Technology Partnerships Canada

An Agency of Industry Canada

Partenariat technologique Canada

Un organisme d'Industrie Canada

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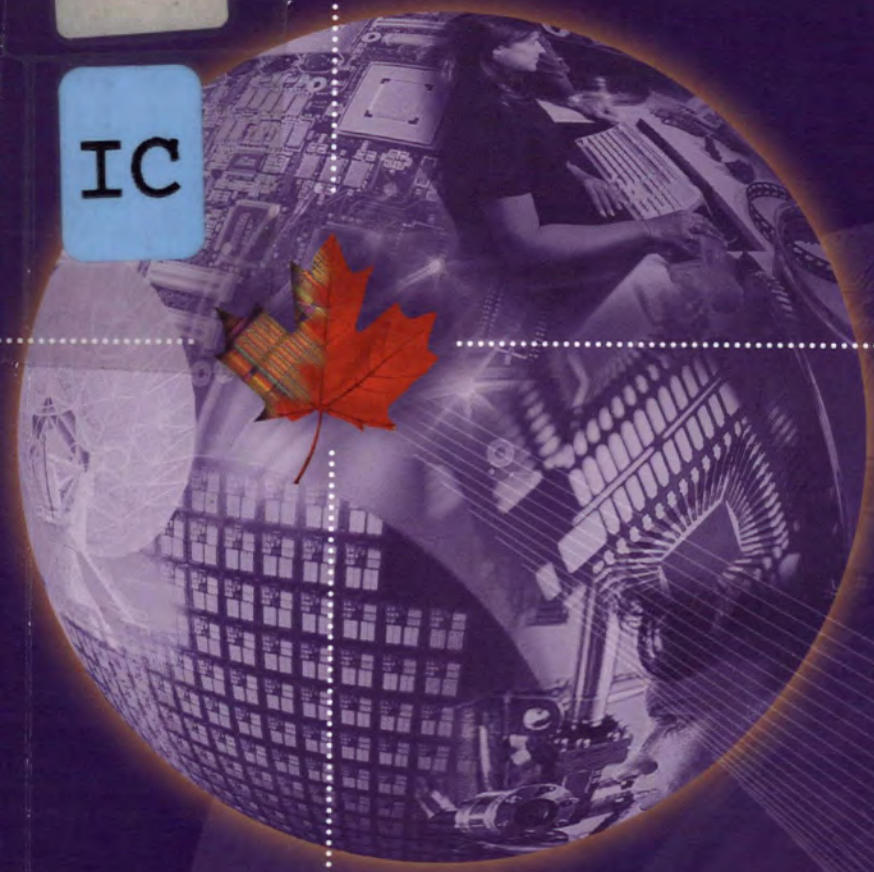

Moving Forward

Annual Report 1998–1999

Canada

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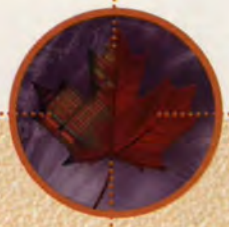
Moving Forward

Environment. Aerospace and defence. Communications. Electronic commerce. Biopharmaceuticals.

In Canada's burgeoning knowledge-based economy, these diverse areas of technology share a common partner — Technology Partnerships Canada (TPC).

TPC is committed to innovation, research and development, and fostering and furthering Canada's transition to a global, knowledge-based economy. Established in 1996, TPC is mandated to make strategic investments in leading-edge technologies that hold the potential to transform businesses of all kinds, in all sectors.

TPC's investments in projects large and small across Canada are, ultimately, investments in people. Demonstrating confidence in our scientists, engineers and entrepreneurs. Demonstrating confidence in ideas. Underscoring a belief that, with vision, conviction and hard work, we can look forward to a new century of innovation, job creation, economic prosperity and growth.



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Highlights

ADDING IT UP

This year's totals

Fiscal year 1998–1999 included the following TPC achievements:

- approval of about $214 million in repayable investments for 22 Canadian research and development (R&D) projects;
- additional leveraged investment commitments of $1.78 billion in innovation spending; and
- creation or maintenance of about 4 450 high-quality jobs.

Based on company forecasts, these 22 projects, if successful, are estimated to generate sales of $16 billion.

Totals since inception

Over three years of operation, TPC's achievements include:

- approval of more than $775 million in repayable investments for 79 Canadian R&D projects;
- additional leveraged investment commitments of $4 billion in innovation spending; and
- creation or maintenance of over 18 200 jobs, including 6 500 jobs over project R&D phases.

Based on company forecasts, these 79 projects, if successful, are estimated to generate cumulative sales of $78.8 billion.

And the TPC fund is growing

- in the 1999 federal Budget, TPC funding was increased by $50 million per year; and
- more than $13 million of repayments were collected in 1998–1999, even though most projects have not yet been commercialized. Authorization was received to reinvest these payments in the fund.

Progress with SMEs

Small and medium-sized enterprises (SMEs) accounted for:

- 61 percent of all TPC projects; and
- almost 20 percent of total TPC funding.

In addition, in 1998–1999 the National Research Council of Canada's Industrial Research Assistance Program's (IRAP) partnership with Technology Partnerships Canada (IRAP-TPC) approved 40 projects, for total investments of $15 million.

Message from the Minister

For three years now, Technology Partnerships Canada (TPC) has been investing in Canadian innovation, research and development and technology. Why? Because we believe Canadian talent, know-how and advanced technologies will drive our economic engine in the 21st century, increase our standard of living and make Canada the place the world looks to for new technologies.

Canada is already well positioned to take a leadership position in the knowledge-based economy as a result of significant government and private-sector investments in transportation, education and telecommunications infrastructure, research facilities and university laboratories. Perhaps even more important are our investments in education, training, apprenticeship, and in the people who are, and who will become, the innovators of the future.

"We believe Canadian talent, know-how and advanced technologies will drive our economic engine in the 21st century, increase our standard of living and make Canada the place the world looks to for new technologies."

John Manley
Minister of Industry

As I visit companies in which TPC has invested, I am always struck by the enthusiasm, entrepreneurial spirit and technical excellence of the skilled engineers, managers and workers. These are people with the vision and ability to push Canada to the top echelons of innovative excellence. Whether they are large enterprises employing thousands of people, or small businesses with 20 to 30 employees, Canadian companies are at the forefront of technology, pioneering advances in which we can take pride.

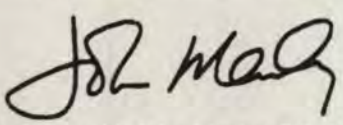
TPC plays a key role in helping companies aggressively pursue the technologies that will help shape Canada's future. How? By linking these technologies to a key source of capital. TPC's repayable investments in Canadian innovation include investments in projects that range from vanguard anti-cancer vaccines to technologies driving the new era of electronic commerce.

By encouraging innovation within Canada, we're helping to keep existing high-quality jobs here and helping to create new ones. We're also keeping the economic benefits in the country which, in turn, helps finance Canadian health, education and social policy objectives.

