

FEDERAL PARTNERS IN TECHNOLOGY TRANSFER

ANNUAL REPORT

*To foster the development of professional capacity within the
Canadian government to enhance the effectiveness and efficiency
of technology and knowledge transfer.*

Fall 1997

FPTT gratefully acknowledges the contribution of E. Kaye Fulton to the Annual Report.

**MESSAGE FROM DR. ARTHUR J. CARTY,
PRESIDENT, NATIONAL RESEARCH COUNCIL CANADA**

In the few years since its inception, the Federal Partners in Technology Transfer (FPTT) has established itself as the most important forum for promoting best practices, entrepreneurial thinking, and information sharing on ways to commercialize the tremendous storehouse technology and scientific expertise in the laboratories of the Government of Canada.

Canada needs initiatives like the FPTT. If the laboratories of federal science-based departments and agencies are to exploit their full potential as national resources in the knowledge-based global economy, those of us responsible must strive to develop and employ every tool available to us to transfer this expertise and the innovations that flow from it to private industry, other institutions, and individuals in order to draw maximum benefits for Canada. We must look for the best ways to commercialize more of the technologies produced in our laboratories to create jobs and to strengthen Canadian industry.

Fortunately, in confronting these challenges, federal departments and agencies are armed with many years of experience and with skilled technology transfer professionals who have had a variety of experiences in a wide range of technologies and industrial sectors. There is much that we can learn from each other and from searching for common threads.

FPTT provides a valuable and effective vehicle for learning from each other and working together to improve our practices, and the National Research Council is proud to have provided support for the FPTT Office and to acknowledge the leadership of Dr. Keith Belinko and his colleagues in this initiative.

We are even prouder to note the workshops, networks, training, policy, and promotional activities that have flowed as specific products of the FPTT initiative as documented in this Annual Report.

The FPTT is having a very real and positive impact on the operations of its member organizations, and because they include all of the key federal science-based departments and agencies, it is, in turn, benefiting Canadian industry and all Canadians.

Arthur J. Carty

**MEMBERS OF
FEDERAL PARTNERS IN TECHNOLOGY TRANSFER (FPTT)**

Agriculture and Agri-Food Canada
Atomic Energy of Canada Ltd.
Canadian Food Inspection Agency*
Canadian Space Agency
Communications Research Centre
Environment Canada
Fisheries and Oceans
Health Canada
Industry Canada
Medical Research Council
National Defence
National Research Council
Natural Resources Canada
Natural Sciences and Engineering Research Council

* Newly formed agency, formerly part of Agriculture and Agri-food Canada

FPTT's Major Achievements

- Creation of an R&D Impact Network
- Workshop on Structuring Technology Transfer Offices
- Development of FPTT Website
- Guiding Principles on the Management of Intellectual Property Issues
- Participation in Small Business Info Fairs and Various Trade Shows -- Providing Access to Technology and Programs from Federal Laboratories
- Forum for Collaboration and Exchange of Expertise on Horizontal Issues Affecting Science-based Departments and Agencies
- Inventory of Technology Transfer Training Programs
- Input to the Caucus Task Force on Commercializing Science Research -- Providing a Policy Platform
- Publications on Model Practices in Technology Transfer

INTRODUCTION

Federal Partners in Technology Transfer (FPTT): Forging Partnerships in Technology Transfer

The development of new technologies, and how effectively they are managed and shared, is key to the establishment of Canada as a major player in the highly competitive, knowledge-based global economy.

Essential to this endeavour is the partnership of Canadian government, industry, and academic research institutions. Effective and innovative technology transfer is both a science and an art. The federal government is a major stakeholder in the development of best practices for both its own 120 laboratories and those in universities and industry, shouldering some 25 per cent of all funding for research and development initiatives. As well, the Canadian government employs more than 25,000 people in R&D, a deep and wide-ranging pool of expertise that makes up the largest innovation team in the country.

