TECHNOLOGY PARTNERSHIPS CANADA

Annual Report 1996-1997

INVESTING
IN JOBS AND
GROWTH

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Canada

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ANNUAL REPORT 1996-1997

Investing in Jobs and Growth

Technology Partnerships Canada (TPC) stimulates economic growth and job creation by strategically investing in technological development that fosters innovation, international competitiveness, commercialization and sustainable development, as well as increased investment in Canada.

TPC's focus is on technologies essential to the knowledge-based economy — environmental technologies and enabling technologies, such as biotechnology, advanced manufacturing, advanced materials, and applications of information technologies — as well as on aerospace and defence industries.

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INDUSTRY MINISTER'S MESSAGE

Technology Partnerships Canada is a key element in building the foundation for a knowledge-based economy in our country.

When we launched TPC in the spring of 1996, it represented a fundamental departure from government's traditional way of doing business. We knew that industry was the main driving force for developing innovative technologies and creating jobs. At the same time, we also believed there was a critical role for government. Strategic and targeted investments by the government could make a difference. We could ensure that projects with great potential, but which were of high risk, would go forward in Canada, rather than somewhere else.

With TPC, we now have a development tool in which partnership and collaboration play a very real role. TPC's investment approach to developing innovative technologies and industrial competitiveness also provides us with an instrument that is both fiscally responsible and strategically effective.

By making targeted, repayable investments that complement industry's development strategies, we are working as true partners with the private sector. We share the risks inherent in the upfront commercialization of innovative technology. At the same time, we also stand to share in the rewards of successful projects, with repayments reinvested to support future investment activity.

This was the model we developed in the spring of 1996. After only one year's experience, we can proudly say that it works well.

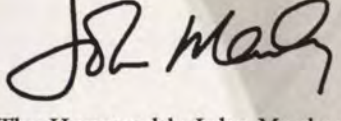
We can already see benefits from these TPC investments. In its first fiscal year, TPC approved $414 million in investments for 30 projects in the three target areas (environmental technologies, enabling technologies, and aerospace and defence industries). These investments will leverage a further $1.6 billion in research and development (R&D) and downstream investments by our private sector partners and will generate some $31.3 billion in sales. Most importantly, the TPC investments are contributing toward creating or maintaining some 10 000 direct and indirect jobs across Canada.

TPC's first year has been a success, but we don't intend to rest on our laurels. We want to make the program even more effective. We want to make more investments in the enabling and environmental technologies. Firms in these areas tend to be small and medium-sized enterprises (SMEs). With these firms, our TPC investments can make a real difference. We also recognize the benefits – both social and economic – that these technologies can bring to Canadians.

Aerospace and defence industries also make a significant contribution to our economic well-being. The sector is highly export oriented. Exports accounted for about 70 percent of sales, or $7.4 billion, in 1995. And there is the prospect of real growth in this area. Canada's aerospace sector currently ranks sixth in the world. With investments from TPC, and with industry's concerted efforts, this sector will be better equipped to compete effectively in the world marketplace and could grow to fourth place.

Canada is well-positioned to be a global leader in the 21st century. We have the people, resources, technology and infrastructure. Building on these strengths, we will create a strong foundation for the future. By focussing on innovation, technology adaption and export development, we can achieve success in the global knowledge economy. But we know that we can't do it by ourselves. As shown with TPC, we need to build partnerships between government and the private sector. Working together, we can build a knowledge economy in Canada and compete with the best in the world.

The first year of Technology Partnerships Canada's operations has shown us the road ahead. Our challenge now is to build on this success and build a Canada that can play a strong leadership role in the global knowledge economy.



The Honourable John Manley
Minister of Industry

EXECUTIVE DIRECTOR'S MESSAGE

In this first annual report from Technology Partnerships Canada, we want to report both on what we achieved and how it was made possible through public and private sector partnerships.

When TPC opened its doors in March 1996, we faced the dual challenges of building an agency from the ground up and dealing with a large backlog of major investments pending in the private sector. We are proud to report that we met both challenges successfully.

Working closely with our partners, we established TPC operationally, and we identified and approved a series of strategic investments that will stimulate job creation and economic growth.

The staff of TPC deserves enormous credit for a successful first year. However, we could not have made the significant progress detailed in this report without the important contributions by all our partners.

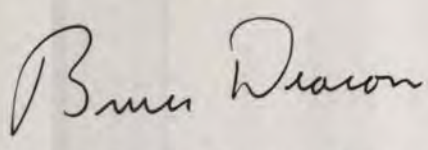
The TPC Advisory Board provided invaluable private sector advice on the vision and goals of TPC's program. The Interdepartmental Advisory Committee gave critical input on the implications of policy, programming and investment issues. Industry Canada's Programs and Services Board helped build a policy framework for TPC and ensured that every case met the highest standards. Our Industry Portfolio partners and colleagues in other government departments worked closely with TPC's staff to identify and assess investments that will best contribute to Canada's future prosperity.

During our first year of operation, the results achieved exceeded our expectations. Industry response to the program has been described as an unqualified success. We received some 300 enquiries, which led to more than 160 project applications being submitted for review and processing by TPC. Thirty of these were approved by March 31, 1997. These include investments in all regions of Canada, in all targeted technologies and sectors, and with large and small firms.

Our challenge now is to consolidate the gains made during our first year by continuing to build strong partnerships with industry. Implementing decentralized and streamlined service delivery for small and medium-sized enterprises will be a priority.

We will also continue to strengthen our commitment to quality service, and to operating in a transparent mode, building trust and confidence through open dialogue.

TPC's partnerships with the private sector are viewed as the key to success. We are confident that these partnerships will result in joint investments that help the Canadian economy grow and that create meaningful and lasting jobs.



Bruce L. Deacon, Executive Director
Technology Partnerships Canada

HIGHLIGHTS

... OF A SUCCESSFUL FIRST YEAR

SUMMARY OF 1996–1997 INVESTMENTS

AS OF MARCH 31, 1997, TPC APPROVED 30 PROJECTS IN ENVIRONMENTAL TECHNOLOGIES, ENABLING TECHNOLOGIES, AND AEROSPACE AND DEFENCE INDUSTRIES.

THESE PROJECTS WILL RESULT IN MULTI-YEAR RESEARCH AND DEVELOPMENT INVESTMENTS BY TPC OF $414 MILLION.

TPC'S INVESTMENTS WILL LEVERAGE AN ADDITIONAL ESTIMATED $1.6 BILLION IN RESEARCH AND DEVELOPMENT AND DOWNSTREAM INVESTMENTS BY PRIVATE SECTOR PARTNERS.

PROJECTIONS BY PRIVATE SECTOR PARTNERS INDICATE THAT THESE INVESTMENTS WILL GENERATE SOME $31.3 BILLION IN SALES.

IT IS ESTIMATED THAT NEARLY 10 000 DIRECT AND INDIRECT JOBS WILL BE CREATED OR MAINTAINED THROUGH THESE PROJECTS.

INVESTING IN JOBS AND GROWTH

ENVIRONMENTAL TECHNOLOGIES: A COMMITMENT TO SUSTAINABLE DEVELOPMENT

Canadian firms that move quickly to adopt environmental technologies will gain a head start in global markets in the next millennium. They will reduce costs of energy, resources and other inputs and will enjoy the marketing advantages associated with environmentally friendly production.

The growing international commitment to sustainable development and environmental protection has had a major impact on industries worldwide, and is driving many economic and investment decisions. Public opinion will continue to pressure industry and governments worldwide to place sustainable development near the top of the economic planning agenda. This priority will mean new investment opportunities in environmental products, technologies and clean processes.

