen cyber-attacks continue and be directed out of universities and medical establishments with attempts to steal data. Mr. Jones also testified that the Government of Canada relies on partnering with the private sector to protect Canadian industry.

Here's the missing piece: Where are we going to find the talent to fill these jobs?

It's great that we have a plan, but without enough trained workers, how do we as a country defend ourselves? The most direct answer is that we need to train more cybersecurity workers.

The follow-up question is, how do we do this and how do we fund it?

For starters, you need a robust training framework. The Coding for Veterans program has a proven retraining template with cyber industry curriculum and certification. We have the capacity to expand our program and establish a separate cohort called “Cyber Skills for Canadians,” targeted specifically at retraining unemployed workers for jobs in cybersecurity.

How do we pay for this?

I can appreciate that the Canadian government has unprecedented fiscal challenges and is looking for out-of-the-box thinking. With this in mind, we propose that retraining people for cybersecurity jobs can be 100% funded by the industrial and technology benefits policy program, which already exists through ISED. This program states that for every defence contract awarded in Canada of over $100 million, an equivalent amount of money be injected into the Canadian economy by the winning bidder. Currently, government stats show that defence contractors owe $34.5 billion in outstanding obligations, with $2.6 billion of that yet to be identified and $850 million of that in arrears. If we can leverage just a fraction of the existing ITB program to fully fund cyber retraining, it will not cost the taxpayers of Canada one single cent, while creating thousands of cyber jobs.

● (1125)

In closing, I believe that we, as a nation, should be retraining our unemployed workers for jobs in Canada's cybersecurity industry. We can support the expansion of our digital economy by building up our cyber defences while at the same time filling thousands of jobs. We have a once-in-a-lifetime opportunity to turn a difficult chapter in our country's history into one of our shining moments.

Those are my introductory comments. Thank you for the opportunity to speak. I would be pleased to answer your questions.

**The Chair:** Thank you very much, Mr. Musson.

On behalf of INDU, thank you for all you're doing for our brave men and women in uniform who serve. We greatly appreciate that.

We're now going to move to StarFish Medical.

Mr. Phillips, you have the floor for seven minutes.

**Mr. Scott Phillips (Chief Executive Officer, StarFish Medical):** Thank you.

I'd like to defer to my colleague, John Walmsley, to start us off.

**Mr. John Walmsley (Executive Vice-President, Strategic Relationships, StarFish Medical):** Hi. I'm glad to be here.

I'm John Walmsley, executive vice-president of strategic relationships at StarFish, and I have been leading our ventilator mission.

In March, we were asked by the NGen supercluster to evaluate two potential ventilator technologies that could be manufactured by a collaboration of their industrial partners. On Saturday, March 20, two of our experienced engineers and I flew to Winnipeg from Victoria—a strange thing to be doing as the provinces went into lockdown. We met with Dr. Magdy Younes, the inventor of the Winnipeg ventilator. Dr. Younes's team had pulled two prototypes from deep in his basement and set them up for us to see. We spent the day, wearing masks as we worked, learning all about them. The design seemed an ideal candidate for an emergency ventilator, as the technology was robust and used components that would not compete with the supply chain of modern ventilators. The interface was well-thought-out and simple enough for supervised use in case of "corridor medicine". The core of the system was a large piston, which we knew would suit any automotive manufacturer who might join the effort. On the plane home, which we shared with high school students glad to be returning from Germany, we were already working on the mechanical and electrical architecture for a new design based on this technology.

By the end of the first week, we had defined the requirements for the system and had offers of assistance from throughout the NGen network of companies and beyond. Linamar-MacDon and General Dynamics were among the first to provide logistical support.

By the end of the second week, we had successfully presented the design to three expert panels: Health Canada, NGen and ISED. A very helpful letter of intent followed. We had over 30 design engineers at this point, turning plans into reality: in mechanics, electronics, software and user interface design.

By the end of April, we had a design that we called "frozen". It is still changing to react to the availability of parts and testing results, but we knew what we were building in detail. The core of our engineers and sub-assembly suppliers across the country have been working 12 hours a day, seven days a week.

On Friday, at the end of May, we completed the first full testing of our completed units. We will be submitting for Health Canada authorization very shortly. From there, we will continue the ramp-up with our flexible and enthusiastic contract manufacturer, Celestica. This two-and-a-half-month project would normally take three years. How have we moved so fast?

Past clients in Canada and the U.S. helped us define a system that will be truly useful in the ICU, but the system is not fancy. All choices were made to be fast and flexible to allow for change. The StarFish team has a wide variety of experience and is used to rapidly developing new medical devices through a well-proven process. Some on the team have 40 years of experience; for others, this is their first co-op term.

Throughout Canadian industry, any CEO took my call. Many called Scott and me. NRC IRAP and NGen are governmental organizations with personal working relationships with industry and were invaluable in finding solutions. Health Canada's regulatory group has been unfailingly responsive, supporting the push while ensuring that products are safe and effective. Global Affairs, Public Works and PHAC have all contributed wonderfully. The collaboration among ventilator initiatives has been open and refreshing. I check in regularly with peers at other companies. We have also provided regulatory advice to those developing a medical device for the first time, including to Professor McDonald's initiative.

Due to speed, this has not been a cheap enterprise. A common project management phrase is "Cheap, fast, good: pick two." Normally, in our world, speed is last. Companies need the product to be good and are only willing to spend just enough. In this case, cheap has been last. In order to deliver a safe product fast, we have paid for contingencies that we have not necessarily needed. We have custom-machined parts in Canada rather than ordering ready-made parts from overseas, but we still needed to source some key components internationally. We have used over-specified parts to be sure they will work, and we are leaving much more work than normal to the manufacturing phase.

We are proud to have answered a national call. Our team will be tired when they are done, but they are not done yet.

Scott.

● (1130)

**Mr. Scott Phillips:** Thank you, John.

I speak to you today as the CEO of StarFish Medical and also as the chair of the LifeSciences British Columbia industry association. As the premier company in this space in Canada, we are proud to have an opportunity to contribute to this important initiative.

Like so many companies in the industry, we mobilized early to develop capacity as required, but we were a little unsure of how best to contribute. It was only when the CEO of NGen called to suggest that we step into ventilators that we actually connected the dots. Then, as John elegantly laid out, we were able to mobilize quickly.

Also, LifeSciences British Columbia mobilized on their own initiative. Like many industry associations, their lifeblood is holding events, which you can't do at this time. They hired a supply chain person and started managing PPE. They mobilized local industry to start assembling testing capacity and supplies. We're very proud of that organization and other industry associations across Canada for their contributions.

We have seen a lot of well-meaning initiatives that foundered, unlike Dr. McDonald's initiative, which managed to get through the regulatory requirements. Any number of initiatives by well-meaning people who did not understand the regulatory environment of our industry were not successful. By and large, we think it is a good thing that Health Canada is finding a balance between what's safe for Canadians and responding effectively at this important time.

It's also evident that national borders are becoming thicker, as Jeff mentioned, and if we want to have strategic capacity for critical supplies, we have a ways to go. In Canada, the industry runs about a $7-billion-per-year deficit on medical devices. Largely, we just have huge specialized companies sprinkled across the country, and that's one observation I would like to make.

However, overall, we're proud of the contribution we've made and of being able to contribute, and also the contribution of government and government agencies across the country. We feel we've done something truly meaningful.

Thank you.

**The Chair:** Thank you very much.

Our next speaker is Mr. Joe McBrearty from Canadian Nuclear Laboratories.

You have the floor for seven minutes.

**Mr. Joe McBrearty (President and Chief Executive Officer, Canadian Nuclear Laboratories):** Good morning, Madam Chair, and thank you for the opportunity to appear before the committee today.

My testimony today is to complement that provided by Dr. Art McDonald and perhaps provide some insight into the collaboration among so many, including those at CNL, TRIUMF, SNOLAB and the McDonald Institute.

Also, I'd be pleased to answer any questions on the role of our national laboratories and our multidisciplinary system coupled with universities, and the power of collaboration, both in times of need and, perhaps equally important, post-COVID and into the future.