But government and industry partnerships in innovative excellence cannot be a one-time commitment if we expect to continue to move forward. To sustain and expand our technological developments, we must continue to develop partnerships and new ways of working together.

This year's Annual Report demonstrates how TPC's past partnership successes have enabled us to move forward. In the 1998–1999 fiscal year, TPC has received additional federal government funding of $50 million per year; received authorization to reinvest repayments back into the fund; and established new funding partnerships with other government departments and agencies.

With a larger investment fund and new government–industry partnerships, Technology Partnerships Canada is well placed to support even more research and development initiatives across the country, helping our economy grow for the benefit of all Canadians.



The Honourable John Manley, P.C., M.P.
Minister of Industry

Message from the Executive Director

After three years of building Technology Partnerships Canada (TPC) from the ground up, defining our vision, our role and our strengths, we've come of age.

Fiscal year 1998–1999 brought with it our most significant achievements to date. This year, the Government of Canada designated TPC a full-status Special Operating Agency, thereby increasing our operating flexibility. The government also augmented our funding by $50 million per year and gave us the authority to reinvest industry repayments in the fund.

The combination of greater operating flexibility and a bigger investment fund has allowed us to encourage and contribute to even more projects across Canada. In industry sectors throughout the country, TPC investment commitments are helping develop key technologies for our future — from semiconductors to avionics, from ethanol to hydrogen fuel cells. TPC investments are also helping develop a stronger, more diversified economy.

Nurturing productive partnerships is an essential part of our continuing success. We have already entered into a number of new partnership agreements with federal government departments and agencies, including Natural Resources Canada, Environment Canada and the National Research Council of Canada's Industrial Research Assistance Program (IRAP).

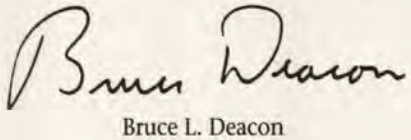
Our partnership with Natural Resources Canada and Environment Canada aims to identify and to help support promising renewable and alternative fuel technologies that will receive repayable investments through both TPC and the Technology Early Action Measures (TEAM) component of the Climate Change Action Fund (CCAF). This funding will not only create new technologies, but is also expected to lead to the reduction of greenhouse gas emissions and help Canada meet its commitment, under the December 1997 Kyoto Protocol, to reduce these emissions by 6 percent by 2008–2012.

Our 1998–1999 $30-million partnership agreement with IRAP to provide pre-commercialization funding to small and medium-sized enterprises (SMEs) across Canada is already enabling some 40 SMEs to turn innovative ideas into technology.

TPC's role will continue to evolve. As we move forward, we continue to face new challenges. To meet these challenges, we must ensure that we adhere to the highest tests of due diligence and fiscal responsibility. We must address evolving international rules for trade and investment, such as those stipulated by the World Trade Organization, and we must continue to meet the changing needs of industry in this fast-paced, knowledge-based economy.

Whether helping new Canadian companies develop innovative technologies or helping established Canadian industries to adopt new technologies to become more technologically competitive, everyone at TPC is keenly aware that the investments we make today will bring economic returns tomorrow.

I'd like to take this opportunity to commend TPC staff for their dedication and energy and to thank our partners for their enduring commitment to TPC and to Canada.



Bruce L. Deacon
Executive Director

"Whether helping new Canadian companies develop innovative technologies or helping established Canadian industries adopt new technologies to become more technologically competitive, everyone at TPC is keenly aware that the investments we make today will bring economic returns tomorrow."

Bruce L. Deacon
Executive Director

Photo: Pratt & Whitney Canada

A Solid Portfolio

Technology Partnerships Canada (TPC) offers an innovative approach to supporting state-of-the-art research and development (R&D) in Canada. With the strengthening of the country's knowledge-based economy as its primary goal, TPC has formed partnerships with some of the most innovative companies in the country. Together we have invested strategically in a growing portfolio of R&D projects that represent key advancements in the areas of environmental technologies, enabling technologies, and aerospace and defence. Our partnerships have enabled these companies to leverage greater financing and increase their attractiveness as joint venture partners to other private-sector companies, allowing TPC's partners to advance their projects more rapidly.

In the 1998–1999 fiscal year, many of TPC's partner companies made announcements that underscore the viability of their technology, mark new levels of achievement and help contribute to the repayment of TPC's investment.

The following notable announcements were made over the past year:

- In August 1998, GFI Control Systems Inc. of Kitchener, Ontario, signed an extensive agreement with the Ford Motor Company to develop environmentally friendly fuel control systems for Ford vehicles. GFI is now an official member of Ford's Alliance Program involving key players in vehicle development. GFI's next-generation fuel control systems use leading-edge sensor and computer technology to tailor fuel mixture, allowing a vehicle to use propane, natural gas or gasoline in a standard internal combustion engine. TPC's 1997 approved repayable investment was $4.3 million.

- In September 1998, Ballard Power Systems Inc. announced that it had started construction of its new development and pilot manufacturing centre and expected to move into the facility by the end of 1999. A significant step for Ballard, the new facility paves the way for full-scale development of its new fuel-cell technology. In December 1998, Ballard concluded a $47.7-million agreement with EBARA to develop two 250-kilowatt Ballard fuel-cell power plants for field testing in Japan. TPC's 1997 approved repayable investment in Ballard's power plant technology was $29.4 million.

- In late 1998, Bristol Aerospace Limited of Winnipeg, Manitoba, announced that it was starting production of its leading-edge composite panels for wings and tail sections of the Boeing 737 Next Generation and Boeing 737 Classic aircraft. Bristol's contract is valued at $13.3 million over two years. TPC's 1998 approved repayable investment in the development of Bristol's composite capabilities was $2 million.

- In December 1998, Kanata, Ontario-based Cambrian Systems Corporation so impressed Nortel Networks of Brampton, Ontario, with the development of its leading-edge, multiplex fibre-optic communications transportation equipment, OPTera, that Nortel purchased the company for incorporation into Nortel's product mix. OPTera is able to send 32 streams of data along a single fibre, considerably speeding up the flow of network traffic between metropolitan areas and the major Internet networks. TPC's 1997 approved repayable investment in the development of OPTera was $2.3 million.

- In January 1999, Orenda Recip Inc. of Mississauga, Ontario, announced that it had been selected by Turkish Aircraft Industries to develop power-plant technology for a new original design agricultural aircraft. The aircraft will use Orenda Recip's OE-600 V-8 piston engine as the basis for an innovative firewall-forward package and involves up to 300 power-plant packages. The company has opened a new operation at its Debert, Nova Scotia, facility to assemble the packages. TPC's 1997 approved repayable investment in the development of the reciprocating V-8 engine was $8.4 million.