Growing at an annual rate of 11 percent, the global market for environmental goods and services including technologies is estimated to reach $700 billion by the year 2000. Canada's environmental technologies sector is well positioned to be a major player in this vital area, with exports poised to grow by 15 percent annually. These industries generated $16.7 billion in revenue in 1995, with more than 600 companies exporting products and services. Another 1200 firms are export-ready.

These benefits have made environmental industries and their related technologies a key target area for investment by Technology Partnerships Canada.

Many of this country's environmental technology firms are widely dispersed small and medium-sized enterprises (SMEs). While they have great potential for innovation, many of them need help if they are to succeed in the world marketplace. Technology Partnerships Canada invests in areas such as pollution prevention and protection, water treatment, and recycling, clean air and clean car technologies.

In October 1996, Technology Partnerships Canada announced it had teamed up with the **Pulp and Paper Research Institute of Canada (PAPRICAN)** of Vancouver, British Columbia, and Pointe Claire, Quebec, in a landmark project to develop and commercialize closed-loop, zero-effluent technologies for the pulp and paper industry. This research and development (R&D) program is focussed on environmental improvement to recycle waste streams from pulp and paper mills. It will develop, demonstrate and commercialize pulp and

Pulp and Paper Research Institute of Canada (PAPRICAN)

paper technologies designed to eliminate end-of-pipe remedial treatments. The initiative will involve more than 50 environmental technology SMEs as alliance partners who will hold the licences and market these new technologies. This will help ensure that Canada's vital pulp and paper industry remains competitive into the 21st century.

Technology Partnerships Canada's $9-million investment in this leading-edge R&D project is expected to leverage another $79.5 million from the private sector and create or maintain some 900 jobs. Even more important, thousands of jobs in Canada's pulp and paper industry will ultimately depend on meeting the challenge of sustainable development.

In November 1996, TPC invested $485 000 in **Maratek Environmental Inc.** of Bolton, Ontario, a firm with 25 years of experience in the printing industry recycling and waste treatment business. Maratek expects to create 49 highly skilled jobs, and generate $7 million in aggregate sales over the next three years as a result of this investment. This environmental systems company designed a turnkey system to clean up pollution in printing plants – a solution that treats waste at a lower cost per litre than any other available method. The company will install a commercial-scale demonstration of

its technology at a major printing plant in Canada. This installation will be the first commercial-scale demonstration for Maratek, and it means that the firm will be positioned to receive world patent rights to this leading-edge pollution control technology.

Technology Partnerships Canada recently invested $750 000 to help an up-and-coming, Canadian-owned environmental technology firm develop an innovative recycling system. **Lex Technologies** of Brampton, Ontario, will pursue the commercial-scale demonstration of an innovative system for converting post-consumer and industry waste into marketable products such as pallets, sheets and roofing tiles. The company estimates this investment will generate sales of $31 million and create 60 jobs over the next three years. And the project has the potential to divert in excess of approximately half a billion kilograms of waste per year from landfill sites.

Ballard Power Systems Inc. of Burnaby, British Columbia, has developed a Proton Exchange Membrane (PEM) fuel cell that produces electricity silently and without combustion by combining hydrogen fuel with oxygen. TPC's $30-million investment in this technology will enable the company to undertake research to develop and bring to market a

"Government support for technology development is critical for companies like Ballard. Because of the strategic nature of our technology and its application in mass markets, our competitors in other countries all receive substantial government assistance. This program with Technology Partnerships Canada will assist Ballard in maintaining our world leadership position."

Firoz Rasul
President and CEO,
Ballard Power Systems

"TPC is a true partnership between government and industry that achieves both environmental and economic goals through a program built on sound commercial principles. TPC was extremely responsive to the needs of our company; its risk-shared investment will enable us to maintain the strong R&D programs we need to stay on the leading edge of the clean car business."

Lloyd Austin
President, GFI Control Systems

250-kilowatt PEM fuel cell power plant. This type of power plant will provide enough clean, pollution-free energy for 100 homes, a hospital or an industrial plant. Ballard's world-leading technology has the potential to revolutionize power generation and distribution as we know it today. Beyond its environmental benefits, this project could make a major contribution to Canada's economic growth and job creation.

It is expected that TPC's partnership will leverage an additional company investment of $413 million. Predictions are that Ballard will be able to command annual market revenues of more than $700 million within 10 years of the commercial introduction of the PEM fuel cell power plant. The research phase of the project will create approximately 250 direct and indirect jobs over the next four years, most of which will be in engineering and research. As the fuel cell goes into production in the year 2000, it is expected to generate some 2000 jobs over the following five years.

GFI Control Systems Inc. of Kitchener, Ontario, received a $4.3-million TPC investment to develop the next generation of gaseous fuel engine control systems for both original equipment manufacturers and after-market applications. GFI's project will improve compressed natural gas and propane fuel injection systems on motor vehicles and will

meet the demands of automakers such as Ford. Over the next five years, demand for alternative fuel vehicles is estimated to number approximately 2.67 million units, with 65 percent of these using alternative gaseous fuels. The project will create 95 new jobs and retain 190 existing ones.

GFI Control Systems Inc.

Calgary-based **Inventus Technologies** has identified a market opportunity to develop a simple, fast and cost-effective way to accurately detect potential leaks in natural gas and liquid hydrocarbon pipelines. Pipeline operators spend US$80 million annually scanning the lines for small leaks that may result in release of hydrocarbons into the soil, water table and air. With a Technology Partnerships Canada investment of $161 000, Inventus will expand its demonstration program and will be well positioned among potential competitors.

The Inventus High-speed Hydrocarbon Detector (HHD) system combines "open path" infrared technology with a Global Positioning System (GPS) and computer data acquisition into an instrument platform for aerial and ground surveillance of oil and gas pipelines. Analyzing the ambient air above the pipeline provides direct evidence of hydrocarbon emissions or pipeline leaks.

The Technology Partnerships Canada investment will help create nine full-time jobs within one year of commercialization

of the technology. It is also projected that for every $2 million in new sales, an additional four jobs will be generated in high-tech manufacturing, operations and marketing positions.

ENABLING TECHNOLOGIES: A KEY TO INCREASED COMPETITIVENESS

One of Technology Partnerships Canada's prime objectives is to invest in enabling technologies, which have the potential for spillover benefits that improve the performance of many industries, thus making Canadian firms more competitive internationally. These include advanced manufacturing, advanced materials, applications of information technology and biotechnology. Typically, firms developing these technologies are highly innovative SMEs. Technology Partnerships Canada can play a strategic role in developing these emerging businesses.

Powerlasers Limited

In November 1996, Technology Partnerships Canada announced a $1.2-million investment in **Powerlasers Limited** of Concord, Ontario. As a result, Canadian automakers will be able to access a domestic source of tailored blanks, made with Canadian materials. A first for Canada, the project will create 24 highly skilled jobs. It is expected to generate a total of $71 million in

Cymat Aluminum Corporation

program sales. The company predicts many spinoff jobs in the Canadian steel and transportation sectors.

Powerlasers will use the investment to advance R&D in the production of automobile body components employing an innovative precision laser technology. Powerlasers is a leader in its field and currently holds 11 patents surrounding its laser welding technology. Initially, the company will manufacture more efficient and lighter inner door panels made possible by its innovative precision laser technology. Powerlasers' tailor blanking system will be the only one in the world capable of welding steel to aluminum and the first in North America to use two-dimensional welding technology.