However, first let me provide some background into the three Canadian national laboratory partners working alongside Dr. McDonald, our role in the project, and then a few words regarding the role of national labs and the potential future benefits of deeper integration and collaboration.

First, TRIUMF is Canada's national particle accelerator centre. It is one of Canada's premier multidisciplinary big-science laboratories and a leading subatomic physics research centre internationally. Located in Vancouver, TRIUMF is owned and operated by a consortium of 21 Canadian universities from Victoria to Halifax. I am joined online today by Dr. Jonathan Bagger, TRIUMF's director and CEO.

Next, SNOLAB, another collaborator in the MVM project, is a leading science facility focused on discovery research in subatomic physics, largely neutrino and dark matter physics, but also other interdisciplinary fields using high-sensitivity radioisotope assay. It is located near Sudbury, Ontario, deep underground in the operational Vale Creighton nickel mine. I am joined online by Dr. Nigel Smith, the executive director of SNOLAB.

Lastly, CNL, or Canadian Nuclear Laboratories, is your nuclear science and technology laboratory. Our 3,300 employees, including over 500 of the world's top scientists, engineers and technicians, provide unique capabilities and solutions across a wide range of industries. You may be aware of some of our active projects, including research and development into small modular reactors to provide clean, reliable energy for remote communities; cybersecurity for industrial control systems; and, together with TRIUMF, the development and production of new isotopes, including actinium-225, in our collective battle against cancer.

You may also be aware of our rich past as Atomic Energy of Canada Limited, or AECL, the inventors of the CANDU reactor technology now providing over 60% of Ontario's clean energy, or as the home of molybdenum-99 production from the storied National Research Universal reactor, which by some estimates has provided radioisotopes to a billion patients worldwide.

As you may be aware, CNL is now operating under a government-owned, contractor-operated model. In short, CNL is a private sector company managing and operating government-owned assets and liabilities in a performance-based contract overseen by AECL, a federal Crown corporation. I should note that when the pandemic started back in mid-March, AECL, our federal Crown corporation, without reservation or hesitation instructed CNL to do whatever possible to leverage our scientific and engineering capabilities in this global fight.

That ties us back to the ventilator project and some of our discoveries. Dr. McDonald established our connection to the Italian MVM ventilator effort and engaged these Canadian national laboratories to bring their complementary capabilities together for a common objective. Each lab brought specific expertise in critical areas honed by decades of experience.

For example, TRIUMF is primarily the lead on the pre-manufacturing phase, including prototype testing, Health Canada certification, software development support and the primary interface with the manufacturers.

SNOLAB, leveraging its expertise in gaseous states, was the lead on the gas supply module and provided process mechanical support. SNOLAB also coordinated external communications requests, allowing scientists and engineers to focus solely on this vital project.

At CNL, leveraging our multidisciplinary systems approach, we provided mechanical, instrumentation, software, safety and overall engineering support. Having designed and built many reactors over the years, CNL has significant experience with formal design and development protocols, and also getting technologies out of the laboratory and into the market.

● (1135)

Frankly, I am inspired by the talent at all three of these national laboratories. But all our efforts would not have been possible without the tireless leadership of Dr. McDonald, whose unquestionable faith-like purpose to save lives and ability to lead in a time of crisis was key to the success of this project.

This brings me to my final point and a key discovery that I alluded to earlier. The contributions of each of these national laboratories and by all the scientists studying dark matter were not part of our day jobs. Particle physicists, sub-atomic researchers, and nuclear scientists and engineers do not routinely go to work with a mandate to invent and build mechanical ventilators for the medical community in 60 days or less.

But when needed —and most importantly, when working in combination across a broad spectrum of basic and applied disciplines—the depth and breadth of scientific and engineering excellence within Canada's network of national facilities can be redeployed to solve the most demanding and urgent of problems. Our laboratories stand ready to be of service to the nation especially when borders are closed, international supply chains are limited, and the country needs to employ its own ingenuity and know-how to weather a storm.

With our innovative spirit and our drive to provide solutions to complex problems, Canada's national labs are a tremendous asset to the nation. More important, when they are brought together, the opportunity is boundless and the potential to propel Canada's prosperity is great.

We hope that the collaboration on the MVM project has helped to demonstrate the value and the potential of the national laboratory to Canada. On behalf of AECL and my national lab colleagues at TRIUMF, SNOLAB, and everyone at CNL, I can say that we'd be pleased to work with you post-COVID to further study how a network of Canada's scientists, researchers and engineers in its totality can make Canada more innovative and internationally competitive.

Thank you for your time. We'd be pleased to answer any questions.

● (1140)

**The Chair:** Thank you so much.

With that we'll start our first round of questions. Our first round of questions goes to MP Rempel Garner.

You have the floor for six minutes.

**Hon. Michelle Rempel Garner (Calgary Nose Hill, CPC):** Thank you, Madam Chair.

I'll just start by addressing Mr. Walmsley. Twenty years ago at the University of Manitoba's industry liaison office it was actually part of my job to work with Dr. Younes's patents related to the Winnipeg ventilator. So it's really nice to hear about him because he made such a tremendous contribution to the U of M and a certain blond MP's early career. That's pretty cool. But I digress.

Our scope of work right now, per the notice of meeting, is the Canadian response to the COVID-19 pandemic. One of our witnesses made the comment about helping to ensure that Canadian companies remain Canadian, which I think is really important. The COVID-19 crisis has precipitated reports of significant devaluation of companies that hold strategic Canadian assets, including significant intellectual property, natural resources and more. In turn, there have been questions raised as to whether the current threshold should trigger a net benefit review under the Investment Canada Act...need to be adjusted, as well as what types of purchases of Canadian companies and strategic assets by state-owned enterprises by authoritarian countries should be tolerated. I think this issue is important. It should be looked into objectively immediately and it is directly material to the business of reviewing the Canadian response to the COVID-19 crisis.

Therefore, I move:

> That, given the House motion made last week granted the committees power to study outside their usual scope, the Standing Committee on Industry, Science...and Technology conduct a study on [the] Investment Canada Act; that this study determine the extent to which companies within strategic Canadian industries have been devalued as a result of the COVID-19 crisis; the extent to which foreign buyouts may occur; determine whether the current Investment Canada Act valuation thresholds [are] adequate to trigger a net benefit review given the potential extreme devaluation of companies within strategic Canadian industries; determine whether Canada should place a temporary moratorium on acquisitions from state-owned enterprises of authoritarian countries; that this study consist of no less than four meetings; that this study be completed by June 21, 2020; that the Committee table its findings; and that the Government table a comprehensive report.

Thank you, Madam Chair.

**The Chair:** We have a motion on the floor, and I open the floor for debate.

**Mr. Lloyd Longfield (Guelph, Lib.):** Madam Chair, the motion on the floor I'd like to be reviewed. With a 48-hour notice on the motion, maybe when we come back we can have discussion on it.

**The Chair:** Technically, while it is in fact related to COVID-19 and the study that we are doing and it is admissible, I would like to ask Madam Rempel Garner if she'd like to allow the other members of the committee the opportunity to review the motion put forward so that we can have adequate debate and vote on it.

I'll turn the floor over to Madam Rempel Garner.

● (1145)

**Hon. Michelle Rempel Garner:** Thank you for ruling it admissible. I believe my staff member is right now circulating the motion in both official languages to all parliamentarians' personal accounts, as well as to the clerk of the committee. It is in order and I can speak to it briefly.

Here is my concern. We're getting a lot of reports in the media about this problem, and I think we need to look at it objectively. I think the place to do that is in our committee.

How many companies could be affected by this particular issue, and in what industries? Does the ICA net benefit review trigger at the right threshold, given the devaluation of assets? I'm seeing more this weekend. I saw a lot of coverage of this, and we're running out of time in June. We're at the beginning of the month already. Given that our next scheduled meeting isn't until Friday, I'm not comfortable waiting for a week to move this motion. I think it's something that is fairly straightforward, and it should be disposed of today.

**The Chair:** I'd like to ask if it's possible, Madam Rempel Garner, because it's being distributed, as you mentioned, as we speak, to come back to this at the end of this meeting so that we can continue with the testimony of the witnesses we have here and we can make sure to leave some time at the end of the meeting to discuss it. Would that be acceptable to you?

