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Industry, Science and
Technology Canada

Industrie, Sciences et
Technologie Canada



**Science and Technology:
The Federal Government Record**

Fall 1989

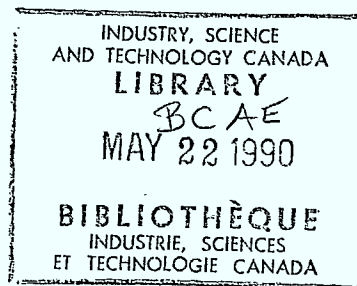
Canada 

INNOVACTION****

The Canadian Strategy
for Science
and Technology

**Science and Technology:
The Federal Government Record**

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**Canadian
Manufacturing
Advanced Technology
Exchange (CAN-MATE)**

On July 15, 1987, the federal government and the Canadian Manufacturers Association announced the establishment of CAN-MATE.

CAN-MATE is a centralized source of information and advice to help Canadian manufacturers compete more favourably in world markets by adopting new technologies. It has four mandates: to foster greater co-operation and sharing of information and resources between the private sector and the country's 70-odd technology centres; to monitor developments in, and exchange information with, other countries for the benefit of Canadian industry; to define and co-ordinate co-operative technology projects at the request of industry; and to act as a source of advice to governments in Canada on how to encourage the development and application of advanced manufacturing technologies.

CAN-MATE is also particularly designed to help existing manufacturing technology centres across Canada improve the effectiveness of their operations.

The National Research Council is providing the CMA with \$3.5 million over seven years to assist in the operation of CAN-MATE.

Technology Transfer

On July 16, 1987, the federal government announced new efforts to promote technology transfer to Canadian industries. The Technology Centres Policy came into effect for the management of key federal laboratories, and the Technology Outreach Program was launched for external technology centres. The policy is designed to enhance the effectiveness of the centres; increase industry's involvement in their establishment; link ongoing federal support to the centres' response to client needs; provide for the participation of clients in the management of the centres; and allow market forces to play a greater role in technology development and diffusion.

The Technology Outreach Program (TOP), which is designed to improve the productivity and competitiveness of Canadian industry, supports national activities and services that accelerate the acquisition, development and diffusion of technology and critical management skills in industry, especially in small and medium-sized enterprises. The program provides start-up and, in some cases, sustaining support to technology centres.

\$100 Million Increase in InnovAction Funding

On July 16, 1987, the federal government also announced that it would be providing \$100 million in new funds for a number of initiatives under InnovAction. New resources were committed to those science and technology programs acknowledged as highly effective and contributing directly to InnovAction's priorities.

In addition to increased funding for university research, through the matching funding policy and the Federal Microelectronics Strategy (referred to in other sections of this publication), the \$100 million in new resources includes:

- \$30 million in new funding for the Unsolicited Proposals Program (UPP) over two years, announced by the Minister of Supply and Services on August 25, 1987;
- \$28 million in new funding for the Industrial Research Assistance Program (IRAP) over four years, including the creation of a new component of the program to assist small firms in negotiating the acquisition of foreign technologies, announced by the Minister of State (Science and Technology) on August 27, 1987; and
- \$12.3 million in new funding for the Technology Inflow Program (TIP) over four years, announced by the Minister of State (Science and Technology) and the Minister of External Affairs and International Trade on September 4, 1987.

Public Awareness of Science and Technology

On January 14, 1988, the Minister of State (Science and Technology) announced federal funding of \$10 million as an initial step in a long-term national effort to increase the public's awareness of the importance of science and technology to their way of life. This national effort consists of the Science Culture Canada Program and a national Public Awareness Campaign involving the public and private sectors. With an annual budget of \$2.5 million, Science Culture Canada is designed to increase awareness of scientific and technological achievements and stimulate greater public understanding of the role and impact of science and technology. The program provides funding for projects and activities that fulfil these objectives. Competitions for funding are held twice a year, in April and October. Campaign activities have included national radio and print advertisements, the publication of a brochure entitled *Science and Technology: Something to Think About*; a travelling exhibit featuring an interactive computer questionnaire; and regional teacher awareness projects in co-operation with the provinces and territories.

