INNOVATION

Fall 1989

INNOVATION

Table of Contents

Photo credits
Masterfile
Front cover and back
Pages 1, 3, 4, 5,
6 and 7

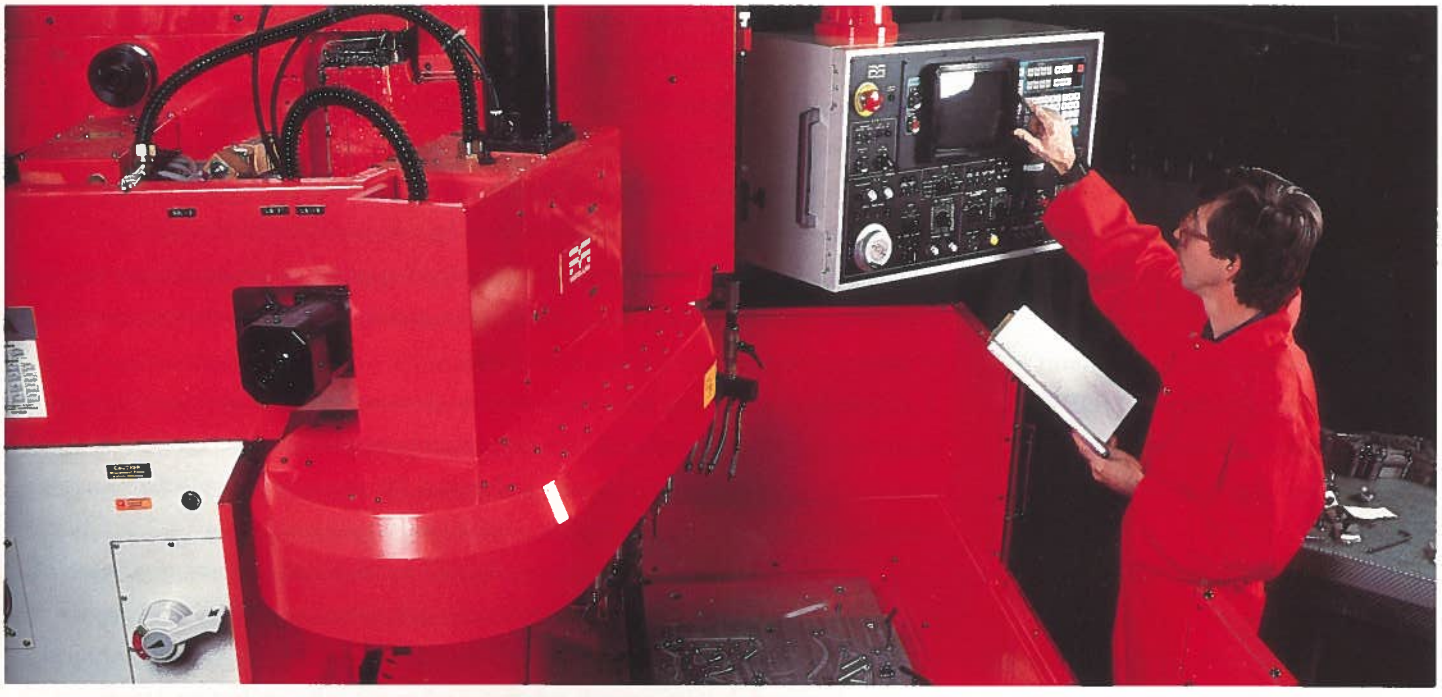
INNOVATION
This is a reader's magazine, open to ideas and information from its readers. Offers and requests of technology transfers must come from our readers in Canada to match those supplied from abroad.

You can contact us at:

INNOVATION, Technology Transfer Service (JOII), Technology Liaison Directorate, Industry, Science and Technology Canada, 235 Queen Street, Ottawa, Ontario K1A 0H5
Tel: (613) 954-3458.

(Également publié en français)

Editorial



In this issue of *Innovation*, among other things, we highlight two of a growing list of innovation centres to be found across the country. Innovation, training and the diffusion of technology are major concerns of these centres which are sponsored by Industry, Science and Technology Canada (ISTC).

The work of Montréal's International Centre for Research and Training in Major Projects Management opens up to Canadian company members a world of large-scale projects in Canada and around the world. It concentrates largely on international exchange programs that help promote Canadian technological expertise, and includes conferences on important current issues such as free trade, interest rates, labour availability and strategic planning of large projects at home and abroad.

The Canadian Industrial Innovation Centre/ Waterloo in Waterloo, Ontario, was established to help Canadian entrepreneurs, innovators and inventors move their products past the idea stage to the marketplace. The centre's mission is to identify good ideas, products or business plans at an early stage and help them become commercial realities.

ISTC's own contributions to the advancement of technology in the Canadian economy appear in an article describing four of the department's programs — Microelectronics and Systems Development Program (MSDP); Advanced Manufacturing Technology Application Program (AMTAP); Environmental Technology Development Program; and Service Industries Studies Program.

Examples of innovative Canadians are featured in articles on three companies which have successfully developed and marketed new products.

NORAC PRODUCTS INC., of Edmonton, Alberta, produces high-quality specialty ingredients for the food and beverage industries.

OCEAN OPTICAL LTD., of Moncton, New Brunswick, has designed and developed advanced manufacturing systems for the ophthalmic industry, including an automated digital eyeglass frame measurement and lens cutting device.

And, of course, our regular features remain, including the Technology Transfers List, Special Events and R&D Notes — that's that for this edition!

ISTC PROGRAMS SUPPORT NEW TECHNOLOGIES

Supporting the development and application of new technologies and providing vital business information are among the most important responsibilities of Industry, Science and Technology Canada (ISTC).

The following four programs are among those the department is offering to meet these objectives:

- the Microelectronics and Systems Development Program (MSDP);
- the Advanced Manufacturing Technology Application Program (AMTAP);
- the Service Industries Studies Program; and
- the St. Lawrence River Environmental Technology Development Program (ETDP).