**Hon. Michelle Rempel Garner:** I'd rather put a timeline on it so that we don't run out of time to discuss it and then not meet until Friday about it.

**The Chair:** I'd like to give the members an opportunity to see it and I understand it's being circulated. We can always keep 10 minutes at the end of the meeting, if that would be acceptable to you, so that we can discuss it.

**Hon. Michelle Rempel Garner:** I prefer to start the debate, if that's possible, Madam Chair. I can read it again.

Here's the thing: We are meeting virtually, and these are the realities of virtual meetings. If we were sitting in person in Parliament, we would be debating this and discussing it and not suspending, as we always do with motions. I would like to proceed with the discussion of this motion.

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

**Mr. Lloyd Longfield:** I think we have some incredible witnesses here that I'd really like to ask questions of. I like your idea of taking it to the end of the meeting. I haven't seen the motion yet, but I've sure heard a lot of great testimony that I want to dive into and I wouldn't want to use this committee to not talk to the witnesses who are now in front of us.

**The Chair:** Is there any further debate?

**Mr. Brian Masse (Windsor West, NDP):** Madam Chair, I am comfortable with this because I have studied the Investment Canada Act a number of times, and we did get it through email. I'm ready to call a vote on the motion. It's straightforward. If we're going to study the Investment Canada Act, we can work out the details later and we can get to testimony.

I'd ask that you call the question and get this done. The way the motion is set forward leaves a lot of openness. That's what my preference is, to call the question and get this done and then hear our testimony. That would be the normal operating procedure that we do in the House of Commons, so if we can continue that, that would be great, because then we can hear the testimony.

**The Chair:** We have a few members here who would like to intervene. We have Mr. Erskine-Smith as well as Mr. Ehsassi.

**Mr. Nathaniel Erskine-Smith (Beaches—East York, Lib.):** I had a question because I listened to the motion, but I haven't seen the text and some of it flew by quickly. How many meetings were you expecting to have, Ms. Rempel?

**Hon. Michelle Rempel Garner:** Thank you, Mr. Erskine-Smith.

I suggested four. I would be open, if we wanted, to having a meeting to discuss business on how many we go into, but I'd like to hear from the department. I'd like to hear from members of the financial industry, people from relevant affected sectors and experts who have been giving advice in the media on this particular issue, and I'd like to get some data and quantify it.

I put the number of meetings at four, which would be an approximately two-week study. I'm happy to have more than that if need be, but I think we can probably bang this out fairly quickly. The goal would be expediency, given that I would think these transactions are being looked at right now and these situations are escalating. I think it's incumbent upon Parliament and our committee to provide advice to the government on this. It's directly within the scope of our work.

**Mr. Nathaniel Erskine-Smith:** It sounds reasonable, from what I've heard. My only concern, given that I didn't know it was coming forward, is that we don't have that many meetings left before we rise. Maybe we can meet into July in some way. There are other things we can discuss too, and I'm very interested in discussing recovery and focusing on a number of recommendations to government on what recovery ought to look like.

It is about how we can best use the finite time that we have. If it's four meetings at the expense of a series of other meetings on other topics, then some time to think about it would be nice in terms of how the calendar plays out. In terms of a specific one-off study, it sounds reasonable.

● (1150)

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

**Mr. Ali Ehsassi (Willowdale, Lib.):** Madam Chair, I would heed the advice that you've provided. I think we have an incredible opportunity today to hear from people who are, first of all, very busy. They've taken time out of their schedules to benefit us with their input. Much like you've suggested, it would be a much better approach for us to hash out all the details after we have heard from the witnesses.

I understand the keen desire of the member to focus on this issue, but she had ample opportunity to bring this to our attention before, and I find it regrettable that we're not making the best of the witnesses who have very generously committed their time to be with us today. I think there should be a process in place. Again, as all of the members have indicated, there are a number of different details that we have to look into before we can reasonably consider this motion.

I would ask that we defer this discussion until we've had a chance to hear from the witnesses and that we return to this issue, I might add, after we have heard from the witnesses.

**Mr. Brian Masse:** Madam Chair, as a quick point of order, we will get our vote following the interventions of the people you had on your list, because I've called for the question. I just want to make sure that we're going to have a quick vote after that, when the interventions are done. Is that correct?

**The Chair:** Procedurally, we have to collapse debate. We still have some folks who would like to debate the motion before us.

[*Translation*]

Mr. Lemire, you have the floor.

**Mr. Sébastien Lemire (Abitibi—Témiscamingue, BQ):** Thank you, Madam Chair.

I just want to say that I'm ready to vote and that I'll be supporting the motion. While we're debating whether we'll be voting on the motion, we're not hearing from our witnesses. I think that we're at the stage where we can vote on the motion.

[*English*]

**The Chair:** Is there any further debate on the motion before us?

Go ahead, Madam Lambropoulos.

**Ms. Emmanuella Lambropoulos (Saint-Laurent, Lib.):** This is similar to Nate's point, actually, since a motion to the clerk.... We're in the process of sending one to finalize the current study we're doing and to have a report written and recommendations made. Given the amount of time, we don't know exactly how long we will be sitting, and we haven't really discussed as a committee when we want this committee to end for the summer. Maybe we could have some discussion on a timeline.

I have no problem with Ms. Rempel Garner's motion, but I'd also like to make sure that we do this report we're currently working on properly, and that we get to take into account all of the different things that we would like include.

**The Chair:** Is there any further debate on the motion before us?

Go ahead, Mr. Erskine-Smith.

**Mr. Nathaniel Erskine-Smith:** I would have thought.... I mean, there's no reason to jam us with a motion like this. There's no reason to not have our committee meet in camera and discuss committee business as we normally do, based on past practice and just being reasonable with one another.

If we are to call the question now, I'll be voting against it, just because it's incredibly unreasonable to put this forward as you have, Ms. Rempel. I mean, you are free to talk to us, as always. You are free to communicate with us in advance. You are free to give notice, as is expected—you don't have to, I understand—and you are also free to have an in camera meeting where we discuss committee business as we normally do.

If you're going to jam us with it, then no. Although it sounds reasonable, again, my concern is finite time. There are a lot of different things that we could discuss. Is this worth four meetings in comparison to other things we could discuss? Maybe, but it's worth having a debate and not jamming us when we have witnesses here. If we're going to call the question now, fine. I'll vote against it. If it comes back, maybe it's reasonable and I can consider it at greater length, and maybe I'll vote for it.

**The Chair:** Go ahead, Madame Rempel Garner.

**Hon. Michelle Rempel Garner:** To Mr. Erskine-Smith, you might want to have a chat with your chair about informal conversations that were had about this particular meeting being a meeting to discuss business, which didn't happen in consultation with members of this committee. Afterwards, we got a notice of motion. You used the term “jammed”.

The other thing is that I do not need a lecture on my rights as a parliamentarian to move motions related to the business at hand. I don't need that. I understand this. I've tried to word it as neutrally as possible and made it as open as possible. This committee can come to an objective, rational position on a very hot topic, and just because members of this committee can't think quickly enough, so it seems, I don't need a lecture.

Thank you, Madam Chair.

● (1155)

**The Chair:** Is there any further debate on the motion before the committee?

**Mr. Lloyd Longfield:** Madam Chair, I'd like to add an amendment that we look at the timeline differently so that it would be done after we complete this study.

**The Chair:** We have an amendment on the floor. Is there debate on the amendment?

Go ahead, Madame Rempel Garner.

**Hon. Michelle Rempel Garner:** Madam Chair, I note that there is no timeline on this study, so I don't know when it's going to be completed. I don't support this amendment because right now this is a very hot topic. There are companies and strategic assets that we should be talking about. Are we allowing authoritarian countries and governments to purchase strategic assets in Canada? It's the headline all over the news.

There's a lot of stuff happening right now. I don't understand why we couldn't spend four meetings in the next two weeks to look at this important issue. I don't want it to be punted down the road. This is timely and should be looked at immediately, as per my remarks to you.

