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Chair

Mr. Leon Benoit

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● (1530)

[*English*]

The Chair (Mr. Leon Benoit (Vegreville—Wainwright, CPC)): Good afternoon, everyone. We're here, as you know, to continue our study on resource development in northern Canada.

There are a couple of quick issues to deal with before we go to the witnesses. The first is the budget. We talked about it the other day, but the bells were ringing and there wasn't agreement to have a vote.

You have a proposed budget in front of you, or soon will. This budget is to cover witness costs. The clerk has indicated that there has been a good, positive response from witnesses. We've had brief discussions today about possibly increasing the amount from the $78,200 on the form to maybe $98,000, because we have a lot of witnesses from the territories, and their cost of travel is quite a bit higher than it is for other witnesses. So if it's the will of the committee, we could increase that now. We don't have to spend it, of course, but if we have to, at least we won't have to go back and get another budget approved if in fact we need more.

Would it be agreed that we would pass a budget for $98,200 instead of the $78,200, and that I take that to the liaison committee to see if we can get approval?

Go ahead, Monsieur Gravelle.

Mr. Claude Gravelle (Nickel Belt, NDP): I'm just wondering if we need the extra $20,000. It's $20,000. Do we need it?

The Chair: Well, the clerk has indicated that if we're going to continue to see witnesses, as has been proposed and as has been accepted.... We've had acceptance from a lot of the witnesses.

We don't have to, but we would probably be coming back later to approve another budget. And you know, just because we budget for it doesn't mean we spend it. We spend money only as needed.

Mr. Claude Gravelle: Well, why don't we spend this $78,000 and then come back if we need more.

The Chair: It's up to the committee, either way.

Yes, Mr. Harris.

Mr. Richard Harris (Cariboo—Prince George, CPC): As you say, Mr. Chair, if we don't spend it, we don't have to take it. This would make it one step rather than two, and I think it's the easiest way.

The Chair: Exactly.

There isn't agreement. I don't want to get into a long debate right now, Mr. Harris, unless you do.

Can we just approve the $78,200, as was proposed originally, before we saw the high level of acceptance of invitations? Is there agreement on that amount?

Some hon. members: Agreed.

The Chair: That is approved. We will send that off to the liaison committee.

Monsieur Gravelle, you have an issue you'd like to deal with now.

Mr. Claude Gravelle: Last week, when we were questioning some witnesses, the bells rang and we had to go for a vote. I'd like to bring those witnesses back, because we have some more questions for them. We'd like to find an hour when we can bring those witnesses back.

The Chair: We'll have Mr. Allen on that.

Mr. Mike Allen (Tobique—Mactaquac, CPC): Mr. Chair, yes, it was unfortunate that the meeting ended with their being cut off. There were a few questions I think our side would have liked to have asked them as well. I would suggest that the clerk plan to have them as soon as he reasonably can. It might be the week after the break, because I think if we're getting a high acceptance of witnesses, we might be booked. If it ends up right after the break, we have no problem with that.

The Chair: Is there agreement?

We'll go to Mr. Harris.

Mr. Richard Harris: Were they all from Ottawa?

The Chair: They were departmental officials, yes, so they are all from Ottawa.

Is it agreed, then, that I can ask these witnesses back as soon as the clerk can reasonably schedule them? We don't want to start bumping witnesses who have agreed, so if we can, we will do it as soon as possible after the break. Is that agreed?

Some hon. members: Agreed.

The Chair: Seeing agreement, we will proceed in that fashion.

● (1535)

Mr. Claude Gravelle: I think you indicated to me earlier that the hour with the Norwegian minister is already spoken for.

The Chair: For the one hour we have witnesses booked. The other hour will be taken by the Norwegian delegation. So we'll have to book it later after the break, but there is wide agreement that we want them back, so we will do that. Thank you very much.

To the witnesses, thank you all very much for coming today to help us get the information we need to do a thorough study on resource development in northern Canada.

We have with us today, from the Canadian Space Agency, Dr. Steve MacLean, president; and Chummer Farina, vice-president. From the Prospectors and Developers Association of Canada we have Richard Moore, chair, geosciences committee; and Scott Cavan, program director, aboriginal affairs. From the Geomatics Industry Association of Canada, we have James Ferguson, chair and acting president.

Thank you all very much for being here today. We'll have your presentations for up to 10 minutes in the order on the agenda. We will start with the Canadian Space Agency and Dr. Steve MacLean.

Dr. Steve MacLean (President, Canadian Space Agency): Mr. Benoit, Chair, Mr. Gravel, Mr. McGuinty, vice-chairs, and distinguished members, thank you for the opportunity to speak to you today.

I'd like to offer a short statement, and I'll be pleased to answer any questions afterwards.

This short brief will touch on how space, our strategic and integrated infrastructure, supports the critical priorities of government, especially those related to this committee of geomapping and the sustainable development of the north.

Just for a moment, let's step back to the very beginning of Canada's long and outstanding history of space nearly 50 years ago, when we became the third nation to launch a satellite, Alouette 1.

Our first scientific satellite was sent aloft as a government scientific mission to increase our understanding of the interaction of solar storms as they collide with our upper atmosphere. While these storms illuminate our northern night sky with the beautiful aurora borealis, they have the potential to wreak havoc on our electrical transmission and communications networks.

Three satellites later, with the launch of Alouette 2, and then ISIS 1 and ISIS 2, Canada and the international scientific community have produced more than 1,000 scientific papers, and at the same time developed applications that will provide advanced warning to allow us to better protect our fragile ground infrastructure.

When we speak of an integrated and fragile infrastructure, it's possible that you may be thinking of Anik F2 when it malfunctioned on October 6. This rare outage cut Internet, broadcasting, cellular, and phone services, and even ATM transactions in many communities across the north. Weather forecasters could not relay critical information to air transportation services, and control towers could not contact first responders, resulting in the cancellation of nearly 50 flights and stranding travellers for days.

The north, more than any other region of our country, because of the vast distances and the hostile and changing weather conditions faced by our citizens who live and work there, needs dedicated, robust, and redundant space-driven communications, weather, and navigation services. It needs this if it is to fully realize and capitalize its potential for sustainable development, now and in the future.

You may be aware that the Canadian Space Agency has a mandate to promote the peaceful use and development of space, advise and advance the knowledge of space through science, and ensure that space science and technology provide social and economic benefits for Canadians.

With a stable budget of $300 million annually, of which more than 70% is contracted to the Canadian space industry and academia, the agency collaborates with and supports the mandates of government departments.

The Canadian Space Agency has recently aligned its programs and organizational structure and directs its activity in full support of critical government priorities. In particular, the programs and activities of the Canadian space program support the Arctic and northern strategy; sovereignty and security and the safe navigation of ships in our icy waters; Canadian Forces deployments at home and abroad; fishing patrols and offshore pollution detection and interdiction activities; atmospheric and environmental monitoring related to precision weather forecasting and climate change; and the exploitation, development, and sustainable management of Canada's natural resources, especially in the north.

The Canadian Space Agency does not act alone. We partner with many government departments and other space agencies to achieve common goals in support of their mandates and the priorities of government.

As an example, the Canadian Space Agency contributes $4 million annually to the Canada Centre for Remote Sensing, a division of Natural Resources Canada. They have the mandate to archive and render RADARSAT data into information products that, among others, may serve to help the sustainable development of the north.

We partner with National Defence in the design of satellites that will provide advance warning, with the capability to track vessels navigating way beyond the sight of our over-the-horizon radar. In the future this will be done on a global scale with a constellation of small satellites capable of monitoring all legal ocean-going vessels. This is critically important to actively manage fishing within our protected zones, carry out pollution interdiction, and support international anti-piracy missions.

Canada's space-ground infrastructure is again a partnered activity shared between the agency, the Canada Centre for Remote Sensing, National Defence, and increasingly with the private sector.

Canada is at a crossroads, and in terms of leveraging future space assets, because of our geographical location, one may view this as both a privileged juncture and a strategic opportunity.

● (1540)

If Canada wants to take fuller advantage of some of the more than 250 satellites that will be launched by nations in the next decade, many of them capturing images over Canada and our northern extremes, we will need to soon begin to expand our integrated space-ground infrastructure. In this way, we will be better poised to ensure the development of our space infrastructure and take advantage of the capture, archiving, processing, and dissemination of this complementary data that other nations are obtaining about our own nation.

Space is a strategic asset, and spacefaring nations know they must partner in areas of mutual interest. In this respect, Canada extends the reach of its space program by actively leveraging the interests of other space agencies. We do this by pursuing missions and exchanging space-derived data, especially in sectors related to the environment, disaster management, search and rescue, and scientific research in the Arctic and the Antarctic.

As an example, in addition to our own satellites, RADARSAT and SCISAT, our scientific instruments are flying aboard American, European, Japanese, and Swedish satellites. These satellites are providing our government departments with complementary and critical space data that is, among others, improving our precision weather forecasting, monitoring the extent of flooding and crop damage, or enhancing the monitoring of the progression of spruce bud infestation and mitigation efforts being applied in western Canada.

At the same time, the private sector is using space data to pursue mining and resource exploration activities and to monitor and protect vital oil and gas pipelines, looking at subsidence around wellheads and along the length of the transmission line to market.

Tracking evidence and mapping zones subject to subsidence, such as geologically unstable areas or where the foundation is built on permafrost, is of vital interest and importance in the north, as communities advance their planning for the implementation of critical and costly infrastructure. Here too, space-based assets such as RADARSAT provide invaluable data in the support of infrastructure planning for the north.

The contributions of RADARSAT, SCISAT, and OSIRIS to the Canadian international research efforts undertaken during the International Polar Year have spurred scientific interest and research throughout Canada's vast northern expanse. The results of this intensive two-year global scientific inquiry, much of it centred on Canada's Arctic, will be unveiled to the world in the Montreal conference for IPY, the concluding conference, in April of 2012.

At the same time, with the increasing global demand for gold, precious rare earth minerals, petrochemicals, diamonds, and water, especially water, our Canadian north is witnessing an unprecedented boom in demand for prospecting, exploration, and exploitation. I have several examples of how we have integrated RADARSAT data with other georeferenced information to produce accurate maps of this intensive resource activity in the north, and I'll make sure that every member of the committee gets those examples.

