Standing Committee on Finance (FINA)

Pre-budget consultations 2012

Coalition for Canadian Astronomy

Responses

1. Economic Recovery and Growth

Given the current climate of federal and global fiscal restraint, what specific federal measures do you feel are needed for a sustained economic recovery and enhanced economic growth in Canada?

Sustained economic recovery requires long-term investments in technology and in its pillar, research in fundamental sciences, thereby promoting the country as a home for research, development and high-end manufacturing. Our submission illustrates this statement through the history of a project supported by the Coalition . Canada has an opportunity to make a strategic investment in a "construction ready" science infrastructure project: the Thirty Metre Telescope (TMT). Canada's participation in the TMT is the top-ranked priority in the Canadian Long Range Plan for Astronomy for the current decade. Over the past decade, Canadian engineers and scientists have played a central role in the specification and design of the TMT. A Canadian investment of about $25 million has been matched with more than $100 million, mainly from U.S. sources, but also from China, India and Japan. The project has undergone rigorous external reviews. Technical and financial risks have been judged to be minimal. The TMT should be ready to begin construction in 2014, after the partners' national authorities have agreed on the sharing of the construction cost. The total for Canada approximates $300 million over eight years. In concert with international partners, the Coalition anticipates a funding request for the 2014 federal budget and urges the Government to fully participate in the international funding discussions that are now getting underway. This is essential for Canada to maintain its position in the partnership and reap the benefits of the project. Past large telescope work in Canada has generated economic spin-offs in a range of industries, from medical imaging technologies to entertainment infrastructures. Canada is contributing two key elements to TMT. The telescope dome is the most distinctive feature of the project. Its innovative design is Canadian, as it was for the National Research Council supported Canada-France-Hawai'i Telescope where a $20M contract generated some $300M in exports. The dome is the first structure to be erected. A timely decision will be important. Through NRC, Canada is also developing the high-technology adaptive optics instrument that will realize TMT's discovery potential.

2. Job Creation

As Canadian companies face pressures resulting from such factors as uncertainty about the U.S. economic recovery, a sovereign debt crisis in Europe, and competition from a number of developed and developing countries, what specific federal actions do you believe should be taken to promote job creation in Canada, including that which occurs as a result of enhanced internal and international trade?

To promote job creation, Canada can take full advantage of international partnerships in domains where its industries excel. Our Canadian industry partners have cemented their reputation as being among the top companies in the world to support the sophisticated design, engineering and manufacturing of billion-dollar international astronomy projects. Canada has been a partner in world-leading international astronomy projects, Canadian astronomers have been ranked among the top researchers in the world and enrolment in astronomy at Canadian universities has been thriving. This situation is beneficial for job creation and will be maintained by Canada's partnership in projects like the TMT. The TMT will get built. The question is whether Canadian industry will join Chinese, Indian, Japanese, and U.S. industries in building it. Under the current funding agreement, Canada is slated to build the telescope enclosure,

the key adaptive optics system and the control system for the telescope's secondary mirror. This work represents $209 million worth (2011 dollars) of direct economic activity and significant employment in the high tech and manufacturing sectors: • Building the telescope enclosure will generate roughly 850 person-years of work, mostly in the Lower Mainland of British Columbia. • The instrumentation work will take place in British Columbia, Ontario and Quebec over an 8-year period, resulting in 25 long-term, high-end jobs. • Total job creation will be 1,050 person-years of work plus an equal number of indirect jobs. Countries like China and India are very interested in scientific pursuits and are allotting significant resources to rapidly expand their investments in these areas. Canada should seize the opportunity to partner with them on TMT because it is a high profile international project that will solidify our trade relationships with the two fastest growing economies of the world. Canada is well-positioned to do so as a founding partner of the TMT project. Finally, it is worth noting that science and technology has been a key feature of the annual U.S.-India Strategic Dialogue, with the June 2012 Dialogue including a $100 million commitment from India to the TMT project.

3. Demographic Change

What specific federal measures do you think should be implemented to help the country address the consequences of, and challenges associated with, the aging of the Canadian population and of skills shortages?