Microelectronics and Systems Development Program

The Microelectronics and Systems Development Program (MSDP) is part of a new generation of ISTC programs that emphasize the development and application of new technologies to enhance the international competitiveness of Canadian industry. Proposed projects are assessed not only in terms of technological innovation and risk but also on market potential in Canada and abroad.

MSDP provides Canadian companies with financial assistance for the development of innovative microelectronics and information technology systems.

The microelectronics element of the program supports the development of components such as optoelectronic devices, integrated circuits and microwave devices for use in advanced systems and subsystems.

Systems development projects funded by the program are based on or incorporate advanced microelectronics and information technologies that are applied in manufacturing, processing or service industries. Two examples would be computer-integrated manufacturing systems or process control systems.

The program covers 50 percent of eligible research costs up to a maximum of $5 million. Full repayment is required for contributions over $500 000. Eligible costs must be directly related to the project and may include salaries for technical personnel, materials, equipment, subcontracting, prototypes, testing, travel, communication, patents and copyright expenses.

As one of the first recipients of MSDP funds, Vancouver's Glenayre Electronics Ltd. provides an excellent example of the kind of project the program is funding. Glenayre designs and manufactures mobile communications systems, which constitute the fastest growing sector in a highly competitive global telecommunications market.

This market currently emphasizes systems that carry data as well as voice communications. With the help of MSDP, Glenayre is developing such a system for MacMillan Bloedel to enhance that company's forest products operations.

The system will relay detailed data on operations in widespread and remote locations over existing mobile radio systems. It will provide MacMillan Bloedel with immediate access to up-to-the-minute information on all aspects of its operations. In today's markets, instant access to such information is often the key to shorter response time, enhanced productivity and, ultimately, competitiveness.

According to Michael Hodson, Glenayre's vice-president, engineering, Canadian telecommunications firms will not survive in world markets unless they focus on integrated voice and data telecommunications systems as well as products. Mr. Hodson also acknowledged the important role of MSDP in helping companies absorb some of the risks associated with developing these systems.

The following companies and their projects are also among those supported by MSDP:
AISI Research Corporation of Vancouver, British Columbia, has developed a low-cost silicon chip that permits the linking of electronic devices in so-called smart homes as well as industrial settings.

Measurex Inc. of Longeuil, Quebec, is developing a computer-integrated manufacturing (CIM) system for a newsprint mill that uses sensors and a communications network to link up and improve the efficiency of all operations.

Newbridge Networks Corporation of Kanata, Ontario, is working on an advanced primary rate multiplexer and associated network manager, which greatly expands the capacity of voice and data communications networks.

For more information on the program, contact the MSDP co-ordinator in the ISTC office in your region. A list of these regional offices appears on the inside back cover of this magazine.

Advanced Manufacturing Technology Application Program

The last three or four years have seen a rapid advance in the use of advanced manufacturing technologies by industry. Global leaders in manufacturing are no longer incorporating robots or computer numerically controlled machine tools as islands of automation. Instead, they are realizing substantial benefits by integrating all of their operations. Computer-integrated manufacturing, just-in-time production control, group technology, flexible manufacturing cells and total quality control have moved out of the lab and into the field.

A Canadian Manufacturers' Association (CMA) position paper on advanced manufacturing technologies, entitled *Canadian Manufacturing at the Crossroads*, makes it quite clear that these investments pay off. "Substantial benefits can be derived from. . .the wide range of technologies which are now radically altering the nature of manufacturing. This is borne out by the impressive gains made by companies which are now using them."

While the opportunities are readily apparent, many Canadian manufacturers are not responding. Here's an example of just how much catching up we have to do. A 1987 report of the Economic Council of Canada indicated that only about four percent of machine tools in Canadian factories are numerically controlled, compared to eight percent in Britain, 12 percent in the United States and almost 40 percent in Japan.

Half of the manufacturers surveyed in 1987 by Statistics Canada reported that they did not use any of five manufacturing technologies identified as advanced. The fact that these companies accounted for only about 20 percent of shipments bears out other evidence that small and medium-sized firms are lagging behind in the adoption of these technologies.

The options for a manufacturer looking to streamline or enhance operations with advanced manufacturing technologies can be overwhelming. Small and medium-sized companies may find it particularly difficult to evaluate their potential effectively. Without a thorough analysis of a company's particular needs and of the technology options, money spent on new technologies may be wasted.

That's why Industry, Science and Technology Canada (ISTC) developed the Advanced Manufacturing Technology Application Program (AMTAP) — to help small and medium-sized companies make informed decisions. Under this program, ISTC shares the cost of outside consultants who assess the technical and economic feasibility of upgrading manufacturing processes.

The Canadian Manufacturing Advanced Technology Exchange (CAN-MATE), a joint venture between the Government of Canada and the CMA, is also involved in helping manufacturers apply advanced technologies. Its executive director, Sandon Cox, regards the design of AMTAP as a "brilliant creative act". He points out that the use of these advanced manufacturing technologies is often restricted to very large companies with vast internal resources.

"AMTAP is one of the best programs the government has come up with because it specifically addresses the small and medium-sized businesses," he said.

Under the program, consultants evaluate current operations with a view to long-term strategy, identify areas that need improvement, analyze costs and benefits, and prepare an implementation plan. The implementation itself is not funded by AMTAP.

Experience has shown that the involvement of senior management is a key element in the success of projects that involve substantial changes within an organization. Therefore, one eligibility criterion for AMTAP is that a senior executive sponsor the project and be actively involved with the consultant as the work progresses.

Other criteria include the viability of the company or companies involved, the consultant's capability and experience in the technology being considered, and the extent to which the growth and international competitiveness of the company will be improved.

AMTAP, which was launched last April, is scheduled to run for four years with a budget of $8.5 million. For individual firms, it covers up to 75 percent of the cost of consultants up to a maximum of $25 000. If a joint application is approved, each firm may receive up to $20 000 with a limit of $200 000 per application.

ISTC staff, knowledgeable in advanced manufacturing methods, are available to help interested firms choose a suitable consultant, make contact with potential partners and plan the implementation of advanced manufacturing technologies.

For more information, contact the AMTAP co-ordinator in the nearest ISTC Regional Office. You will find a list of Regional Offices on the inside back cover of this magazine.