\$1.3 Billion Funding Increase for S&T Initiatives

At the National Conference on Technology and Innovation, the Prime Minister announced federal funding of \$1.3 billion for science and technology initiatives over the next five years as part of InnovAction, the federal S&T strategy. The initiatives announced at the Conference include the creation of a Canada Scholarships Program in the natural sciences, engineering and related disciplines; and the establishment of Networks of Centres of Excellence. Subsequent announcements of initiatives funded by the \$1.3 billion include the Strategic Technologies Program, Sector Competitiveness Initiatives, and Business Services of Industry, Science and Technology Canada; and increases in the base budgets of the university research Granting Councils.

\$80 Million Canada Scholarships Program

On April 6, 1989, the Minister of State (Science and Technology) announced details of the 1989 Canada Scholarships Program. The five-year, \$80 million program, introduced in 1988 as a result of advice received from NABST, is designed to recognize and encourage outstanding students to pursue undergraduate degrees in natural sciences, engineering and related disciplines. Each year, 2 500 scholarships, worth \$2 000 each, are awarded to top

students entering first-year undergraduate studies in eligible fields. The scholarships are renewable for up to three additional years for a maximum value of \$8 000. A minimum of 1 250 scholarships are awarded to women and at least ten to residents of each province and territory.

The first year of the Canada Scholarships Program was widely acclaimed as successful. Some 11 000 applications for scholarships were received. Fifty-one percent of the scholarships were awarded to women. The 2 500 Scholars applied their awards in more than 80 institutions across Canada.

**\$240 Million for
Networks of Centres
of Excellence**

On May 25, 1988, as a result of advice received from NABST, the federal government announced details of the \$240 million five-year program for the establishment of national Networks of Centres of Excellence.

Since that date, some 158 groups of Canadian university and industrial researchers have submitted applications for support. The selection process involves an International Peer Review Committee, which was asked to provide advice based on pre-established criteria that include excellence in science; linkages and networking; the research's relevance to industrial competitiveness; and administrative and management capability.

Advice from the International Peer Review Committee was submitted to the Minister of State (Science and Technology) who announced the 14 competition winners on October 26, 1989 with the assistance of a Ministerial Advisory Committee of distinguished Canadians. The networks selected will stimulate the production of leading-edge fundamental and long-term research of importance to Canada and develop and retain world-class Canadian scientists and engineers critical to the country's future industrial competitiveness.

The 14 selected networks represent a cross-section of the natural and medical sciences and engineering; their industrial linkages will reach into the manufacturing, resource and high technology sectors and businesses across the country. Each network involves anywhere from 5 to 20 institutions and companies.

\$200 Million Increase for University Research Granting Councils

Announced May 25, 1988, the increase of \$200 million for the Granting Councils strengthens and stabilizes support for the broad base of research and training in Canadian universities. The additional funding is being provided over five years to the base budgets of the Natural Sciences and Engineering Research Council (NSERC), the Medical Research Council (MRC) and the Social Sciences and Humanities Research Council (SSHRC). NSERC's budget has been increased by \$103 million, with \$61 million going to MRC and \$36 million to SSHRC.

ISTC Cornerstone Programs

On October 28, 1988, the Prime Minister announced three cornerstone programs of ISTC: strategic technologies support, sector competitiveness initiatives, and tailored services for businesses. More than \$400 million have been allocated for these new initiatives.

The Strategic Technologies Program will support alliances among companies, between groups of companies and research institutions, and between groups of companies and foreign partners. These alliances will undertake pre-competitive R&D or leading-edge technology applications, positioning Canadian firms to capture future markets in a myriad of industrial sectors and to profit directly from advances in biotechnology, information technology and advanced materials.

Sector Competitiveness Initiatives will enhance international competitiveness and performance of particular industrial sectors and will be carried out in co-operation with industry and with other departments in government. Action plans will be jointly sponsored with industry to take advantage of growth opportunities identified through an extensive process of strategic analysis and consultations.

Business Services will fund initiatives aimed at helping the Canadian private sector strengthen existing marketing and new market development capabilities, as well as assisting entrepreneurs in acquiring and implementing new technology.

On April 6, 1989, the Minister of State (Science and Technology) announced funding of \$8.5 million for a four-year program designed to assist Canadian manufacturers. Set up as a service-oriented program, the Advanced Manufacturing Technology Application Program (AMTAP) will provide funding for qualified firms to engage consultants to assess the commercial and technological feasibility of comprehensively upgrading their manufacturing operations.

OTHER MAJOR S&T INITIATIVES

The Federal Five-Year Financial Plan for University Research

The first-ever five-year financial plan for university research through the Granting Councils was introduced in the Budget of February 26, 1986 and was updated August 19, 1987, and May 25, 1988. The initiatives are designed to provide stronger and more stable funding for the Councils.