At the same time, one of these products demonstrates the integration of various sources of georeferenced data to document the range of research and activities of one of our government departments, Fisheries and Oceans, as they carry out their mandate in the ice-infested waters of Canada's Arctic region. We are partnering with the Department of Fisheries and Oceans in a pilot project to show how we would map the entire northern coastline and undersea continental boundaries in support of Canada's sovereignty claim over the vast expanse in the Arctic region. This project demonstrates both the power and the potential of using space assets in combination with other instruments such as airborne lidar and undersea sonar devices. A combination of these precise and varied data sources will be used to produce an accurate georeferenced mapping product of the Arctic coastline and extension of the continental shelf. The detailed accurate mapping information produced by this collaborative undertaking will be used to defend Canada's Arctic sovereignty, support our international policy agenda, and, in time, broaden our commercial interests.

Canada's use of these georeferenced products to stake our international claim will be assuring the future social and economic prosperity of all our citizens and foster the active management, protection, and exploitation of Canada's northern expanse, its coastlines, and navigable and sovereign waters coast to coast to coast.

Thank you.

● (1545)

The Chair: Thank you very much, Dr. MacLean, for your presentation.

We go now to the Prospectors and Developers Association of Canada, to Mr. Moore. I believe you're giving the presentation, so if you would go ahead, please, for up to 10 minutes.

Mr. Richard Moore (Chair, Geosciences Committee, Prospectors and Developers Association of Canada): Good afternoon, Mr. Chair and committee members. My name is Richard Moore, and I am a representative of the Prospectors and Developers Association of Canada. I am a PDAC board member and I am the chair of the geoscience committee. I am also a consulting geologist with more than 40 years of experience internationally and in Canada.

I am here with my colleague, Scott Cavan, PDAC program director for aboriginal affairs. Thank you for providing us with an opportunity to meet with you today.

The PDAC is a national association, formed in 1932, whose members are involved in the mineral exploration and development industry both in Canada and around the world. Our membership includes over 1,000 corporate and more than 7,000 individual members, comprising mining companies, junior exploration companies, service and consulting firms, geoscientists, prospectors, students, and the financial and investment sectors.

The PDAC organizes an annual convention in Toronto, which is the world's premier mineral industry trade show and investor's exchange. In 2011, our convention attracted over 27,000 delegates from over 100 countries.

The geoscience knowledge provided by federal, provincial, and territorial governments as a public good is widely acknowledged to be one of Canada's competitive advantages in attracting mineral exploration and to have contributed to this country's standing as a leading mineral producer.

It is also essential for maintaining Canada's role as the leading destination for exploration investment. Since 2004, Canada has been the number one country for attracting global exploration, attracting a share of between 16% and 19%.

Geologic mapping is the basic research tool needed for finding evidence that geologic forces have led to a concentration of resources that are economically viable. Geomapping is fundamental for a company to decide where to focus its exploration activity.

Most mineral resources in Canada are public assets. The responsible development of these resources is in the public interest. It creates jobs, sustains communities, and contributes to Canada's GDP. Public geoscience stimulates exploration and is a key element of federal, provincial, and territorial strategies.

Government geoscience plays an important role in mineral exploration in Canada.

Mineral exploration and development differ from most other economic activities, as mineral deposits are where you find them. It takes many years and lots of money to determine whether a mineral deposit can turn a profit, and it is a high-risk business.

Government geoscience is important. It attracts exploration investment by helping companies to identify areas of favourable mineral potential. It makes exploration efficient and more effective. By reducing exploration costs and risk, public geoscience attracts investment, creates jobs, and increases government revenues.

There is documented evidence that government geoscience stimulates mineral exploration. Program evaluations suggest that six out of ten mapping projects have immediate impact in terms of claims staking and new exploration activity.

There is also data that highlights the return on investment for geoscience research. Natural Resources Canada data suggests that while incremental increases in exploration expenditures are difficult to quantify, every $1 million of government investment to enhance geoscience knowledge will stimulate $5 million in private sector exploration expenditures.

Geomapping has played a critical role in the past and present successes of the Canadian mining industry. It was at this time of year 119 years ago that J.B. Tyrrell was canoeing home from his geomapping program along the western shore of Hudson's Bay. His had been a voyage of discovery, travelling by canoe into the eastern Barren Lands of the Canadian tundra, an area where no European had travelled since Samuel Hearne in the 17th century.

J.B. Tyrrell was an officer of the Geological Survey of Canada, and his were some of the first geomapping expeditions of the geological survey in the north, which led to the eventual understanding of the geology of the eastern Barren Lands.

Where are we today? The same region explored by J.B. Tyrrell is home to Nunavut's only producing mine, the Meadowbank gold mine. Its discovery was the result of many years of prospecting and exploration work by geologists using maps of the Geological Survey of Canada.

The Meadowbank mine employs about 500 people, and in 2010 it contributed almost 12% of the territory's GDP. The mine is owned by Agnico-Eagle Mines Limited, which by the end of 2010 had spent $1.26 billion on the project. The mine entered production in June 2010 and has an estimated reserve of 32.2 million tonnes grading 3.5 grams per tonne of gold.

● (1550)

Before the development of the mine, the unemployment rate in Baker Lake was at 50% or higher, and there were few opportunities for economic development. The company enacted policies to give preference to local suppliers, sponsored community events and organizations, and provided as many jobs as they could. Employment at the mine and related service jobs significantly lowered the unemployment rate and provided a huge economic boost to the community, bringing with it improved lifestyles.

This is just one example of how government-supported geoscience has translated into the development of a mine that produces tax revenues, contributes to the Canadian economy, supplies jobs and training, and offers a higher standard of living for local communities, including aboriginal people. There are many more examples like the Meadowbank mine. They demonstrate that the future of Canada's continued dominance in the exploration sector rests upon continued and increased investment in geomapping and scientific research.

In its pre-budget submission to the House Standing Committee on Finance, the PDAC has recommended that the Canadian government continue to invest in the geomapping for energy and minerals, or the GEM, program and the targeted geoscience initiative, or the TGI. These programs have provided important geological knowledge that will undoubtedly result in significant exploration success. The government has planned on continuing these programs. The PDAC supports this decision and recommends that the funding for these research programs remain a firm commitment in future budgets.

Both the geomapping for energy and minerals program and the targeted geoscience initiative are multi-year programs that have been funded for several years. The annual costs to the federal government are $22 million for GEM and $5 million for TGI.

The information gathered from these programs increases the knowledge of Canada's natural resources; encourages mineral exploration and mine development; contributes to economic development, particularly in the north; attracts investment; and contributes to the professional development of geology students.

Geomapping is building the technical exploration infrastructure for the future, for the continued success of the Canadian mineral industry and the economy.

Thank you, and I would be pleased to answer questions.

The Chair: Thank you, Mr. Moore, for your presentation, and to both of you for being here today.

We go to the final presenter for the day from the Geomatics Industry Association of Canada, James Ferguson, chair and acting president.

Go ahead with your presentation, please, Mr. Ferguson.

Mr. James Ferguson (Chair and Acting President, Geomatics Industry Association of Canada): Thank you, Mr. Chair and committee members, for allowing us to speak to the committee this afternoon. I'll read a prepared brief also.

Celebrating its 50th anniversary this year, the Geomatics Industry Association of Canada, formerly the Canadian Association of Aerial Surveyors, is the only national organization in Canada that advocates for geomatics on behalf of its members. The geomatics business in Canada is home to over 2,000 firms—small, medium, and large—that employ close to 25,000 employees across the nation. To gauge relative size, this is larger than the number of people employed in the pharmaceuticals business, as an example. The estimated annual gross revenue generated by these firms is over $2 billion, with approximately 25% of that being earned as export revenue.

What is geomatics? The definition from Wikipedia is as follows:

> Geomatics (also known as geospatial technology or geomatics engineering) is the discipline of gathering, storing, processing, and delivering geographic information, or spatially referenced information.

Geomatics has traditionally been practised by the surveying, mapping, remote-sensing, cartography, photogrammetry, geodesy, hydrography, and geographic information system disciplines. In the past few decades, geomatics has rapidly evolved and grown into a modern cross-sector advanced technology discipline employing sophisticated approaches to creating and maintaining maps and imbedding those maps into the multiplicity of decision support systems that a digital society needs and uses. One common example is the vehicle navigation systems that we use today. This evolution has significantly broadened the range of sectors that employ geomatics and has also substantially increased the need for up-to-date, modern national mapping, which is the foundational digital infrastructure required to support the efficient application of geomatics across our society.

Commercial companies, such as Google, NAVTEQ, and Microsoft, to name a few, rely 100% on the business of geomatics to create their maps. Microsoft Bing estimates that 35% of all Bing search engine searches have a geographic or location component. Most of this available mapping is of a resolution and accuracy that allows it to be used for general consumer consumption but does not meet the demanding business and societal needs required for in-depth geomatics analysis for, say, flood mapping, transportation and infrastructure development, and detailed exploration activities. This available mapping from commercial companies also tends to be focused on areas where a commercial market is available, as opposed to over all of Canada; thus it does not consistently meet many of the demands of our society.

Who uses geomatics? The users of geomatics are truly cross-sectoral. Users come from sectors that include infrastructure and critical infrastructure; transportation—land, air, and sea; emergency management; public health and biosecurity; resource management; mining; petroleum resources; the environment; national defence and border security; utilities and telecommunications; forestry; fisheries; manufacturing; and trade and retail services.

Further, governments are the largest consumer of geomatics data and services—municipal, regional, provincial, territorial, and federal.

For the past 20 or more years, advancements in applied geomatics in Canada have taken place primarily in the private sector, some independently funded and some in cooperation with universities and limited government programs. Examples include IRAP, GEOIDE, GeoConnections, Tecterra.

Whereas Canada was an international leader in geomatics post-World War II and into the 1980s, its status and ability at the federal level has fallen behind much of the developed world. There are many reasons for this, but GIAC believes the lack of a coherent, practical, and actionable national strategy and plan is at the core of this decline.

Most of Canada's national maps are antiquated, with base data often more than 30 years old. Canada's mapping information is incomplete, and the level of accuracy and resolution of national maps is inadequate and needs to be enhanced to include detail adherent to the needs of modern cross-sectoral geomatics users.

As a result, in order to support effective decision-making, public and private activities across many sectors are forced to use out-of-date mapping, create new mapping, or acquire other mapping for their specific projects. The cumulative effect of this situation across our society is to add substantial costs and time to all projects in sectors that require mapping. This is a productivity drag on Canada's economy.