- In the spring of 1999, Mississauga, Ontario-based LARCAN Inc., the only Canadian designer, manufacturer and marketer of high-power television transmitters, announced that it would shortly supply Canadian industry with its first digital television transmitter to help conclude testing in Canada. The transmitter will be located in Manotick, Ontario, near Ottawa. Canada is expected to follow the lead of the United States, which expects to shift from analog to digital television by 2006. In addition to providing the technological foundation for the shift to digital television, LARCAN's digital transmission system will also provide a new, wider range of television services, including high-definition television (HDTV). New television receivers are already gaining acceptance in the U.S.: between 4 000 and 5 000 homes in the Seattle, Washington market alone are viewing digital high-definition television transmissions on newly purchased HDTV television sets. TPC's 1998 approved repayable investment was $3.5 million.

- In early 1999, Future SEA Technologies Inc. of Nanaimo, British Columbia, signed its first international technology demonstration agreement for its new aquaculture system. A second-generation system will be launched in late 1999. The company has introduced a number of major technological changes to traditional fish farming, including its Sustained Environment Aquaculture system, which regulates water flow and oxygen levels — good news for the environment. The technology has received interest from fish farmers in a number of regions. TPC's 1998 approved repayable investment was $1.7 million.

- In early 1999, Pasteur Mérieux Connaught Canada (PMCC) announced that the University of Manitoba, Dalhousie University, the National Research Council of Canada (Institute for Biological Sciences), Sunnybrook and Women's College Health Sciences Centre, and the Mount Sinai Hospital in Toronto were the first five partners to join its $350-million Cancer Vaccine Network to develop therapeutic vaccines for the treatment of cancer. PMCC's 10-year project represents the largest single biotechnology investment ever made in Canada. TPC's 1997 approved repayable investment was $60 million.

- In 1998 and 1999, the Pulp and Paper Research Institute of Canada (PAPRICAN) announced that it had installed its newly developed control processes for two principal bleaching chemicals (oxygen and chlorine dioxide) used in pulp and paper manufacturing in two Canadian mills: one in Quebec, the other in British Columbia. These dramatically improved processes will be offered commercially through Walsh Automation, a leading supplier of manufacturing automation products based in Montreal, Quebec, and Burlington, Ontario. The processes are among other technologies being developed by PAPRICAN under its System Closure program — an extensive R&D initiative to make pulp and paper manufacturing processes more efficient, improve resource utilization and reduce or eliminate the production of pollutants. TPC's 1996 approved repayable investment was $9 million.

Strategic Investment Areas

Environmental Technologies

Enabling Technologies

Aerospace and Defence

Photos: top to bottom, Questor Industries Inc., Harris Canada Inc. and Pratt & Whitney Canada

Environmental Technologies

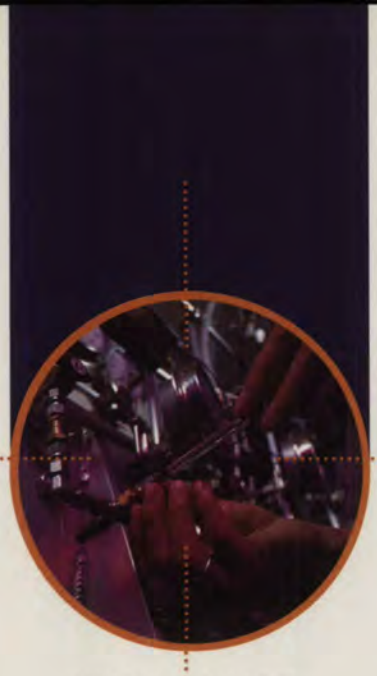


Photo: Questor Industries Inc.

"TPC SUPPORT HAS BEEN A KEY FACTOR IN HELPING THE PULP AND PAPER RESEARCH INSTITUTE OF CANADA ADVANCE LEADING-EDGE RESEARCH AIMED AT REDUCING EMISSIONS FROM OUR INDUSTRY'S MANUFACTURING PROCESSES. THIS IS A SOLID GOVERNMENT–INDUSTRY PARTNERSHIP FOR ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT."

Dr. Joseph D. Wright
President and Chief Executive Officer
Pulp and Paper Research
Institute of Canada

Today, large corporations, SMEs and individual entrepreneurs are recognizing that it is possible to have development that is good for both business and the environment. The Government of Canada, industry associations and innovative companies are working together to develop clean processes that will enhance productivity and improve Canada's environmental future.

To accelerate the pace of technological development, Technology Partnerships Canada (TPC) and its partners are investing in environmental technologies that will help the federal government to meet its commitment to reduce greenhouse gas emissions by 6 percent by 2008–2012, and advance sustainable development and pollution prevention across Canada.

Over the past year, TPC, either alone or with its partners, approved $31 million in repayable investments for eight environmental projects in a variety of sectors, including transportation, forestry, aerospace and defence, and oil and gas. This doubled TPC's investment over the previous year as well as the number of jobs created and maintained. Five ($26.6 million) of these eight investments involved joint funding with the Technology Early Action Measures (TEAM) component of the federal government's Climate Change Action Fund (CCAF).

Environmental Technologies In Brief

EASTERN POWER LIMITED/SUPER BLUE BOX RECYCLING CORPORATION

Turning waste, an underutilized renewable resource, into power is the focus of Toronto, Ontario-based Eastern Power's subsidiary, Super Blue Box Recycling Corporation. This new technology also promises to dramatically reduce landfill gases emitted from buried municipal solid waste.

TPC/CCAF-TEAM approved repayable investment: $4.725 million

Number of jobs expected to be created or maintained: 305

IOGEN CORPORATION

Canada's only integrated manufacturer of industrial enzymes is playing a vital role in reducing greenhouse gases. With its enzyme technology expertise, Ottawa-based Iogen expects to produce ethanol at a lower cost than the current method through a new production process that uses a wide variety of biomass, including straw, grass and oat hulls. This process is expected to yield a cost-effective, clean-burning ethanol that can be blended with gasoline and used in today's cars without modification to engines or fuel systems. By using Iogen's technology, every litre of ethanol substituted for gasoline will reduce carbon dioxide emissions by 70-90 percent.

TPC/CCAF-TEAM approved repayable investment: $10 million

Number of jobs expected to be created or maintained: 572

IRVING PULP & PAPER

Saint John, New Brunswick-based Irving Pulp & Paper is examining a new way of treating kraft pulp mill effluents, with the goal of returning cleaner water to the environment. The project involves the testing, evaluation and refinement of a complete reverse osmosis system recently installed in Irving's mill. If proven effective, the technology is expected to have applications in other pulp and paper mills as well as in other types of industrial processes.

TPC approved repayable investment: $497 200

Number of jobs expected to be created or maintained: 16

Photos: above, Iogen Corporation featured in collage, Questor Industries Inc. and SCC Environmental Group Inc.

Environmental Technologies In Brief *(continued)*

ORENDA AEROSPACE CORPORATION

Cleaner power and a cleaner environment are the objectives of a new technology in development in Gloucester, Ontario. Orenda Aerospace Corporation is in the process of developing and refining a reliable electrical power-generating system that can be operated entirely on biomass-derived liquid pyrolysis fuels.