An integral element of the vision outlined in “*Science and Technology for the New Century: A Federal Strategy*”, FPTT was pulled together to capitalize on this wealth of researchers and technology and, in turn, facilitate the technology transfer process. Comprised of representatives from 14 federal science-based departments and agencies, FPTT’s goal is to provide leadership in the creation of a networked community of professionals. Among its objectives: to promote the best in technology transfer from a myriad of sources within the public and private sectors, improve communication and cooperation among its members, as well as provide a forum for the exchange of technological information and expertise that will lead, ultimately to job and wealth creation and an enhanced quality of life in Canada.

As Canada approaches the 21st century, groups such as FPTT and its member departments and agencies will play an increasingly important role in the development, management and transfer of key technologies -- technologies that will position this country as a leader in the global marketplace.

“FPTT is a very effective mechanism for ensuring that technology transfer activities are not reinvented in every science-based department and agency. It provides a forum for the right people to talk to each other, thus saving time and money.”

*Jacques Lyrette, Vice-President, National Research Council Canada
and Chairman, FPTT Advisory Council*

HISTORY AND STRUCTURE OF FPTT

From Linear to Dynamic

“Creativity in today’s organization means more than just generating ideas. It means recognizing a good idea when you see it and identifying the uses or applications of the idea. This is where the business expertise and market knowledge of the technology transfer office can play a catalytic role in the R&D process.”

Arthur J. Carty, President, National Research Council Canada

In the past, research conducted in government laboratories was structured to perform the elemental role of furthering the public good. The process was linear -- from basic to applied research, to development and only perhaps, commercialization. That single-minded approach has been replaced by radically changing demands of both government and the marketplace that require collaborative schemes and strategic alliances between the public and private sectors.

For Canada to effectively compete in the global economy, the technology developed in government and corporate laboratories must be developed into products and processes that generate revenue. The faster this technology is transferred to industry, the faster it will get to market and the more likely it will create jobs for Canadians. In an increasingly competitive and aggressive global marketplace, the first out of the starting block often wins. Speed, of course, is not the only ingredient of success. Nor is it enough for government laboratories, in particular, to simply invest in R&D. They have to excel at getting products -- whether those deliverables are expertise, inventions or generic technologies -- to the marketplace. To ensure that Canadian businesses are aware of, and can adopt, state of the art technologies, both rapid action and co-operation within this country’s scientific community are paramount. More than ever, federal departments and agencies must foster that entrepreneurial spirit in tandem with the recognition that, in the end, they are members of the same team, working to the same goal.

FPTT is structured to meet this challenge. Cutting across science-based federal departments and agencies, FPTT hallmarks are co-operation and collaboration in the management of an inter-dependence among its members that will reduce costs, spur innovative growth and create jobs. A forum with its own Advisory Council and Executive Office, FPTT is a mini Team Canada within the federal government. The success of each and every one of its members is a victory for the entire team and, thus, for the entire country.

Speaking in a single voice that represents the interests of many, FPTT is both an advocacy and a service agency. For its 14 members, it is an invaluable link to one another, and to the outside world. By sharing their problems and opportunities -- whether on intellectual property management or on how to maximize the commercial potential of

technology developed in their separate labs -- the FPTT team works to find common, practical solutions and approaches to technology transfer.

The federal government continues to play a vital role in undertaking research aimed at public good but not necessarily specific to any individual. Much of this research has benefits that are broadly diffuse - for example, improved basic understanding of new atomic particles; or health research on prevention; or research to support the development of public policy and regulations - such as environmental monitoring techniques to determine public safety and environmental compliance. Some of the technologies stemming from this R&D are transferred to private and public sectors, often in the international arena.

Canada must do a better job to commercialize all of its scientific discoveries. In recognition of that priority, the Caucus Task Force On Commercializing Science Research was asked in July 1996 to identify practices to assist the federal government in this regard. FPTT made a presentation to the Task Force on the good practices within the federal government, and provided input and support in addressing the questions raised by the Task Force and in ensuring participation in the various roundtable discussions held across the country. In effect, Members of Parliament in search of links to science-based departments and agencies can rely on FPTT as a barometer of the country's progress in the global race for technological prowess.