There is not a one-size-fits-all solution, but the technology and know-how exist to create a modern national map in Canada. However, without a cohesive national multi-sector strategy to establish standards, develop an execution, delivery, and maintenance model, and ensure that data when collected is stored and accessible, investments made by governments and the private sector will continue to be ad hoc and incomplete.

● (1555)

Beyond mapping, a national geomatics strategy would also address the strategic importance of geomatics technology to a modern economy and society by helping facilitate the effective application of geomatics in our education systems, our research, development, and commercialization activities, our skills development programs, and with our key national policy issues, such as energy, sovereignty, environment, public safety, natural resources, health, and others.

Having up-to-date and accurate mapping data openly and freely available, based on user models that can be well defined, would allow Canada to efficiently direct resources effectively, plan for future growth and development, and establish sovereignty over our borders.

Governments need to care, because the current situation is negatively impacting our national productivity, competitiveness, and levels of innovation.

Geomatics is a modern technology that Canada needs to leverage more effectively in order to compete effectively in a global economy. This is especially true for more remote areas such as Canada's north, where the lack of adequate geomatics information hinders ongoing activities as well as future economic development.

There are a number of examples of how government can partner with industry to ensure accessible data is available and to work together to prioritize the gaps in existing locations. In the field of geomatics, the following program is an example that is in place in Alberta: Spatial Data Warehouse Ltd. is an Alberta-registered, not-for-profit company created in 1996 to take over and fund digital mapping activities that were previously undertaken and funded by the Government of Alberta. It has proven to be one of the most successful P3 initiatives within the province of Alberta. Spatial Data Warehouse's objective is to provide for the long-term management, updating, storage and distribution, and associated funding of digital mapping data sets that collectively make up Alberta's digital mapping infrastructure.

The following recommendations were made by GIAC in its pre-budget submission to the House finance committee in both the fall of 2009 and the fall of 2010, and were supported by explanatory visits to over 40 members of Parliament in November 2009 and November 2010.

One, GIAC recommends that the Government of Canada fund the development of Canada's first comprehensive multi-sector national geomatics action plan by the end of 2010. This would be Canada's first comprehensive multi-sector national geomatics action plan. The objective of the NGAP, as it's called, would be to strengthen the use of geomatics and promote it as an essential tool upon which decisions that impact our quality of life, innovation, productivity, and global competitiveness rely.

The NGAP would be facilitated and compiled by an independent policy and research organization working through a national forum that would consist of representatives of government, industry, academia, and the user community. The NGAP would address the need for a modern approach to national mapping as well as the need for the more effective application of geomatics in our education systems, in our research and development and commercialization activities, and in our skills development programs.

Two, GIAC recommends that the Government of Canada invest up to $250 million over a five-year period in a national imagery acquisition program. This program would satisfy the need for modern national mapping by leveraging satellite and airborne imaging and digital elevation models that have become the preferred option for mapping users. These modern maps are directly usable but can also be employed to modernize the maintenance of other key types of mapping, such as road mapping, topographic mapping, and land use mapping, and others.

GIAC's vision of the NIAP is for Canada to establish and sustain a comprehensive repository of up-to-date imagery and digital elevation models that will be accessible and freely available to all federal, provincial, territorial, and municipal governments, the private sector, non-government organizations, communities of interest, and the public.

Notwithstanding the above recommendations, in 2011 GIAC supported a submission by one of its members to the House finance committee as part of its pre-budget consultations, recommending a series of pilot projects that could lay the foundation to support the above-mentioned national geomatics action plan.

National leadership would allow for the establishment of standards and avoid issues of interprovincial effects of development caused by having incompatible data—i.e. projects that span provinces are currently disparate when it comes to geospatial data. This leadership would also provide for a consistent inventory for federal government property across Canada, and having a national perspective will better prioritize data acquisition or updating for all levels of government.

● (1600)

The benefits derived from employing geomatics more effectively can be seen in a report prepared for the Canadian Council on Geomatics, which pegs gains to GDP at 0.6% to 1.2%, or in the range of $9.5 billion to $18.9 billion per year. In a similar analysis funded by two private Canadian geomatics firms in 2010, Dr. Ian Lee, the MBA director of the Carleton University Sprott School of Business, predicted gains in the range of $7.3 billion to $14.4 billion.

In closing, Mr. Chair, the Prime Minister has made Arctic sovereignty a priority, but only a small percentage of Canada's north has recent geomatics data. Programs such as the GEM program would gain much greater benefit if those researchers had ready access to better, up-to-date, and open geospatial data, as opposed to having to source it ad hoc using funds extracted from already stretched research budgets.

The solution is through GIAC's recommendations for a national geomatics action plan and a national image reacquisition program. A national geomatics warehouse containing all current and future data that all could freely access and use as needed would be created. This could be built on a sustainable business model, ensuring continued relevance of this essential digital infrastructure that would continue to facilitate the effective development and growth of the north.

On behalf of the Geomatics Industry Association of Canada, I would like to thank the Standing Committee on Natural Resources for the opportunity to speak before you today. I welcome any questions you might have.

● (1605)

The Chair: Thank you very much, Mr. Ferguson. Thank you all for your presentations.

We will now go to questions and comments, starting with, from the government side, Mr. Harris, for up to seven minutes. Go ahead, please.

Mr. Richard Harris: Thank you, Mr. Chair, and thank you, presenters. I appreciate your input today.

As we go along with this committee, we're getting the idea that there is, of course, a huge benefit north of 60 for the residents who live up there who are able to perhaps improve their quality of life because of the economic benefits of working at the mines and in exploration.

I am sure the exploration and mine development brings a new economy to the north and employs local people. I know that a lot of specialists come in from the outside. From the local point of view, is the average family or resident who lived there prior to the mine actually seeing some real tangible gains in quality of life? Or are any personal economic gains they are making through pretty good employment being taken away by increases in the prices of goods and services they are able to buy?

In other words, I know the economy is getting better for many of the residents, but there are also a lot of businesses up there selling things to them. Is there any exploitation going on so that the personal gains are not as much as we would expect? Is anyone keeping an eye on this to make sure there are some real ground-level benefits for the people who have lived there prior to and now subsequent to the development?

Mr. Cavan and Mr. Moore, perhaps it should go to you guys.

The Chair: Mr. Cavan, go ahead, please.

Mr. Scott Cavan (Program Director, Aboriginal Affairs, Prospectors and Developers Association of Canada): While the Prospectors and Developers Association of Canada were proponents of the mineral industry and the exploration phase, I would have to say that I'm not that well versed in the on-the-ground economics of the impact in terms of the flow of goods north and the cost or quality of life impact you are perhaps suggesting. I don't think I would be qualified to comment.

Mr. Richard Harris: I had that question asked to me by someone just a couple of days ago. Milk cost $10 a quart in any one of the northern communities before the mine came. Now the mines have come, and hundreds of thousand and millions of dollars are going into the communities through employment. But now milk is $20 a quart. This is just a suggestion. Is it now $20? Is that happening? I was curious as to whether anybody is keeping track of the price of goods and services. Are they escalating more than the personal gains for the people who should be making some personal gains?

That's okay. I will save that question for another party.

Dr. MacLean, I have a couple of questions. There has been some public discussion about a new satellite program for northern Canada called PolarSat. Can you tell us a little bit about this? What will this satellite do for the north? How could it help the economy? How can it meet our obligations regarding sovereignty, defence, and indeed the environment?

Dr. Steve MacLean: I'll explain what it is first.

● (1610)

Mr. Richard Harris: That's a lot of questions.

Dr. Steve MacLean: As you know, Anik F2 is an equatorial system that sits out at geosynchronous orbit. It sits above a particular position of the earth and rotates around the earth at the same speed of the earth and stays there. It has a footprint into Canada and barely makes 60 degrees north. So there is the recognition that for all the mining and exploration going on up north and all the flying happening up north because of the mining exploration, there is a hole in the communications and weather services provided by the north.

At the Canadian Space Agency we were asked to take a look at a long-term plan for how we would approach the priorities of government. So we did that. We did a long consultation process, and the number one activity that came back was to provide social and economic development for the north. For us, that meant this PolarSat satellite system.

It's a system in a patented orbit that Canada owns—if this is the earth, with the north pole here and the south pole there, it hangs at 44,000 kilometres out, over the north, and as it skirts around the south, it hangs, again, over the north. It has a 12-hour period, so you need two of them to get complete communication coverage of the north.

By bringing this system in, you will equalize the service, from a communications point of view, for all Canadians. You'll have the latest and greatest technology supporting your Internet, supporting your aircraft, supporting your weather services, etc. That's the communications aspect of this system.

It also provides weather. There is no weather north of 60 right now. Now there is an interesting phenomenon—the tropopause up north is about 20,000 feet, wherein most of our weather is below the tropopause. The tropopause at the equator is 50,000 feet. So if we provide weather, you'll get the same information that you see on your CTV or CBC every evening, except it will include the north. If we provide that weather, we are actually able to improve the models in the south as well.

This proposal is to bring communications and weather infrastructure to the north. We also have an air quality experiment that we probably will fly on it. That hasn't been quite decided.

This is a major proposal. It's at the proposal stage. We've finished phase A of the design. I have been asked to come to cabinet to describe the long-term space plan, and I am hoping they ask me about the social and economic development of the north, where PolarSat would be the number one item.

Mr. Richard Harris: Okay.

Do I have some time yet?

The Chair: Very short.

Mr. Richard Harris: Speaking of the long-term space plan requested by Minister Prentice just a few years ago, the government has been perusing it, I guess, and that's one of the reasons you're here.

Can you tell us briefly where it's at and when it might be made public?

Dr. Steve MacLean: We were asked—in fact that's the reason I took the job as president—to produce a long-term space plan for the benefit of Canada. We had an extensive consultation process starting in September of 2008. Over the following 18 months, we had round table discussions with all of industry. There are about 200 institutions that are involved with space in Canada. We had round table discussions with 23 universities and 14 government departments that are involved.

Each group wrote up what they thought this plan should entail, and we distilled that down to a long-term space plan. We have submitted that to the Government of Canada and it's in process right now.

It's my hope that it's made public soon, but it is in a cabinet process that we have to basically act out.

What that plan does is align with government priorities, which are safety, sovereignty, security, natural resources, the environment, and health. So we align with all of those.

The safety, sovereignty, and security, given the purpose of this meeting, is a major portion of what we can do. We can handle the northern perimeter, we can handle the western approach and the maritime approach, and all of those are part of the plan.