I definitely don't want this to be punted to the end of an indefinite study that has no scope and that was forced upon us due to the suspension of the House of Commons. I don't find that acceptable.

**Mr. Brian Masse:** Madam Chair, I won't be supporting the amendment. It's just a filibuster to put off our witnesses' testimony.

The motion we have is straightforward. We either support it or we don't, and then we can hear our witnesses' testimony. Any other business is just filibustering.

**The Chair:** Is there any more debate on the amendment?

As there is no further debate, I will call for a recorded division.

(Amendment negatived: nays 6; yeas 4 [*See Minutes of Proceedings*])

**The Chair:** We will now move to the motion before the committee. Is there any further debate?

Seeing no further debate, I will call for a recorded division.

(Motion agreed to: yeas 6; nays 5 [*See Minutes of Proceedings*])

**The Chair:** Madam Rempel, you still have three minutes and 35 seconds on the clock for comments.

● (1200)

**Hon. Michelle Rempel Garner:** I'm happy to cede the floor. Thank you.

**The Chair:** Thank you very much.

With that, we'll move to the next speaker.

MP Longfield, you have the floor for six minutes.

**Mr. Lloyd Longfield:** Thank you, Madam Chair.

I really appreciate the witnesses for coming today and for their patience with us.

Mr. McDonald, I'd like to start with you.

I had a great time at SNOLAB. You took me underground a few years back to show me first-hand the amazing work our scientists are doing and how applied the work they're doing is. Thank you for that, and thank you for continuing to be involved in championing Canadian science.

I am interested in the open licence approach. I'm a certified pneumatic specialist, a mechanical engineering technologist. I did a lot of work putting solenoids and regulators together. I can picture the safety challenges you're looking at. Low-flow pressure is particularly difficult in pneumatics, as you need some pressure for valves to function.

I'm interested in the open licence approach of putting regulators and commercially available products together to create solutions and work in cross countries.

**Dr. Arthur McDonald:** Thank you. It's nice to see you again. It's been an honour to testify today, and it's been fascinating to see the debate and the inclusion of a spirited discussion.

In terms of the open licence, our approach to this is that basically everyone involved in the project has been doing it from a humanitarian point of view. We started with a group that is used to working in a very open way. We work in basic science, and that has been a very open topic for years. Even during the Cold War, the sorts of things that were being worked on in basic science were very open in the literature, and I think the whole world has benefited by this approach.

In this particular case, we were looking for something of a humanitarian nature, so we wanted to do it in such a way that companies in other countries could pick up on the particular concept that we have here, which is really a modernization of another formerly used ventilator, a very simple one from the early days, known as the Manley ventilator.

We took the attitude that we would first of all publish the design openly and then the improvements to the design and the testing that goes along with it. None of us wants to attempt to hold IP on this subject. Our manufacturers, of course, are putting in their own specific industrialization, and that's a separate question for them, but any company in the world is capable of taking our design and industrializing it and obtaining certification in the relevant jurisdiction. It's a standard approach in science.

**Mr. Lloyd Longfield:** That's terrific. Thank you. That's an approach I took through my 30-year career as well. When you're working openly, you can come to better solutions.

We did have alternative testimony a few meetings back from Mr. Balsillie on IP. It is interesting to see that you're also using the Lazaridis Family Foundation. These are two very different approaches to creating solutions in the marketplace.

I'd like to pivot over to StarFish. You mentioned one of the companies in my riding, Linamar and Linamar MacDon. I'm originally from Winnipeg and used to do a lot of work with MacDon back in the 1980s. Looking at using the collaboration among NRC, IRAP and NGen and working with Health Canada, and the importance of lining everything up correctly in order for the government to function correctly in terms of making the best use of all partners, and at the same time getting through the regulatory hurdles that you have to get through, could you comment on the strategy you've used in order to draw the best from all partners to create a solution for Canadians?

**Mr. John Walmsley:** Absolutely, I'd be happy to speak to that.

Developing a novel medical device from an early idea is something that StarFish is very used to doing, so in terms of a technical path, we were pretty well equipped with our standard existing partners and our own capability to do that. The big challenge was the timeline, the outrageously aggressive timeline. For that, a big part of the challenge was to field all of the offers of help and to get the best from them, as you say.

Linamar people, I think, were prime movers in this, and MacDon, the team there in Winnipeg, met us that first weekend and its people were with us along the way and also brought in a number of supports along the supply chain, which was a big constraint. I think NGen with its connections really got things started.

IRAP really helped. An area where it helped me personally was that I had a lot of people calling wanting to do things and to contribute in many ways. Once we had selected this path to develop a ventilator, I needed somewhere to refer them that would not leave people lost, and I referred them to my local IRAP representative, who did a fantastic job of connecting to the NRC and creating alignments. I think creating alignments is the key point.

● (1205)

**Mr. Lloyd Longfield:** Thank you. Could we use that same approach on clean technology and climate change solutions?

**Mr. John Walmsley:** My personal opinion is that it seems like if I sit here and look at the challenges facing us, this approach of talking to the highest level of companies to get immediate alignment is applicable only, I think, in the most dire challenges, but for me, climate change fits into that category as well.

**Mr. Lloyd Longfield:** Thank you very much.

**The Chair:** Thank you very much.

[*Translation*]

We'll now move on to the next round of questions.

Mr. Savard-Tremblay, you have six minutes.

**Mr. Simon-Pierre Savard-Tremblay (Saint-Hyacinthe—Bagot, BQ):** Thank you, Madam Chair.

I also want to thank all the witnesses who are appearing before us today.

My first question is for you, Mr. McDonald. You spoke about the establishment of your project. You rightly thanked a number of philanthropists who provided their support—

Madam Chair, I see that Mr. McDonald is waving at me. I don't know whether there's an interpretation issue.

[*English*]

**Dr. Arthur McDonald:** If I may, I'm not receiving the translation, and unfortunately, my French is not adequate to the task.

I'm wondering if there's something I need to be clicking. I thought I was going to be receiving translation.

**The Chair:** Mr. McDonald, are you on the English channel?

**Dr. Arthur McDonald:** I am. What channel should I be on?

**The Chair:** You should be on the English channel for translation into English.

**Dr. Arthur McDonald:** I believe I am, but I have heard no translation until now.

I don't know where to check on my screen to see if I am on the English channel. My apologies.

**The Chair:** On the bottom of your screen, do you see “Participants”, a little world symbol, and then “Actions”?

**Dr. Arthur McDonald:** I see “Participants”, yes.

**The Chair:** Do you see “English” in the middle?

**Dr. Arthur McDonald:** Yes, I do. It was off.

**The Chair:** Please select “English” and then the translation will work.

**Dr. Arthur McDonald:** Okay.

I really apologize having to ask to please repeat the question. Thank you very much.

**The Chair:** No problem.

[*Translation*]

Go ahead, Mr. Savard-Tremblay.

**Mr. Simon-Pierre Savard-Tremblay:** No problem. We must take the time to do things properly.

You spoke about the establishment of your ventilator project and you mentioned the support provided by some philanthropists. I gather that this financial support was very useful, if not essential, for the successful completion of the project.

I want to ask you about the funding cuts. Is there enough funding for research and development? It's good to receive support from philanthropists. However, you also need support from the public and the government.

Has this worked against you? Has this led to any issues?

When it comes to research and development, you need funding. The lack of funding has been criticized by a number of agencies responsible for studying risk. In short, was your decision to turn to private philanthropists a last resort?

[*English*]

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

**Dr. Arthur McDonald:** In a sense there are two questions.

First of all, we had substantial support from the Canadian national laboratories, which of course are publicly funded at their basis, in converting their special teams to this project. From that point of view, we were able to proceed.

The private sector companies of course put a lot of their resources into this, anticipating that ultimately there would be a contract for them to recoup their expenditures. From that point of view, we had a letter of intent from the federal government early on, assuming we were able to meet its requirements, to be able to go forward with the project. That was very helpful.

You're asking me in general about the question of funding for science, engineering and indeed for economic activities across the country. I actually served on Canada's fundamental science review panel a few years ago, which was chaired by David Naylor. In that review we made a number of recommendations, some of which have been accepted by the federal government. We're very hopeful that this perspective as to the value of funding, not only for science and engineering but also for a broad range of academic activities, is of value to the country in many ways.