Cymat Aluminum Corporation of Mississauga, Ontario, received a $3.4-million investment to commercialize an innovative process for making aluminum foam. The process will combine scrap and specialty aluminum alloys with continuous casting to create porous, lightweight panels that can be used in a wide range of products, such as retaining walls, fire doors and architectural panels. The project will create up to 75 high technology jobs at full production, and an estimated 250 indirect jobs in the Toronto area and across Canada.

"Technology Partnerships Canada's support of our R&D for advanced electronic packaging is the cornerstone of our strategic decision to expand the scope of operations and product flow at our Calgary facility. It complements other financing, which will shortly lead to significant technology development and transfer, and shortly thereafter to expanded high technology employment."

Kaley Parkinson
CEO of Crystalline Materials Corp., parent company of Crystaline Manufacturing Limited

Technology Partnerships Canada has made an investment of $2.5 million in **Crystalline Manufacturing Limited**, a Calgary, Alberta, firm at the forefront of producing diamond-enhanced electronics. Crystalline is poised to become the world's first fully integrated manufacturer of diamond-based electronic packaging systems for both civilian and military use.

Crystalline will redesign conventional electronics packages using diamonds, which can rapidly conduct heat away from electronic circuits, thereby enabling enhanced performance. Using chemical vapour deposition manufactured diamond, Crystalline will produce components that double the output of radio frequency devices, enabling cell phone manufacturers to use half as many units as in current products. These diamond-enhanced electronics will also result in communications satellites lasting twice as long as current models.

Potential sales for diamond-containing packages are estimated at more than $316 million over the next five years, and the project is expected to create 57 direct new jobs and maintain 13 existing positions.

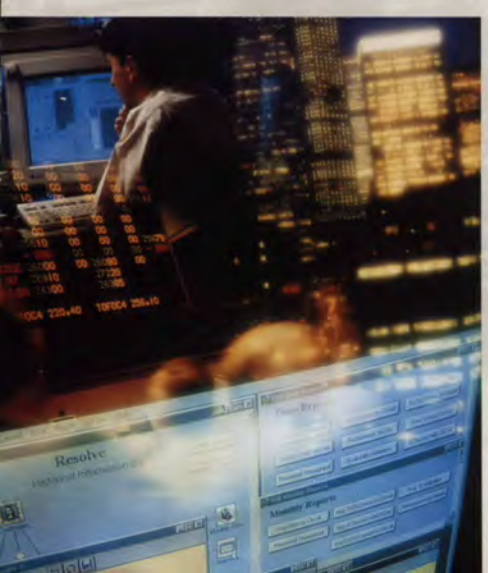
In April 1997, Technology Partnerships Canada announced investments totalling $3.1 million in three Kanata, Ontario, high technology firms: **CrossKeys Systems Corporation**,

TimeStep Corporation and **Tundra Semiconductor Corporation**.

TimeStep Corporation

These investments will enable the firms to accelerate the R&D necessary to bring their innovative products to market fast enough to gain a significant share of business with telecommunications firms and other global service providers. The investment will help create 29 new jobs immediately and an additional potential for 637 jobs over the next four years.

CrossKeys will provide innovative network management to enable telecommunications systems to handle large amounts of voice, data and image traffic. The TimeStep investment will involve encryption of secure transmissions, an increasing need as Canadians move toward electronic commerce. Tundra will develop the next generation of a peripheral component interconnect (PCI) bus-bridging chip that will enable designers of embedded systems to connect Motorola PowerPC-based products to the PCI bus.



CrossKeys Systems Corporation

A $50 870 investment with **Aquarius Flight Inc.** of Markham, Ontario, will allow the company to demonstrate

the effectiveness of an enhanced version of the multispectral, electro-optical imaging scanner (MEIS) remote mapping system. This project, which will create or maintain 19 high technology positions with opportunities for subcontractors, has the potential to help keep Canada in the forefront of imaging technology and applications.

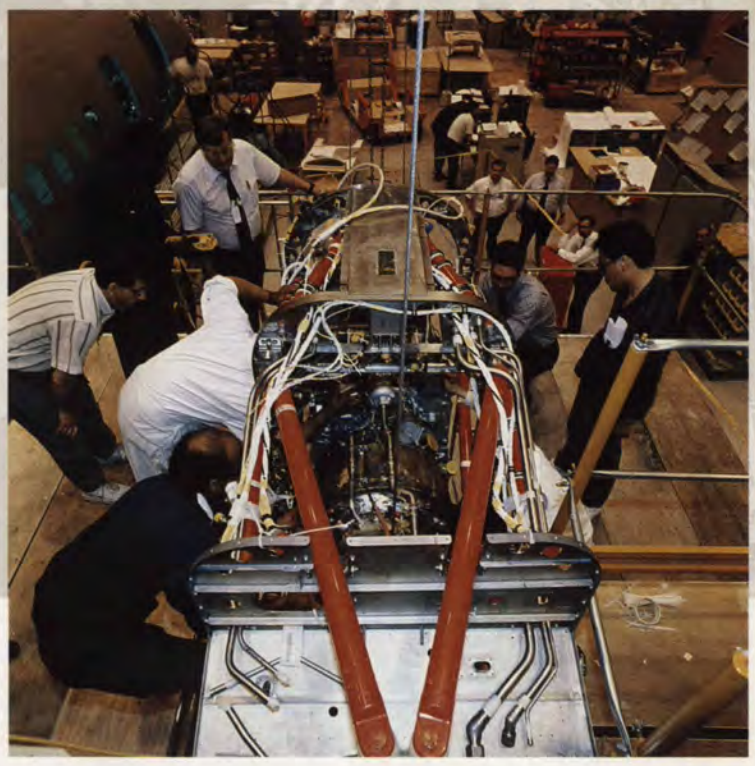
Helping Canadian students to communicate is the goal for $1.09-million TPC investment with **Starvision Multimedia Corporation** of Burnaby, British Columbia. The investment will support Starvision in developing its distance learning project and help students obtain multimedia access to a world of resources through educational networking. By making optimal use of broadband asynchronous transfer mode (ATM) networking technology, the project will allow students and educators to work with several media in real time. The project is expected to create 65 new jobs.

AEROSPACE AND DEFENCE INDUSTRIES: BUILDING ON CANADA'S STRENGTHS

Bombardier Inc. (Canadair)

Aerospace is a key growth sector in knowledge-based economies worldwide and a source of high-value jobs. Canada is the world's sixth largest supplier of aerospace and defence products ($12.5 billion sales in 1996) and, at current

growth rates, the industry is poised to move into fourth place by the year 2000.



Bombardier Inc. (Canadair)

The challenge for Canada is to advance in this multibillion-dollar global business with its many desirable high technology jobs. Industry experts caution that other countries, well aware of the economic potential of aerospace, are eager to become players. This industry is strategically important for Canada: it employs 59 000 Canadians (including 12 000 engineers) and creates thousands more spinoff jobs through suppliers. It also accounts for 11 percent of industrial R&D spending in Canada.

While most national governments around the world support their aerospace industries through their defence budgets, Canada has taken a novel approach in demonstrating its support through conditionally repayable investments through Technology Partnerships Canada.

As the demand for air travel grows worldwide, Canadian firms have moved quickly to position themselves as global industry leaders. Technology Partnerships Canada seized the opportunity to invest $87 million in R&D for the 70-passenger Canadair Regional Jet project in October 1996. **Canadair**, a division of **Bombardier Inc.**, is a world leader in the

Pratt & Whitney Canada

"The Canadian government commitment to participate in aerospace R&D projects gave us the confidence to increase our own R&D by over 50 percent over the past two years, and to proceed with several engine programs that will translate into jobs for Canadians for years to come."