Along with substantial increases to the Granting Councils' base budgets, the five-year plan includes a policy to match private-sector contributions to university research by payments to the Councils, up to \$380 million between 1987-88 and 1990-91. The matching policy is designed to increase the level of collaboration between the private sector and universities as well as the overall amount of university research. In the first year of the policy, private-sector contributions reported by the Councils totalled \$129 million, far exceeding the first-year target of \$44.5 million. The policy is being evaluated with a view to deciding its future after 1990-91.

Established Programs Financing (EPF)

Besides its direct expenditures on university research through the Granting Councils, the federal government makes a substantial and increasing indirect contribution to universities through transfer payments to the provincial governments under the EPF arrangements intended for post-secondary education. These transfers, in cash and tax points, have risen from \$3.3 billion in 1981-82 to a current level of about \$5.7 billion annually. They are forecast to increase annually almost six percent for the five years from 1985-86 to 1990-91 and at no less than the rate of inflation thereafter. The provinces, in turn, provide grants to the universities to cover their capital and operating expenditures. The universities use a significant portion of these grants to support research and related overhead and infrastructure.

Biotechnology Strategy

The federal government has committed \$11.9 million per year to support the National Biotechnology Strategy. The goals of the strategy are to create a strong research base for the development of biotechnology; increase the supply of highly qualified personnel; enhance scientific co-operation and technology

transfer to industry; and foster an economic and regulatory climate conducive to commercial biotechnology investment and activity.

In addition to funding for the National Biotechnology Strategy, the federal commitment to biotechnology is demonstrated by such developments as the establishment of the Biotechnology Research Institute and other activities at the National Research Council; Agriculture Canada's expanded activities in plant, animal and food biotechnology; and ISTC's efforts to install a biotechnology regulatory information system to serve industry, the provinces and other federal departments.

Already, ISTC has established a separate biotechnology division within the Resource Processing Industries Branch that will serve as a focal point for developments in this strategic technology. New funding programs under Strategic Alliances have been put in place to support pre-commercial research in specific areas including biotechnology. Other federal departments, such as Health and Welfare; Energy, Mines and Resources; and Fisheries and Oceans, have their own biotechnology programs and the federal Granting Councils provide support for research carried out at Canadian universities. The Department of External Affairs and International Trade, through the Interdepartmental Committee on International Science and Technology Relations (ICISTR) Sub-committee on Biotechnology, provides a forum in which federal efforts in biotechnology can be co-ordinated with those of the international community.

The total annual federal expenditures on biotechnology-related research are approximately \$100 million, not including allocations for person-years and highly qualified personnel support.

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contributions between 1983-84 and 1986-87. In 1987-88, the federal government spent \$28.1 million for operating and minor capital costs, and for contributions.

National Biotechnology Advisory Committee

The Minister of State (Science and Technology) recently announced new appointments to the National Biotechnology Advisory Committee, which reports directly to him. The Committee, whose new members reflect the greater involvement of the Canadian business community in biotechnology, has had its mandate renewed for a second five-year term. It is developing a business strategy that will encourage long-term investments in biotechnology.

Canadian Institute of Industrial Technology (CIIT)

The CIIT, located in Winnipeg, was established in February 1986 as a national facility and federal initiative focusing on advanced industrial and manufacturing technology. It is operated by the National Research Council with the participation of, and to benefit, the private sector, academic and research institutions and governments. The federal government's contribution to the Institute for operating and equipment costs is expected to total up to \$29 million over five years to March 1991.

Canadian Institute for Advanced Research (CIAR) Matching Funding

In August 1986, the federal government announced it would provide up to \$7 million over four years to match private-sector contributions to CIAR. The institute facilitates leading-edge research by top university scientists in areas of national importance, such as artificial intelligence and robotics. It promotes the establishment of research networks and provides valuable links between the academic community and industry.

Institute for Chemical Science and Technology

On March 18, 1988 a federal contribution of \$5 million was awarded to the Institute for Chemical Science and Technology to help generate research and development in the chemical manufacturing and petroleum processing industries. The Institute is a national non-profit Canadian co-operative research organization linking chemically related industries with Canada's university and government research communities.

**Science World
British Columbia**

The federal government contributed \$5 million to the \$17.2 million Science World British Columbia project, which was announced on September 11, 1987. This project, designed to transform Expo Globe into a science and technology museum, is being managed on the federal side by the Department of Communications in co-operation with the provincial government, Science World British Columbia and other participants.