Service Industries Studies Program

The importance of service industries to the Canadian economy is now indisputable. In 1987, they were responsible for 70 percent of output and employed over nine million people in Canada. We owe nine out of every 10 jobs created in the last decade to the service sector. It is clearly the fastest growing sector of the Canadian economy.

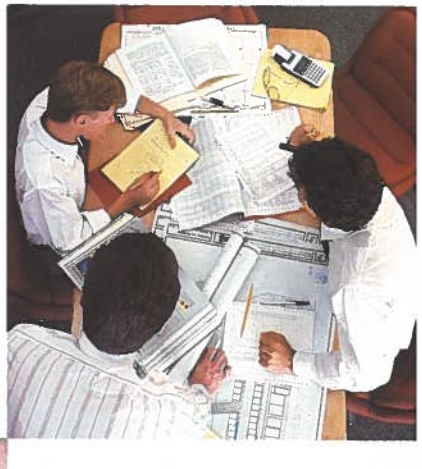
The term "service industries" refers to industries that are not primarily engaged in the production of goods. It includes financial services, telecommunications, consulting, transportation, health care, education, retailing and wholesaling.

Despite the importance of service industries to the economy and the daily lives of Canadians, their growth, structure and role in the economy were not understood. In 1986, the federal government addressed this situation by launching the Service Industries Studies Program (SISP), a $2.4-million project that examined the structure and dynamics of the service sector and its component industries.

The program, which was sponsored by ISTC, involved over 80 individual studies that can be grouped into three major streams. The Fraser Institute studied service sector growth in the Canadian economy; the Institute for Research on Public Policy examined Canada's international trade in services and regional development and services; and Statistics Canada assessed data on service industries to determine needs and potential for improvement.

Here are a couple of examples of myths about the service sector that were exploded by the studies — service industries provide only low-paying, low-skill jobs; and their growth represents the de-industrialization of Canada.

On the contrary, service industries create many highly specialized jobs in such fields as management, informatics, finance and communications. These types of services have a profound effect on competitiveness in all other economic sectors. Rather than representing the de-industrialization of Canada, service sector growth has been a fundamental and positive factor in our industrial development.



St. Lawrence River Environmental Technology Development Program

There is a certain irony in the fact that the St. Lawrence River, which has truly been a spawning ground for industrial development in Quebec, is facing a serious industrial pollution problem. Studies of this once-magnificent aquatic ecosystem show a direct relationship between the discharge of pollutants from industrial plants and environmental damage.

ISTC's St. Lawrence River Environmental Technology Development Program (ETDP) is a $20 million component of a five-year, $110 million federal action plan to clean up the problem. It helps companies operating in Canada to develop innovative technologies to reduce water pollution from industrial sources.

To be eligible, projects must have commercial potential for the St. Lawrence as well as other Canadian or foreign waters. Technologies may involve modifying manufacturing processes to reduce or eliminate effluents, recycling wastes or treating contaminated water.

Here are just a few examples of the kinds of technologies that are being developed to reduce industrial water pollution: semi-permeable membranes for eliminating trace-level toxins, bacterial agents for eliminating forest and mineral waste, and software for monitoring and evaluating contamination levels.

In addition to saving a river, the ETDP will help to build an industry. For example, demand for water treatment equipment in Canada is expected to grow from the current level of $400 million a year to $600 million a year by 1992.

The program covers up to 50 percent of eligible costs to a maximum of $2 million per project. While individual firms may apply, consortia and other types of co-operative arrangements among companies and non-profit organizations are encouraged.

The federal government's St. Lawrence River Action Plan is intended to complement the Quebec government's efforts to reduce pollution from municipal and agricultural sources.

A Canada-Quebec harmonization agreement on the clean-up effort was signed on June 8 of this year. The lead responsibility for the federal plan rests with Environment Canada, which has established the Centre St. Laurent in Montréal to co-ordinate the project.

The federal action plan also includes the following components: the protection of endangered species and sensitive areas; the identification of sources and pathways of pollution and the application of "polluter-pays" compliance schedules; the clean-up of federal facilities and wetlands; and other cost-sharing environmental technology development and application programs.

For more information, such as a list of the studies and a synopsis of each one, please contact:

Director
Commercial Service Industries Directorate
Service Industries and Consumer Goods Branch
Industry, Science and Technology Canada
235 Queen Street
Ottawa, Ontario
K1A 0H5
Tel: (613) 954-2994
FAX: (613) 954-3107

For more information on the St. Lawrence River Environmental Technology Development Program, contact:

National Co-ordination Office
Environmental Technology Development Program
Environmental Industries and Projects
GSTM
Industry, Science and Technology Canada
235 Queen Street
Ottawa, Ontario
K1A 0H5
Tel: (613) 954-3225

For more general information on the St. Lawrence River Action Plan, contact:

Le Centre Saint-Laurent
Environment Canada
Conservation and Protection
Room 400, 105 McGill Street
Montréal, Quebec
H2Y 2E7
Tel: (514) 283-7000