FPTT's workshops, website and participation in technology transfer conferences and info fairs, lend visibility to not only its individual members, but to the Canadian government. As a companion to other federal initiatives -- including the highly respected Industrial Research Assistance Program (IRAP) at the National Research Council -- FPTT gathers together the threads of a complex tapestry of technology. For universities and companies faced with a plethora of often confusing research programs and funding schemes, FPTT is a single point of contact, serving as a clearinghouse of information on federal technology transfer activities and a virtual microscope for deciphering programs related to technology transfer.

Key FPTT Objectives

- To address horizontal issues of common concern related to technology transfer and exploitation, thus saving on time and costs and getting a much bigger bang for a buck.
- To provide a forum for federal science-based departments and agencies to exchange model practices in building partnerships.
- To provide opportunities to work with leaders in the technology transfer field in Canada and around the world.
- To assist in the development of an infrastructure of government-wide policies and programs which encourages technology transfer, particularly to smaller Canadian companies
- To promote public awareness of federal technology transfer activities.

A TEAM AT WORK

From Creation of Networks to Workshops

“We are all struggling with the same types of technology transfer issues. So why not work collectively?”

*Marc Denis Everell, Assistant Deputy Minister, Earth Sciences Sector,
Natural Resources Canada and Member of the FPTT Advisory Council*

Creation of an R&D Impact Network:

With continued emphasis on the reduction of expenditures, comes a subsequent challenge for managers of Research and Development: how to demonstrate the value they create for the federal government and the people it serves and, at the same time, account for their costs. One obvious solution is to find the appropriate tools to measure the impact of R&D and to ensure sound investments. In an information age, that should be easy. That it is not as simple as it should be is the one of the reasons that the FPTT team, with Natural Resources Canada in the lead, decided to launch the R&D Impact Network, operated by the Conference Board of Canada, in affiliation with the Canadian Research Management Association. A series of five-city regional workshops during June 1997 provided a cross-sectoral forum of government, industry and academia. Learning from each other, network members have taken a major step in developing consistently applied methods and tools for the assessment of the economic and social impacts of R&D, a long-term investment essential to the attainment of any organization's strategic goals. For the FPTT team, sponsorship of the network is a natural move into a parallel world.

Promotion -- Info Fairs and Trade Shows:

With its “Team Canada” approach of a coordinated front or one-stop shopping for accessing technology from its fourteen members, FPTT saves the government, as well as industry, both time and money. The greatest impacts are often made in unexpected places. One of the first priorities of FPTT in its initial months was to establish a recognized presence among technology-related small and medium-sized businesses, engines that drive the Canadian economy. That was accomplished by meeting business on its own ground during the Industry Portfolio's Small Business Info Fairs across the country (Vancouver, Edmonton, Winnipeg, Saskatoon, Ottawa, Montreal, Quebec) and in tradeshows (Developing the Advanced Economy II; Second Global Conference on Lifelong Learning Conference).

Representing FPTT were the aptly named Promotechers, members of an energetic and innovative FPTT sub-committee, dedicated to the promotion of the team's activities inside as well as outside government walls. Individuals looking for information to meet their companies' needs received immediate feedback from the Promotechers and later

contacted individual FPTT members to address particular needs. This resulted in the provision of technological solutions to particular small business needs and in closer linkages between the private and public sectors.

Case Studies and Training Programs:

In a landmark study, University of Ottawa public administration professor David Large worked with several FPTT members to compile factors that influence success and failure in technology transfer laboratories. Using as a base 34 projects involving technology transfer from federal labs, the study, entitled *Building Successful Technology Commercialization Teams*, laid a foundation for the continued development of the best methods to use, and avenues to take, to lift government research and development out of the laboratories and into the marketplace.

In order to ensure successful technology transfer, effective training programs and courses are required. FPTT compiled an inventory of existing courses to gather data for a directory organized under various themes including overview of technology commercialization; managing technology commercialization; mastering technology marketing; intellectual property negotiation; outreach skills for federal laboratory employees; entrepreneurship; and fundamentals of business development and government-industry negotiations. Sources for this inventory include a number of small and large consulting firms, firms specializing in providing training in management education, firms specializing in providing basic business training, and universities and colleges offering technology management related programs.