TPC/CCAF-TEAM approved repayable investment: $1.2 million

Number of jobs expected to be created or maintained: 24

PRATT & WHITNEY CANADA

Cleaner air is on the horizon, thanks to the development in Longueuil, Quebec of a dry, low-emission combustion system for an industrial gas turbine engine. The new system will reduce nitrogen oxide emissions by more than 50 percent from present emission levels and has a variety of uses, from the co-generation of power, to flood control, gas and oil pumping, and gas compression.

TPC approved repayable investment: $3.4 million

Number of jobs expected to be created or maintained: 69

QUESTOR INDUSTRIES INC.

The potential to revolutionize the industrial gas market is being explored in Burnaby, British Columbia. Questor Industries Inc. is developing a unique gas separation technology that strips nitrogen and other gases from the air stream, leaving pure oxygen. This initiative will improve fuel cell efficiency, thereby reducing its cost and helping bring widespread use of fuel-cell powered vehicles closer to reality. It will also reduce greenhouse gas emissions.

TPC/CCAF-TEAM approved repayable investment: $4.9 million

Number of jobs expected to be created or maintained: 545

SCC ENVIRONMENTAL GROUP INC.

Newfoundland-based SCC Environmental Group Inc.'s adaptation of its Thermal Phase Separation contaminated soil treatment system will enable valuable fluids to be recovered and treated from waste mud and cuttings produced in oil and gas drilling operations. The system is expected to have significant economic and environmental benefits.

TPC approved repayable investment: $491 552

Number of jobs expected to be created or maintained: 32

STUART ENERGY SYSTEMS INC.

In a significant step to reduce carbon dioxide emissions, Stuart Energy Systems Inc. of Toronto, Ontario is developing technology to reduce the cost of refuelling fuel-cell powered buses. Stuart's high-volume refuelling system enables commercial transportation companies using fuel-cell vehicles to refuel more buses overnight, taking advantage of off-peak electricity rates. Lowering the cost of fuel-cell powered vehicles should increase their attractiveness to a wider market.

TPC/CCAF-TEAM approved repayable investment: $5.8 million

Number of jobs expected to be created or maintained: 386

Photos: featured in collage, Questor Industries Inc. and SCC Environmental Group Inc.

Enabling Technologies

Photo: Harris Canada Inc.

Enabling technologies are recognized by all developed countries as critical to economic growth. These technologies strengthen productivity in existing industries and create opportunities in new and emerging sectors. Technology Partnerships Canada (TPC) is targeting development in four enabling technology areas that have a wide range of applications in a variety of industries across Canada, and create new jobs for highly skilled Canadian workers: information technologies, biotechnology, advanced manufacturing and processing technologies, and advanced materials.

Information and communications technologies make up the world's fastest growing sector, with explosive growth in wireless communications, new media and telecommunications. In fiscal year 1998–1999, TPC approved $64 million in repayable investments for seven information technology projects, including the development and use of electronic commerce, and the strengthening of our capabilities in the increasingly important fields of telemedicine, semiconductor chip design and wireless communications.

In fiscal year 1998–1999, TPC continued its support of biotechnology, assessing a wide range of biotechnology proposals for possible investment. Biotechnology is critical to the advancement of a variety of sectors, with the potential to radically change current practices in disease prevention and control, and completely transform agriculture and aquaculture.

TPC is also working with large and small companies in a range of industries to further Canadian capabilities in advanced manufacturing and processing technologies, and advanced materials — key technologies for enhanced productivity and processes.

"TPC's repayable investment of $33 million helped fuel IBM's decision to accelerate research and development in Canada on Net.Commerce, its leading e-commerce software technology, and to establish a state-of-the-art, $125-million research facility in Markham, Ontario. Approximately 1 400 jobs will be supported by this initiative. This technology will help strengthen Canada's position in e-commerce R&D and in the information technology sector."

Susan Puglia
Vice President, Server Development and Director, Toronto Laboratory
IBM Canada

Enabling Technologies In Brief

ELECTROMED INTERNATIONAL LIMITÉE

On-line medical consultations on heart patients will soon be available to remote areas of the country that lack extensive medical facilities. This will be possible through the development of ViewNet, a medical video-conferencing system, by Saint-Eustache, Quebec-based Electromed International Limitée. Using the latest high-speed, wide-band data transmission networks, Electromed's system will allow real-time consultations between Montreal Heart Institute specialists and consulting physicians, thereby permitting them to share complex medical information. Medical video conferencing will help eliminate waiting time for examination results and reduce the need to transport patients long distances for consultations.

TPC approved repayable investment: $499 995

Number of jobs expected to be created or maintained: 32

HARRIS CANADA INC.

Repayable investments from TPC and its federal government partners have helped Harris Canada Inc.'s Montreal and Calgary facilities obtain a world product mandate from their U.S. parent company to design and develop point-to-multipoint broadband wireless access products and systems. The Montreal facility will design systems that make applications such as high-speed Internet and video available via wireless equipment. The Calgary plant will address rural areas by developing third-generation personal telecommunications systems.

TPC approved repayable investments: $9.68 million (Montreal), $8.46 million (Calgary)

Number of jobs expected to be created or maintained: 283 (Montreal), 493 (Calgary)

Photos: featured in collage, Mosaid Technologies Inc. and Harris Canada Inc. (Wireless Division)

Photo: Harris Canada Inc.

IBM CANADA

TPC's repayable investment in Markham, Ontario-based IBM Canada's development of its e-commerce software, Net.Commerce, was a major factor in the company's decision to locate its $125-million state-of-the-art research facility in Canada. Winning the confidence of one of the world's biggest e-commerce software developers is expected to substantially strengthen Canada's position in the highly competitive e-commerce R&D and information technologies sectors.

TPC approved repayable investment: $33 million

Number of jobs expected to be created or maintained: 192

MOSAID TECHNOLOGIES INCORPORATED

Faster, better, cheaper is the mantra motivating Kanata, Ontario-based Mosaid's development of three advanced information technology products: two engineering memory systems to test increasingly faster custom computer memory chips, and one computer network switch for use in local area networks (LANs), linking more computer systems and networks.

TPC approved repayable investment: $6.2 million

Number of jobs expected to be created or maintained: 96

SPECTRUM SIGNAL PROCESSING INC.

Spectrum Signal Processing Inc. of Burnaby, British Columbia, is developing high-speed digital signal processing (DSP) systems that convert analog information, like speech and pictures, into a digitized form that can be more easily transmitted. DSP technologies will enable Canadians to access a wider range of digital communications services, such as transaction services, broadcasting, financial and business services, entertainment, video conferencing and telemedicine. DPS systems can also be applied in military surveillance.

TPC approved repayable investment: $6.3 million

Number of jobs expected to be created or maintained: 332

Photo: Spectrum Signal Processing Inc.

Aerospace and Defence

Photo: Pratt & Whitney Canada

"Magellan Aerospace has established itself as a long-term player in the aerospace global market. This achievement has been made with the support of many participants, including TPC. TPC has made the difference in the ability of Magellan and its subsidiaries, including Bristol Aerospace, Orenda Aerospace Corporation and Fleet Industries, to create new technology in key areas. We look forward to TPC's continuance as an investor in Canada's aerospace sector."