David Caplan
Chairman and CEO,
Pratt & Whitney Canada

manufacturing of commuter aircraft. The project has the potential to maintain and create 1000 high-quality, long-term jobs.

In December 1996, Technology Partnerships Canada announced a $57-million investment in **de Havilland Inc.** of Toronto, Ontario, to develop a 70-passenger version of the firm's popular Dash 8 regional aircraft. The new Dash 8-400 will be a faster, stretched version of the Dash 8 line. Sales are projected at over $6 billion, with initial deliveries scheduled for 1999. This investment is predicted to generate 1000 new jobs in the industry.

In January 1997, TPC announced a $100-million investment with **Pratt & Whitney Canada,** which will allow the company to complete work on its new PW 150 turboprop aero-engine. The 6500-SHP engine will be used in large, high-speed regional aircraft such as the de Havilland Dash 8-400. The early introduction of this next-generation engine will help Pratt & Whitney maintain its dominant market position. The company is a world leader in the design and manufacture of small turbine engines.

CAE Electronics Ltd.

A second, $47-million investment will allow Pratt & Whitney to sustain the high level of R&D necessary to remain competitive and will support 135 jobs over the next three years, including jobs for new university graduates. The R&D project involves continuous improvement to reduce aircraft design times and improve engine weights and performance.

Combined, the two projects will create about 1 210 jobs in Canada – some in Halifax and the majority in Montreal. Engine testing will also be carried out in Pratt & Whitney's Mississauga facility.

CAE Electronics Ltd. of Saint-Laurent, Quebec, a world leader in flight simulator and visual system markets, will undertake the R&D necessary to develop the next stage of image generation products for flight simulators. This high technology project is funded in part by a $31-million investment announced in March 1997 by Technology Partnerships Canada. With real-time, computer-generated images of topography, roads, buildings, runways and surrounding areas, the Visual Technologies (VISTEC) project will give users the detail and realism needed in a flight simulator application. This investment is predicted to create or maintain 200 jobs over five years for a total of 1000 person-years of employment in Canada.

CAL Corporation

Orenda Recip Inc.

"Technology Partnerships Canada investments benefit large and small aerospace firms. New aerospace projects launched with TPC support have had a cascading effect, creating new business opportunities and jobs at more than 125 aerospace firms across the country."

Peter R. Smith
President, Aerospace Industries Association of Canada

Through its global leadership in aerospace, Canada has also developed an enviable record of achievement in space technologies. Technology Partnerships Canada is nurturing this important future-oriented sector through a $1.8-million investment in Ottawa-based **CAL Corporation**'s CALTRAC starsensing technology announced in March 1997. This high-speed star sensor will track the position in space of everything from space stations to satellites. CALTRAC has superior operating characteristics, works during eclipses, and has reduced weight and power requirements compared with conventional star-sensing devices. The Technology Partnerships Canada investment is expected to create more than 32 immediate jobs, with production generating up to 90 jobs over the next 10 years in the Ottawa area.

TPC also invested $8.4 million in the newly formed **Orenda Recip Inc.**, a subsidiary of Magellan Aerospace Corporation. The investment will support an aircraft engine development and manufacturing facility at the former Canadian Forces base in Debert, Nova Scotia. Orenda will develop a new, high-performance reciprocating engine for use in civil aircraft. The engine will fill a gap in the market between existing piston engines and the small gas turbines. In addition to the 110 people Orenda will employ at Debert, another 325 supplier jobs will be created over the next five years.

Defence conversion is also a focus for Technology Partnerships Canada. In February 1997, TPC announced a $3-million investment in **Computing Devices Canada Ltd.** of Calgary Alberta, allowing it to diversify into commercial markets by developing electronic voting systems aimed at the growing U.S. market. A world leader in the development and integration of military communications systems, the investment will help the firm convert its expertise to benefit civilian markets. This investment will lever a $7-million investment from the company and is expected to create 325 direct and indirect jobs over the next eight years.

TPC has made two investments with **AlliedSignal Aerospace Canada** of Toronto, Ontario, totalling $12.7 million. The first is directed to the development of the power management generating system (PMGS) for de Havilland's Dash 8-400 turbo-prop aircraft, which is currently under development. This is AlliedSignal's first full-scale effort as a systems integrator of a complete aircraft PMGS. With the second investment, the firm will pursue further developments and enhancement of the variable speed constant frequency (VSCF) advanced power system, which is aimed at large commercial and military aircraft. These two investments will maintain 75 direct engineering jobs as well as 270 manufacturing jobs over the life of the project.

A $3.25-million TPC investment will assist **Fleet Industries Ltd.** of Fort Erie, Ontario, in the design and development of McDonell Douglas MD-95 aircraft wing components. Fleet will manufacture various components for the MD-95 aircraft including: ailerons and wing tabs, flaps, vanes, forward and aft wing fairings, and wing-to-fuselage fillets. The company will also design and manufacture all the required tooling for these components as part of the project, expected to result in the creation of 82 jobs over 11 years.

A $1.1-million investment with **Canadian Marconi Company** in Kanata, Ontario, will create 20 new jobs, sustain 15 existing jobs and generate $47 million in export sales over the next five years. The investment will assist Canadian Marconi to develop a cockpit display unit for the United States Army's UH60-Q Black Hawk helicopter produced by Sikorsky Aircraft

TPC's $3.15-million investment in **Walbar Canada** of Mississauga, Ontario, will support the design, development and installation of technologies for production of high-pressure nozzle segment assemblies for jet aircraft engines. With this investment, Walbar will be well positioned to meet the increasing demand for complex subassemblies and higher-value-added components in the global jet engine sector. The project will create up to 88 direct jobs, with potential export sales of some $30 million annually.

1996-1997 INVESTMENTS

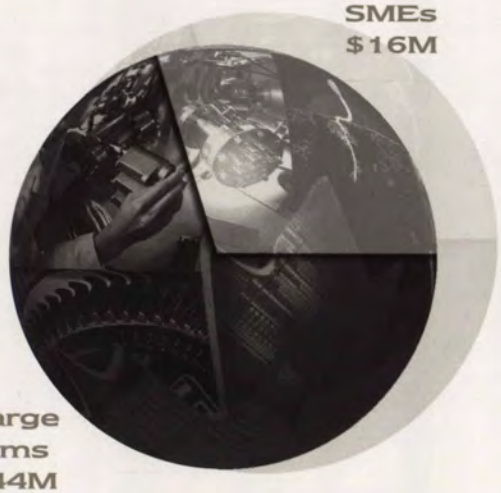
TPC INVESTMENTS ($414 MILLION)

Environmental and Enabling (E&E) Technologies

1996–1997 Approvals

- As the year progressed, activity increased within the E&E sector – 17 projects were approved, totalling $60 million in investments.
- E&E projects involved a larger number of SMEs and were distributed across Canada.

Note: The distribution of investments for 1996–1997 is not expected to be reflective of continuing activity; by 1998–1999, one third of TPC funding will be targeted to E&E technologies.