Of our graduates in the basic science we do, 75% of them are not university professors. They're very skilled at evidence-based decision-making, and that gets carried to the financial industry, to other technology companies or to government. It's a broad spectrum that is obtained by funding academics in this country.

● (1210)

[*Translation*]

**The Chair:** Thank you.

[*English*]

Our next round of questions goes to MP Masse for six minutes.

**Mr. Brian Masse:** Thank you, Madam Chair. Thank you for leading us through what was probably a historic vote that we had on the last segment.

There are a couple of things happening that I want to ask about with regard to Mr. Musson. We have historic government spending on a number of different programs and services right now. We have a lot of innovation that's taking place. We also had a directive prior to this, but even more so now, to move more Canadians online, whether it be at home, through education, through business or even on personal matters. In fact, it's for everything from your home family experience to getting your daily banking and a whole series of things done. Expectations have risen even in applying for government services during all of this.

We also heard from a number of witnesses and, just recently, our Privacy Commissioner that our laws are outdated with regard to protecting privacy for individual Canadians and even for the business sector.

From my own work on the Competition Bureau, I know that it's antiquated in terms of bringing down penalties on those who are bad players. We also don't have international agreements to go after bad operators with regard to even some of our own trading partners. We've done some work here on the committee, and I thank the committee again for its work on fraud.

I'd just like to know a little more about the particulars of your program. You mentioned a phrase about leaving “the side door” open. Can you flesh that out in terms of how as we ramp up our speed in going online, at the same time what's happening that's really vulnerable...? How does your not-for-profit program fill that void? I think you mentioned 25,000 unfilled positions before COVID-19.

**Mr. Jeff Musson:** Yes. I appreciate the question.

Canada has a severe lack of talent as it relates to cybersecurity. With our program, we've been able to identify the best and the brightest who want to learn about cybersecurity. With Coding for Veterans, what we're proposing is to have a similar program but target it towards unemployed workers.

For the Coding for Veterans program, we have all the people who are interested in enrolling do a 45-minute online assessment that makes sure they have the soft skills and the aptitude to be successful in a job related to cybersecurity. As for the whole reason why that is, at the end of it, we want close to 100% job placement for graduates from the program.

What's interesting is that when you're talking about privacy, and when you're talking about all these other cyber-issues and tracking the bad guys, that all takes people power, and it takes accredited people to be able to do it. Canada has a lack of sufficient talent as it relates to cybersecurity. It's an open secret. We've heard it from CSE and in my own anecdotal evidence from our financial institutions and defence companies. They're clamouring for graduates coming out of our program, so I've said, “Why can we not take this opportunity for those who are unemployed?” If these jobs are surviving this global pandemic, you know that they are stable, good-paying jobs, and people can get back to work.

● (1215)

**Mr. Brian Masse:** Where I'm from, the manufacturing industry has been hollowed out in many respects. We've seen what was predictable to me, which is a dependency on foreign nations, including non-democratic nations, for PPE and other types of materials. For example, in the auto industry, even though we have some support happening and awesome projects going on, there's been a dependency on foreign manufacturing because of wages and other types of barriers.

Are we in the same circumstance? If we don't fill these jobs with Canadians, if we don't train them ourselves, would we actually be dependent on foreign jobs—jobs or people outside of Canada—to fulfill our cybersecurity?

**Mr. Jeff Musson:** Absolutely, and the problem is that we'd have to rely on others in the Five Eyes network. We've seen this movie before. When we have to rely on foreign companies, we get bumped down the list. What I'm proposing is that we use cybersecurity as a driver of economic activity, like the Israelis do. Not only can we retrain and reskill our unemployed workers, but when we become a global leader, guess what? We can then be the experts that the world turns to.

**Mr. Brian Masse:** As this grows, we've even seen the call industry relocate back into some parts of Canada because of security issues, so instead of having that problem later, we do a training program now. You're involved with the University of Ottawa, I believe it is, to ramp up our qualified credentials for that and not even go down the road of dependency. You stop that before it happens.

**Mr. Jeff Musson:** Absolutely. The PPE was the canary in the coal mine, in my opinion. The University of Ottawa and the PDI program, led by Mr. Serge Blais, has been a phenomenal partner to train and reskill military veterans in our program. We said, "Let's supply that same framework to unemployed workers."

**Mr. Brian Masse:** Yes. We're seeing the vulnerability in our agricultural sector. Just outside my area right now, we have another COVID outbreak from one of the groups that's come inside, and we have to try to deal with that.

Thank you, Madam Chair. My time's up.

**The Chair:** Thank you very much.

We now move to our second round of questions.

Our first question comes from MP Gray. You have the floor for five minutes.

**Mrs. Tracy Gray (Kelowna—Lake Country, CPC):** Thank you, Madam Chair, and thank you to all of the speakers for being here today.

Something that I hear about quite often, whether it's ventilators or testing kits, is delays with Health Canada for approving products that might be similar in the United States or in the United Kingdom. Things seem to take longer here.

First of all, I'd like to ask Mr. McDonald. Is this something that your team has faced, and do you have any concerns with red tape as you've been going through your processes?

**Dr. Arthur McDonald:** No. Actually, it's just the opposite. Health Canada has been very helpful as we've gone forward. There are some small differences between what the approval that we already have from the FDA is and what Health Canada will be looking for, but in particular, Health Canada will be providing authorization for our Canadian manufacturers. You authorize a final product in this case, so it's important for us to manufacture and test specifically what is being manufactured here in Canada and submit it to them for the final approval.

We've had guidance on the characteristics they're looking for, and they have offered us a three- to five-day turnaround once we have submitted the device for authorization. I've found Health Canada to be very good.

● (1220)

**Mrs. Tracy Gray:** That's good to know. Thank you.

When we look back to January, we see that it was January 30 when the World Health Organization declared a public health emergency of international concern. It was back then that they were making statements and recommendations, and going into February, telling countries to mobilize and prepare even if they didn't have incidents in their country yet. As we look at our timeline here, we see that it was just on May 27 when our health minister signed an interim order to accelerate access to products related to COVID-19, a full four months later.

My first questions are to Dr. McDonald. Do you feel that if we had mobilized sooner and put some plans together sooner, we would have had a greater impact on this crisis? When did you start your process? I believe you said it was sometime in March. Could you explain your timeline and your thoughts on whether we could have been further ahead if we had started the work earlier this year?

**Dr. Arthur McDonald:** We started our project in Italy on March 19 and in Canada on March 23. That was predicated by the very dire circumstance in Italy that stimulated our original response. At that time, we began discussions with the people who were already active in this area, which included NRC and NGen, as mentioned by John Walmsley. In fact, I spoke with John at the time as an experienced medical equipment manufacturer, and he was very helpful, as were many people at that time, including, in particular, people associated with the federal government.

We had an initial review of what we were developing. We actually had a device working on the benchtop within a week for our design. It was, I think, on April 7 that the federal government made a commitment, at least through letters of intent, assuming successful fulfillment of their conditions in such a letter. That was a pretty good response, from my perspective.

**Mrs. Tracy Gray:** Thank you, Doctor.

I'm up against the clock here, but I'd like to ask a similar question of StarFish Medical. I wonder if you could answer a similar question regarding the timeline of when you became active. We know that the pandemic was declared on March 12. Was it after that, or were you involved previous to that deadline? When did you get involved? Would you have seen different activities happen that would have been more helpful?

**Mr. John Walmsley:** As you are running out of time, my answer will be very short. I don't anticipate that we could have reacted differently. March 19 was also when we first engaged with the Winnipeg ventilator. We'd had some preliminary conversations shortly before that. For ourselves, as an organization that is focused on technology, looking ahead to what technologies might be required, and when, is kind of outside of our agreement.

**The Chair:** Thank you very much. That's all the time we have for that round.

Our next round of questions goes to MP Jowhari. You have the floor for five minutes.

**Mr. Majid Jowhari (Richmond Hill, Lib.):** Thank you, Madam Chair. I will be splitting my time equally with MP Lambropoulos.