Richard A. Neill
President and Chief Operating Officer
Magellan Aerospace Corporation

Photos: featured in collage, Pratt & Whitney Canada and Orenda Aerospace Corporation

Aerospace and defence are key sectors in Canada's transition to a global, knowledge-based economy. To help maintain our position of excellence and world leadership in these sectors, these industries must continuously innovate.

TPC's repayable investments are helping Canadian aerospace and defence industries maintain technological leadership in the following areas:

- civil helicopters, flight simulation, small gas turbine engines and space technologies;
- expansion and diversification of Canadian small and medium-sized business technological capabilities in such areas as civil aircraft, aerospace electronics and avionics enterprises;
- improved processes for manufacturing aerostructures and components for civil aircraft; and
- the development of new world-class capabilities in aerospace electronics, such as military simulations and new niche avionics technologies.

In fiscal year 1998–1999, TPC approved $118 million in new repayable investments for seven projects. These projects ranged from small business projects, such as an affordable small aircraft tracking system; and defence conversion projects, such as the adaptation of munition expertise to the development of smaller and safer airbags for vehicles; to large business projects, such as the development of the largest and most complex turbofan jet engine ever designed and built in Canada.

Aerospace and Defence In Brief

AIR DATA INC.

Staying safe by staying in touch is the objective of Montreal, Quebec-based Air Data's Aircraft Tracking and Messaging System. The new system provides affordable data communications technology to companies that fly small aircraft and helicopters in remote areas, giving them the exact location of their aircraft and enabling them to communicate with these aircraft in real time. The system is a significant improvement in both safety and efficiency over the current analog radio system.

TPC approved repayable investment: $147 608

Number of jobs expected to be created or maintained: 8

ALLIEDSIGNAL AEROSPATIALE CANADA INC.

TPC's repayable investment in Quebec-based AlliedSignal is enabling the company to design, develop and produce next-generation fuel control components for turbofan engines. This technology will establish the company as a major supplier of advanced aircraft fuel control systems and keep a valuable research and development capability in Canada.

TPC approved repayable investment: $3.664 million

Number of jobs expected to be created or maintained: 104

CANADIAN MARCONI COMPANY

In a joint venture with U.S.-based AirTV Limited, Canadian Marconi Company (CMC) of Kanata, Ontario, will provide aeronautical television antenna systems to the aviation industry. CMC is designing, developing and providing certification tests for a receiver antenna and system controller that would enable aircraft equipped with the AirTV network to provide live, high-quality, in-flight TV service to the world's long-distance airline passengers. There is currently no other system in place that provides this service. Once the development phase is complete, CMC will remain AirTV's exclusive supplier. The joint venture enables CMC to build on its share of the airline market for satellite communications (Satcom) antennas.

TPC approved repayable investment: $5.76 million

Number of jobs expected to be created or maintained: 466

EXPRO CHEMICAL PRODUCTS INC.

Expro Chemical Products, of St-Timothée, Quebec, has developed a process to adapt the military technology that once made hand grenades to the production of next-generation automotive airbags that are both safer and smaller.

TPC approved repayable investment: $1.79 million

Number of jobs expected to be created or maintained: 47

ORENDA AEROSPACE CORPORATION

Tremendous potential exists for suppliers who can deliver high performance engines for high performance transportation. Orenda Aerospace Corporation, of Mississauga, Ontario, is developing two projects that provide new technologies for aircraft engine components. In one project, Orenda will develop eight crucial components for the new AS900 series turbofan engine. In the second project, the company is developing technologies that improve the durability and life expectancy of components for today's high performance gas turbine engines. With these latter technologies, Orenda will set a new standard for engine maintenance that will likely result in a longer-lasting engine.

TPC approved repayable investments: $6.2 and $1 million, respectively

Number of jobs expected to be created or maintained: 98 and 23, respectively

PRATT & WHITNEY CANADA

TPC's repayable investment is helping Pratt & Whitney, of Longueuil, Quebec, develop and expand the PW308, the largest and most complex turbofan jet engine ever designed and built in Canada. The new engine is expected to improve the performance of mid-sized corporate jets, such as Pratt & Whitney's Hawker Horizon 4000.

TPC approved repayable investment: $99.4 million

Number of jobs expected to be created or maintained: 307

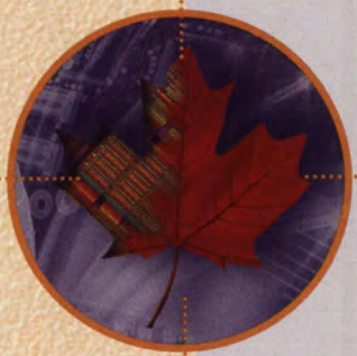
Photos: featured in collage, Expro Chemical Products Inc. and Orenda Aerospace Corporation

Over the past three years, Canadian industry has shown tremendous support for Technology Partnerships Canada (TPC), thereby rapidly expanding its growth. To manage the challenges of this growth, and to help fulfil its mandate to increase economic growth and job creation while supporting sustainable development, TPC's five short-term goals include:

- streamlining its operations to reduce costs and improve client services;
- maintaining its support of three technology areas (environmental technologies, enabling technologies, aerospace and defence) that TPC believes offer important opportunities for economic growth and job creation;
- enhancing the technology capabilities of small and medium-sized enterprises (SMEs), Canada's major new-job creators;
- developing new partnerships with more government departments and agencies to help companies that have promising technologies; and
- working closely with both existing and new public and private-sector partners.

With these goals in mind, TPC and its government partners continue to build a new Canadian industrial technology and skill base, to encourage capable and competitive SMEs, and to stimulate private-sector investment.

Review of Performance



Review of Performance

The research and development (R&D) phase of projects in which Technology Partnerships Canada invests normally takes between two and five years to complete. Because TPC has operated for only three years, only a small number of its projects are now reaching completion. To date, six of TPC's 79 projects have begun commercialization. As more companies reach the commercialization phase of their projects, TPC will be able to report on the actual number of jobs, investments and sales generated by its investments. The numbers included in this report are projections based on the anticipated successful completion of all projects.

Leveraged Investment

TPC investment leverages private-sector spending in both R&D and commercialization — spending that is key to stimulating economic growth. Generally, industry finances its share of this spending through a variety of sources, including:

- internally generated cash flow from operations;
- debt and equity financing;
- generally available tax incentives, such as the federal government's Scientific Research and Experimental Development tax credits; and
- other federal and provincial assistance programs, such as training assistance.

Forecast project investment can be divided into three parts:

- TPC's projected investment;
- a company's share of supported eligible development costs; and
- additional non-supported development costs, such as land and buildings, and ineligible investment in subsequent production.

Occasionally, investment spending can include project costs incurred outside Canada that are deemed essential to the successful completion of a project. These costs relate to activities that, for practical reasons, cannot normally be carried out in Canada. Examples of such costs include the use of specialized test facilities or clinical trials by biopharmaceutical companies, where Canada lacks the right mix of patients with the targeted disease or diseases.