The FPTT Website: <http://scitech.gc.ca/fptt>

As a communication bridge between partners as well as to, and from, the outside world, the FPTT Website is the epitome of the team's mandate to pull together the science-based community. With easy, one-step access to information on science and technology activities in Canada, the Web offers technology transfer practitioners the latest news on both existing and fresh technologies, innovative services, programs, expertise and facilities available within the federal government's science-based departments and agencies. The Web is a bright, two-way window, allowing the partners to keep track of each other -- their individual success stories, the hot technologies developed in their labs -- in an open forum, as well as in private, password-protected communication.

Technology transfer practitioners outside the team can log on to learn what licensable technologies are available, what other national and international organizations involved in technology transfer are up to, or who to contact in each department for information. As a data base, the website offers up-to-date statistics from Revenue Canada and Statistics Canada, as well as available government tax credits, venture firms and S&T assistance programs at both federal and provincial levels. Furthermore, it provides hot links to these sites, which include IRAP, the Canadian Technology Network and Strategis, to name but a few.

Workshops:

Further to the workshops on R&D Impact sponsored by FPTT in Ottawa, Montreal, Calgary, Halifax and Toronto, FPTT also staged several workshops of its own. An April 1997 Technology Showcase, held in conjunction with regional universities and members of the Ottawa-Carleton Regional Innovation Forum, was designed to highlight federal technologies relevant to the region and to improve access to training in technology transfer.

Certainly, the centrepiece of FPTT's inaugural year was as host of a May 1997 workshop, entitled Structuring Technology Transfer Offices. The two-day conference in Ottawa attracted a capacity audience of key Canadian stakeholders, 80 of them from government laboratories, 40 from universities, in addition to 30 private sector practitioners. Representatives came with their own ideas, experiences and queries about ways to develop best practices of technology transfer. Because of the dynamic nature of the issue, most went away asking for more. Seminars and conferences, such as the FPTT workshop, have proven to be more than showcases for wares and wherewithal. They are constructive tools that can be utilized to cultivate professional relationships, to break down the hurdles that plague every enterprise, no matter how simple or sophisticated, and to share innovative methods with like-minded practitioners of a perpetually evolving field. The results, premier among such initiatives, the increased benefits of publicly funded research, are of value to all Canadians.

“The FPTT Workshop on Structuring Technology Transfer Offices was instrumental in helping us align our business development offices.”

*George H. Kimbell, Acting Chief Research and Development,
Department of National Defence*

MODEL PRACTICES

In Search of the Best

“It is not enough to support the globally competitive research being undertaken in Canada. Government departments and agencies must work collaboratively with universities and with business to ensure that Canadian research is put to the best possible use to improve the health of Canadians and the economy of Canada.”

Henry Friesen, President, Medical Research Council.

In the spiraling world of technology, the search for success is a never-ending quest. The thread that connects the 14 members of FPTT is the desire and need to find the very best methods of delivering a service or a product as quickly as possible and to the maximum benefit. As such, FPTT is a forum for its members to share the practices and processes that not only work for them but may be of use to others, either within, or outside, the government realm. From incentives to monetary rewards, from a revolutionary process to ideal practices, the solution to a problem is often only as far away as next door. Among the programs already in use by individual members being built upon or adopted by others:

- **Communications Research Centre (CRC) Innovation Centre:** In 1994, the Communications Research Centre (CRC) opened its doors to fledgling small and medium-sized companies, allowing them access to federal technologies, expertise and facilities, including specialized testbeds. With its technology incubator program, the centre is literally a one-stop shop, where businesses which locate on the premises at market-based rates are in daily contact with any of more than 200 researchers, as well as dozens of federal technologies and unique CRC laboratories. While increasing R&D collaboration with industry, the centre, in turn, reduces the risk to enterprises in the development of commercially viable products and services. One of the CRC Innovation Centre’s first clients, Linmor Information Systems Management Inc. began in 1995 with six employees. Within two years, the company outgrew its quarters: with a staff of 23, annual sales of approximately \$1 million for its network and system management products, Linmor recently established its first public share offering on the Alberta Stock Exchange.
- **Agriculture and Agri-Food Canada’s R&D Matching Investment Initiative:** Stretching both industry and government’s research dollar, the investment fund, expected to reach a total of \$35.8 million in federal money alone by the year 2000, matches, dollar for dollar, research and development contributions to collaborative projects between the private sector and Agriculture and Agri-Food Canada, a member of FPTT. The newly formed Canadian Food Inspection Agency is also an active participant in the initiative. Matching funds provided to the agency will increase to over \$3.5 million per year by 2000. By involving industry research investors directly, the initiative speeds up the process of fine-tuning and transferring of new technology

to the private sector, while at the same time ensuring that the real needs of the agriculture sector are met. Since its introduction in 1994, the fund has been applied to a host of innovative research projects, including studies of the management of the carrot rust fly in Newfoundland, the eradication of wheat midge in Western Canada and the development of new soybean varieties in Ontario.

- **NRC's Entrepreneurship Program:** A multi-faceted series of initiatives, this program is a vital element of NRC's vision as a leader in the development within government of an agile and more entrepreneurial approach to an innovative, knowledge-based economy. Aimed at the creation of an environment within NRC that fosters technological innovation, collaborative research and commercialization, the program includes awards that recognize employees who achieve exemplary results in forging or participating in successful R&D partnerships with industry, and rewards for those who help to maximize the economic impact of NRC's technology and expertise. Also among the incentives are an entrepreneurship leave policy that supports NRC employees who want to exploit NRC technology by setting up a new business, join an existing firm or take a leave with pay, as well as a jointly-funded program that offers two-way secondment opportunities between government and industry.
- **The Canadian Medical Discoveries Fund Inc:** Initiated by the Medical Research Council, an FPTT member, this labour-sponsored venture capital fund invests in early stage and even pre-commercial health research ventures. In less than three years, CMDF has become Canada's leading investor in biotechnology, and has driven the transition of Canada from a venture capital-poor biotech industry to one of the world's richest. With over \$250 million raised and almost one third already spent, CMDF is helping to create new companies, such as Apoptogen and Terragen Diversity, which are leading the recent explosion of growth in Canada's biotech industry. In addition, CMDF has helped repatriate lost Canadian technologies and researchers, thus reversing the flow of the brain drain through newly Canadian companies like Vascular Therapeutics in Hamilton.

This federal government - private sector partnership has proven so successful at building relationships between Canada's academic based researchers and its business community that other FPTT members have expanded the model well beyond the health sector. This year saw the launch of the Canadian Science and Technology Growth Fund, a sister to CMDF.

- **The Canadian Science and Technology Growth Fund:** As a link to industry and an opportunity to promote access to technologies within the federal government, FPTT members -- the National Research Council, the Canadian Space Agency and the Natural Sciences and Engineering Research Council -- are participating in this venture capital investment fund, sponsored by the Canadian Air Traffic Control Association on a pilot basis; remaining members will be invited to participate in the near future. Designed to help Canadian businesses, from early stage to mature medium-sized companies, develop and apply cutting-edge technologies in the natural

sciences and engineering, the fund will help both industry and government-sponsored researchers complete the R&D and commercialization. A major benefit from this alliance is that the fund managers, the Technology Investments Management Corporation (TIMCO), target financial aid to commercial ventures at an earlier stage of development than is normal for most venture capital firms.

INTELLECTUAL PROPERTY MANAGEMENT

Setting a Solid Framework

The development and implementation of fair and consistent intellectual property (IP) management practices are at the very heart of the FPTT mandate. Arguably one of the most complex and difficult issues to face science-based departments and agencies, IP management in the specialized sphere of governing is a delicate balance between serving the public good and supporting the private interests of companies through revenue-generating work.