**Core Funding for the
Royal Society of Canada**

In May 1989, the Minister of State (Science and Technology) announced an award to the Royal Society of Canada of up to \$1 million per annum in core funding for 1989-90 to 1993-94. This follows a grant of \$500 000 in 1988-89 provided jointly by the departments of Industry, Science and Technology; Energy, Mines and Resources; Health and Welfare; and Secretary of State. The annual grant is intended to enable the Society to develop its role as Canada's national academy.

The Society will use part of these funds to undertake a major program of research evaluation, promote equity for women in science and the academic community, and promote greater public understanding and appreciation of science and technology.

**Canada Awards for
Business Excellence**

On September 14, 1988, the accomplishments of Canadian businesses, their management and employees, were recognized at the fifth annual Canada Awards for Business Excellence ceremony. This program was created in 1984 by the federal government to honour businesses of all sizes and in all industry sectors for outstanding achievements in productivity, performance and innovation. Independent panels of private-sector experts chose up to five trophy winners in each of eight categories: Small Businesses, Productivity, Marketing, Entrepreneurship, Labour/Management Co-operation, Innovation, Invention and Industrial Design, and "new in 1989" Quality. The awards bring national recognition to firms demonstrating the innovative, productive and managerial capabilities that are the key to Canada's economic success.

The Tax Environment for Research and Development

The May 1985 Budget introduced several measures to replace the controversial Scientific Research Tax Credit. The measures include a provision for the 100 percent refundability of the 35 percent investment tax credit for the first \$2 million of current R&D expenditures made in Canada by small businesses. This credit is of great benefit to small businesses, which often do not have enough income against which to apply the tax credit. In addition, the definition of eligible R&D expenditures was expanded to include some activities that did not previously qualify.

Tax Reform limits the amount of investment tax credits claimed in one year to 75 percent of federal taxes payable. This brings Canada in line with U.S. tax policy and helps ensure that all profitable corporations will pay some taxes.

On April 11, 1988, the federal government announced administrative measures and amendments to the *Income Tax Act* designed to expedite refunds of tax credits to qualifying Canadian-controlled private corporations engaged in research and development. The changes, developed through extensive consultation with members of the research and development community, will simplify the claim process and substantially reduce the time required for the processing of refund claims.

Overall, the tax environment for R&D performed in Canada is one of the most generous among leading industrialized nations.

Amendments to the *Patent Act*

Amendments to the *Patent Act*, which received Royal assent on November 19, 1987, are designed to bring the act in line with our major trading partners and to modernize it to meet the challenges of a dynamic, high-tech economy. Included in the amendments is the restoration of patent protection for the creators of new pharmaceuticals. This policy is intended to stimulate research into new drugs in Canada, by providing innovative companies with increased market protection from generic competition for a limited period of exclusivity. The amendments are expected to induce some \$1.4 billion in new industrial R&D spending that would result in the creation of 3 000 jobs over 10 years.

Amendments to the Copyright Act

The first major amendments to the *Copyright Act* in more than 65 years received Royal assent on June 8, 1988. The act is now equipped to meet important demands of an information-driven economy by giving writers of computer programs clear copyright protection. The certainty in law provided by these amendments will encourage investment and promote development in the software industry in Canada. These changes are in line with the protection offered by our major trading partners. The United States, the United Kingdom, France, Japan and most other industrialized countries provide explicit copyright protection for computer programs.

Memoranda of Understanding on Science and Technology

Memoranda of Understanding (MOU), providing a mechanism for bilateral co-operative efforts in science and technology, have been signed with: Saskatchewan (January 30, 1984), New Brunswick (April 13, 1984), Prince Edward Island (June 13, 1984), British Columbia (March 1, 1985), Alberta (April 22, 1985), Manitoba (May 10, 1985), Quebec (incorporated in the S&T Sub-Agreement, June 10, 1985), Newfoundland (April 23, 1986) and the Yukon Territory (September 9, 1987).

The objective of the Yukon MOU is to develop a science and technology strategy and to determine the improvements in infrastructure needed to support S&T appropriately in the Yukon. In New Brunswick and Prince Edward Island, MOUs have been instrumental in developing formal S&T strategies. New Brunswick's strategic plan is designed to accelerate development and application of technology to increase and enhance employment opportunities and has effectively been implemented via the Canada/New Brunswick Subsidiary Agreement on Industrial Innovation and Technology Development. The key elements of Prince Edward Island's strategy include increasing public awareness, promoting technology transfer, improving the infrastructure in education and training, and managing the transition towards a technology-based economy.