Total Leveraged Investment to Date

TPC's $775 million of approved investments in 79 innovation projects to date are forecast to leverage about $4 billion of private-sector investment ($5.17 for every TPC dollar invested), if all projects are commercially successful. Private-sector investment per TPC dollar invested is divided as follows:

- a minimum of $2.59 in supported eligible company investment (about $2 billion); and
- $2.58 in additional private-sector investment, including both non-supported development costs and ineligible investment in subsequent production (about $2 billion).

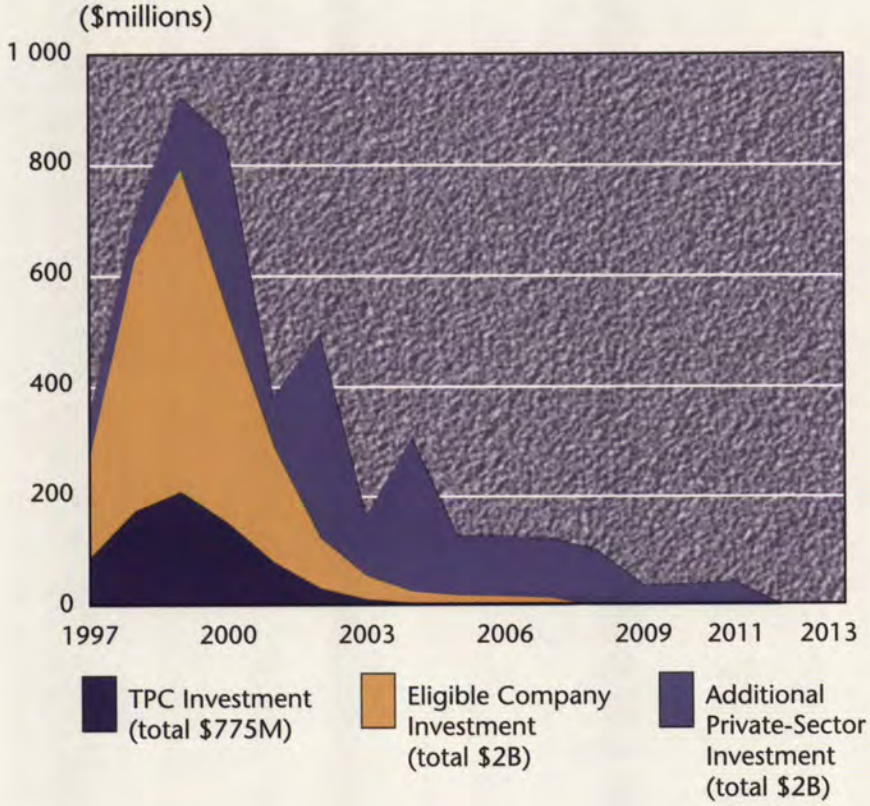
Total Leveraged Investment in 1998–1999

TPC's approved investment of about $214 million in 22 projects in fiscal year 1998–1999 is forecast to leverage about $1.78 billion in private-sector investment ($8.31 for every TPC dollar invested), if all 22 projects are commercially successful. Private-sector investment per TPC dollar invested is divided as follows:

- a minimum of $2.25 in supported eligible company investment ($482 million); and
- an impressive $6.06 in additional private-sector investment, including both non-supported development costs and ineligible investment in subsequent production (about $1.3 billion).

Projected Investment Leverage

on 79 projects contracted as at March 31,1999



Jobs

TPC's investments in innovative technologies and the large number of highly skilled Canadian jobs these technologies create or maintain have a significant impact on our economic growth. All companies being considered for TPC investment must provide a schedule of jobs forecast to be created or maintained, an annual report of their job achievements, and updated forecasts.

TPC counts two types of jobs that are created or maintained by its projects:

- jobs directly involved in the research and development (R&D) phase of a project; and
- jobs directly involved in subsequent commercialization.

TPC's job estimates are very conservative, since only the number of jobs directly generated by its projects are included. Jobs excluded from TPC's totals are those that:

- are generated indirectly through TPC-supported projects, such as the number of jobs created or maintained for suppliers, producers of ancillary products, or purchasers of end products; and
- are not directly involved in a TPC project, but are created or maintained in other areas of a company as a result of TPC's investment.

Total Estimated Number of Jobs to Date

The 79 TPC projects contracted to date are expected to generate over 6 500 R&D jobs and, if successful, are estimated to generate up to 11 700 jobs during subsequent commercialization, for a total of 18 200 jobs.

Total Estimated Number of Jobs in 1998–1999

The 22 TPC projects contracted in fiscal year 1998–1999 are expected to generate 900 R&D jobs. If all 22 projects are successful, an additional 3 550 jobs are expected to be generated during the projects' subsequent commercialization periods, for a total of about 4 450 jobs.

Risk and Reward Sharing

Mandated to make high-risk investments, TPC administers an investment fund that shares both risk and reward with its private-sector partners. However, unlike commercial financial institutions that measure return solely in financial terms, the return to TPC is also measured in terms of a broad range of non-financial benefits to Canada that flow from successful projects. These benefits may include:

- economic growth and job creation;
- contributions to sustainable development;
- development of capable and competitive SMEs in all regions;
- growth in private-sector investment spending; and
- maintenance and growth of the industrial technology and skill base essential for innovative products and services.

It is the balancing of financial and public policy objectives that distinguishes TPC from a commercial financial institution.

TPC determines an appropriate balance of investment risk and repayment terms that will enable its private-sector partners to proceed with the desired scope, timing or location of a given project. Sharing ratios (the ratio of TPC investment to total supported development costs) will vary from project to project and have ranged from 20 to 50 percent. As at March 31, 1999, the weighted average sharing ratio of the portfolio was 27.9 percent, while the average for projects approved in fiscal year 1998–1999 was 30.7 percent. When negotiating an appropriate sharing of investment risk, TPC takes into account other government funding (both federal and provincial) that may be available to support a project.

Repayment terms are negotiated on a case-by-case basis and the forecast return can vary widely from one project to the next. TPC's approach to risk and reward sharing is to share in the return on successful projects commensurate with the level of risk, benefits to Canada and level of return received by the company. This means that, after assuming the fact that some projects, or components of projects will not succeed technologically or in the marketplace, TPC's expected repayment may be less than nominal. In almost all cases, however, TPC will share in the upside returns should commercialization turn out better than anticipated. All TPC repayments are reinvested to help grow the fund.

One measure of the extent to which TPC shares in revenues is the ratio of a company's projected repayments to TPC's investment. To March 31, 1999, TPC approved investments of $775 million in 79 projects. For every dollar of this investment, TPC is forecast to receive $1.74 in repayments over time. Assuming all projects are fully successful to the extent projected by the companies, this would result in a total repayment of $1.35 billion. In fiscal year 1998–1999, TPC's approved investment of about $214 million in 22 projects is forecast to yield $363 million over time or $1.70 for every dollar invested by TPC, assuming success.