Thank you to the witnesses for all the great information. Thank you as well for all the great work you've done. You've made us proud and you've made Canada proud. You're also putting the health of many citizens of the world at the forefront.

Dr. McDonald, you talked about the fact that you started the Canadian research on March 21, and you recently submitted the Canadian design to Health Canada for approval. You also heard feedback, in around three to five days, in approval. Can you tell us when you actually submitted? When do you expect to have the approval from a timing point of view?

**Dr. Arthur McDonald:** No, I'm sorry, I must have misspoken earlier. We are planning to submit to Health Canada in a couple of weeks' time.

**Mr. Majid Jowhari:** Okay.

**Dr. Arthur McDonald:** At that point, they have committed to giving us a three- to five-day turnaround.

**Mr. Majid Jowhari:** You're anticipating to submit, but during this time you have the requirements and you're very clear what Health Canada is looking for, and it will be three to five days. We're hoping that in three weeks we will have a Canadian-made ventilator approved by Health Canada. Am I correct on that?

● (1225)

**Dr. Arthur McDonald:** That's correct. We're hoping to start production at the end of this month.

**Mr. Majid Jowhari:** Great. Thank you for that.

You also talked about 10,000 ventilators and the plan for about 800 per week. Am I clear in understanding that those are targeted for the federal government and that there may be partnerships or orders coming from the provinces and territories, or do those 10,000 cover all levels of government? Could you clarify that a bit?

**Dr. Arthur McDonald:** To my understanding, and I think it would also be true for the StarFish ventilators, the ones that the federal government is contracting for are to be distributed by the federal government to the provinces and/or stockpiled. As well, potentially, if Canada's need are met, including for future possible second waves and things of this nature, then there is at least the consideration, from the statements made by government individuals, including the Prime Minister, of possibly offering them to other countries that are in great need. That's my understanding.

**Mr. Majid Jowhari:** Thank you.

Thank you, Madam Chair.

**Ms. Emmanuella Lambropoulos:** Good afternoon, witnesses. Thank you for being with us today.

Professor McDonald, I'd like to ask you a question with regard to the Health Canada approval. As my colleagues have already touched on, you are seeking the approval. We know that in the United States there are a lot more approvals happening at a much quicker rate, but they're not necessarily being as careful about what they are approving. I think it's a good thing that Canada is taking this approach of being careful and making sure that only the right equipment is being used and that the right tests are being approved.

From reading your testimony and hearing you this morning, I was under the impression that it's been a while that you've been seeking the approval, but you just said that you haven't even applied yet. Is that correct?

**Dr. Arthur McDonald:** That is correct, and it is because what Health Canada will approve is what is manufactured in Canada. In the last three or four weeks, companies in Canada in combination with our partners in Europe have been industrializing the design and have been securing the supply chain. It was necessary in some instances to wait until there was a signed contract in order for them to make commitments on such supply chains.

This week we have a complete device in Italy. We have the start of production of devices of a similar nature here in Canada. It will take us a few weeks to test them. Then that will be submitted to Health Canada, but in the meantime our discussions with Health Canada are to define what we should be testing and the complete set of tests that they will require, which in some cases means going slightly beyond what the FDA has asked for. They have been very helpful that way.

**Ms. Emmanuella Lambropoulos:** Thank you so much for clarifying. Thank you.

**The Chair:** Thank you very much.

Our next round of questions goes to MP Dreeshen.

You have the floor for five minutes.

**Mr. Earl Dreeshen (Red Deer—Mountain View, CPC):** Thank you very much. Indeed, it's an honour for me to be able to speak here today and to ask questions.

There was a comment earlier about the lack of Canadian taxpayer research dollars going to science and so on, but I remember a few years ago when I was in Germany with the science minister and we had an opportunity to talk to folks like those from the Liebniz and Helmholtz and Max Planck research institutes. Really, they were saying that per capita and per GDP, the Canadian taxpayer actually puts in just as much as any place else does. The fact is that we have difficulty getting our private sector linked in. Of course there are many reasons for that. One, of course, is that we have 37 million people. We have six time zones. We have 14 different government entities, and we aren't the main draw when it comes to businesses.

I think it's important that we recognize this. Canada has always done some amazing work, which is one of the reasons why amazing scientists, such as Mr. McDonald, are be able to do the great things that they do.

When we are talking about Health Canada, Mr. McDonald, you just mentioned that you were anticipating three to five days because that was what you were being assured by Health Canada. Unfortunately, a lot of other companies have been given similar assurances that once they have their applications in, things are going to happen for them. I hope that because of your appearance here at this committee, people will take note and we will see that happen.

I'm just wondering if there are certain things you have seen. Maybe you haven't experienced yet how approvals happen out of the United States or the European Union, while we are still waiting in Canada for Health Canada. Is the Canadian process working the way it should be in these particular times, and can we improve the approvals? Are there any impediments that you've heard about from those companies and researchers who have been trying to get their work onto the world stage ?

● (1230)

**Dr. Arthur McDonald:** I really don't think I'm qualified to comment effectively on Health Canada's actions with respect to others.

Admittedly, as one of the four ventilator projects—StarFish being another one that was approved by the Canadian government—and having been given priority, we have exceptional access to Health Canada, so we have had, and I referred to this in terms of turnaround time, the preferred situation. It's very difficult for me to comment on the general situation, other than the fact that it's obvious there is an awful lot being looked at carefully by Health Canada right now. I certainly have some sympathy with them in terms of the workload that is on their plate.

**Mr. Earl Dreeshen:** Thank you very much. Of course, there are so many companies that have made applications. No doubt they have to be well scrutinized.

What you just mentioned was that, unless they are going to be manufactured here in Canada, they are not particularly going to become a priority. You mentioned the work that had been done in Italy and how those approvals by the EU seem to be moving along and that you still have to go through the due diligence here in Canada.

Is this also part of the reason we continue to hear about different things happening in the U.S., and people are saying, “Why don't we take a look at this now?” and wanting these new procedures or new technologies to be used in Canada?

If it is the case that we have this international conflict or at least slowdown, is there anything we as a committee could be doing here to try to help out in this situation?

**Dr. Arthur McDonald:** I'm very pleased that we have been able to mobilize several Canadian companies to get into this needed technology. The companies themselves have been extremely co-operative and have brought expertise to the table. I'm sure it's also happening with the StarFish device, as that is company that already has experience in this area.

I think this is a case where, as you mentioned the discrepancy in terms of total expenditure in Canada is primarily associated with R and D done here in Canada. This is an example where company co-operation with national labs and universities has been a very positive experience. I think it's good for the country.

**Mr. Earl Dreeshen:** Thank you.

**The Chair:** Thank you, Dr. McDonald.

Our next round of questions goes to MP Lambropoulos. You have the floor for five minutes.

**Ms. Emmanuella Lambropoulos:** Thank you, Madam Chair. I'll be splitting my time with MP Longfield.

I was up before but I'd like to follow up a little. You mentioned that you were not looking to get a patent with whatever is produced under this project. Can you please tell us what the benefits are of this? I know that Canada should be looking to own as much intellectual property as possible and we should be looking to.... Can you please tell us what the balance is and why you think it's a good thing that we won't be looking for a patent?

● (1235)

**Dr. Arthur McDonald:** If you look at the expansion of COVID-19 into South America, Africa and parts of Asia, such as India, they are still in an exponential rise in terms of the number of cases. On the question of having broad manufacturing capability around the world on a new design that is potentially simpler than the quite complicated devices typically on the market, which are intended to do many other things, and the potential for that to be geared up quickly by companies in other countries, particularly if they have relationships with our companies, for example, we wanted our device to be accessible to the world. It's as simple as that in terms of our objective in doing it this way.

**Ms. Emmanuella Lambropoulos:** It is for humanitarian purposes, mostly.

**Dr. Arthur McDonald:** It is for humanitarian purposes. That's right.

**Ms. Emmanuella Lambropoulos:** Do you think any conditions should be placed in these cases? Obviously, you want it to be available to everyone in the world so that we can help as many people as possible, but should there be any conditions?