SMEs/LARGE FIRMS
4 LARGE FIRMS AND 13 SMEs

REGIONS
12 PROJECTS IN ONTARIO, 4 IN WESTERN CANADA AND 1 IN QUEBEC

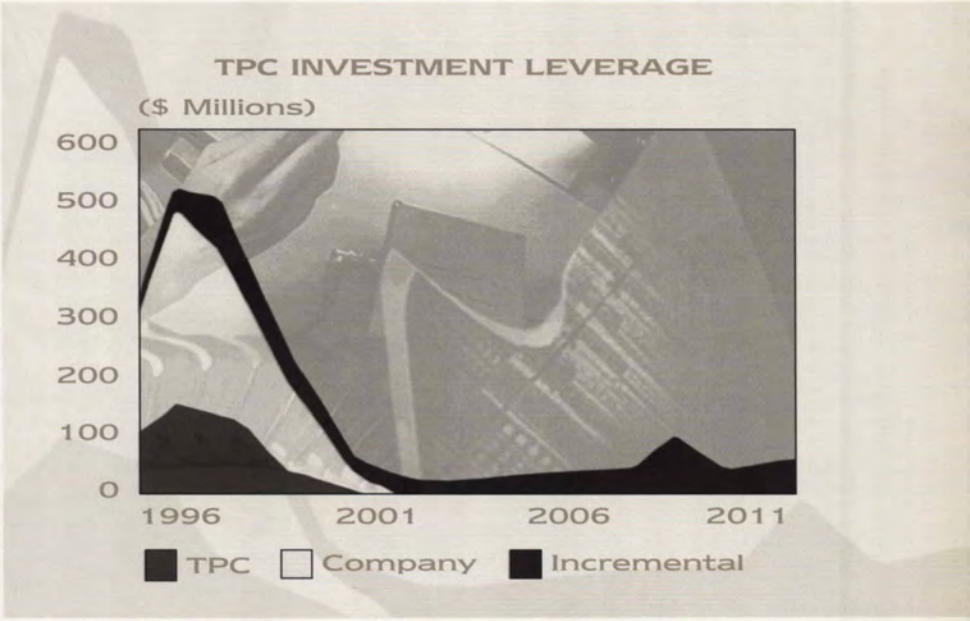
Aerospace and Defence (A&D) Industries

1996–1997 Approvals

- Demand was strongest in the A&D sector – 13 projects were approved, totalling $354 million.
- A&D projects were with large firms, located mainly in central Canada.
- Approved projects are forecast to create new business opportunities and jobs at more than 125 aerospace supplier firms across Canada.

REGIONS

7 PROJECTS IN ONTARIO, 4 IN QUEBEC,
1 IN ATLANTIC CANADA AND
1 IN WESTERN CANADA



LEVERAGED FUNDS ($1.6 BILLION)

- TPC's average cost-sharing ratio is 30 percent. Each TPC dollar leverages about $3.86 in private sector investments.
- Investment by industry continues after TPC's funding expires.
- Production by industry is projected as continuing well into the next century.

REPAYMENTS ON TPC INVESTMENTS (ESTIMATED AT $465.8 MILLION)

- The $414 million TPC invests is expected to result in $466 million in repayments over the term of the royalty repayment period.

TPC FUNDING

TPC is funded from a combination of the federal government's jobs and growth strategy and funds reallocated from within Industry Canada. Currently approved funding levels are summarized in the table below. TPC's funding will reach $250 million annually in 1998–1999.

FUNDING FOR TPC ($ MILLIONS)

	1996–1997	1997–1998	1998–1999
Jobs and growth strategy	40	90	140
Industry Canada	110	110	110
Total program funding	**150**	**200**	**250**

Approved program funding is intended to cover outstanding commitments under the Defence Industry Productivity Program (DIPP), the Environmental Technology Commercialization Program (ETCP), administrative costs and new TPC investments. The table on the next page illustrates the net funding levels available to TPC.

FUNDING AVAILABLE FOR TPC CONTRIBUTIONS ($ MILLIONS)

	1996–1997	1997–1998	1998–1999
Total program funding	150.0	200.0	250.0
Less:			
DIPP and ETCP forecast requirements	(51.0)	(20.1)	(10.4)
Estimated administration costs	(5.0)	(7.5)	(7.5)
Funding available for TPC contributions	94.0	172.4	232.1

HOW TPC WORKS

BUILDING TPC – AN INNOVATIVE APPROACH

TPC represents a new way of doing business, an introduction to a new era in government program design and delivery.

TPC is:

- **Financially innovative:** cost-shared, with government sharing in upside returns.
- **Fiscally responsible:** an investment approach, with repayments recycled to help finance TPC.
- **Results oriented:** focussed on the near-market end of the R&D continuum and on jobs.
- **Multisectoral:** building on areas of strength in the knowledge-based economy – enabling and environmental technologies as well as aerospace and defence industries (including defence conversion).
- **A government/private sector effort:** based on partnerships within the private and public sectors, aided by an interdepartmental committee and overseen by a private sector advisory board.

TPC is a new way of stimulating investment and growth. TPC is a real partnership between industry and government: both share the costs, risks and returns on investment. TPC program dollars directly leverage private sector investment. It is estimated that for every dollar invested by TPC, the private sector invests $3.86.

In a broader context, TPC is but one element of the Government of Canada's Science and Technology Strategy, which hinges on the recognition that technology development represents a critical success factor for quality job creation and economic growth in the new economy.

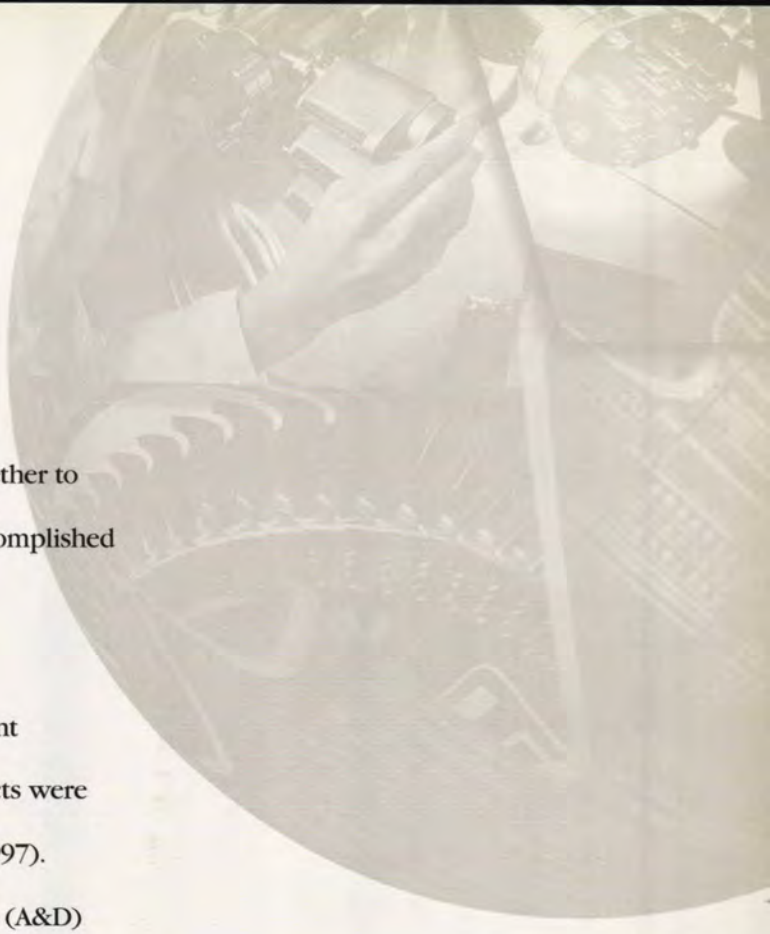
INNOVATIVE ARRANGEMENTS AND THE IMPLEMENTATION OF UNIQUE SOLUTIONS

- **Special Operating Agency:** provides TPC with enhanced visibility, accountability and transparency consistent with a commitment to building a client-focussed, results-oriented organization.
- **Emphasis on recovering investment/profit sharing on successful projects:** the government will recover investment and share in upside profits through royalties, stock options, etc.
- **Leveraging alliances within industry:** TPC helps to build alliances between large and small firms for supplier development and job creation.
- **Utilizing outside expertise:** the availability of expert advice in partner organizations is fully utilized by TPC. The contributions by TPC's partners, both within and outside the Industry Portfolio, are essential to the agency's daily operations.