In fiscal year 1998–1999, TPC received repayments of $13 million. Given that TPC is only in its third year of operation and that over 90 percent of its projects have not yet reached the commercialization phase, repayments are expected to fluctuate significantly over the next few years.

Portfolio Distribution

TPC has achieved its mandate to allocate one third of its investments to environmental and enabling technologies, and two thirds to aerospace and defence.

When TPC began operating in 1996, the backlog of funding applications in aerospace and defence projects resulted in an initial heavier investment weighting in these industries (87 percent) than in other technologies. However, by proportionately increasing its investments in environmental and enabling technologies over the past two years, TPC has been able to steadily increase the ratio from 13 percent in 1996 to 32 percent by March 31, 1999 (33 percent, when including IRAP-TPC approvals), achieving its ratio requirement. In 1998–1999, TPC began allocating its budget on a one-third/two-thirds split, allowing TPC to maintain the mandated ratio over time. It should be noted that annual approvals may vary, depending on demand and the possible carry-forward of previously unused budget allocations. In 1998–1999, 45 percent of approved investments were for environmental and enabling technologies and 55 percent for aerospace and defence.

Portfolio Distribution (excluding IRAP-TPC)

(in dollars)

1998–1999 Distribution

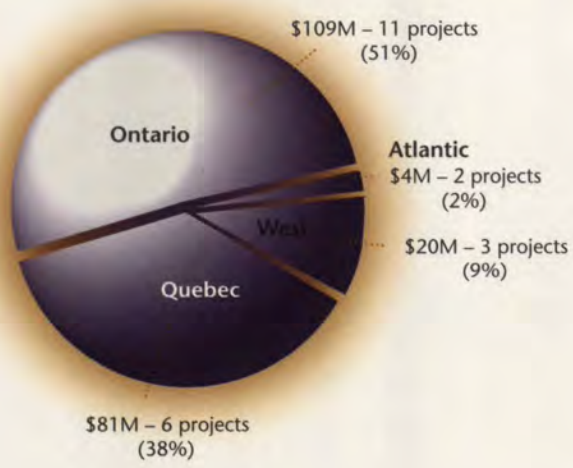
Cumulative Distribution as at March 31, 1999

Regional Distribution (excluding IRAP-TPC)
(in dollars)

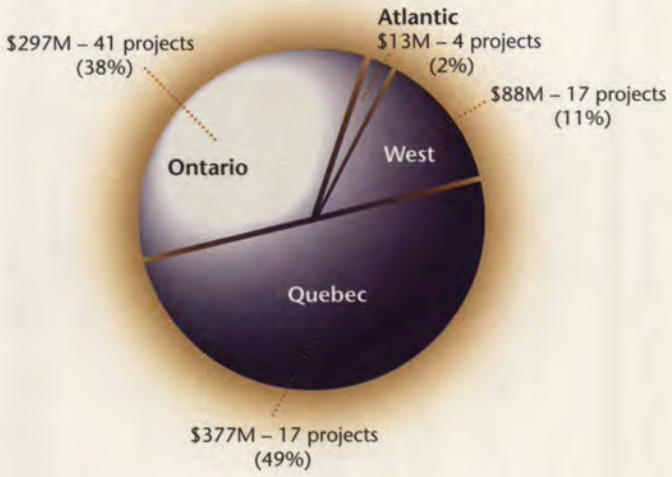
TPC is available to firms across Canada and continues to approve projects in all regions.

The majority of companies developing new, knowledge-based technologies are located in Ontario and Quebec, with the remainder dispersed throughout the rest of the country. TPC approved repayable investments are available to firms in every region of Canada, and 1998–1999 investments supported projects in all regions. TPC's project funding numbers reflect these location concentrations.

1998–1999 Distribution



Cumulative Distribution as at March 31, 1999



Delivery to SMEs

Technology Partnerships Canada provides repayable investments to small and medium-sized enterprises (SMEs) both directly and through its partnership with the National Research Council of Canada's Industrial Research Assistance Program (IRAP-TPC). IRAP-TPC was established in 1998–1999 to make pre-commercialization assistance more readily available to SMEs across Canada. The IRAP-TPC program is cost-shared on a 50:50 basis between IRAP and TPC, and has a budget of $30 million per year. IRAP-TPC is mandated to:

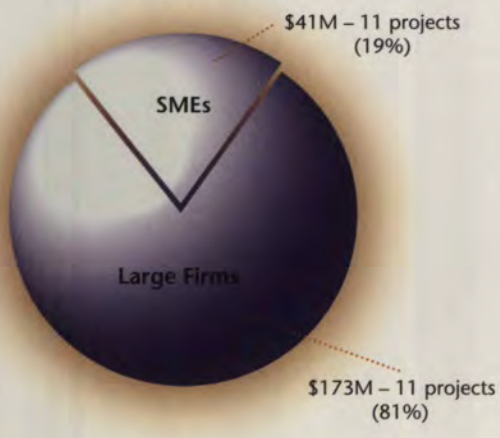
- provide investments to SMEs with less than 500 employees and with project costs under $1.5 million;
- stimulate technology development by providing support for pre-commercial innovation projects; and
- serve as a source of information, direct technical assistance to the latest technological advances, facilities and other resources, and provide access to expertise in the business end of innovation.

By adding IRAP-TPC to the existing IRAP structure, the National Research Council is able to deliver IRAP-TPC through a network of over 260 Industrial Technology Advisors in seven IRAP regions across Canada and 150 partner organizations in 90 communities. IRAP's advisors provide direct liaison with clients and consider regional concerns, priorities and resources.

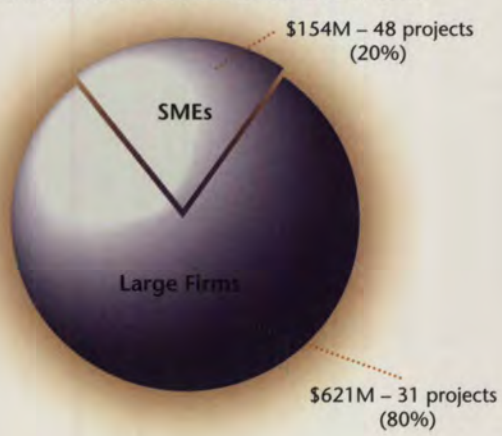
TPC Summary of Investments by Size of Firm (excluding IRAP-TPC)

(in dollars)