Major Projects Management

International Centre for Research and Training in Major Projects Management

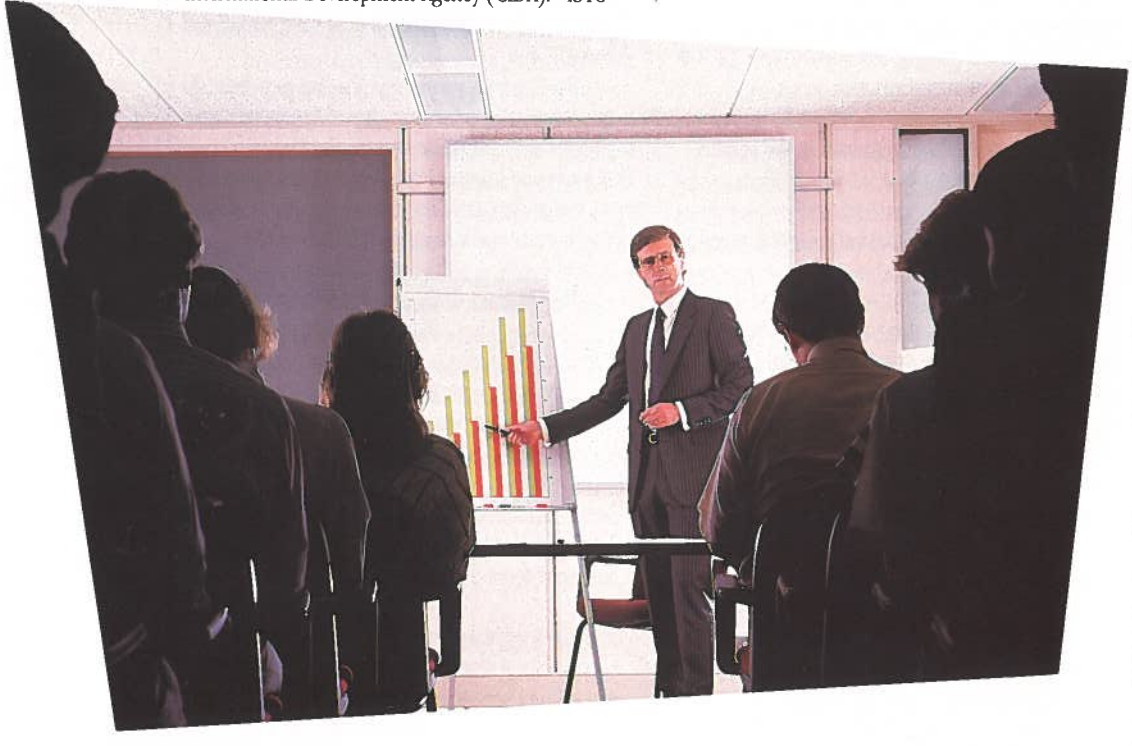
Founded in Montréal in 1984, the International Centre for Research and Training in Major Projects Management (International Centre GP) reaches beyond its regional origins to promote Canadian expertise on the international scene. More than just a training centre or professional association, the Centre is a veritable global cross-roads drawing together important developers, academics, business people and government officials. By becoming a member, these individuals acquire a passport of sorts, which opens up to them the fascinating world of large-scale projects in Canada and around the world.

Some 100 well-known organizations, comprising business, public corporations and universities, are already involved in the Centre. Its main activities include international exchange programs which help promote Canadian technological expertise, and conferences on important current issues such as free trade, interest rates, labour availability, and strategic planning of large projects, at home or abroad.

"The International Centre GP is a development tool for business," explains director general Pierre Gaudreau, an engineer and owner of P.R. Gaudreau Inc. "We would not have so many people involved if we couldn't offer tangible benefits for business, as well as for the overall national interest. Our members send top level staff to the Centre because we share the same goals, whether members are in the business or public sector."

Mr. Gaudreau salutes the financial contribution of the federal government through Industry, Science and Technology Canada (ISTC), and the Canadian International Development Agency (CIDA). "ISTC contributed a grant of $1.4 million over five years under the Technology Outreach Program (TOP). The program's aim is to improve the productivity and competitiveness of Canadian industry by fostering the creation of technology centres such as ours. For its part, CIDA provided a grant of $500 000 in 1988 under its Industrial Co-operation Program. This financial support package of $1.9 million has enabled us to take our rightful place on the national and international scene."

Mr. Gaudreau says this financial assistance signals official recognition of the important role of organizations such as the Centre. "If we have received government assistance," he explains, "it's because we are responding to an obvious need. The International Centre GP is a generator of synergy and excellence open to all interested participants. It contributes not only to the quality of projects undertaken here, but to the international prestige of our experts."



While its primary mission is to serve its members, the Centre performs a duty to humanity as a whole. From the four corners of the Earth it gathers fresh information on major business opportunities and then invites colleagues from around the world to participate and share information in workshops and training sessions.

The International Centre GP has three immediate goals:

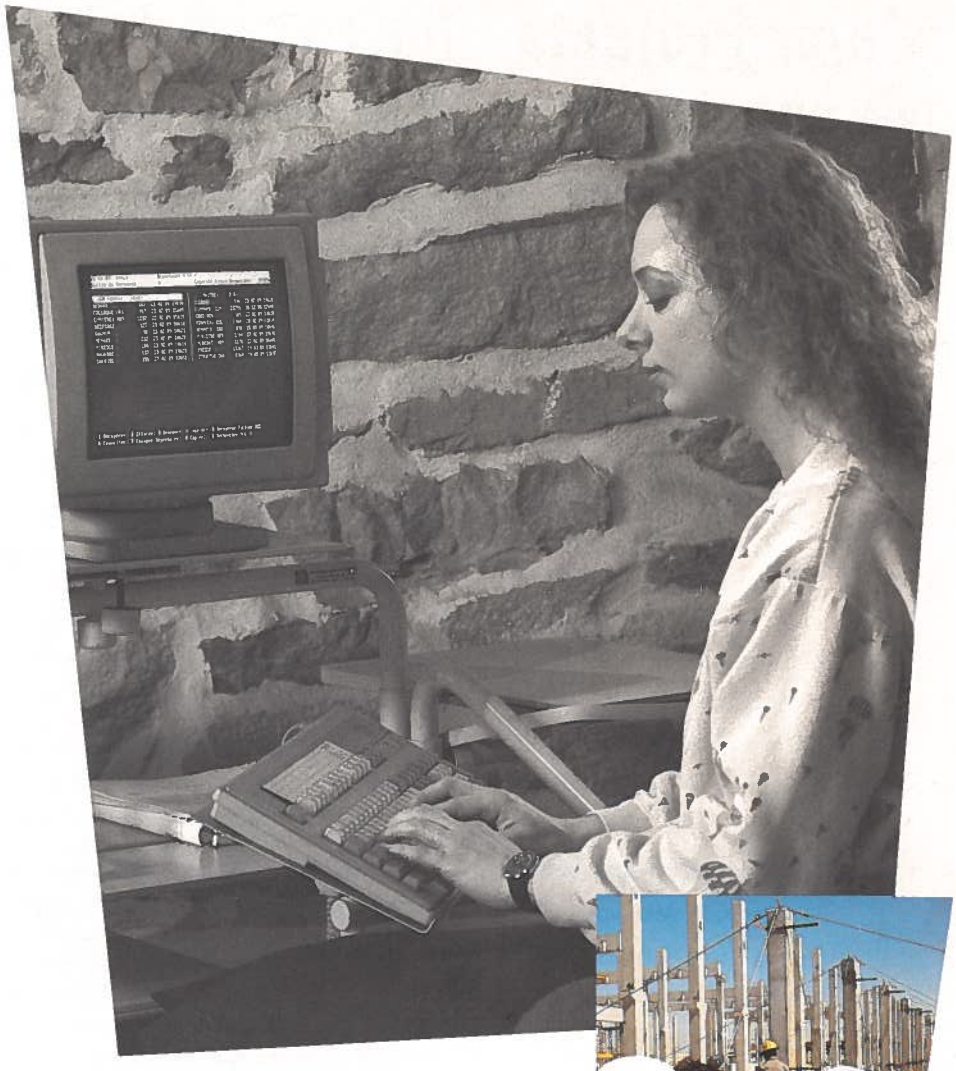
- establish and maintain a data bank on projects in progress or under development;
- provide training and advanced learning through general interest conferences and training sessions. These sessions are offered equally to foreign and Canadian senior executives;
- offer an exclusive meeting place for members.

