

Coalition for Canadian Astronomy Newsletter

Taking Astronomy's Message to Ottawa

On Monday, May 30, 2005 the Coalition for Canadian Astronomy participated in a meeting with Parliament's Standing Committee on Industry, Natural Resources, Science and Technology to discuss the study of Canada's industrial strategy, changes and areas of improvement. Specifically, the Coalition was present to talk about the Long Range Plan (LRP).

Gilles Joncas, Director of Research, Centre Observatoire du mont Mégantic and Professor at Université Laval began by discussing the importance of long-term planning. "You could say the LRP is astronomy's industrial strategy for doing science," states Joncas. "We sought a partnership with industry to harness the technological expertise needed to bring project concepts to reality," he adds, linking the importance of industry to scientific pursuits.

"First and foremost, Canadian astronomers have achieved scientific excellence," states Joncas. "Canada is now ranked first in the world in astronomy despite the ongoing funding challenges that we face in relation to our main competitors."

"Jobs have been created for Canadians through the design, construction and operation of astronomical facilities and instruments. This experience has, in turn, generated new knowledge and technological developments that produce spin-offs and market advantage for Canadian companies," explains Michael Jolliffe, Coalition Co-Chair and Vice President, Government Relations and Communications for AMEC. "Investments in astronomy are encouraging research and development, helping build a skilled workforce, and projecting an image to the world that Canada is serious about the pursuit of scientific leadership," he adds.

"In terms of reaching people in different parts of Canada, in big cities and small towns and small colleges; we're developing connections in the smaller colleges, and astronomy courses are taught at all of these places," states Gretchen Harris, Coalition Co-Chair and Associate Professor, University of Waterloo.

"One of the main goals of the Canadian Astronomical Society, imprinted in the LRP, is to work to have about 1 to 1.5 per cent of funding

towards any of these projects be devoted to outreach, to community awareness and understanding; because we recognize that by having people understand what we're doing, we're going to get better support," she adds.

The problem lies in the funding. "Quite simply, we have a plan to achieve scientific excellence, but we lack the funding framework needed to implement it," stresses Jolliffe. "Canadian astronomy is now a victim of its own success, being ranked first in the world. Obviously, long-term financing would be the most appropriate way to deal with these projects."

The upcoming opportunities for Canada, in becoming involved in large international projects, will be better exploited if long-term funding exists. Long-term funding will ensure that Canada plays a major role and completes the projects properly.

"From a private sector point of view, it allows companies to ensure that their contracts are not going to disappear because Canadian funding has been pulled," explains Jolliffe.

"In astronomy, I'd say the easy problems have been solved. What remain are the complex questions, and you need a long-term commitment to be able to answer them," furthers Joncas.

Astronomy is like a program. All findings and research build on the last, which is why long-term funding is necessary in order to advance. Planning ahead will ensure that Canadian astronomers are striving to hit goals and provide solutions on a continual basis.

"In 20 years' time, with adequate contributions, I can assure you that Canadian astronomy will be the best in the world and the industry supporting it will benefit from international contracts so big that they are difficult to imagine today," forecasts René Racine Executive Director, Association of Canadian Universities for Research in Astronomy (ACURA) and Emeritus Professor, Université du Montreal.



Opening reception at the CASCA AGM, May 2005: Speaking is Pekka Sinervo, Co-Chair representing ACURA. Background left to right: Gretchen Harris, Co-Chair representing CASCA, Michael Jolliffe Co-Chair representing Industry and Rene Racine, Executive Director ACURA.

"According to a recent analysis by the Institute for Scientific Information in Philadelphia, which monitors scientific publications, Canadian astronomers deliver the most scientific bang for the buck." Dennis Overbye, New York Times

LRP Update

We continue our intense efforts to secure LRP funding. The LRP is a comprehensive, national strategy designed to maintain and expand on Canada's leading position in the areas of astronomical and astrophysical research.

The community has secured \$88.8 million since 2000, when the LRP was released. "This is an incredible testament to this community and the unity of its message," remarks Industry Co-Chair Michael Jolliffe.

SKA/LAR Update

The Square Kilometre Array Project or SKA is the international radio telescope project for the 21st century. The SKA will revolutionize astronomy and make unique contributions to basic physics. Building the SKA will require vigorous technological developments in computing, communications and radio frequency devices.

In Penticton, much progress has been made on the technical front – including the aerostat, the adaptive surface, the mechanical structures and the control system. Now, focus is shifting to the development of phased arrays feed systems, to be placed in focal plane.

Astronomy: An Economic Advantage for Canada

History shows there is an economic advantage in astronomy. So it is no surprise that astronomy professionals and societies go hand-in-hand with their industry counterparts. This partnership is needed to ensure growth in areas of both business and research.