What's interesting when you do those kinds of things...the plan shows that if you want one outcome—and let's say that's the sustainable and economic development of the north—you need several assets to do that. You need the RADARSAT data that we now provide with RADARSAT-2 inside the plan. And three more of these RADARSAT-type satellites were approved in Budget 2010.

Let me show you this. The quality and the quantity of—

The Chair: Doctor, I'm going to have to cut you off for now. I hope someone else will ask a question that will bring the rest of the information out, and I'm quite confident they will.

Thank you, Mr. Harris, for your questions.

Mr. Gravelle, you have up to seven minutes.

Mr. Claude Gravelle: Thank you, Mr. Chair.

Thank you, Dr. MacLean.

I'm very interested in hearing about your experience taking two trips into space 14 years apart. I'm interested to hear, taking our study into consideration here, if you saw any changes in the north from space, such as changes in the Arctic waters or the ice cap. Is there any evidence of planetary warming in these trips 14 years apart?

● (1615)

Dr. Steve MacLean: Yes, I did.

I was fortunate to fly in the same month, October, in 1992 and then again in 2006. As you know, seasonal changes are still larger than the yearly climatic changes that we're seeing, and so having the privilege of flying in the same month allowed me to see the climatic changes and not just the seasonal changes.

The amount of ice in the mountains all over the world is substantially reduced. I was so impressed with that reduction that I went and got RADARSAT data from 1995 and RADARSAT data from 1996 and used the software to see how much the ice has been reduced. The tongues of the Columbia Icefields, for example, are reduced by two to three kilometres depending on where you are.

Pollution indexes were visible to the naked eye. Back in 1992, China was dirty at the centre of Beijing, for example. The air was dirty. Now the entire region is dirty. I just came back from China, and it's a major problem for them over there. I saw that with my own eyes, but we have satellites that measure that as well and have been collecting data. It's a system called MOPITT. It's been collecting data for 10 years, and it shows that there is a substantial increase of this local pollution in China. What's interesting, though, is that it also shows the upward transport phenomenon that takes it up over the north. That local pollution problem is causing a pretty substantive problem in our north.

So yes, those changes are evident.

Mr. Claude Gravelle: As a scientist, you're saying there is scientific data showing that there is global warming?

Dr. Steve MacLean: I have to be careful with that answer.

If you were to look at what's happening up north in the summer... the ice, for example, used to be open in M'Clintock Channel four weeks of the year. Now it's open six weeks of the year. In the time we've been measuring it, that is a substantial difference. The average temperature in the north is several degrees higher. There are parameters that indicate that change is taking place.

Whether this is global warming in the long term, that's a big step to take. There are definitely changes taking place in the north, and if you don't react to them, you can consider them a disaster or you can consider them an opportunity. If you consider them an opportunity, you need to react to and mitigate them.

That's the approach I would take if I were asked.

Mr. Claude Gravelle: Okay.

There were news stories this month about a massive Arctic ozone hole—two million square kilometres, twice the size of Ontario—opening up. Twenty-nine scientists are reporting that this means higher degrees of harmful ultraviolet radiation hitting northern Canada and the northern hemisphere.

This news occurs as our government cuts Environment Canada's ozone monitoring network system. I understand governments and groups around the world rely on work that Canada is doing. Neil Harris, an atmospheric chemist in the United Kingdom, says, and I quote:

> Canada has been a linchpin of Arctic ozone observation.... It has contributed very substantial data to research that allows us to be diagnostic about what's happening in the Arctic stratosphere. If we were to lose one-third of our monitoring capability in the Arctic the overall loss in scientific value will be much greater.

Can you comment on the ozone hole, its dangers, Canada's work here, and these cuts?

Dr. Steve MacLean: Yes, I can. In 1987 I flew over the northern depression measuring ozone. We have a vortex that goes around the North Pole, and it takes three weeks in the spring to complete its circle. If you fly through that vortex in the spring you will see what, until this year, was a depression. I was studying the difference between dynamic depletion and chemical depletion of ozone in that depression.

Canada is famous for its world ozone monitoring network based on an instrument called the Brewer, which was developed by Alan Brewer, a Canadian. Because of that work we flew instruments on the shuttle that measure ozone. We have two satellites now—SCISAT and Odin. Odin is a Swedish satellite, but the instrument is Canadian. We are using them to measure ozone, among other trace elements. The measurements we take show the seriousness of what happened this spring in the Arctic. So it is something we have to look after.

It's a tribute to the leadership of our country that over the last 20 years we've been tracking ozone. We are the best at it. We have the best instrumentation and the best scientists. We're kind of in a parking spot, and we just need to stay there because we're the best at it. We don't have to leave and let someone else take over.

So I have strong feelings that our history in this area is stellar, and the expertise we have developed over the last 20 to 25 years has been nothing short of a service to the rest of the world.

● (1620)

Mr. Claude Gravelle: What will these cuts do to the service we give to the world?

Dr. Steve MacLean: The cuts are not within my mandate. I'm not sure what the cuts are, so I can't really comment. I can say that the United Nations has asked the Canadian Space Agency to bridge the gap, starting in 2014, to build another satellite that will measure greenhouse gases and trace elements, including ozone. They are asking us because we're the best at it. It's something that is worth looking at.

M. Claude Gravelle: Okay.

Do I have more time?

The Chair: You have a few minutes.

Mr. Claude Gravelle: This is a question for the mining sector. The private sector is using this space data to pursue mining and resource exploration activities, and to monitor and protect vital oil and gas pipelines. Looking at the substances around well heads and along with the length of the transmission line to market, can you give examples of the data you are gathering?

Mr. Richard Moore: I can't give any examples for the oil and gas industry because that's not what we do. We do mining exploration. But the satellite data is extremely useful for us in the Arctic. It hasn't been talked about, but there are other forms of data collected from satellites. It can be used to inference what the rock types actually are. This is where they're not covered by sand, gravel, or vegetation, which is often the case in the Arctic.

RADARSAT-2 is widely used for exploration in the Arctic, as well as some other satellites that are multi-spectral. I don't believe that Canada is the owner of those satellites, but they're also extremely useful. I know our Canadian government has an arm that has done really great research on using hyper-spectral work from space and low-flying aircraft to determine rock types and potential sites for mineral deposits.

The Chair: Thank you, Mr. Gravelle.

We'll go now to Mr. McGuinty for up to seven minutes.

Mr. David McGuinty (Ottawa South, Lib.): Thanks, Mr. Chair.

Thank you very much for being here this afternoon.

First of all, Dr. MacLean, welcome home. I know you have roots here in this city, and it's nice to welcome you home.

Dr. Steve MacLean: Thank you very much.

Mr. David McGuinty: Can I pick up where you left off, starting with you, Dr. MacLean? You just referenced that even the United Nations is now turning to the Canadian Space Agency and asking us to further assist in global monitoring and tracking of greenhouse gases, the impacts, and so on.

I just want to step back if I can. One of the things I've been looking for, as we conduct a northern Canadian natural resources study here, is whether we have any coherence or connection between the exploitation of important resources, backstopped by proper geomapping, for example, the economic potential, which is massive.... I'm trying to see whether there's a connection here between economic exploitation policy and greenhouse gas reduction in environmental policy.

You're a deputy minister equivalent, Dr. MacLean, in the public service. You are the head of an agency, if I recall.

Dr. Steve MacLean: Yes.

Mr. David McGuinty: As the head of the Canadian Space Agency, with a $300 million budget, have you been presented by the government—PCO, beyond, anywhere—with a plan, a road map, a trajectory on how we're going to reduce our overall greenhouse gases by 17% from now until 2020?

Has anything been presented to the CSA?

Dr. Steve MacLean: Not as a president of the CSA, but I was on the government's advisory panel for COP 15 in Copenhagen, and at that meeting among the negotiating team for Canada was a plan for how you were going to meet the targets in COP 15. One of the major areas was the transportation sector. By reducing the emissions in the transportation sector—I forget the number right now, but it was more than 50% of our output—you could go a long way.

The other techniques were in areas with respect to managing heating. These are all the areas you see in the media, so I probably don't need to go into detail on them.

But as a member of the advisory panel, I did see the government's plan to meeting the targets they were negotiating.

● (1625)

Mr. David McGuinty: Do you have a copy of that plan that you can share with this committee?

Dr. Steve MacLean: No, I don't, I'm sorry.

Mr. David McGuinty: I was in Copenhagen as well, and I saw the plan presented by Minister Prentice at the time. I wasn't on the advisory committee.

In fact there were no consultations with anybody in the opposition, either before, during, or after that meeting, which was unprecedented. I saw the paper that was presented to the standing committee and it was one page. Now I'm sure you had access to more information, and I'm glad to hear that.

Maybe, Mr. Chair, we could follow up afterwards and request from the government a copy of the plan that apparently exists. I've been looking for it now since Copenhagen, and with every series of witnesses that comes through we've been asking for copies of it.

But let me just turn, if I could, to—

Dr. Steve MacLean: If I could just add, my role in that meeting was in the monitoring activities the Space Agency could provide, I believe, because that became a major contribution that Canada could make to the rest of the international community. That's an important point.

Mr. David McGuinty: That's exactly where I want to go next with you, which is the question of monitoring the effects.

One of the things that is hard for folks who live in the north to come to ground with is.... As one grand chief once put it to me, we want the diamonds but we want the caribou too. It's this reconciling of what's going on, overall care and capacity in the only semi-pristine tundra left on the face of the planet.

You just described how the migration of pollution from China and elsewhere is wreaking havoc in the region—ozone problems, canary in the mine. It goes on and on. It's a big challenge. To what extent are you seized with helping to inform overall policy-making by telling the truth about the climate change crisis and the challenge we're facing?

Dr. Steve MacLean: I think this is exactly what the Canadian Space Agency can do and what other space agencies around the world can do. The quality and the quantity of our data now is frankly unbelievable. We used to have resolutions that were 30 metres; we now have resolutions that are half a metre. We can see millimetre change in something that is let's say, 0.7 metres or 1 metre square. If we pass over it day by day by day, we'll see millimetre changes in it.

Just to give you an idea, we track the caribou. We actually see their footprints through the tundra and we can track that. At the same time there is the geomagnetic data. When you take that and couple it with our RADARSAT three-dimensional data, this is the best way to determine the geology of an area.

The Canadian Space Agency is providing data to the leadership of the country that gives them a balanced picture of this entire issue. We have the best satellites in the world to measure the atmosphere. We now see a half a kilometre in a vertical profile. That's phenomenal. And because we see that, we can tell you what's going on.