Given the extraordinary diversity and wide-ranging mandates of science-based departments and agencies, the task of sorting out who owns what is understandably daunting. Commercial success, for instance, cannot be used to measure the effectiveness of departments and agencies, such as Health Canada and Environment Canada, whose mandates are to protect the health and safety of Canadians. At the same time, all departments and agencies, including Health and Environment, must be able to identify, and exploit, the commercial possibilities of processes or products developed while carrying out their primary roles. Over the course of 1997, FPTT worked to pinpoint and address the various issues around IP management.

FPTT's challenge while tackling IP management was to fulfill its pledge to act as both a catalyst and a clearing house. Covering many stakeholders' needs -- whether it be those of NRC's Plant Biotechnology Institute in Saskatoon, which teamed with industry to discover new strains of Canola, or those of Health Canada's Laboratory Centre for Disease Control that produces valuable IP as a spin-off from its health and safety role -- was essential. The result was a set of 16 principles on IP management that FPTT team members agree offers a uniform set of guidelines that are reasonable, workable and comprehensive.

The guiding principles are designed to cover both the core issues that concern the creation and transfer of public technologies and, in turn, the subsequent questions that are then raised in terms of IP rights. The simplest model stems from government obligations, such as public health and safety, that can be met with the sole use of government resources. Complications occur when the government shares the development of research with the private sector, when government must reach outside itself to find a solution to a problem or a need, or, conversely, when it must find a public sector solution for a private sector demand. Each scenario presents its own set of IP management needs. The FPTT teams then extended the model by factoring in other elements -- from the broad issue of possible market distortions caused by the transfer to the private sector of Crown-owned intellectual property to the narrower, internal issue of rewards to government employees to encourage participation in technology transfer programs.

Guiding Principles for the Management of Intellectual Property:

Generation of IP- Basic Principles

1. Intellectual property management (IP) must be managed as a tool to help departments fulfill their mandates. This is its primary function. No other consideration can equal or surpass the obligation to support the department mandate.
2. When government transfers IP to the private sector for commercialization, the objective is to maximize socioeconomic benefits for Canadians.

Split ownership of IP

3. When split ownership of IP occurs, contractual arrangements must be managed so as to maximize possibilities for commercial exploitation. This will generally translate into efforts to focus control of the IP into the hands of a single player for a given application of IP.

Industrial Standards

4. To facilitate technology and IP transfer to the private sector, government will use generally accepted industrial standards and norms whenever possible.

Industrial Development

5. IP developed in a collaborative research and development with industry generally stands the best chance of being effectively transferred to the private sector and commercialized. This mode of technology transfer should be favored in the management of the IP. In instances where government research and development laboratories do not have a mandate to collaborate directly with firms, licensing of IP should be the favored option.
6. For departments and agencies that have an industrial development or support mandate, project selection should involve careful consideration of the market potential and value of the IP being targeted.

Internal Incentives

7. IP may be embodied in various forms, including patents, copyrights “know-how” and trade secrets. All forms of IP must be properly managed and respected.
8. IP management is an integral part of the research and development process. It helps define the optimum research strategy. Managers of IP should be part of R&D teams during the entire course of project development.
9. Human resources training is an essential component of IP management. It leads to improved R&D strategy and reduces the risk of premature disclosure. Departments must provide such training for scientists and their managers.
10. The importance of contributions to the creation, management and exploitation of IP must be properly reflected in job descriptions and performance evaluations of employees.
11. Government-created or sponsored IP is an asset of the Crown. As such, it must be treated with the same care and respect due to physical Crown assets. In particular, care must be taken to recognize the value of IP at the early stages of its development.
12. To maintain employment equity, rewards to inventors and innovators in government employment must be made according to uniform principles established by the Treasury Board. Appropriate rewards should be given to the employees directly responsible for the development of an IP and to members of the support team that contributed to the work, even if they were only indirectly involved in the discovery.
13. The management of IP involves flexible business skills such as deal-making that are not readily translated into rules and guidelines. Given the complexity and diversity of IP issues, sharing of knowledge and experience across departments through mentoring and information exchange is considered to be an essential means for training and for management improvement.