Such a partnership exists today between AMEC, an international project management and services company, universities, government and astronomers. In the 1970's, AMEC's work on the Canada France Hawaii Telescope was the beginning of what has become a lasting partnership and important link between scientific research and industrial application. Using innovative design techniques to combat the issues associated with high altitudes and freezing temperatures, the company successfully completed their contract, and continues to work within the industry.

Today, AMEC is the world's leader in the design and construction of astronomical observatories and structures. AMEC has constructed domes for the Keck I



and II optical telescopes, the Japanese Subaru telescope, the Gemini North telescope, the Gemini South telescope and two UK optical telescopes, Isaac Newton and William Herschel, on the Canary Islands. The firm's work on all telescopes and spin offs has now grossed \$300 million. AMEC has subcontracted many projects to smaller firms throughout Canada, stimulating the technology business.

To ensure success within the industry, AMEC is aligned in partnership with the science community, universities,

industry leaders and the government. These existing relationships at all levels of astronomy have made Canada a world leader in the field.

The relationship between industry and astronomy is not only advancing Canadian science, but it is also delivering concrete benefits to Canadian universities and the economy. Specifically, Canada's economy improves as more jobs are created within the Canadian workforce.

For Canada, the presence of industry in any research and development project is critical. Industry can be the vehicle that allows work to be retained within Canada. It can prevent the migration of key researchers by securing a long-term research agenda.

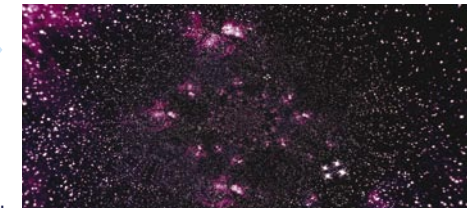
AMEC is only one of hundreds of Canadian companies that have leveraged Canada's leading role in astronomy into real, tangible business. Our next newsletter will showcase yet another industry member and their benefits from involvement in astronomy.

Coalition for Canadian Astronomy...

The Coalition for Canadian Astronomy, formed in 2000, was created to secure new money from the Federal Government to fund the LRP for Astronomy and Astrophysics.

The Coalition is made up of academics, astronomers – both amateur and professional – universities and various industry members. The Coalition is an umbrella-like organization that encompasses all of Canada's major players in astronomy outside of federally-funded facilities.

The Coalition will partake in a number of initiatives to ensure appropriate funding for the LRP is reached. One initiative includes sharing success stories regarding astronomy to government decision makers. Similarly, engaging various communities to the Coalition's activities will raise awareness and increase support for the LRP. Through continuous support and promotion of a single, national, long-term vision for Canadian astronomy, the Coalition will communicate the importance



of the LRP. Another initiative includes implementing a new communications effort for upcoming budget cycles to aide in securing funding for the other elements of the LRP. And lastly, securing sustainable funding to cover the communications and lobbying activities of the Coalition will ensure that the LRP becomes a reality.

TMT Update

The Thirty Meter Telescope (TMT), once completed, will dwarf all other existing telescopes. The larger surface area of the telescope will provide greater resolution to see finer detail in galaxies. The location of the telescope is still unknown, however as always it will be somewhere dry and elevated.

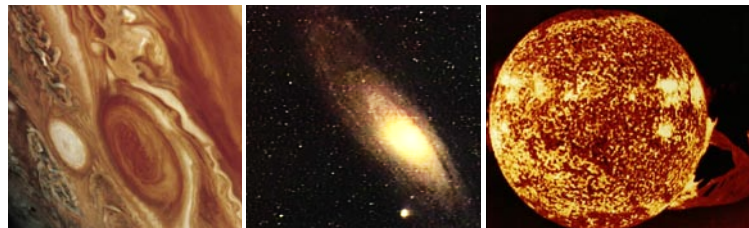
The Enclosure Conceptual Design for the TMT is currently being built with a projected finish date of March 30, 2006.

ACURA

The Association of Canadian Universities for Research in Astronomy (ACURA) is an organization of Canadian universities dedicated to the advancement of research and teaching in astronomy and astrophysics in Canada. It assists in coordinating large-scale national initiatives of its member institutions, advocates for the priorities in the LRP for Astronomy, and is a liaison between Canadian member universities and international partners in international and world observatories.