"In collaboration with Industry, Science and Technology Canada, we have set up a strategic information clearing house," Mr. Gaudreau says. "It allows us to take advantage of first-hand information on the development of important projects of all types. Our information is not just releases from the World Bank or other similar agencies, but also includes critical information gathered by the global network of Canadian diplomatic missions."

The Strategic Information Centre will be linked to the National Research Council database, allowing members access to useful technical information. It collects, analyzes and disseminates information on:

- foreign markets;
- major projects in preparation which will soon be open to offers;
- major projects at the finishing or finished state;
- techniques used in project management;
- state-of-the-art technologies used in the creation of major projects;
- specialized programs to control costs and monitor projects.

Mr. Gaudreau is also enthusiastic about members' participation in training programs. "We are at the point of achieving a first which will assure our companies and the Centre a valued place on the international scene. We have set up an exchange and advanced learning program for foreign executives. The visitors are taken on technical visits and training sessions all across Canada over a period of several weeks. These guests are recommended to us by members of the International Centre GP.



"With the financial assistance of CIDA, the Centre pays for necessary expenses of visitors from developing countries. Candidates not in this category, as determined by CIDA, cover their own expenses or submit them to the Canadian company that recommended them. Following the sessions, guests receive the title of official member of the International Centre GP."

The Centre is preparing other courses designed to improve relations between Canadian experts and their international counterparts. The program Understanding International Realities, for example, was created for Canadian businesses interested in taking part in major foreign projects.

The program deals with the following topics:

- how different nations handle various aspects of major projects, such as: call for tenders, co-venturing, forming consortia, including legal, fiscal and financial aspects;
- financing, the rules that govern it and the various criteria applied to finance practices, with emphasis on world development priorities;
- awareness of real life experience in the diverse regions of the world: politics, economics, social and cultural perspectives, management customs and practices, availability of human resources.

Program content will be kept up to date and adapted to the nature of a business and level of management.

Mr. Gaudreau adds: "This program is currently under review and we are hoping to get the Quebec government involved. The first session will likely be held in February 1990."

Acting on its mission to be a global crossroad, the Centre also organizes conferences and other activities throughout the year. These gatherings are valuable opportunities for representatives of small, medium and large enterprises. "At these sessions," Mr. Gaudreau explains, "there's an exchange of expertise which benefits each member in their own way."

Finally, the Centre enhances co-operation between the business and academic communities.

Its numerous committees bring together volunteer members interested in particular aspects of major projects. These occasions foster exchanges between specialists in various fields with a resulting enrichment in expertise. The committees are constantly planning new endeavours to increase the range and visibility of the Centre.

Jean-Guy Desforges, PhD, a professor at École des Hautes Études commerciales in Montréal, says he's impressed by the creative energy generated by the International Centre GP. "As a professor," he says, "I am interested particularly in administrative structures and the management of large projects. The creation of the International Centre GP is a boost for sustained efforts to enhance research in this area. It is gratifying to be able to apply principles we've developed to the management of large projects."

The idea to create the International Centre for Research and Training in Major Projects Management came from a working group organized in 1984 by the Montréal Chamber of Commerce. Mr. Desforges recalls the formative stages. "The group wanted to create a rapport between groups interested in the management of large projects in Montréal, itself an important city in the field of international project management. I was involved in the definition of the main priorities and mission of the International Centre GP, as we know it today."

The most rewarding aspect, according to Mr. Desforges, is the exchange between academics and practitioners from diverse fields. "When we observe the success of the various conferences and seminars, as well as the interest in the documentation centre," he explains, "we see the role of the Centre reinforced, as a network of information for all those involved in the management of major projects, especially on the international level.

"This network is growing and becoming increasingly influential. The international aspect of our efforts is developing a greater profile, with the exchange program stimulating discussion of questions of global interest. All this creates greater visibility for Canada as an advancement centre for major project management resources."

These glowing assessments are echoed by Raymond Leroux, vice-president of Lavalin International, the Montréal-based consulting giant. With his international focus, Mr. Leroux is particularly interested in western European markets as well as French Africa.

"Our corporate vice-president, Armand Couture, was among the founders of the International Centre GP," Mr. Leroux recalls. "Personally, I have been involved since the first exchange seminars with foreign executives. It's an excellent way to get together — to invite outsiders to come see how we do things in North America, especially in Quebec. It's an effective way to get an edge on the Europeans, who are our principal competition in foreign markets. We look forward to more sessions where we hope to invite foreign colleagues with whom we would like to deal in the future."

Judging by the comments of members, the International Centre for Research and Training in Major Projects Management will be a major force in the coming years. Already, it has outgrown its local scope as witnessed by its activities with a global focus and its membership coming from around the world. For businesses looking to the future, the Centre is truly a passport to the world of major projects in engineering and construction.