**Dr. Arthur McDonald:** The intellectual property that we as scientists and engineers have brought to this, we all wish for it to be as open as possible. In dealing company to company between our manufacturing partners and other companies, that's their objective, although I think they're also motivated by humanitarian reasons and their profit margin is going to be conservative in this case.

**Ms. Emmanuella Lambropoulos:** Thank you.

My last question is in regard to our international partners. I know this is not just a made-in-Canada approach. You've been working with Italy and other countries as well. What role do these other countries play? A lot of the public opinion is moving towards making things in Canada, really being dependent solely on Canadian businesses and trying to be more protectionist, because we've experienced some issues with being dependent on other players. What positive role do you think the international players can play in the COVID-19 situation?

**Dr. Arthur McDonald:** Let me give you the example of our dark matter studies. We're looking for the particles that make up five times as much mass in our universe than we do and that hold our galaxy together. We have a project happening at SNOLAB right now. We are working internationally with a group that is looking at something 10 times bigger and has committed to something 10 times bigger than that to be done here in Canada, perhaps 10 years from now, when there would be tremendous economic benefits, again, back here in Canada.

The international co-operation of 400 scientists and 14 countries in this collaboration is a way in which Canada can both contribute to very fundamental questions, where we don't know what this part of our universe is, and scale up to try to get the ultimate sensitivity, which could happen at our laboratory, SNOLAB, but would require major co-operation on the scientific front from other countries. It is becoming typical in particle physics—has been for a while—and I think it will have economic benefits in the long term as well.

**Ms. Emmanuella Lambropoulos:** Thank you so much.

**Mr. Lloyd Longfield:** Thank you.

I will direct my first question—if I can get two questions, we'll see—to Jeff Musson.

Thank you for mentioning the work you're doing with our veterans. We have a policy in place that after 12 years of service, veterans can have up to $80,000 in training or for six years of service, $40,000 in training, including cyber-training. Have you worked at all with the Future Skills Centre, the centre that we set up last Parliament?

**Mr. Jeff Musson:** We've started preliminary discussions with them. We've been working more directly with Veterans Affairs and with CAF and their transition group, so we've been able to plug in with those. That's how we've connected in.

**Mr. Lloyd Longfield:** I'd love to follow up with you at another time on the Future Skills Centre.

**Mr. Jeff Musson:** Absolutely.

**Mr. Lloyd Longfield:** Thank you.

**The Chair:** Thank you very much.

[*Translation*]

We'll now start another round of questions.

Ms. Vignola, you have the floor for two and a half minutes.

**Mrs. Julie Vignola (Beauport—Limoilou, BQ):** Thank you, Madam Chair.

My question is for Mr. Musson.

Mr. Musson, you spoke about a technology development program whose exact name I don't recall. In the past, funding from this program was earmarked for the improvement of a French fry plant.

How do you think Canada can improve the program to ensure that the funding is really invested in training, facilities and technology development, and not in something that we already know very well.

● (1240)

[*English*]

**Mr. Jeff Musson:** One thing we've done—and this is why we've worked with the University of Ottawa and directly with people at ISED—is to make sure that there is a proper framework in terms of deals or projects that are approved. How we fall in with that ISED program is that they've identified cybersecurity as a priority, and in order to qualify, you also have to be a business that works with a university.

I think the regulations or the approval of projects have tightened up significantly since that project was approved. However, our program is laid out such that, not only do we have the proven track record, but we're able to fit within the criteria that ISED has developed.

[*Translation*]

**Mrs. Julie Vignola:** Thank you.

For the benefit of the committee members and the public, can you provide one or two concrete examples of how a cybersecurity breach affects people's lives, while considering, for instance, that the 1987 crisis resulted from a computer that went haywire?

[*English*]

**Mr. Jeff Musson:** What you've seen right now with the pandemic being a health crisis, you can rest assured that a cyber-crisis would be similar. Smart cities are connected to a grid, so you can imagine what would happen if our electrical grid was attacked. Financial institutions and everything that's non-health related is potentially an issue that needs to be addressed here. The more connected we are, the more opportunities the bad actors have to able to access our networks.

**The Chair:** Thank you very much, Mr. Musson.

Our next round of questions goes to MP Masse.

You have two and a half minutes.

**Mr. Brian Masse:** Thank you, Madam Chair.

Really quickly to StarFish Medical, how much of your manufacturing operations and your partnerships were you offshoring outside of Canada? I'm just curious as to how much of your manufacturing, as you lead people through the process, is done outside of Canada.

**Mr. John Walmsley:** The manufacturing of the systems and the subsystems is all happening in Canada.

**Mr. Brian Masse:** Even prior to COVID, 100% of all the projects that you deal with and the companies you refer to them are within Canada.

**Mr. John Walmsley:** Separate from this program that we're discussing today...?

**Mr. Brian Masse:** It's just in general. I come from an area of tool and die mould-making, where we transitioned outside of just auto to aerospace, mining, medical devices and so forth. I'm curious to know what we need to do for the future. Prior to this or when you're referring customers that go through you—I've gone on your website—are they referred to manufacturers outside the global supply chain or domestic? I'm trying to get a snapshot here.

**Mr. John Walmsley:** That's a good question.

We have our own manufacturing capability that we offer people to get them up and running. Then typically we will work with our partners' preferred manufacturer. By and large, I would say that those are all in North America, but are they in the U.S. or Canada? I would imagine that the split is probably in line with our own work, which is about 70% in the U.S. and 30% in Canada.

**Mr. Brian Masse:** Are there any recommendations you have for us going forward to enhance that supply chain? Are you faced with some manufacturing maybe that has a weakness because of its dependency on.... Mr. Musson mentioned something about U.S. procurement, actually, if you didn't catch it. Even on our own defence procurement, we can get bumped by the U.S. at any point in time, even when we're ahead of them in the orders.

Thanks, Madam Chair. I will let you have the final word here.

**Mr. John Walmsley:** In this case, of course, we did see that there was a brief period when getting systems or components across the border was difficult, though that eased fairly quickly.

It would take me a little more reflection to give you a good answer to that question, I think.

● (1245)

**The Chair:** Thank you very much.

Our next round of questions goes to MP Patzer. You have the floor for five minutes, please.

**Mr. Jeremy Patzer (Cypress Hills—Grasslands, CPC):** Thank you very much, Madam Chair, and thank you to everybody who is on the panel today for the work you have been doing for the health and benefit of not just Canadians but of people around the world.

As far as the MDEL licences, medical device establishment licences, we have heard from companies in Ontario that were given 24-hour to 48-hour timelines to get approval, but it was 23 days in the one report I read. Is anybody concerned about the possibility that when you're told three to five days it might actually take significantly longer than this?

Anybody on the panel can answer that.

**Dr. Arthur McDonald:** Yes, there would be concern because we want to get the devices to market as soon as we possibly can.

However, we're very hopeful, given the fact that we had discussions back and forth with Health Canada to define the parameters of the product that we are going to be supplying at the time that the government was seeking to define the contract. We feel quite confident in being able to meet those requirements, including the testing necessary to prove that we meet them. We're very hopeful that perhaps the interaction we've had so far is such that they can meet that sort of deadline if they stick to devoting the resources to it they stated to us that they would.

Yes, we're concerned but it's out of our hands. We will just have to deal with what happens. We're optimistic.

**Mr. Jeremy Patzer:** Okay. Thank you.

Moving on to Canadian Nuclear Laboratories, aside from your efforts in producing ventilators, I want to ask you about your work with hydrogen-based transportation. I was reading on your website that by 2020—so, this year—you were looking to have something to go with on that.

Are there any delays or any issues in getting to that goal?

**Mr. Joe McBrearty:** Thanks very much for that question.

We are still working very closely to look at hydrogen for transport. We have some specialized catalytic technology at CNL. We are in the process of continuing to do studies for those systems.

Obviously, with hydrogen, safety is the number one concern. One of the first things we have to do to get to hydrogen for transport is to verify that the systems we have and the processes we are working on will meet safety requirements.