Mr. David McGuinty: What's my time, Mr. Chair? Another minute?

The Chair: You have two minutes.

Mr. David McGuinty: Can I ask this, then, of both you and the geomapping representative, Mr. Ferguson.

Professor E.O. Wilson from Harvard has been calling, for almost 15 years now, for a biological survey of the planet. This country has been mapped more or less through the Geological Survey of Canada. There continues to be a strong push for the mapping of more traditional natural resources. His thinking is that a country that does not map its biodiversity, for example, is a very foolish country; that a country that does not understand that soils take 100 years to produce one inch of topsoil, that is not monitoring the extent of its soils and the health of its soils and doesn't treat it as a natural resource, is a foolish country.

Mr. Ferguson, I've been looking through your material, and, Dr. MacLean, your presentation, and I haven't seen anybody talk about it. Does this country need a biological survey of Canada? Do we not need to be able to take a snapshot in time to find out where we're going, what's happening with biodiversity, what's happening with species at risk, particularly in the context of the fragility of the northern ecosystems where we have species that are so much at risk?

Mr. Ferguson.

Mr. James Ferguson: I'm not intimately familiar with E.O. Wilson's specifications or requirements for a biosurvey of the planet, but I will say that our members in certain capacities support all types of mapping requirements and databasing, including biodiversity. In theory, our members will be some of the first people called upon to provide solid base data and information in a geospatial sense so that any biodiversity mapping and follow-on can be built in a logical and reproducible fashion with real coordinates on the face of the earth.

So apart from the need for full biodiversity mapping in Canada—I'm not sure I'm qualified to comment on that, but our members would be some of those practitioners who support an effort such as that.

● (1630)

Dr. Steve MacLean: I can't comment on the outcome, but I can tell you what we can do. In forestry we can measure the infestation of the pine beetle. You see it with your own eye from space, but our RADARSAT-2 can see it, and you can watch that propagation from west to east.

In hydrology it's something we don't do right now, but we could easily measure the flux of the spring where water rises six feet and then watch where it goes. You need four assets to do that, but we can do that. We can do habitat monitoring. We did it in Haiti. We tracked dengue fever, so we know where the mosquitoes are. We can't see the mosquitoes, obviously, but we see their habitats and we send DARTs to fix that.

You can't do everything with respect to biodiversity, but we can do quite a bit. We can do geology. We have a 3-D map of the earth. We don't have it, but we're developing a 3-D map of Canada. Add that to the fact that an instrument will be flying soon that Canada has major participation in that measures soil moisture down to half a metre. We have something called CloudSat, where Canada has the klystron, which is the heart of that instrument. It measures all the precipitation in a cloud, and it's going over every spot in Canada once a day.

If you do all this together, you start having the data that allows you to describe biodiversity, to work issues in hydrology, to work what happens when soil moisture changes its humidity context by so much. The next thing you know the modellers take all that data...and they're starting to get something realistic.

Canada is well positioned to do that. Our long-term space plan talks not about answering the question, but providing the data that allows those individuals to answer the question, and that's where we're coming from.

The Chair: Thank you, Mr. McGuinty.

We go now to the five-minute rounds, starting with Mr. Trost.

Go ahead, please.

Mr. Brad Trost (Saskatoon—Humboldt, CPC): Thank you, Mr. Chair, and thank you to the witnesses for being here for our study on resource development in northern Canada.

The representatives from PDAC were discussing some of our northern mapping programs; GEM would be the largest one. You said you support continuing this from the five years to, if I remember, the full 10-year program that was envisioned. At this point, having seen it a few years in, what would your recommendations be as far as changing, improving, or modifying the program as we go forward?

Would you argue for more emphasis on certain aspects, be it technological or geographical? Would you include more information that would not be as traditional in geological surveys, perhaps GEOSAT? What would be your recommendations on how it should be modified and improved as we continue our geological mapping?

Mr. Richard Moore: I haven't seen enough of the products, what they've done, to be able to recommend any changes from what they're doing. But the position of PDAC and of our group is generally that maps are what we want, feet on the ground, looking at the rocks, and producing maps from that perspective. These are lasting documents that are good for decades.

Mr. Brad Trost: Mr. Ferguson, is there anything your industry members have seen that perhaps they could add that hasn't been a part of these surveys?

Mr. James Ferguson: I haven't spoken directly to members of the GEM program, but I have asked researchers who are working on the GEM program in the field and others whether or not the program includes up-to-date geospatial mapping. I think the answer was they're not sure, because they're sourcing their maps from sources that aren't necessarily part of that program.

I think it could be a pretty valuable addition to it to—

● (1635)

Mr. Brad Trost: Let me then suggest to the witnesses that if they do get more information, to submit written briefs or notes to this committee before we're done with our study. That might be helpful for us.

I have a follow-up question. We have not only the geomapping program but the provincial geological surveys and the federal geological survey. What do you see as the predominant challenges and needs of these surveys going forward and in the case of this study, particularly when it comes to resource development in northern Canada?

Mr. Moore, you noted you've been a geologist for 40-some years. Coming from a geophysics background myself, I know it takes quite a few years to mature a talented geoscientist with field experience and so forth. It's not something you just learn in school. I'm not just asking for the bureaucratic and so forth, but human resources in all aspects of what you see going forward as needed for the geological surveys, again, particularly with regard to dealing with the north.

Mr. Richard Moore: The human resources are always a big key to what we feel is needed in Canada. During one of the recessions, much of the mining industry retracted, students stopped going to university, and some of the geology schools shut down in the universities, so there is a shortage of geologists now in Canada.

Mr. Brad Trost: What do you do to change it?

Mr. Richard Moore: I think it has to do with the universities. If the enrollment of certain courses gets below a certain level, they have a tendency to cut them out. They are looking for bums in seats. That's the expression they tend to use, and I think what we could do is show more support for the various university departments to keep—

Mr. Brad Trost: Let me suggest that if you have any ideas, submit them to the committee, and any industry ones too.

I have a final question on regulatory issues. I'm sure that tends to occupy a fair bit of your time. What are the more successful ways that governments and organizations have used to deal with regulatory issues, and what contributions do you think this committee could make? What changes do you think need to be made to make regulations simpler and more effective for the industry in the north?

Mr. Richard Moore: One I have seen personally was in Greenland, where they have a one-person approach. There is one individual who is assigned to your project, and this individual helps you work your way through all the various regulations and departments to get all the permissions you need. It's a one-window approach.

I understand that Newfoundland will soon be using this approach as well, and that would really help facilitate exploration in knowing where to go and who to talk to.

The Chair: Thank you, Mr. Trost.

We go now to Mr. Lizon, for up to five minutes. Go ahead, please.

Mr. Wladyslaw Lizon (Mississauga East—Cooksville, CPC): I have a question for Dr. MacLean. In your presentation you mentioned that one of the activities the Canadian Space Agency is doing is the exploitation, development, and sustainable management of Canada's natural resources, especially in the north. Could you elaborate a little more on this?

Dr. Steve MacLean: One of the things that I think is important to allow us to do that effectively is to have a data policy under which the data is free. So look at what our data sources are, where we're measuring parameters in the north. We can do three-dimensional mapping of the north down to the resolutions I gave you earlier. That's topographical mapping. You can put the geological mapping on top of that. You can do the hydrology, which is a major piece of the geology associated with exploration, on top of that. And that hydrology can be measured as a function of what it is today and what it might have been in the past.

We have a situation in which 90% of our assets on the utilization side of the agency—we also have the exploration of space, which is a separate entity—can be used and focused on the north. We do surveys of the pipelines. We can see subsidence around a pipeline to millimetres. We can warn an oil company that there is an issue with a particular structure on their pipeline and change the character of the risk associated with that. We can see subsidence. We can see subsidence changing at the millimetre level. Because of that, we not only monitor that risk, we develop the character of that risk associated with mining. We are operational with respect to rock slides in B.C. So we see and track areas people have identified they're nervous about. So if they start to slip, Public Safety ends up closing the highway.

By having all this kind of data—and then the PolarSat satellite you're talking about, which is the communications infrastructure that allows you to get the data to the people in the north—you're going to change the acceleration of the development of the north. You will make it more operationally efficient, and you will make it safer for all of that activity that happens up in the north during the summer. And I think we have a major role to play with respect to the development of the north, because our assets can do those kinds of things today. We're the space highway, if you like, for the development of the north.

● (1640)

Mr. Wladyslaw Lizon: This is a follow-up question. What data in particular that you collect will, in a practical form, help in mapping activities for petroleum or mineral resources?

Dr. Steve MacLean: I think our 3-D map that's being developed by RADARSAT-2 and the follow-up map that will come from Constellation will be at the heart of all the other data sets that you put on top of that map to understand what's going on from a geological point of view. So the example I gave earlier was you'll get magnetic data from airborne instruments. If you put that on top of this 3-D map, you're going to see the intrusives of nickel, say, across Sudbury. There are other things to see, magnetically, that geologists use all the time. If you put that on top of a 3-D map of the north, you'll see what the history of that geology is because you're doing that.

Hyperspectral is something we don't have. We have a proposal for it, but we don't have it because it's too expensive for us to get it up right now. If we add hyperspectral to that data set, it will make a major difference for mining. With hyperspectral, you get the entire spectrum for every pixel you're working with if you look at it from space, and that entire spectrum tells you about the character of the geology. When you put it on top of 3-D, when you add it to the hydrology, it gives you an integrated picture.

Mr. Wladyslaw Lizon: And when we're talking about the geology, what depth are we talking about?

Dr. Steve MacLean: It depends on the asset. With RADARSAT-2 we're measuring the topography, and we give that to you in 3-D to quite a high resolution. If we use another satellite system that has what's called Elban, which is a different frequency, it will penetrate and give you the water moisture down to just under a metre—to half a metre or three-quarters of a metre. So it depends what asset you're talking about. The highest resolutions are with optical, but they work only when it's not cloudy. In Canada, you have 50% cloud every day. RADARSAT works night and day, 24/7, because it doesn't worry about the content of the clouds. We have other instruments. We let the radar be stopped at the clouds, and that's called CloudSat. That's an American satellite, but it's our instrument that is at the heart of that satellite.

So all of these things put together can make a difference, but the only way they're really going to make a difference is if the data at level zero is free. Then the mining companies can get all the data at level zero, hire somebody who is value-added to put it all together, and give them an output they can use to make their exploration operations more efficient. This is a key point. Part of the data policy we're pursuing is to make raw data that comes from government-based satellites be free to the industry.