1998–1999 Distribution



Cumulative Distribution as at March 31, 1999

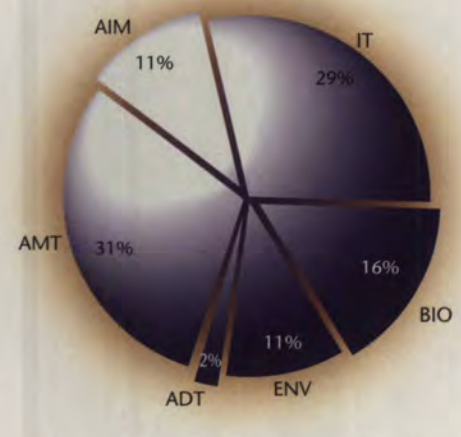


IRAP-TPC Summary of 1998–1999 Investments

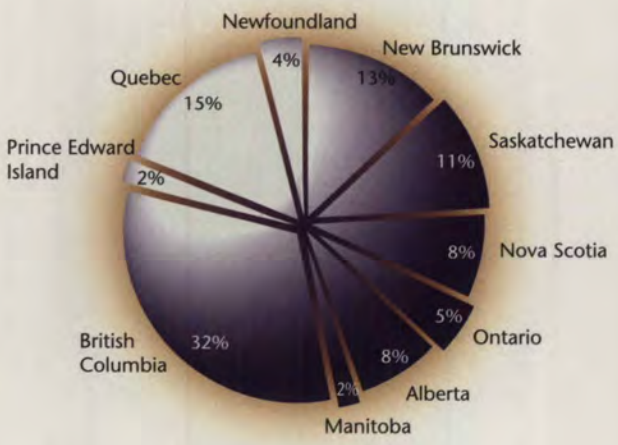
Because of IRAP's wide distribution network, IRAP-TPC was able to approve 40 SME projects ($15 million of investments) in its first year of operation. These projects spanned all targeted sectors in all regions of Canada.

- 40 approved projects
- Total contribution of $15M over 4 years
- Projects in all provinces
- Projects in all technology sectors
- 70% already IRAP clients
- Average contribution of $376K

Contribution by Technology



Contribution by Province



AMT	Advanced Manufacturing Technologies
AIM	Advanced Industrial Materials
IT	Information Technologies
BIO	Biotechnology
ENV	Environmental Technologies
ADT	Aerospace & Defence Technologies

Program Administration

Technology Partnerships Canada is committed to limiting its administrative costs by using new and innovative delivery mechanisms. To meet this challenge, TPC has developed partnership and service agreements with other areas of Industry Canada and other government departments, rather than develop its own group of experts. These agreements enable TPC to access existing government expertise related to: technological assessments, communication, finance, legal assistance, contracting, costs analysis, claims verification and audit.

TPC strives to limit its administration expenses to approximately 3 percent of its total program funding ($7 million or 3 percent of $235 million for 1998–1999, excluding the $15 million dedicated to IRAP-TPC). In 1998–1999, TPC expended $6.5 million in program administration, well within its targeted budget.

The IRAP-TPC program was launched in 1998–1999. The localized and highly decentralized nature of the delivery of this program results in higher administration costs as a percentage of program approvals (6.7 percent versus 3 percent). In 1998–1999, IRAP-TPC expended $839 000 from a budgeted $1 million.

Statement of Operations ($000)

(For the year-ended March 31,1999)

	1998–1999	1997–1998
SALARY		
Regular salaries	2 916	2 477
Employee benefits	583	495
Total salary	3 499	2 972
NON-SALARY		
Transportation and communications	351	306
Information	505	450
Professional and special services	1 388	1 569
Other	781	1 054
Total non-salary	3 025	3 379
TPC operations	6 524	6 351
IRAP-TPC operations	839	—
Total operations	**7 363**	**6 351**

Statement of Contribution Funding ($000)

(For the year-ended March 31,1999)

	1998–1999	1997–1998
CONTRIBUTION DISBURSEMENTS UNDER TPC		
Environmental Technologies	20 274	18 104
Enabling Technologies	25 344	14 930
Aerospace and Defence	152 776	141 215
Industrial Research Assistance Program (IRAP-TPC)	4 089	—
Total contributions under TPC	202 483	174 249
CONTRIBUTION DISBURSEMENTS UNDER SUNSETTED PROGRAMS		
Defence Industry Productivity Program (DIPP)	744	23 742
Environmental Technology Commercialization Program (ETCP)	—	145
Total contributions under sunsetted programs	744	23 887
Total contribution disbursements during fiscal year	203 227	198 136
Funds carried forward to future years	19 224	13 170
Total contribution funds available	**222 451**	**211 306**

Status of Contribution Portfolio ($000)

(As at March 31, 1999)

	ACTUAL	PLANNED SPENDING			
	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003
TOTAL PROGRAM FUNDING (1)	250 000	300 000	300 000	300 000	300 000
Funding from other government departments (2)	13 206	17 710	21 556	15 755	15 378
Allocation for program operations	(8 156)	(9 188)	(10 678)	(10 522)	(10 511)
Funds lapsed in 1997–1998 and carried forward to future years	—	5 300	17 311	24 559	—
Funds lapsed in 1998–1999 and carried forward to 2001–2002	(19 224)	—	—	19 224	—
Funds reprofiled to future years	(32 599)	(62 532)	1 164	2 440	62 000
Reinvestment of repayments	—	—	—	13 131	—
Available contribution funding	203 227	251 290	329 353	364 587	366 867
COMMITMENTS UNDER SUNSETTED PROGRAMS					
Defence Industry Productivity Program (DIPP)	744	125	1 103	—	—
Environmental Technology Commercialization Program (ETCP)	—	226	—	—	—
Total commitments under sunsetted programs	744	351	1 103	—	—
COMMITMENTS UNDER TPC					
Environmental Technologies	20 274	32 861	9 919	3 495	1 035
Enabling Technologies	25 344	29 500	33 453	19 930	7 991
Aerospace and Defence	152 776	108 299	36 031	16 996	6 292
Industrial Research Assistance Program (IRAP-TPC)	4 089	9 381	1 491	118	—
Total commitments under TPC	202 483	180 041	80 894	40 539	15 318
Total portfolio commitments	203 227	180 392	81 997	40 539	15 318
Total funds available for new contributions in future years	—	70 898	247 356	324 048	351 549
FUNDS AVAILABLE FOR NEW IRAP-TPC CONTRIBUTIONS	—	23 000	31 000	32 911	30 000
FUNDS AVAILABLE FOR NEW DIRECT TPC CONTRIBUTIONS	—	47 898	216 356	291 137	321 549
	—	70 898	247 356	324 048	351 549

Note (1) Includes a $50 million increase in annual funding starting in fiscal year 1999–2000, as announced in the 1999 federal Budget.

Note (2) Includes funds from the Climate Change Action Fund, the Canadian Landmines Fund and the Industrial Research Assistance Program (IRAP-TPC)

TPC Partners in Progress

TPC Advisory Board

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Chair of the Advisory Board

The Honourable Gilbert Normand, P.C., M.P.
Secretary of State
Science, Research and Development
Vice-chair of the Advisory Board

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Toronto, Ontario

Ex-officio Members

Executive Director, Technology Partnerships Canada

Deputy Minister (or Associate Deputy Minister),
Industry Canada

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Canada Economic Development (Quebec)
Canadian Space Agency
Environment Canada
Fisheries and Oceans
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Industry Canada
National Defence
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Natural Resources Canada
Public Works and Government Services Canada
Western Economic Diversification

Government Partners

Department of Justice
Environment Canada
Industry Canada
National Defence
National Research Council of Canada
Natural Resources Canada
Public Works and Government Services Canada

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