Bombardier Inc. (Canadair)

- **TPC Advisory Board:** provides expert advice on the vision and goals of TPC's program. Chaired by the Minister of Industry, with the Secretary of State for Science, Research and Development as Vice Chair, the board is a unique blend of 12 private sector leaders and federal government ministers, including the ministers of Environment and National Defence. (Additional information, including membership, is provided later in this report.)
- **Interdepartmental Advisory Committee:** while many interdepartmental committees perform a coordinating function, this committee actually helps administer TPC's program. Committee members review recommendations, thereby providing a second due diligence check. (Additional information, including membership, is provided later in this report.)
- **TPC Management Board:** provides a forum for managers across Industry Canada to give input on specific projects as well as on important policy issues before recommendations are finalized and decisions are made.

TimeStep Corporation

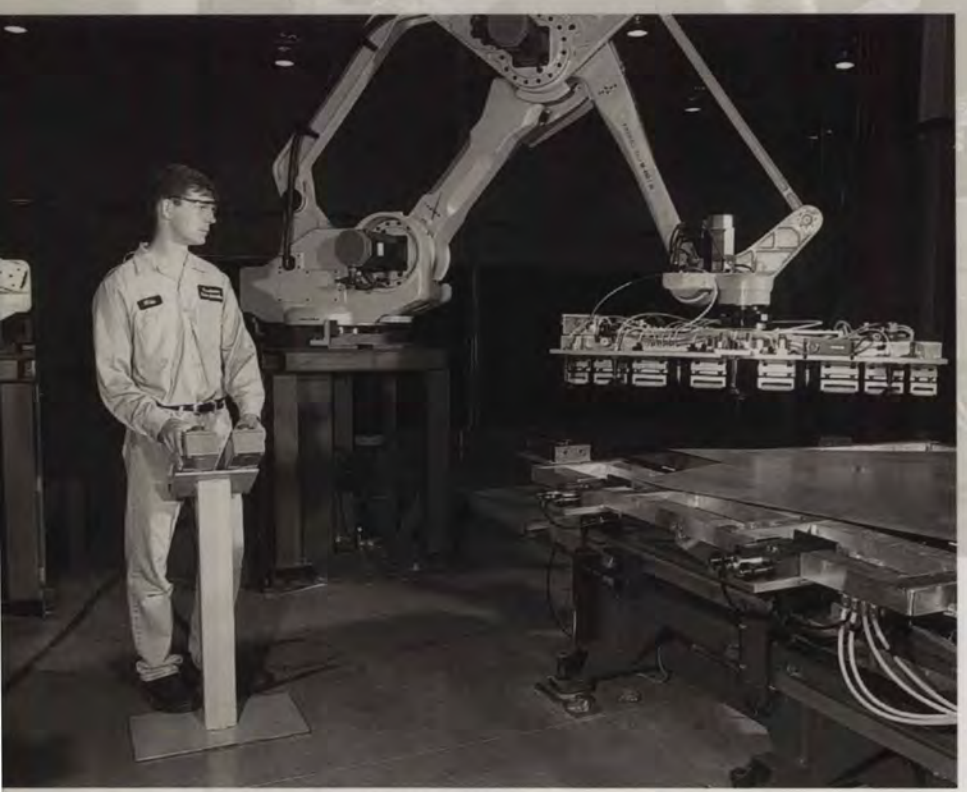


TPC'S FIRST YEAR – A STARTING POINT

Over the past year, TPC and its partners worked together to build the agency. Our most important work was accomplished in delivering the program to our industry clients.

Industry response to the program has been significant (more than 300 enquiries were made and 160 projects were reviewed by TPC, with 30 approved during 1996–1997). Demand was strongest in the aerospace and defence (A&D) industries, accounting for 81 applications. A strong R&D growth rate in the sector accounts for this concentration of applications. The Canadian A&D sector is composed of 500 firms, located mainly in Quebec and Ontario. The 12 largest firms account for most of the R&D and shipments, of which 80 percent are exported. This is a global industry with mobile capital requiring large-scale investments to remain competitive. Canada's goal is to move from sixth to fourth place by the year 2000 with an output of $16.5 billion. During the 1996–1997 fiscal year, a total of 13 aerospace and defence projects were approved, representing a TPC investment of $354 million. TPC is proud to be an investment partner in this export-oriented success story.

Companies developing environmental and enabling (E&E) technologies tend to be SMEs and are dispersed across the country. Their expressions of interest in the program started out at a slower pace, but accelerated as the year progressed. At the end of the 1996–1997 fiscal year, together they made up almost half of the total applications (36 in environmental-tal technologies and 43 in enabling technologies). Up to March 31, 1997, some 17 projects were approved in the E&E program component, representing a total TPC investment of $60 million. These projects tend to be of a lesser dollar value and for shorter periods of time. Successful commercialization of E&E technologies requires investment not available to many SMEs. These companies have promising technology projects with high rates of return but, due to their undercapitalization, provide TPC with a real niche to fill. TPC is mandated to deliver the program in such a way that by 1998–1999 one third of its funding will be targeted to the E&E component.