The Chair: Thank you, Mr. Lizon.

Mr. Wladyslaw Lizon: Do I have any time left?

The Chair: No, you do not. You are out of time.

We go now to Monsieur Lapointe for up to five minutes.

[*Translation*]

Mr. François Lapointe (Montmagny—L'Islet—Kamouraska—Rivière-du-Loup, NDP): Thank you, Mr. Chair.

Mr. MacLean, you and Mr. McGuinty have stated certain things having to do with global warming. If I am not mistaken, you think that warming is in fact happening in the north.

[*English*]

You may speak in English, if you want, and I'll speak in French.

[*Translation*]

Dr. Steve MacLean: I do think that is the case. I went to the Northwest Passage twice this summer and last year, and it was obvious to my eyes.

Mr. François Lapointe: Did I hear you correctly, that you think this is not primarily an opportunity, it is in fact a potential disaster?

Dr. Steve MacLean: No. In my view, it is an opportunity. We have to react to a situation in which things are changing, but if we are aware of how they are changing, we can react in a well thought out way.

● (1645)

[*English*]

The permafrost is melting, but it's melting here, and it's not melting there. We provide these data. You decide to put your structures here. Don't set up a mine in an area that has a potential to slide. Set it up over here. It's that kind of thing.

[*Translation*]

Mr. François Lapointe: I do understand that. I appreciate your professionalism when you suggest that a safety audit of sites be done.

However, apart from the question of mines, are you not at all concerned about the changes that are happening so quickly and about biodiversity?

Dr. Steve MacLean: You can't say that. These changes can be seen every day. I can't say exactly what will happen in 10 years or what parameters will be more difficult to understand 10 years from now.

[*English*]

What we can do is show you the data today and show you what you need to work at. The caribou paths are changing, the permafrost is changing, and the ice is melting longer in, say, Larsen Sound. The polar ice comes from the north into the Northwest Passage and makes it much more difficult than it was a few years ago, and it will be that way for a while. So it's a matter of understanding exactly where we are with climate change and then taking action that in some cases mitigates it, in some cases takes advantage of it, and in some cases recognizes that we have to do something to prevent the next tipping point from happening.

I'm outside my area of expertise, but take what's happened with cod. I'm not talking the cod off Newfoundland; I'm talking about the four-inch cod that sit under the ice in the northwest. Twenty years ago, the captain of a ship would tell you that when the ice flips over you'd see 500, and now you see four. And that's because he's a tipping point for the food chain, ecologically, up in the north.

Does that mean things are going to be serious in 10 years? I don't know. It means it's serious now and we need to mitigate the effects of this trend. You do that across each example you have that provides a tipping point in the north, and there are several.

The flow of water from Alaska, the Pacific water and the Atlantic water...by measuring salinity and by the tide, you can tell which water is getting there first, and that's changing. And those current flows tell you what's going to happen with the atmospheric flows.

All of this is information that we need to collect so that you can provide it to the people who know, so that they're working with accurate data and not with data that has large error bands and doesn't mean anything.

[*Translation*]

Mr. François Lapointe: From that kind of perspective, which calls for simply reacting, it is important to move forward by observing what is happening in real time, and react by creating opportunities. Is that what you see?

Dr. Steve MacLean: Yes, that's it.

Mr. François Lapointe: Change, even rapid change, doesn't worry you?

Dr. Steve MacLean: I didn't say that.

Mr. François Lapointe: I'm trying to understand. For example, are there certain thresholds where you might sound the alarm? You were talking earlier about pollution in China that is coming to the north. Are there thresholds that should not be reached, in your opinion? Does that exist in your organization?

Dr. Steve MacLean: I studied the atmosphere for several years when I was young. In all of that, I learned that we didn't know exactly what would happen to our atmosphere. However, we know it is very fragile. What we did with the ozone layer is a specific case. We changed the amount of CFCs in the air. Those substances have a life of about 1,000 years. We made that change, and the hole in the ozone layer over the Antarctic has closed up slightly.

Now we are in a situation where the changes in air currents have altered the Arctic depression. It is changing. We know we can change that. We can adopt a strategic plan to reverse the damage caused.

Mr. François Lapointe: Based on what you are observing at present, should action be taken more robustly over the next decade?

Dr. Steve MacLean: Pardon?

Mr. François Lapointe: Should government action be undertaken more firmly over the next decade, based on what you are observing at present? You note that we actually operate on an observation-reaction dynamic. How would your observations prompt us to act vigorously over the next decade?

[*English*]

Dr. Steve MacLean: You cannot make a statement like that in a vacuum. It is true if we stop changing the atmosphere, things will settle down. If we stop adding things into the atmosphere, things will settle down, but you can't make it in a vacuum. You have to understand what's happening with the economy. You have to understand what's happening politically between countries. Just the diversity with respect to the third world starting and the western world being mid-stream in terms of industrial development, just that causes a huge political issue in meeting the targets for, say, something you want at Copenhagen.

● (1650)

[*Translation*]

The Chair: Thank you, Mr. Lapointe.

[*English*]

The time is up.

Mr. Allen, you have up to five minutes. Go ahead, please.

Mr. Mike Allen: Thank you very much, Mr. Chair, and thank you to our witnesses for being here today.

I'd like to start with Mr. MacLean. I just have a couple of clarification questions on some of the items that were stated in the questioning. You were commenting about being able to see some of the challenges on the atmosphere. The pollution you saw in China is now coming into the north and into northern Canada.

Did I understand that correctly? Is it the same theory? Is seeing the same global warming somewhat of a Chinese phenomenon? Can you indicate how much is man-made and how much is natural, assuming the same thing?

Dr. Steve MacLean: It is true that local sources of pollution travel around the world. That's a given. We see it every day with our satellite data. If you start with the Montreal Protocol, where they took baselines from the 1990 level, you can establish who is adding more anthropogenic substances into the air compared to who is not. It is clear that China and India are hitting way above the numbers that they should be.

Canada's numbers? Canada only has 2% of the total substance that is being injected into the atmosphere. If Canada were to clean up its 2%, it wouldn't change anything in the world at all. I think we should still meet our targets, but it wouldn't change anything. The space data tells you who is emitting and who has cleaner numbers.

That's about the best I can do.

Mr. Mike Allen: I want to talk to you a bit about partnerships. We've talked about them in the presentations. I'm going to ask Mr. Ferguson to chime in on this as well as Mr. Moore.

The thing that struck me about this was some of the ozone monitoring.

Mr. MacLean, in your answer, you also said that a lot of our equipment is still travelling on other country's satellites. So in fact they are using our equipment to monitor these types of things. It seems to me we're still playing a leadership role in that.

I take the next point from your comments, where it says:

> If Canada wants to take fuller advantage of some of the more than 250 satellites that will be launched by space nations in the next decade, many of them capturing images over Canada....

So truly this whole mapping and information is going to be an international thing that we're all participating in, and it's a great opportunity for us to all share the cost as well.

How would that model work in terms of these partnerships? And I'll take it down to the next level in Canada, to Mr. Ferguson's...the spatial data warehouse in Alberta. They seem to be able to bring all these disparate pieces together. So how can we build a partnership model with other countries that makes sense economically? And how do we then extend that into something like an Alberta model for Canada so that we have the best use of our information?

Dr. Steve MacLean: There are 70 earth observation satellites up there right now. Canada has four of them. In ten years there will be somewhere around 280—more than 250—and those are the ones that are on the books right now.

Canada is a country of choice for downlinking, and that's because we are the country that is the furthest north, much further north than Russia. If we put three or four ground stations—and what I mean by ground stations is for telemetry control and downlinking of these satellites—those countries would love to downlink with us. One of the ways it works is that the data they obtain over Canada will be given to Canada free of charge—if we provide that service. Now, it costs us to provide that service, but I think this is a smart thing to do.

You take that, and then you couple it with the fact that there's an international data policy where the level zero data is going to be free; then the Government of Canada would take the data from those 250 satellites, plus the ones we have—and there's a plan with what each country does—and give that to the mining industry, and then the value-added sector of the mining industry would turn it into application products that suit and serve their needs. That's how I see that happening.

There are issues along the way on a data policy. You have to have everything on the same georeference. It is not right now. So it has to be redone, and that's something we need to clean up, which I believe Alberta, the data centre, is involved in. But this is something that will change how we get space data to the mining and exploration companies.

● (1655)

The Chair: Thank you, Mr. Allen. Your time is up.

We go now to Madam Day, for up to five minutes. Go ahead, please.

[*Translation*]

Mrs. Anne-Marie Day (Charlesbourg—Haute-Saint-Charles, NDP): Good afternoon. My first question is for Steve MacLean and the next two are for James Ferguson. Since the interpretation is very good, you may answer in English.

Mr. MacLean, are you able to extrapolate the effect that development in the north will have in terms of pollution?

[*English*]

Dr. Steve MacLean: I'll try to say this again, to answer the other question as well.

There are clearly changes that are taking place. Water temperature is going up. Air temperature is going up. Pollution indexes are changing and variable. Coastlines are changing with this, and that's a combination of the swelling because of the permafrost and also of what's happening in the water. Ocean currents are changing. From space, we don't measure that under the ice cap, but DFO is involved in measuring that. Atmospheric circulation is changing. We have parts of that but not all of it.

The way I'm going to try to answer this question is what I hinted at in the beginning. Development of the north is going to be accelerated by the space business, but we're also able to monitor what those companies are doing. For example, if a capped well head starts to leak in the Beaufort Sea, we'll see it from space, even though it's two or three kilometres under the surface of the water. We could actually see that if someone asked us to look in that area. If a ship that's going back and forth up the west coast starts to dump its bilges or is leaking oil, we will see that.

So we can help to prevent the pollution from taking place by measuring and monitoring it. If we do that across the whole Arctic...I think this is what the definition of "sovereignty" is. It is not that you have sovereign right to that area; it's that you have the capability to respond to the pollution that may be happening so that you're protecting the area.

I think what happened...you know, the northern waters pollution act, which was a way to show our sovereignty, which was what the government did in...I want to say 1974. That's a very difficult question, what is sovereign and what is not. But Canada has the right to control the pollution off its waters, so this was very smart to do that. And communities like ours can now measure that and protect the northern perimeter in such a fashion.

So we have assets that will promote the acceleration of the development of the north, and we have assets that will protect the countryside with respect to the development of the north. It's that balance that I feel we're trying to achieve.