For further information, contact:
International Centre GP
321, rue de la Commune ouest
bureau 200
Montreal (Quebec)
H2Y 2E1
Tel: (514) 848-6100
FAX: (514) 848-9992

Scott Smith, president of Proshred Security, stands beside the van that contains the mobile shredding equipment his company developed with help from the Waterloo Industrial Innovation Centre.

The Canadian Industrial Innovation Centre/Waterloo

The success of Canadian companies operating within Canada during the next decade will depend largely on their ability to develop new products and innovations. Many of the ideas for these will come from individuals and entrepreneurs in small and medium-sized organizations. For many, the path from the idea to the marketplace can be difficult. However, an organization exists to help make this journey easier — the Canadian Industrial Innovation Centre/Waterloo (CIIC/W).

The CIIC/W was established in 1981 as an independent, non-profit corporation associated with the University of Waterloo. CIIC/W is one of many non-profit organizations funded by the Technology Outreach Program (TOP) of Industry, Science and Technology Canada (ISTC). For up to five years, the program supports the development and diffusion of technology and critical skills training through the funding of specific start-up and operating costs. Additional funding for non-recoverable services costs may also be available after this five-year period.

The CIIC/W includes a staff of 10 professionals and provides a wide range of services to Canadian innovators across the country. These services are aimed at individuals and companies with new ideas who need help in commercializing their inventions and innovations.

They include:

- assessing technical strength;
- conducting market research;
- evaluating commercial potential;
- managing development and testing;
- assisting in venture planning;
- providing training.

The Innovation Centre's mission, says Gordon Cummer, CIIC/W's chief executive officer, is to identify, at an early stage, good ideas, products or business plans and help make them commercial realities. The Centre's services, he says, are primarily educational and are based on the experience of the Centre and its advisors and consultants.

"One of the common characteristics of inventors," says Mr. Cummer, "is their lack of understanding of the marketplace and why their product could be successful. Learning about market needs usually comes with experience in the marketplace and many of these individuals haven't had the opportunity to gain this experience.

"Inventors are often driven by an idea," he adds, "rather than a market need. Most come from technology backgrounds and so they often need help with the business and marketing aspects of their invention."

Not all inventions are successful, Mr. Cummer points out. As part of its education service, the Centre tries to make people aware of potential problems they may encounter and to enable them to manage better the risks involved in bringing their ideas to market. "We try to minimize the cost of failure, which is just as important as helping people be successful. Many issues, such as marketing, financing and proper planning have to be addressed. Most people can deal with them once they are recognized."

According to Gordon Cummer, people who come to the Centre for help have a wide variety of backgrounds. "We evaluate all kinds of ideas. We don't regard any invention as not worth considering. Anybody who has an idea that they feel could be successful should contact us. It may turn out that we won't be able to help much but we can provide initial guidance that won't cost the inventor anything."

Bill Haras, president of Shoreguard Inc. of Guelph, Ontario, is one inventor who has worked closely with the Innovation Centre. Mr. Haras, who developed WAVEBLOCK™, a modularized, steel-reinforced concrete structure designed to minimize shoreline erosion, has used several of the Centre's services to bring his product to the marketplace.

Initially, he worked with Centre staff to develop a brochure for potential customers, such as municipal governments, conservation authorities and private shoreline owners.

He then contracted the Centre to conduct laboratory and field testing on ice-loading and other physical properties of WAVEBLOCK™. "The Centre put me in touch with the proper people quickly. They also provided the objective expertise I needed. We're now working together to develop marketing strategies and identify potential customers."

Another recent success story is that of Toronto company, Proshred Security. The company, which had sales in fiscal year 1988 of $2.3 million, traces its beginnings to the early 1980s when company president, Scott Smith, recognized the need for a mobile shredding service to provide confidential destruction of corporate records and files. To meet this need, Mr. Smith developed a unique mobile shredder.

His next step, in 1984, was to ask the Innovation Centre to evaluate his invention and advise him on costs and engineering. He was happy with the results. Innovation Centre staff were easy to approach, he says, and the evaluation produced several technical recommendations to make the product better. "Because the evaluation was positive, it gave me encouragement to continue. It also provided me with an objective assessment to show to potential investors."

In addition to helping inventors such as Mr. Haras and Mr. Smith, the CIIC/W offers assistance to small and medium-sized companies. "The future of these companies will depend on their ability to innovate and develop sound business and marketing plans," says CIIC/W Chief Executive Officer Cummer. The Centre has developed models that help companies learn more about business strategies and innovation. "Our major aim is to help companies develop new ideas and innovations in product development or marketing. Our interest is in looking at existing resources and showing organizations how to be more innovative."

The CIIC/W offers many programs to assist inventors, entrepreneurs and companies:

The Inventor's Assistance Program provides inventors with a low-cost, professional and confidential evaluation of the strengths and weaknesses of their inventions. These can vary from simple household products to advanced scanning sonar systems. The Centre may also conduct a more detailed follow-up analysis, called The Preliminary Market Evaluation, which may include preliminary market research, confidential reviews by outside evaluators and a search of related technology at the Canadian Patent Office. After the evaluation process is completed, the Centre may further assist some inventors to bring favourably rated inventions to the market.

The Enterprise Planning System provides assistance to entrepreneurs and potential entrepreneurs in several ways. The system gives an objective assessment of an individual's strengths and weaknesses as an entrepreneur. It also helps individuals determine whether a business opportunity really exists and assists in preparing a strategic business plan to turn an idea into a viable business venture.

Contracted Design and Development — The Centre helps companies locate and arrange applied research and product testing, construct prototypes, analyze development problems and recommend design solutions.

In 1987/88, the Centre initiated an *Affiliated Organizations Program* to involve organizations across the country in its *Inventor's Assistance Program*. A national communications network now enables inventors to gain access to the *Inventor's Assistance Program* at local levels and receive counselling and training by organizations which foster innovation within their communities. Members of the national network include the Saskatchewan Research Council, the University of Ottawa and the University of Manitoba.