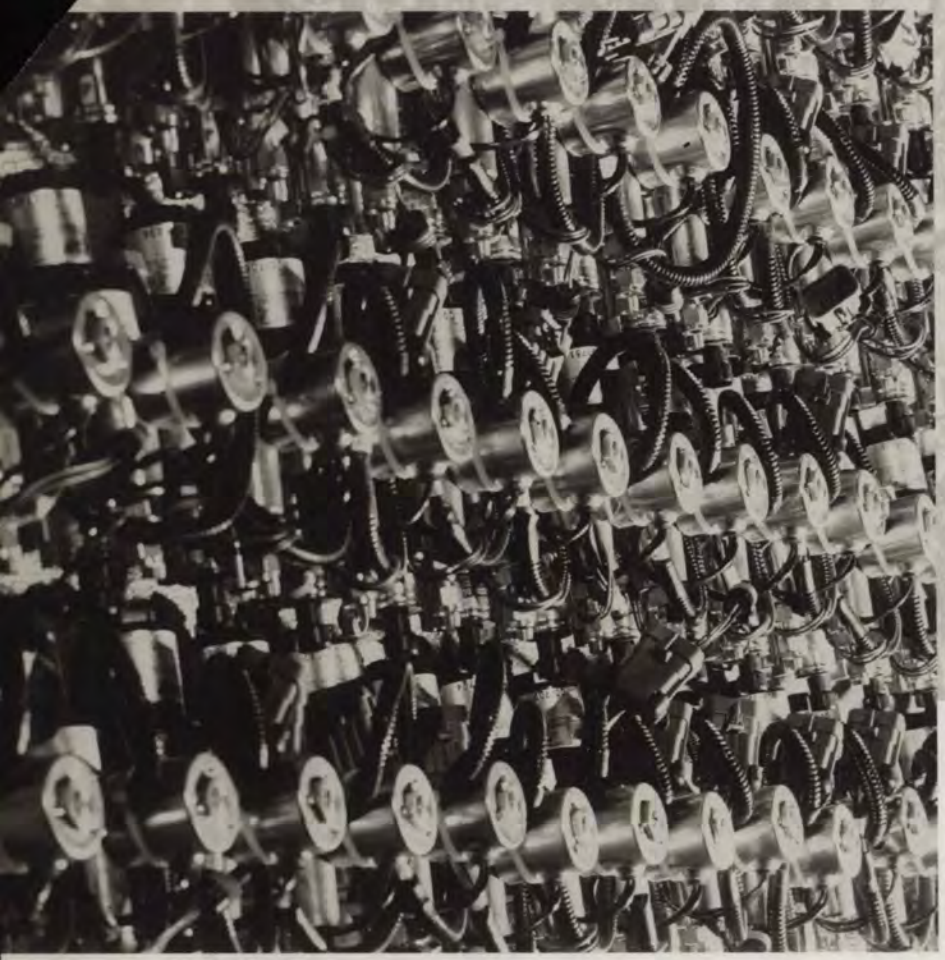
Powerlasers Limited

EXTENDING OUR REACH TO SMEs

Implementing decentralized and streamlined service delivery for SMEs is a priority for TPC. SMEs want their cases to be processed locally and as non-bureaucratically as possible. Moreover, they require a broad range of support services that cannot be efficiently delivered from Ottawa. Decisions with respect to the selection of SME delivery partners will be made in the 1997–1998 fiscal year, with implementation to follow as soon as possible. Partners will be selected on the basis of their credibility with, and reach to, the SME community, experience in value-added decentralized program delivery and cost efficiency.

THE WAY AHEAD – PARTNERSHIPS FOR A KNOWLEDGE ECONOMY

The crucial challenge that TPC must address during its second year of operations is to cement its partnerships with industry. TPC must continue operating in a transparent mode, building trust and confidence through open dialogue. As important, TPC must refine its ability to intervene in a timely and strategic manner with investments that result in long-term job creation and sustainable economic growth. TPC will look to its Advisory Board and the Interdepartmental Advisory Committee



GFI Control Systems Inc.

for expert advice and guidance on all of these matters. As well, the outstanding support provided by the sector branches of Industry Canada and other partners within the Industry Portfolio will continue to be essential.

TPC's investments are small relative to the large R&D funding support provided by governments in other developed nations – most notably the United States, the United Kingdom, Japan and France. Consequently, it is vital that TPC target its investments in those areas where Canada can take on the best in the world. Canada's aerospace and defence sector, enabling technologies and environmental technologies have the potential for high growth in the knowledge-based economy. For that reason, TPC's strategic investments in these areas are key to growing the Canadian economy and creating meaningful and lasting jobs across Canada.

TPC PARTNERS

For TPC, "partnership" is a critical success factor. TPC is committed to administering the program in a streamlined manner and minimizing administrative costs so that maximum dollars are available for investment with industry.

Without the invaluable assistance provided by all partners, both within and outside the Industry Portfolio, TPC's success during the past year would have been diminished significantly. TPC would like to acknowledge the contributions made by all of the partners, and looks forward to future successes utilizing combined government/private sector efforts.

TPC ADVISORY BOARD

PRIVATE SECTOR MEMBERS *

Paul G. Antle, President and Chief Executive Officer,
SCC Environmental Group Inc.

Robert E. Brown, President and Chief Operating Officer,
Bombardier Aerospace Group

John Evans, Chairman, Allelix Biopharmaceuticals Inc.,
Alcan Aluminum Ltd. and Torstar Corporation

Barbara Hislop, Group Vice-President, Coastal Operations,
Canfor Corporation/Canadian Forest Products Ltd.

Claude Lemay, President and Chief Executive Officer,
Alis Technologies

John A. MacDonald, Chief Operating Officer, Bell Canada

Terence H. Matthews, Chairman of the Board and Chief Executive Officer, Newbridge Networks Corporation

Gilles P. Ouimet, President and Chief Operating Officer, Pratt & Whitney Canada

Jo-Anne Raynes, Head, Knowledge-Based Business Group, Canadian Imperial Bank of Commerce

Sami Rizkalla, Professor of Civil Engineering, University of Manitoba

Claude St. Arnaud, Senior Vice-President, Canadian Marconi Company

Deborah A. Turnbull, President, Agrodev Canada Inc.

*Some affiliations may have changed during the fiscal year.

MINISTERIAL MEMBERSHIP (FISCAL YEAR 1996–1997)

The Honourable Jon M. Gerrard, Secretary of State for Science, Research and Development (Vice Chair)

The Honourable John Manley, Minister of Industry (Chair)

The Honourable Sergio Marchi, Minister of the Environment

The Honourable Douglas Young, Minister of National Defence

INTERDEPARTMENTAL ADVISORY COMMITTEE

Atlantic Canada Opportunities Agency

Canadian Space Agency

Department of Foreign Affairs and International Trade

Department of National Defence

Environment Canada

Federal Office of Regional Development (Quebec)

National Research Council of Canada

Natural Resources Canada

Public Works and Government Services Canada

Western Economic Diversification

INDUSTRY CANADA BRANCHES AND AGENCIES

Advanced Materials, Chemicals and Plastics Branch

Aerospace and Defence Branch

Automotive and Transportation Branch

Bio-Industries Branch

Communications Research Centre

Consumer Products Industries Branch

Coordination and Management Services Branch

Environmental Affairs Branch

Forest Industries and Building Products Branch

Health Industries Branch

Information Technology Industry Branch

Investment Partnerships Canada

Manufacturing and Processing Technologies Branch

Metals and Minerals Processing Branch

Service Industries and Capital Projects Branch

OTHER GOVERNMENT DEPARTMENTS

Agriculture and Agri-Food Canada

Department of Justice

Health Canada

PRIVATE SECTOR INVESTMENT PARTNERS (PROJECTS APPROVED AS OF MARCH 31, 1997)

ENVIRONMENTAL TECHNOLOGIES

Ballard Power Systems Inc.