Competition Policy

14. When it awards an exclusive license thereby providing a monopoly to a firm, government should reserve the right to continue to use the invention in question for its own non-commercial purposes.
15. The continuance of licences should be conditional upon the licensee achieving pre-determined performance milestones so that government can recover its property if the licensee fails to properly develop and exploit the IP.
16. Licensees should be prohibited from assigning licences to third parties without the consent of government since such an action may conflict with the obligation to maximize the use of the IP for the socio-economic well-being of Canadians.

PARTNERSHIPS IN EVIDENCE

“Relationships are at the very heart of our technology transfer activities. By sharing our experiences and networks, our institutes are witness to a growing and vibrant new entrepreneurial culture. More and more, we are working together within the federal government to better meet the needs of our clients.”

Brian Morrissey, Assistant Deputy Minister, Research Branch, Agriculture and Agri-Food Canada and Member of the FPTT Advisory Council

RED RIVER FLOOD, 1997

Technology and Spirit:

It was the worst flood since 1826, and by the time the Red River peaked and then, finally, ebbed in the spring of 1997, more than 200,000 hectares of arable ground -- about five percent of Manitoba's farmland -- were covered with water. As devastating as the flood was, it likely would have been much worse had it not been, in part, for the floodway, the dikes and the dams built at strategic points along the river that swelled to as high as 34.2 feet. Although 28,000 Manitobans were evacuated and the damage tally was more than \$150 million, the totals were still less than those of the flood of 1950, which cost more than \$600 million and forced 100,000 people from their homes when the Red River rose to 30.3 feet.

What became evident during the catastrophe and its aftermath was an amazing combination of technology and spirit. Four FPTT members -- the Department of National Defence, Natural Resources Canada, the Canadian Space Agency and Health Canada -- pooled their resources and know-how in a battle that brought out the best in all Canadians. Participating in Operation Assistance with more than 8,600 Canadian Forces personnel, the Canada Centre for Remote Sensing of Natural Resources Canada assessed the damage to the Red River flood area, providing both access to and training in RADARSAT image processing to produce quick turnaround flood maps that were an invaluable source of information for the soldiers, residents and volunteers in the field. Data from RADARSAT, a remote sensing satellite launched by the Canadian Space Agency in November, 1995, showed the extent of the damage and supplied information that will help refine current hydraulic models for the Red River, giving federal, provincial and private sector scientists a better idea how the river system will respond to future floods. In the clean-up that followed, the technology was then applied in conjunction with the Canadian Crop Information System, operated by the Manitoba Remote Sensing Centre, which uses satellite information to estimate vegetation mass and crop yields. Health Canada, in collaboration with the Manitoba Ministry of Health and Manitoba Family Services, throughout all these valiant efforts, provided medical supplies and equipment as well as registration cards for the evacuees. In advance of the flood, they were involved with community emergency preparedness education programs; and

both during and after the flood, they supplied emergency health and social services consulting advice.

CLEAN COMBUSTION NETWORK

From Fuel to Software:

With a membership roster that stretches from individual furnace operators to fuel producers and software developers, Canada's Clean Combustion Network, launched in 1997 by the CANMET Energy Technology Centre, a division of Natural Resources Canada, is a vital link between the combustion industry and the technology development sector. Among the array of benefits offered on its Internet site, the network helps its members solve operational problems, evaluate new developments in combustion technology, find the facilities they need for research and development and then gain access to lucrative international markets. Ultimately, the network plans to be a self-financing service, managed and run by the private sector.

To help meet that goal, four members of the FPTT team -- Environment Canada, Industry Canada, the National Research Council and Natural Resources Canada -- work alongside combustion experts and electronic communications specialists in the development of a nation-wide, cost-effective program of services and resources that pulls together users, developers, manufacturers and regulators of combustion-related services. Because of the support of FPTT members, federal expertise and resources are available to help the network locate technological development and business opportunities at home and abroad, as well as establish a national network of expertise and information on stationary combustion and environmental controls. Teamwork is reflected in enhanced research and development practices; the result -- a sound foundation for a national combustion R&D strategy and a healthy, growing sector of the economy.