List of University members:

<i>Athabasca University</i>	<i>University of Lethbridge</i>
<i>Bishop's University</i>	<i>Université Laval</i>
<i>Brandon University</i>	<i>University of Manitoba</i>
<i>McGill University</i>	<i>Université du Montreal</i>
<i>McMaster University</i>	<i>University of New Brunswick</i>
<i>Queen's University</i>	<i>University of Toronto</i>
<i>Saint Mary's University</i>	<i>University of Victoria</i>
<i>Trent University</i>	<i>University of Waterloo</i>
<i>University of Alberta</i>	<i>University of</i>
<i>University of British Columbia</i>	<i>Western Ontario</i>
<i>University of Calgary</i>	<i>University of Regina</i>
<i>University of Guelph</i>	<i>York University</i>



Spotlight on McGill

A note to those who made the LRP possible: Thanks from McGill

During a recruitment process at McGill University last fall, three new faculty members were hired into previously non-existent positions. McGill's astronomy program itself was non-existent until 1999. Today there are a total of six professors who are all happily educating university students. This is all thanks to the attractiveness of Canadian astronomy.

"These efforts and their demonstrable successes – funding for issues in the LRP, such as TMT, ALMA, eVLA and others – played the decisive role in my acceptance of the professorship at McGill," states McGill University's Assistant Professor, Robert Rutledge.

"It bears stating explicitly that I am personally grateful for your efforts, since they created a very inviting career opportunity for me in Canada, and I am very pleased to be here to fulfill that opportunity," adds Rutledge.

Overall, astronomy's benefits for Canada are extensive and impressive . . .

ALMA Update

The Atacama Large Millimeter Array (ALMA) is designed to detect and study the earliest, most distant galaxies, and to take a closer look into star and planet formation. Canada's largest contribution to ALMA construction is the design, development and construction of the "Band 3" receiver cartridges. Other contributions include software requirements in the area of offline data reduction systems and scientific oversight and guidance to the project. It is clear that securing the remaining funding for the LRP is vital to completing our commitments to ALMA, since the funds remaining from the initial 5-year allocation will run out in 2007.

Coalition for Canadian Astronomy
8 York Street, Suite 201
Ottawa, Ontario
K1N 5S6

Did you know that? ...



- ◆ Canada is ranked number one in astronomy worldwide.
 - ◆ In 1979, the CFHT telescope provided Canada with a share of one of the most powerful and productive telescopes in the world.
 - ◆ Canada has a share in the Gemini telescopes – giant 8 meter telescopes located in Chile and Hawaii.
 - ◆ The Sudbury Neutrino Observatory located deep within a nickel mine, is the world's most powerful detector of the various types of neutrinos. Neutrinos are subatomic particles emitted by nuclear reactions in the sun, stars and supernova explosions.
 - ◆ The opening of the Dominion Observatory in Ottawa in 1902, in conjunction with astronomy, was essential for the surveying and westward expansion of our country.
 - ◆ Over 1 million people visit Canadian observatories and planetaria each year.
 - ◆ Without the LRP, Canada would not participate in the most powerful, new world observatories – and our excellent reputation in astronomy and astrophysics would be lost within a decade – and so would all the economic opportunities and social benefits.
- ◆ Education benefits: enrollment in astronomy is booming. New astronomy departments have been created at several universities.
 - The number of graduate students pursuing astronomy has doubled since the launch of the LRP.
 - In Canada there are more female graduates from astronomy than any other physical science
 - The number of Canada Research Chairs in astronomy has grown from 1 to 23 in four years.
 - ◆ The tangible benefits to industry within Canada are a two-to-one direct return for every dollar invested in astronomy. The direct return stems from contracts awarded to Canadian companies to design and build major international astronomy projects.
 - DiCOS Technologies of Sherbrooke, Quebec, was selected to provide the Master Laser systems for ALMA.
 - INO of Saint Foy, Quebec has been contracted to study the development of the advanced, super-durable coatings needed for the TMT mirrors and is participating in the conceptual design for an extreme adaptive optics unit.
 - ◆ Nanowave Technologies of Toronto is providing low noise amplifiers for Band 3 hardware development for ALMA of radio-telescopes.
 - ◆ Breconridge in Kanata, Ontario, was contracted to provide \$100,000 feasibility study for work on the SKA, positioning it for downstream contracts.
 - ◆ Matrox, a company formed by two students from École Polytechnique, produced electronic cards for storing numerical images at the Mont Mégantic Observatory in 1979. Today, Matrox is a world leader and has export sales in excess of \$200 million annually.
 - ◆ Within medicine and medical science, the spin-off benefits of astronomy include:
 - Image reconstruction techniques from radio astronomy have been put to use for CAT scans, magnetic resonance imaging, and positron emission tomography.
 - Microwave receivers have been employed in scans for breast cancer
 - Astronomical image processing software has been applied to angiograms and monitoring neuron activity in the brain.