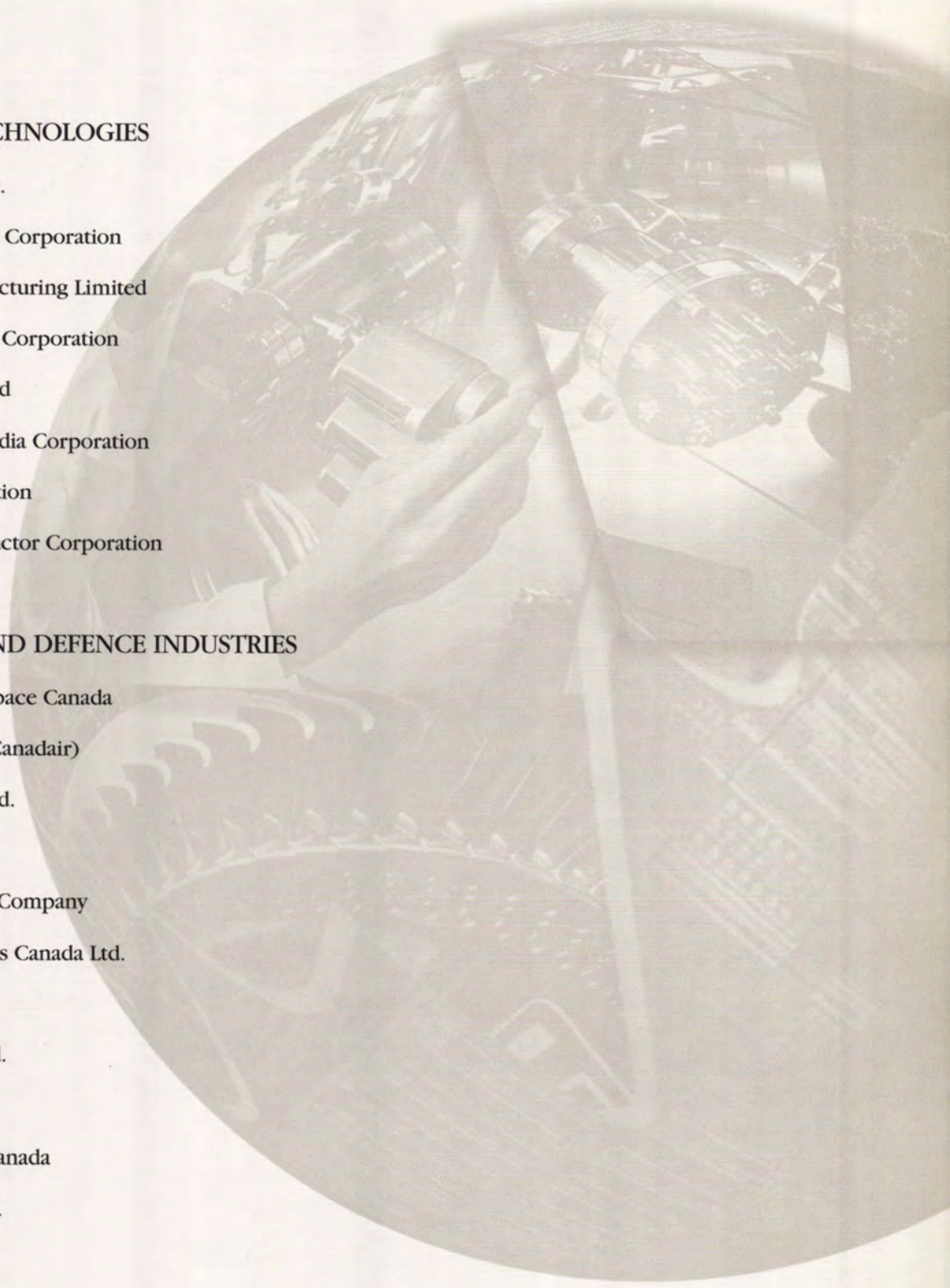
GFI Controls Systems Inc.

Inventus Technology Inc.

Lex Technologies Inc.

Maratek Environmental Inc.

Pulp and Paper Research Institute of Canada



ENABLING TECHNOLOGIES

Aquarius Flight Inc.

CrossKeys Systems Corporation

Crystalline Manufacturing Limited

Cymat Aluminium Corporation

Powerlasers Limited

Starvision Multimedia Corporation

TimeStep Corporation

Tundra Semiconductor Corporation

AEROSPACE AND DEFENCE INDUSTRIES

AlliedSignal Aerospace Canada

Bombardier Inc. (Canadair)

CAE Electronics Ltd.

CAL Corporation

Canadian Marconi Company

Computing Devices Canada Ltd.

de Havilland Inc.

Fleet Industries Ltd.

Orenda Recip Inc.

Pratt & Whitney Canada

Walbar Canada Inc.

TECHNOLOGY PARTNERSHIPS CANADA

STATEMENT OF OPERATIONS

For the 12-month period ended March 31, 1997 ($000)

Salary:	
Regular salaries	2 252
Employee benefits (Note 1)	447
Total salary	**2 699**
Non-salary:	
Operations	440
Professional services	750
Communications	282
Travel and hospitality	270
Training and conferences, etc.	43
Equipment and software	346
Office accommodations/refurbishings	126
Total non-salary	**2 257**
Total operations	**4 956**

Note 1: Employee benefits are calculated at 20 percent of direct salary. There are no employee benefits associated with student salaries ($17 000).

TECHNOLOGY PARTNERSHIPS CANADA

STATEMENT OF CONTRIBUTION FUNDING

as at March 31, 1997 ($000)

Contributions under TPC	1996–1997
Environmental Technologies	5 307
Enabling Technologies	2 130
Aerospace and Defence Industries	65 712
Total contributions under TPC	**73 149**
Contributions under sunsetted programs:	
Defence Industry Productivity Program (DIPP)	50 763
Environmental Technology Commercialization Program (ETCP)	249
Total contributions under sunsetted programs	**51 012**
Total contributions during 1996–1997 fiscal year	**124 161**
Funds carried forward to 1997–1998	**20 839**
Total contributions available in 1996–1997	**145 000**

TECHNOLOGY PARTNERSHIPS CANADA

STATUS OF CONTRIBUTION PORTFOLIO

as at March 31, 1997 ($000)

	Actual	Projected cash flows on approved contributions			
	1996–1997	1997–1998	1998–1999	1999–2000	2000–2001
Total Program Funding	**150 000**	**200 000**	**250 000**	**250 000**	**250 000**
Allocation for program operations (Note 1)	5 000	7 500	7 500	7 500	7 500
Available contribution funding	145 000	192 500	242 500	242 500	242 500
Commitments under sunsetted programs					
Defence Industry Productivity Program (DIPP)	50 763	19 709	10 432	3 668	1 500
Environmental Technology Commercialization Program (ETCP)	249	423			
Total commitments under sunsetted programs	**51 012**	**20 132**	**10 432**	**3 668**	**1 500**
Commitments under TPC					
Environmental Technologies	5 307	20 638	12 954	6 500	
Enabling Technologies	2 130	10 789	1 598		
Aerospace and Defence Industries	65 712	116 945	104 391	47 633	18 644
Total commitments under TPC	**73 149**	**148 372**	**118 943**	**54 133**	**18 644**
Total portfolio commitments at March 31, 1997	**124 161**	**168 504**	**129 375**	**57 801**	**20 144**
Funds available for new projects	20 839	23 496	113 125	184 699	222 356
Funds lapsed in 1996–1997 and carried over to 1997–1998	(20 839)	20 839			
Total funds available for new contributions in future years	**0**	**44 335**	**113 125**	**184 699**	**222 356**

Note 1: Treasury Board Secretariat has approved up to 3 percent of the total program funding for operations. Startup costs during the first two years of operations account for the larger percentage in these years.

TPC'S QUALITY COMMITMENT

QUALITY SERVICE

We are professionals who take pride in providing quality service to our clients.

TRANSPARENT OPERATIONS

We conduct business in an open manner.

TIMELINESS

We strive for efficiency in all our services.

CONFIDENTIALITY

We respect client confidentiality at all times.

NO SURPRISES

We outline the application process clearly, identify all required information and provide a full explanation of contract terms.

FLEXIBILITY

We are continually adapting to more effectively serve our industry clients. Level of investment and repayment terms are determined on a case-by-case basis.

OPEN COMMUNICATIONS

We keep the information flowing. We make sure the request is understood, set a deadline to respond to it, advise the client of any delays and follow up to evaluate client satisfaction.

OPINIONS COUNT

We solicit suggestions to improve our processes and services.

CONTACTS

For more information, please contact TPC by:

Phone: 1-800-266-7531 or (613) 954-0870

Fax: (613) 954-9117

Mail: Technology Partnerships Canada

Industry Canada

300 Slater Street, 10th Floor

Ottawa ON K1A 0C8

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Or visit our web site at: ***http://tpc-ptc.ic.gc.ca***

Electronic copies of this document can

also be obtained at our web site.