"The *Affiliated Organizations Program* allows local organizations to work with us and to work locally with the inventor," says Gordon Cummer.

Waterloo Centre staff members study new Canadian invention.

Industrial Market Research — The Centre's Marketing Services group provides market research services to a variety of organizations ranging from small regional companies to large multinational corporations. This research activity can focus on market size, potential market changes, competitive analysis and assessments of clients' current marketing strategies.

The Centre also provides education programs, for both the private and corporate innovator, which include a wide variety of workshops, seminars and training programs. Topics include market research, managing a new enterprise, advertising and public relations, identifying customers and legal rights and safeguards.

"They may help the inventor prepare specific information relating to the proposal before it is evaluated." The most important role of the local office will be to advise and assist an inventor after a positive evaluation. "Because they are closer to the individual, local organizations can provide valuable advice quickly and help to make a project a commercial success," he adds.

The Innovation Centre covers its costs by charging fees for most of the services provided. All material, data and information pertaining to each client is held in confidence.

For more information on the Centre, contact:
The Canadian Industrial Innovation Centre/Waterloo
156 Columbia Street West
Waterloo, Ontario
N2L 3L3
Tel: (519) 885-5870
Telex: 069-55259

NORAC Products Inc. —A Natural Success Story

In these days, when health-conscious consumers are searching for healthy food substances without chemical additives, a dynamic young Edmonton-based company, NORAC Products Inc., is proving to be a trail-blazer.

How Did It All Get Started?

NORAC Technologies originally started up its research operations in Edmonton, Alberta, to work in the heavy oil and hydrocarbon industries. This was hardly surprising. After all, two of its founding members, Dr. Fritz Boehm and Richard Caron, came to NORAC Technologies after extensive experience in the oil and gas industry.

Dr. Boehm's credentials included a stint as vice-president of Krupp Industries (Canada) and previous experience as a department head at the Central Coal Research Institute in West Germany. Mr. Caron's background was in the financial industry but he, like Dr. Boehm, had been a co-founder of Canadian Energy, a company operating a heavy-oil upgrading pilot plant. So, the original move from operations to research in oil and gas is no surprise. But, how did two men, whose background was oil and gas, become involved in that trend-setting industry, natural foods?

As Mr. Caron explains it, it was a natural progression. He and his partners came across an exciting new extraction technology while working with a West German affiliate on a hydrocarbon upgrading development plant. This technology, known in the industry as "Super Critical Fluid (SC) extraction", is a process technology mainly used for the extraction of high-grade products. Lights went on. Surely, Mr. Caron thought, this technology should be put to work "on carbohydrates, not hydrocarbons."

With this goal in mind, to work on the extraction technology and develop a full range of "new" and "natural" food ingredients, NORAC Extraction and Product Development was established in Edmonton in 1985.

What's So Special About the Products?

To begin with, the ingredients produced by the Super Critical Fluid process are all natural. Their characteristics are not changed or damaged in any way by the process technology. This means that they taste and smell much more natural than ingredients produced by conventional steam or solvent extraction, precisely because they are more natural.

Even more crucial in these days when all opinion surveys show that consumers are increasingly nervous about chemical additives in their food, ingredients produced by the NORAC formula are free of potentially harmful chemicals and solvents.

According to Mr. Caron, this technology is already emerging quickly in Europe, and he and his partners saw it as the wave of the future in North America. "The trend to enhanced flavour and natural products will only get stronger."

As companies read consumer preferences and anticipate a world of stricter government regulation in response to consumer demand, he has noticed that many are no longer looking to expand in the traditional technologies. NORAC seized the opportunity to capitalize on what the company saw as a winning formula.

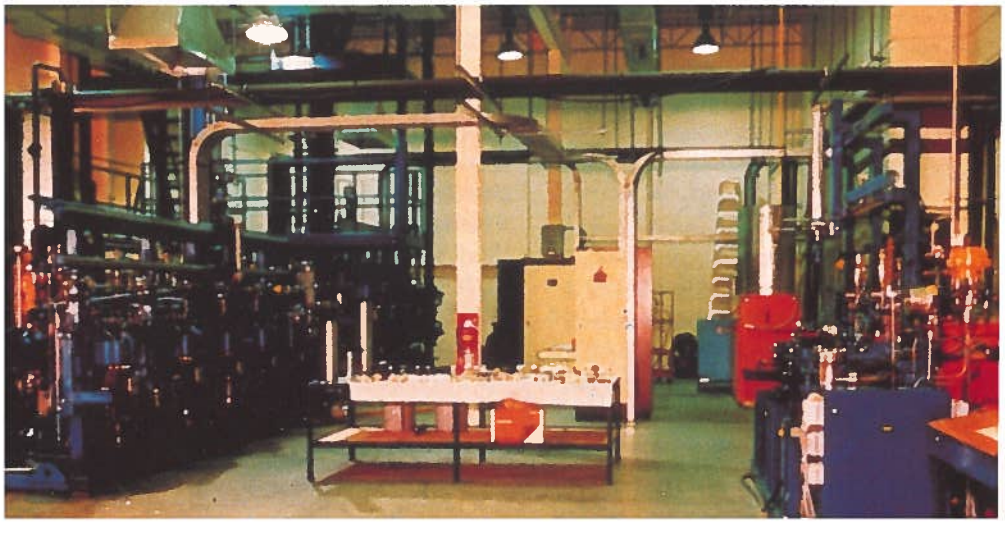
The Opportunity

Super Critical Fluid extraction has already been put to the test in Europe. However, most European plants are dedicated to single product application, for instance, decaffeinating coffee.

NORAC's intention was to design a multi-purpose plant capable of processing a wide range of raw materials. This would allow for efficiencies of scale. It would also reduce the dangers inherent in being dedicated just to one product, or a narrow product line. NORAC would have the flexibility to respond to changing market needs.

So product development and enhancement would be part of the winning formula. There was, however, another important factor. Although Super Critical Fluid extraction is a leading-edge technology in Europe, it was hardly known in North America. The NORAC Product Development Centre moved fast to establish itself as the North American leader in this new technology.