KAON Impact Study

On July 21, 1988, the federal and British Columbia governments announced that they would share the cost of an \$11 million engineering design and impact study on the proposed KAON

factory. KAON would be a world-scale, medium-energy particle accelerator that would incorporate the current TRIUMF at the University of British Columbia.

**St. Lawrence River
Environmental
Technology
Development Program
(ETDP)**

A new program to support the clean-up of the St. Lawrence River was launched in April 1989 and will involve \$20 million in expenditures over five years. Investing in processes to abate industrial pollution, the program will help achieve the overall objectives of the \$11 million St. Lawrence River Clean-Up Action Plan. It will also contribute to the international competitiveness and growth of the Canadian environmental industry.

THE CANADIAN SPACE PROGRAM

Canada's long-term Space Program was announced on May 12, 1986. At the same time, the government approved some \$926 million to be spent between 1986-87 and 1990-91 in five different areas, including remote sensing, satellite communications and Canada's contribution to the United States' Space Station Program. Revised estimates are that \$1.329 billion will be spent during the five years from 1988-89 to 1993-94 and that, overall, spending to the year 2000-2001 will reach more than \$3 billion. The program is expected to create more than 100 000 person-years of employment and up to \$8 billion in revenues by the year 2000.

Creation of the Canadian Space Agency

On March 1, 1989, the federal government announced the establishment of the Canadian Space Agency (CSA) to be based in the greater Montreal region and the appointment of its president-designate, Dr. Larkin Kerwin.

On May 2, 1989, it was announced that the agency will be located in the airport zone at St-Hubert, Quebec. The agency will be responsible for the management and co-ordination of the Canadian Space Program. Its prime objective will be to promote the peaceful use and development of space for the social and economic benefit of Canadians.

Participation in International Space Station

On September 29, 1988, the federal government signed agreements that solidified Canada's participation in the United States-led International Space Station. A commitment of \$1.185 billion to the year 2000 for Canada's role in the design, development, operation and use of the Space Station was announced in April 1988. The Canadian contribution to the project is the Mobile Servicing System (MSS), which will incorporate the next generation of Canadarm technology and enable Canada to build on its strong capabilities in robotics and artificial intelligence.

Canadians in industry, government and universities will be able to use the Space Station facilities to advance their scientific, technological and commercial interests. When the Space Station is up and running in the late 1990s, there will be a Canadian astronaut aboard for the equivalent of six months every two years. During the next 15 years, the space and terrestrial spin-offs of the Space Station project are expected to exceed \$5 billion, and an estimated 80 000 person-years of employment will be realized.

**Canada/European
Space Agency (ESA)
Co-operation Agreement**

On May 31, 1989, the Minister of State (Science and Technology) and the Director General of the European Space Agency (ESA) signed a 10-year Co-operation Agreement, renewing Canada's long-standing and very successful relationship with the ESA.

Since 1979, Canada has been a "closely co-operating" state under the provisions of two five-year agreements. Canada's relationship with ESA strengthens our long-term international competitiveness and maintains access for Canada to European space technology. It also reinforces the political and economic relationship with the European Economic Community, allowing Canadian companies to compete for international contracts and develop closer ties with European industries.

RADARSAT

On June 25, 1987, federal approval (subject to successful negotiations with international, provincial and private-sector partners) was announced for the 10-year, \$725 million RADARSAT Program. In June 1989, the Prime Minister reported that agreements with our international partners, the provinces and industry were complete and that announcement could be expected soon. RADARSAT will be a Canadian-led international joint program to design, construct and operate Canada's first earth observation satellite system. It is estimated that the development and operation of this system will generate 10 000 person-years of employment in Canada and provide more than \$1 billion in benefits to the Canadian public and private sectors.

SUMMARY

The federal government has followed a comprehensive plan of action "built on a broad foundation of consultation" to improve Canada's science and technology performance. Our future economic prosperity and social welfare depend on our ability to stay on the leading edge of unprecedented scientific progress and technological change. The message from our trading partners and competitors is clear: science and technology must be at the top of the national agenda. As the initiatives reported in this document demonstrate, the federal government is committed to providing the leadership and support to meet these challenges.

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