[*Translation*]

Mrs. Anne-Marie Day: Mr. Ferguson, you noted that geomatics also serves our communities and our businesses. You mentioned Google and Microsoft, for example.

Is geomatics completely funded by our governments, or do these companies share the expenses incurred?

[*English*]

Mr. James Ferguson: In the case of Google and Microsoft, they are buying data to put up on their websites. They acquire data through partnerships. Microsoft, for example, owns a company that builds digital sensors that collect data, so they actually have a commercial arrangement with them. They buy data from different satellites around the world. They buy data from other sources, if and where it's available.

Their model is to try to get as much data for as low a cost as possible, and if it is freely available they will use that as well.

[*Translation*]

Mrs. Anne-Marie Day: Is it the same thing for companies that are going to develop natural resources, or do they use the data free of charge?

● (1700)

[*English*]

Mr. James Ferguson: When I hear discussions today of free data, as a practitioner and as a business person, I never think there's such a thing as free data. Someone has to pay for it, otherwise it doesn't get collected.

Open data, in our opinion, does not necessarily mean free data. I don't think any of our practitioners and the user community that we speak to will have any issues paying for data at a certain level, and licensing it, because many people can license the same data set and use the same data set over and over again, so the cost per user comes down significantly.

If you want to fly the city of Ottawa with photographs...if you're the only client, it will cost you lots of money; if you're one client of many, it will cost you a lot less. That's our opinion. That's our position on the cost of data.

[*Translation*]

Le président: Thank you, Mrs. Day.

[*English*]

We'll now go to Mr. Trost for up to five minutes.

Mr. Brad Trost: Thank you, Mr. Chair.

Before I start my questions, Mr. Moore, in my last round you were talking a bit about the regulatory processes in Greenland and Newfoundland. We've got a few more minutes here. Would you care to give us a bit more detail about that, so we can have some idea if it's something we should include in our recommendations?

Mr. Richard Moore: My personal experience in the Greenland example is that they had an office where you would put forward your exploration plan, and then they would take that plan to each different department and ministry that had regulations controlling exploration and development within their jurisdiction.

This office was responsible for coordinating all the different responses from the different ministries, and then it would come back to you and you would respond by making changes to your plans or would note that there is an acceptance of the plan.

I understand in Newfoundland.... I was speaking with a colleague the other day. I don't have first-hand experience, but he has been operating in Newfoundland. They are about to have a web-based program where you put forward your exploration plan through the Internet to the government, and then this plan goes to the various ministries—environment, fisheries and oceans, and so on—and they take it all the way through, and then it comes back with requested changes or acceptance.

There's only one place to go, rather than three or four different ministries.

Mr. Brad Trost: I remember I was working on a project, and the senior geologist had 20 years of experience. He was telling me that most of his time was spent in permitting rather than exploration work. I can see where the value would be there.

I'm putting together a few things from what Mr. MacLean and Mr. Ferguson were saying.

Mr. MacLean, you were saying that we gather all of this data from satellites, and we are able to compile it.

Mr. Ferguson also noted a little bit about national standards being somewhat necessary.

Have I put that together, that both of you are calling for national standards that would coordinate the various levels of data? Who should be responsible for that? What would be the cost, and in what sorts of timelines could that be done? I can see how it would be useful for data collection to be applied in the north.

I guess I'll let Mr. Ferguson start, and then Mr. MacLean, if he has any comments.

Mr. James Ferguson: I would say that's an accurate assumption, for sure, an accurate inference.

We know that all levels of government—regional, municipal, federal, provincial—do want to work together as users of this data in both collecting and using it. There have been some initiatives that have been started at the federal government level. There's one called the CGDI, which is the Canadian geospacial data infrastructure. It's been partially funded through a program in the federal government called Geoconnections, but we're not sure all the stakeholders that need to be there at this time have been there. But I would definitely —

Mr. Brad Trost: So it could be expanded and accelerated.

Mr. James Ferguson: Absolutely.

Mr. Brad Trost: Mr. MacLean, do you have some comments on that?

Dr. Steve MacLean: Basically I concur. Data has to be on the same georeference. All levels need to march to that georeference and proceed accordingly.

Mr. Brad Trost: We're talking about standards being put together. Mr. MacLean, of course, you'll need money for some of the projects you're suggesting, but other than money and the standards coordination, what other steps need to be taken so that all the data we have of the north can be aligned? Mr. Ferguson has some suggestions for geomatics, and the GEM program will probably be continuing.

All three witnesses can answer this one. What else needs to be done other than the financial commitments to get the best quality data for the north?

● (1705)

Dr. Steve MacLean: With respect to all the data that's developed, whether it's space-based, airborne, or even underwater as well, the mandate for data is that it be spread across many entities. The standard has to be developed so that we march to the same tune. All of those entities have to ensure they're following that standard so that when the data is stored, you're storing it with the same georeference. This is the second piece of the problem: you go from wherever you collect the data to wherever you store the data. This is so that someone who goes and accesses the data doesn't have to modify it or do some software to get what he really needs. The big issue here is the coordination of the many groups and levels that are involved and to store the data so that it's accessible.

The Chair: Thank you, Mr. Trost. Your time is up.

We go now to Mr. Stewart, for up to five minutes. Go ahead please.

Mr. Kennedy Stewart (Burnaby—Douglas, NDP): Thank you, Mr. Chair, and welcome to guests. Thanks for all this very interesting information.

I have a question for Mr. Cavan about first nations involvement in prospecting and the capacity of local communities to make use of all this great information. We heard about an array of information, and there were so many acronyms I can't get through them all myself.

It looks like the development of mines in the north is a top-down process, essentially. Companies gather this information and make pitches to local communities. I'm wondering what could be done to make this more of a bottom-up process. As I said in the last committee meeting, a lot of the best projects in British Columbia have been developed in concert with local first nations, if not driven by local first nations.

Do you see a way that local and northern aboriginal communities could make use of this information to perhaps develop projects that are more ground up rather than top down?

Mr. Scott Cavan: Thank you.

I'll have to say that the PDAC does advocate for actual partnership between the mineral proponent and the community and for actual engagement with the communities. They actively look for participation and look to create prosperity on a mutually beneficial level. It is happening. Industry does talk to the communities when they get there. One thing that's happening is we're looking at and actually identifying the need for greater understanding amongst all the parties. That's both on the first nations side, in terms of the mining sequence, as well as on the industry side, in terms of first nations sensitivities. We are actively looking at trying to create a product or tool in conjunction with the related people on the ground, be it industry or first nations.

There are already materials that have been developed. One is a mining toolkit for aboriginal communities in conjunction with the Canadian Aboriginal Minerals Association, the Mining Association of Canada, and Natural Resources Canada. This describes the mining sequence from start to finish to help encourage...and to provide information so that informed decisions can be made. Recognizing the turning point from 2004 forward in terms of the duty to consult, everybody recognizes that.... Again, greater encouragement and helping clarify some of the consultation pieces and the clarity around engagement practices.... We monitor that. We look at better ways to open the doors, because it's about moving forward together. It's about winning and it's about getting to the deal. There has to be information on all sides.

The information flow is a very high-level collection for ideas and for very early exploration to identify a mineral deposit that could lead to an exploration. We're looking at the early exploration tenants and moving forward from there into the advanced stage.

Mr. Kennedy Stewart: Are there many first nations companies that have been formed, so as to keep a lot of that wealth and knowledge within the local community? Talking about northern development, a lot of it is changing the economic status of the aboriginal people. Can you provide examples of local communities that have been able to use this information to stake their own claims and build their own companies?

● (1710)

Mr. Scott Cavan: I don't have quite the scientific background for what's being talked about here. My experience is more on the ground. When it comes to engagement between industry and first nations communities, that rests with impact benefit agreements and MOUs. But there's been a bigger movement towards inclusion. It's about participation and moving forward as partners. There's a recognition taking place within the industry and the first nations about how to do this together. This is creating collateral business models—catering businesses, transportation, etc. It's moving into a proponent stage. That's happening. But it's not an overnight effect. All we can do is continue to encourage the steps being taken and build on them.

Mr. Kennedy Stewart: Would there be any way that the government could expand these types of programs to have more local training or university training that might help the local communities move forward?

Mr. Scott Cavan: I would say that the PDAC is a big fan of any educational or training programming that can further the advancement of the aboriginal communities in the mineral industry, whether it's K to 8 level, high school, post-secondary, or on-the-ground training that leads to a job. There are many different training models out there. We are trying to encourage education in aboriginal communities, and we can see the education happening. We're a big fan of any education and training.

The Chair: Thank you, Mr. Stewart.

Mr. Harris.

Mr. Richard Harris: Thank you, Mr. Chair.

Mr. Cavan, I can appreciate the planning and the development of programs and the encouragement of partnership. I'm not sure how long you've been in your role or how long the PDAC has had an aboriginal affairs associate. I appreciate the work that's gone into it. But are there any ground-level success stories where we've seen a real cash-in-your-hands economic benefit to the first nations communities that have been working with mining development groups? Is there anything that's actually happened? I know all the work that's being done to make that happen, but is there anything that actually has happened that we could use as a model?

Mr. Scott Cavan: Off the top of my head, you could look at Detour Gold, the De Beers mine, the Victor Diamond Mine, and the Musselwhite Mine. There are a number of signings between the industry and Moose Creek, Mushkegowuk Council, and Attawapiskat.

That's what I'd be prepared to say about actual successes, where the communities and the industries have actually come to an agreement and they're providing prosperity to each other.

Mr. Richard Harris: Do you mean that the mines are employing first nations in the mines?

Mr. Scott Cavan: Yes.

Mr. Richard Harris: And there's a real paycheque benefit coming back into the communities? Is that what you mean?

Mr. Scott Cavan: Yes, there are workers in the mines, and the communities are also supplying some of the collateral businesses. Some of the catering services are supplied by the first nations communities. They're developing businesses in and around the mines. It's not just to work at the mine site. Underground or above ground, they're providing services in and around the mine. That's another piece that we actively promote. It comes down to skills and training.

Mr. Richard Harris: That was the other thing, the skills and training and the upgrade in skills, so that people can move into positions of good, solid, well-paying employment.

I appreciate that. That's what I was looking for, trying to follow where the thing led to some really tangible economic benefits for the bands.

● (1715)

Mr. Scott Cavan: I'd be happy to provide you with more examples. I know they're out there. Off the top of my head, I didn't come with the pieces around it, but I'd be happy to send you—

Mr. Richard Harris: I would really like that. Maybe you could provide it to the committee, because I'm sure some of my colleagues would like to see some of the real success stories as well.