CANOLA AND GINSENG

More Than Just a Cash Crop:

Proof of the wide-ranging success -- and dramatic benefits -- of technology transfer lies literally in Canada's farmlands. In southwestern Ontario, farmers who once relied on tobacco crops for their livelihood are now planting ginseng, long-valued in Asia for its medicinal value. Meanwhile their Prairie counterparts are reaping bigger, and better, yields from rolling, sunny fields of canola. Streamlining Agriculture and Agri-Food Canada (AAFC) research and development capabilities through 18 specialized centres across Canada, the federal government in 1995 also created the Matching Investment Initiative, a fund that matches, dollar for dollar, industry contributions to collaborative research in AAFC laboratories. The results of those efforts have been dramatic. Researchers from the department's Pest Management Research Centre formed an alliance with the Ontario government and the University of Guelph to develop commercial production of the fast-growing ginseng, a lucrative export crop with an annual worth of more than \$60 million. Federal contributions to the investment initiative funds the

research studies of University of Guelph graduate students, four of them among the dozen researchers who are now associated with the ginseng program.

In Western Canada, a discovery in federal laboratories led to a transfer of technology that was nothing but good news to canola farmers. AAFC scientists isolated and refined a naturally occurring fungus that helps plants use phosphorus, a key food for healthy plant growth. The technology was licensed to Philom Bios Inc. of Saskatoon, and marketed as a seed inoculant by DowElanco under the trade name Provide. In addition to the increased crop yields, farmers benefited from lower fertilizer costs and a reduced likelihood of groundwater pollution.

BIOTECHNOLOGY

A Good Provider:

The Networks of Centres of Excellence (NCE) Program, a collaboration between federal departments and agencies and granting councils together with universities and private sector companies, has unequivocally demonstrated the value returned to Canadians by collaborative R&D efforts. In the health sector alone, five biotechnology-oriented NCE's have created some 25 rapidly growing spin-off companies over the last three years. With their accelerating employment currently approaching 400 jobs, these new companies are leading the extraordinary growth taking place in Canada's biotechnology community.

The growing impact of this industry on the Canadian economy is stunning, and the explosion of job creation in the industry is well supported by Canadian business. In fact, the last three years have seen this industry experience five-fold increases in venture capital investment - from \$50 million to over \$280 million - and market capitalization of the industry increase from about \$3 billion to over \$12 billion.

CONCLUSION

“ . . . there is a role for government in both nurturing basic research and helping to commercialize research results. This kind of support will generate spin-off enterprises and jobs that will provide employment opportunities for Canadians in all walks of life and all regions of the country.”

**-- Securing Our Future Together: Preparing Canada for the 21st Century.
The Liberal Plan - 1997**

Over the past few years, Canadian science-based departments and agencies have mirrored many of the profound changes undertaken by government since World War II. As an integral element of the quest to place Canada at the forefront of global economies, FPTT is dedicated to the pursuit of innovative, integrated and informed methods of technology transfer. In February, 1994, a federal review, Science and Technology for the New Century, explored opportunities for government action in developing a thriving technological culture and, in doing so, set a new direction for science and technology in Canada.

Since many of the principal public policy issues tackled by the federal government today are horizontal in nature, a corresponding horizontal integration of federal scientific and technological activities makes sense.

It is no small feat, however, to draw together the talents and dedication of 14 entities with their own agendas, visions and individual roles to play in the common job of making Canada work. FPTT does just that, and more. In recent years, the re-alignment of jurisdictions by all governments in Canada has substantially reduced the degree of overlap and duplication, in some cases more than the public knows. As governments enter into more and more partnership arrangements, one benefit expressed in a chorus by FPTT members is clear: the partners achieve results that would be well beyond their reach had they acted on their own.

November 1997

For further information, please contact:

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