The Federal Government can provide financial support for those projects that build on existing excellence to advance Canadian leadership in particular fields that will create jobs and investment for Canadian industry, and that attract and retain young talents in Canada. The Government can also help motivate the younger generations for economically rewarding careers in the scientific and technology oriented disciplines where it excels. The scientific community is remarkably mobile. As a world-leader in astronomy, Canada has traditionally been a magnet for researchers in this field, which in turn has helped our universities and Canadian industry. Canada has traditionally been the place to be for young aspiring astronomers. Strategic investments in disciplines like astronomy will encourage those young people to stay in this country instead of going to countries where the opportunities are superior. Also, astronomy is a gateway science that inspires our children to pursue scientific and technical careers, and enhance our position as a first-world society. It deals with some of the biggest questions that civilised societies ponder: the origins of our solar system and home planet; the universe that spawned us; the evidence for extraterrestrial life; and the extreme conditions that exist across the cosmos. It uniquely enjoys high public interest and support. The public appreciates Canadian endeavours and discoveries, and participation in major facilities is a source of widespread pride in our country. A recent study by the firm Hickling, Arthurs & Low, commissioned by the National Research Council, finds that federal contributions to major astronomical facilities are cost neutral, but points out that investments in areas of internationally recognized strength give positive results such as the motivation, through astronomy, of the younger generations for science, technology, engineering and mathematics.

4. Productivity

With labour market challenges arising in part as a result of the aging of Canada's population and an ongoing focus on the actions needed for competitiveness, what specific federal initiatives are needed in order to increase productivity in Canada?

Collaboration on important international projects with other dynamic economies is an important initiative to increase productivity in Canada. There is constant concern that Canada lags in productivity, in research and development and in scientific investment. There is now concern about the challenges posed in many traditional sectors by China, India and other emerging economies. These challenges are not confined to sectors like manufacturing. Canada, through the Association of Canadian Universities for Research in Astronomy (ACURA), is one of the original partners in the TMT project, joining the

California Institute of Technology and the University of California in 2003. The National Astronomical Observatory of Japan (NAOJ) joined the project in 2008. Now, the Science Academies of China and India are both moving aggressively to secure a share of TMT. The other countries in the TMT collaboration have been active: • The U.S. partners host the project headquarters and have engaged the NSF in a cooperative agreement to advance engagement in the TMT by the U.S. astronomy community. • Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) has invited NAOJ to submit a proposal for full funding of its share of TMT. • India has recently committed $100 million to the TMT, as announced by the Indian Minister of External Affairs Shri S.M. Krisna and the U.S. Secretary of State Hillary Clinton as part of the Third U.S.-India Strategic Dialogue. • China has become a TMT partner and expressed an interest in increasing its stake. These countries see the economic opportunity provided by investments in fundamental science. Canada's standing as equal partner with these economic giants is now at stake. Links with these countries will extend far beyond the TMT project itself. Canada should ensure that Canadian industry participates in the TMT construction. Otherwise, instead of reaping the benefits of an international partnership, Canada would see other countries exploiting the Canadian investment in the design and the Canadian technical contributions and replace us with their own industrial capabilities. Wheels are turning elsewhere. A financial commitment in 2013 is not essential, but keeping our team engaged and working until construction starts requires the Government of Canada to express its interest in TMT now.

5. Other Challenges

With some Canadian individuals, businesses and communities facing particular challenges at this time, in your view, who is facing the most challenges, what are the challenges that are being faced and what specific federal actions are needed to address these challenges?

The challenges facing the Federal Government's decisions about investments in fundamental sciences are well illustrated by the TMT example. Canadian astronomy has a proven track record of providing jobs and opportunities for strategic investments and important spin-offs. We have projects planned for the coming years that will do the same. The Coalition is not advocating a request for funding in the 2013 budget. However, in 2014 we will need funds to move those projects forward. If Canada does not invest scientific resources in TMT, some other countries will. Jobs and spinoffs and other benefits will go offshore. That would be a huge loss because the opportunities are currently sitting on our lap. To summarize: • The Coalition believes that strategic investments in international astronomy represent an important element of a sustained economic recovery and of enhanced growth in Canada. • The Coalition urges the Federal Government to become a full partner in the international TMT funding discussions that are now getting underway. Opportunities for such engagement will occur over the next year. • We anticipate engaging in a detailed funding request for the TMT construction for Budget 2014. • We thank Committee members for their attention.