Thank you very much.

The Chair: There's a little time left, Mr. Allen, if you would like to use it.

Mr. Mike Allen: A quick question then from the last time. Mr. Ferguson didn't finish on that model in Alberta.

Picking up on Mr. MacLean's comments, how would that make its way down into Canada, and using Alberta as a model, how would you propagate this across Canada? What would that model look like? I understand it is a private-public partnership.

Mr. James Ferguson: I won't speak to the multinational model. I don't think that's in our purview right now.

However, as I said, we have had discussions with various provinces at the level that they provide mapping services to their clients, who would love to cooperate with the private sector and other government jurisdictions in order to be able to put a plan together for a national strategy that includes the north, which is a very big part of that.

There are definitely a number of different models that could be pursued. The private-public partnership is one of them. There have been a couple of other models that have been adopted in other jurisdictions as well.

It still needs more discussion and some more research into that, but our membership believes it is something that is completely doable if we're all on the same page talking about the same strategic objectives across the nation. I think right now we're not quite sure what all of those are. And that's actually what one of our recommendations is, to find out exactly what all the needs of the users are without making those assumptions first. Once we understand that, then we start moving into how we can fund this, and how we can make it work as a model so that everybody benefits.

As I said, I don't think any of our members are advocating free data or free information. What they would like—to build on what Dr. MacLean said—is access to it. It's a shame that we're talking about all of this technology and all of these sensors, but I'm not sure everybody in this room can get on their computer and access that information to answer some of the questions that have been asked today. And I think that's what we should be striving for across the board.

The Chair: Thank you, Mr. Ferguson, and Mr. Allen and Mr. Harris for your questions.

Mr. Lizon, you have up to five minutes. Go ahead, please.

Mr. Wladyslaw Lizon: Thank you, Mr. Chair.

I would like to ask Dr. MacLean about the project that the Space Agency is doing, the DFO mapping of the northern coastline. Can you tell this committee a little bit more about this project?

Dr. Steve MacLean: We ran a pilot project this summer and did 550 square kilometres. There is a plan to do an identical project next summer during the time when the Northwest Passage is open, which is approximately six weeks in the summer, roughly in the latter part of August and the first part of September.

RADARSAT data from RADARSAT-2 was used to get the coastlines at very high resolution. So we ended up with a three-dimensional image of the coastline and the rock outcrop. Then DFO flew in aircraft with the latest lidar instrument, which made bathymetry measurements. Depending on the clarity of the water, it measures down to 50 metres, so you use the lidar to do the intermittent areas of rock and shallow water, and in addition, launched off the *Louis S. St. Laurent* , they did underwater surveys with sonar down to a depth of 200 metres.

The concept of this pilot project is to show, again to the leadership of the country, that this is the best way to chart the Arctic, because right now it's only 10% charted. Then there would be a proposal made to cabinet about how to do that. It would take 10 to 15 years to chart the entire Arctic, using the latest and greatest technology.

Obviously, using the space assets it doesn't take that long to get the coastline to the resolution that we're looking at, or the rock outcrops, but the lidar and the sonar take longer, given that you're working six weeks a year, when it's open.

● (1720)

Mr. Wladyslaw Lizon: Is this a project that will be ongoing for some time?

Dr. Steve MacLean: No, this summer was the first time. It's a coordinated effort between Environment Canada, the Canadian Space Agency, DND, and the Department of Fisheries and Oceans. It was done within our authorities to show that if we were asked to chart the Arctic, this is how the group would do it.

Mr. Wladyslaw Lizon: Do you think there is a need to monitor the coastline of our north, due to the changes you were talking about before? If the coastline will be changing as a result of rising temperatures and the—

Dr. Steve MacLean: The answer is yes. There are islands in the Northwest Passage that some summers are there and some summers they're below water. The erosion you see when you're up there is such that we should be measuring it. There's erosion because the ice is free.

In the old days, winds and storms didn't matter, because going over the ice was like going over land. Now the wave action because of winds and storms is higher, so erosion on the coastline in the Northwest Passage is higher. Coupled with the fact that the permafrost is starting to rise as it melts, that changes the coastline dramatically. So it is important to measure these changes in real time.

Mr. Wladyslaw Lizon: Thank you very much.

Do I still have some time, Mr. Chair?

The Chair: Yes.

Mr. Wladyslaw Lizon: I have a question for the Prospectors and Developers Association of Canada.

Can you tell us if the exploration tax credit has any effect on creating jobs in the mining industry?

Mr. Richard Moore: Yes, it has a great positive effect. It really helps the junior mining industry attract funds to carry out exploration.

Mr. Wladyslaw Lizon: Do you have any good examples that you can share with this committee?

Mr. Richard Moore: It would be nice to come up with some mines that have been discovered, right off the top of my head, but I can think of some in the ring of fire in Ontario. A lot of the junior companies that started the first exploration up there would have used flow-through funds and the mineral exploration tax credit to do their exploration.

Mr. Wladyslaw Lizon: Can you talk about the difference between mining exploration and mining operations?

Mr. Richard Moore: They're chalk and cheese. Mining exploration is low impact. A geologist wanders over the surface, or uses his computer with geomatic materials and satellite materials. We go into the field to take samples and measurements. The largest impact in the north may be the camps we have to build in order to stay there.

Mining operations, of course, are multi-million-dollar activities. They're quite different and need a different regulatory regime to manage them.

The Chair: Thank you, Mr. Lizon.

We will go now to the New Democratic Party and Monsieur Gravelle. Then maybe we'll go to Monsieur Lapointe and Madame Day, depending on the time.

Monsieur Gravelle.

Mr. Claude Gravelle: I would like to ask Mr. Moore to supply to this committee the examples that Mr. Lizon was asking about. Can you give the examples to this committee?

Mr. Richard Moore: I'm not sure exactly what you mean by "examples".

Mr. Claude Gravelle: On the flow-through shares, what companies were helped?

Mr. Richard Moore: Perhaps it would be more useful if I provided a long list of these things to the committee afterwards.

Mr. Claude Gravelle: That's what I'm asking for.

Mr. Richard Moore: Yes.

[*Translation*]

The Chair: Thank you, Mr. Gravelle.

Mr. Lapointe, you have the floor.

Mr. François Lapointe: Thank you, Mr. Chair.

I want to go back to a basic calculation. First, I want to be certain I heard correctly. The idea is that a $1 million investment produces a $5 million return. That is in fact the ratio you suggested a moment ago, Mr. Moore? For $1 million in investment, there is a $5 million return.

Let's take geomatics as equivalent, and correct me if the comparison is too poor. When I had my small business in the service industry, if someone had given me $1 for each $5 that I brought in to help me do my market study, I would have been in heaven.

How should the 1:5 ratio be seen as an achievement, as being the right thing to do? I would like to hear your explanation of this.

I have another quick question for you, Mr. Moore. How is your role in relation to geomapping different from the role of the Department of Natural Resources? How are you different and complementary?

I would like to get some clarification from you, Mr. Ferguson. You seem to be critical of the fact that there is no Canadian geomapping plan. You associate that in part with problems for Canadian sovereignty. I have not completely made the connection and I would like to understand that better. Can you help me see what the relationship is between Canadian sovereignty and the lack of a Canadian geomapping plan?

Thank you.

● (1725)

[*English*]

Mr. Richard Moore: I'm not sure of the exact question, but the one-to-five ratio is moneys spent, with the expenditure on mapping and also collection of geomaterials—other data sets and so on. The exploration industry uses this data. It gives us the information to be able to say this is a good area or that is a good area, and then you invest that much more.

It's not really a return to the country; it's more just investment. That investment in turn leads to discovery and then there is a return from that discovery.

I've often asked various economists to try to make a direct link for me and to show a rate of return, and they never do that. They say it's too complicated and the links are not well enough established.

[*Translation*]

Mr. François Lapointe: So is there no way to make the ratio understandable to a mere mortal like myself? Do the people you have asked the questions think it isn't feasible?

[*English*]

Mr. Richard Moore: It's—

[*Translation*]

Mr. François Lapointe: But we agree that it is not a return to the Canadian treasury. The idea is that for each $1 million in investment, there is $5 million in investment. That aspect we understand.

[*English*]

Mr. Richard Moore: Ultimately it does, through the taxes collected from the mines—

[*Translation*]

Mr. François Lapointe: Yes, I understand.

[*English*]

Mr. Richard Moore: —which come into operation as a result of the discovery.

[*Translation*]

Mr. François Lapointe: But it isn't a ratio of $5 in the Canadian treasury for $1 invested. If we invest $1, it may generate $5 in investment. That we can understand.

[*English*]

Mr. Richard Moore: No, no, you're right.

[*Translation*]

Mr. François Lapointe: But we don't know how they arrive at the $5. It's too complicated for mere mortals, and we don't know why.

[*English*]

Mr. Richard Moore: Well, this figure is calculated by examining, over a five-year or ten-year period, expenditures by government on data sets, and then it looks at the expenditures by mineral exploration companies following up on the results of these data sets. So the government spends, we'll say, $10 million on providing this data, and the mineral exploration industry ends up spending $100 million on collecting more data and exploration.

[*Translation*]

Mr. François Lapointe: I also wanted to know whether you are complementary to Natural Resources Canada, and if so, how.

[*English*]

The Chair: The translation seemed to be cut off.

Mr. François Lapointe: Okay.

Between Natural Resources Canada and what you do, could you tell me what is complementary and what is totally different in your work, your research?

Mr. Richard Moore: The geological surveys provide basic data, which is an indication of what mineral resources might exist in the provinces and in the various states, but it's a long way from actually knowing it's there. So the exploration company then says, okay, we think there may be something there. In that case, the statistics generally say that for every one hundred projects you take on—in other words, you think something's there and you're going to explore it—in one in a hundred cases you're right. But then of those cases, only one in five is economical.

It's a continual process of hypotheses building based on data. We use the government data to hypothesize that there is a mine there. We collect our own information in much more detail and find out most of the time that we're wrong.

● (1730)

[*Translation*]

The Chair: Thank you, Mr. Lapointe.

[*English*]

Our time for this meeting is up.

I thank you all very much, the Canadian Space Agency, the Prospectors and Developers Association of Canada, and the Geomatics Industry Association of Canada, for your presentations and for the responses to questions. It will be very helpful to us in our study.

Again, thank you very much.

The meeting is adjourned.

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