**Mr. Jeremy Patzer:** What's the environmental impact of this technology through energy efficiency and carbon emissions? The reason I'm asking is that we have seen from Environment Victoria, based in Australia, that to produce three tonnes of liquid hydrogen would actually release 100 tonnes of CO2 into the atmosphere.

I'm curious to hear your thoughts about that.

**Mr. Joe McBrearty:** Part of the production of hydrogen is an electrolysis production and it's also done by heat. One of the methods we look at in the production of hydrogen is using waste heat from other plants, heat that would actually be wasted anyway. You can use that heat to be able to help produce hydrogen.

The second part of being able to produce clean hydrogen really would come as a result of a small module reactor design in the production of electricity, which can then, from a clean perspective, produce hydrogen from that process for the country.

**Mr. Jeremy Patzer:** How hard would it be to scale it or commercialize it so that it becomes a readily available product, if we're going to use it, potentially, going forward?

I notice that Honda, Toyota and Hyundai already have three vehicles that are running off hydrogen, and South Korea and Japan have moved to a hydrogen-based model going forward. To scale it to domestic capacity, what's that going to take?

**Mr. Joe McBrearty:** At this point, we are looking at taking the technology and the catalysts that we have at CNL from the laboratory benchtop to a prototype design, so that we can actually show that we can move it to industrial scale. We are not ready to do that yet. We would expect that it would take two to three years of testing and observation of that system to make sure that the process works and that it's safe. I think you're still looking at two, three or four years for a technology to be on the market for hydrogen for transport systems to use.

● (1250)

**The Chair:** Thank you very much.

Our next round of questions goes to MP Ehsassi. You have the floor for five minutes.

**Mr. Ali Ehsassi:** Thank you, Madam Chair. Allow me to also thank all of the individuals who have appeared before our committee today. Perhaps I should thank them and also apologize for the procedural wrangling that occurred earlier.

My first question would be for Mr. Kryski.

Thank you so much for your testimony. You obviously highlighted the need for us, as a country, to support innovators and entrepreneurs, and I can assure you that's something that's been very much a part of our focus at the federal government. As you've suggested, these are difficult times. I believe you said that the future is bright. Some of the developments we've seen have been incredible, but the future is also at risk.

Given that you're based in Alberta, what do you envision the role of provincial governments to be? As you know, we have seen historic levels of federal investment, but it's also important that the provinces be part of that effort. I say this against the backdrop of having seen that, in Alberta for example, at Alberta Innovates, for the second time in a year, there were budget cuts. They laid off over 100 employees.

Could you tell us what your thoughts are on that and how crucial it is that provinces also be there to support entrepreneurs and researchers?

**Mr. Eric Kryski:** Thanks for the question.

I think it's critical that we have support from the federal, municipal and provincial levels working in harmonization towards this. Particularly, when the NDP came in provincially, we did see a lot of that really start to take shape with their introduction of the Alberta investor tax credit program. Unfortunately, we don't have a program now as a result, so that's something I would love to see reinstated.

I think this is where, potentially, matching from provincial governments alongside federal government matching, specifically for angel investment and venture capital investment, would be critical to helping diversify and support Alberta-based businesses. Across the Prairies and even in B.C., we are still at very serious risk here in the west. The economic climate is very different than in Quebec and Ontario in terms of venture capital and angel investment, so it's imperative, now more than ever, that we actually have some of this harmonized support rapidly.

**Mr. Ali Ehsassi:** Absolutely, thank you very much for that.

I would be remiss if I didn't ask Dr. McDonald a question.

Dr. McDonald, you touched on the significance of international co-operation and how that is crucial. Given your lengthy expertise, would you perhaps share with us what the federal government can do to better support open science and open-source licensing?

**Dr. Arthur McDonald:** Open science and open-source licensing are two separate questions.

Open science, I think, is important. In fact, it was addressed in the fundamental science review for the federal government to have a straightforward ability to connect the federal government with international projects. People who come forward with ideas where Canada can collaborate with other countries have some difficulty in understanding exactly to whom they should be speaking. The chief science adviser is certainly one person who is clearly in the middle of this, but on the question of whether you go to NRC, CFI or NSERC—the various agencies—it's important to perhaps centralize the approach to international co-operation a bit more in Ottawa.

One of the things, certainly, that we recommended in that fundamental science review was the creation of a major overview committee on science, technology and innovation, with external experts. That has been slow in coming. There actually was a call a year ago for people to indicate interest in participating, but it hasn't happened yet.

That committee could deal with large-scale international co-operation and would be a good idea.

● (1255)

**The Chair:** Thank you, Dr. McDonald.

Our next round of questions goes to MP Gray.

You have five minutes.

**Mrs. Tracy Gray:** Thank you, Madam Chair.

I was speaking the other day with a manufacturing company that makes cleaning supplies that use spray bottles. They were saying that they can ramp up their production really quickly; however, they can't get the nozzles for the tops of their spray bottles because they come from China, and they're just not able to get them.

I have a question for our representative from StarFish. As you're looking at putting this ventilator system together, how are you finding the parts that you're getting? I understand that it will be produced in Canada, but as you're acquiring all the different parts, are they all within Canada or do you have to access parts from elsewhere? Are you having any issues with that?

**Mr. John Walmsley:** As you say, manufacturing is happening in Canada. There are some specialist components in the system. We selected this system as something where many of the parts could be made in Canada with technology that's available. I would say that key parts we're sourcing are sensors and some of the pneumatic components, where specialist industries exist elsewhere in the world. We've been sourcing the components from there.

As we do this, in terms of the volumes that we're asking for on the timelines that we're working with—and with companies that we don't have existing relationships with—sometimes it's been a little slow. That has been helped by our supply chain expertise that our subcontractor Celestica has brought, but still, getting all the parts to arrive in time is definitely a big part of the challenge.

**Mrs. Tracy Gray:** Thank you for that.

I have a question for Dynamite Network. What an interesting project it sounds like you're working on with getting these veterans to work on cybersecurity. Can you maybe explain a bit of what the process is as you bring on these veterans and if you have any challenges technologically? Do you send out certain computers and technology to them so that they can operate? Can you just describe a bit of how that works? As well, how are you finding these veterans? How do they come to you, or do you go out and find them?

**Mr. Jeff Musson:** I'll quickly reply to all of these very interesting questions.

To start off, where do we find them? Last year my team and I visited 18 different military bases as part of their job fairs. We actually went right to the source. The problem was that at the moment COVID-19 hit, that was our main source for doing outreach, so we switched to a social media strategy. What was amazing was that we saw an increase in numbers when we used social media for outreach to get people into the program.

As for the program itself, from the outset we designed it to be taught 100% online, with professors. We set up virtual labs that simulate what it is like to work inside a cyber-operations centre. For the curriculum that's part of this program, we talked to our big banks. We talked to our partners Cisco, Amazon and IBM as well. We asked them a question: What are the specific skill sets that you require when you hire these individuals? That's how the curriculum became very much all-encompassing. I can send you a brief synopsis.

The last thing we did was introduced an organizational behaviour course that's mandatory for all people. Those who have already released from the military are teaching the cultural aspects and the differences between life in the military and life in the tech world.

That's how we were able to do that.

● (1300)

**Mrs. Tracy Gray:** Thank you very much.

There's one other question I really want to get in here. It has to do with veterans who are going online.

Do you have any issues with their connections, with broadband? Are a lot of the veterans in major centres? Are they in rural areas? How are you finding that? Are there issues with their connecting and being able to access and do the work and get the education that they've signed up for?

**Mr. Jeff Musson:** You just hit a bit of a road bump that we've identified, which we're going to need the federal government's help on. The vast majority of veterans are able to get access because they have high speed. However, there are those in more remote locations who require satellite connections, and that starts getting very cost-prohibitive. Not having an Internet connection has actually prevented a couple of people from coming into this program.

**Mrs. Tracy Gray:** That's a real shame. It's not equal access to all veterans, then, unfortunately. It depends on where they live.

**Mr. Jeff Musson:** It depends on your Internet connection. The good news is that it's affecting fewer and fewer people, but it's something to work on.

**The Chair:** Thank you very much.

Unfortunately, that's all the time we have for today. I'd like to thank the witnesses.

With that, the meeting is adjourned.