NORAC extraction centre in which the Edmonton-based company produces natural food ingredients.



But this was only the beginning. NORAC's founders now confidently claim that when the new multi-purpose plant comes on stream in the mid-1990s, it will be the largest of its kind in North America. They also expect the construction of this plant to give the company a five- to seven-year lead time in producing distinct and unique products to meet the new marketplace realities of educated consumers and tougher government regulations.

And there is more to come. While the initial NORAC plant will be in Edmonton, the company already has ambitious plans to open up facilities in locations as diverse as California and Malaysia.

The market opportunities, indeed, seem almost endless. The extraction and separation industry, excluding oil and gas, is estimated to have annual revenues of more than $16 billion, with an annual growth rate of 8 percent! And, as the appetite of consumers for unadulterated ingredients grows, the trend-line seems to be pointing ever upwards.

What Has Been Achieved So Far?

Any organization's strength is its people. NORAC believes that it has put together a small but highly professional management and research team that has been effective and successful in building up the NORAC Centre and is now poised to move on to the new challenges posed by the establishment of multi-purpose plants.

NORAC's tangible successes are easy to list. Over the last four years, since it was set up in 1985, the NORAC Centre has: successfully designed five product development plants, developed over 70 products, attracted more than 20 collaborating partners and designed its first commercial plant.

These are tangible results. It is likely, however, that when future balance sheets are examined, it will be revealed that NORAC's growth has come from the collaborative associations it has developed and is developing.

Right from the beginning, in its association with West German companies involved in Super Critical Fluid extraction technology, NORAC has used collaborative arrangements as a crucial tool in its advance. These early arrangements allowed NORAC to design, engineer and construct "state-of-the-art" plants.

Some of the products created by NORAC.

Currently, these associations are among the ways in which NORAC ensures that it maintains its local and international research reputation. Partners include Alberta-based institutions, such as the Government of Alberta, the Alberta Research Council and the University of Alberta, as well as the National Institute of Health in the United States, the University of Erlangen in West Germany and the TNO research facility in the Netherlands, the equivalent of Canada's National Research Council.

In addition, the basis of NORAC's marketing strategy is to work with companies requiring new processing capabilities or products. This has translated into marketing arrangements where NORAC guarantees product supply and joint-venture relationships for a long period of time. These long-term arrangements are crucial to the company's continued success. Although NORAC has had a "jump" on the competition, other companies, including such giants as General Foods, are beginning to move in, although generally into single-purpose applications.

The Future

NORAC has an ambitious 10-year strategic plan. It intends, of course, to continue its development program on Super Critical Fluid extraction technology. Also, it will be expanding its capabilities into new, complementary separation processes. New applications will be sought in the beverage, cosmetics and pharmaceutical industries. The exciting new field of biotechnology promises a bright future.

There are plans to build and operate four manufacturing facilities to service NORAC's purchasing and marketing contracts. There are also plans to seek new marketing arrangements for other food ingredients.

A few examples: In a joint venture with a British-based food conglomerate, NORAC has agreed to provide a manufacturing facility for aromas, flavours and special food ingredients to serve the European market; NORAC has signed a Letter of Intent with a U.S.-based company to supply NORAC products to their more than 20 branches. This order will initially be filled from the Alberta plant.

NORAC even has an agreement with a large pharmaceutical company based in Southeast Asia and an international European flavour house jointly to construct a manufacturing facility, producing extracts from Southeast Asia and the Pacific Region, a potential growth area for Canadian companies with the business savvy to exploit this growing market.

With a world market that is constantly growing for food ingredients that can meet new consumer demands and increasing government regulations, the prospect, indeed, looks rosy for a company that has proved itself willing to take a chance and invest in the technologies of tomorrow.

For further information, contact:
NORAC
4222-97 Street
Greystone Pavilion
Edmonton, Alberta
T6E 5Z9
Tel: (403) 461-7163
Telex: 037-42695

Ocean Optical Ltd.

Let "Fingers" Do the Walking — Innovation in the Optical Industry

Claude Brunet's aim was to streamline production of eyeglass lenses in his small Moncton-based manufacturing operation, Ocean Optical. The device he came up with is now making a major impact on the whole optical industry.

Trade-named "Fingers", its advent has swept much of the sludge out of the lens-making process. It eliminates steps, improves the final product, improves service to the customer and reduces costs. The industry could hardly ask for more.

Brunet's first company, Ocean Optical, came into being in 1976; what started as a two-person organization has grown to its present complement of 36 employees. Much of the company's success is due to the president's skill in searching out new technology to enhance production and products. Mr. Brunet does not wait around for other people to come up with the answers. He seeks them out himself.

In the manufacture of an ophthalmic lens, one of the most difficult procedures is the correct measurement of the eyeglass frame. The second challenge is to produce a lens whose size and shape fits the frame exactly. Up to now, the combined process has required technicians highly trained in pattern-making and skilled in the use of an "edger" in combination with templates or patterns. Not only do they have to create extremely accurate templates, but also the process requires that each lens be cut two or three times. The final adjustment is made by hand.

This rather laborious approach is time-consuming, labour-intensive and involves a high degree of spoilage. For Claude Brunet, it simply was not good enough. About manual measurement of the frames, he said, "We found that data was not accurate enough. We decided to invent a little mechanical electronic gadget that would measure the frame more accurately. That information then would be sent to the computer."

In his search for the "little mechanical electronic gadget", Claude Brunet ended up designing a new system that has the optical industry buzzing. It effectively eliminates creation, storage and retrieval of physical patterns, hand edging of the lens, and the need for highly trained technicians to carry out the process.

Mr. Brunet originally came up with his idea in 1979 but, at that time, the research and development to bring it into being was too expensive. He parked his scheme for a few years and then presented it to a professional engineer on his staff, Marc Savoie. "I've been dreaming about this for years. Can it be done?" he asked. After going away and working on the idea, Savoie came back with his answer. Yes, absolutely.

Claude Brunet and Marc Savoie approached Cadmi-Micro Electronics Department of the Université de Moncton, a private research and development company funded by the federal and provincial governments and the university. The design was their own; Cadmi provided the electronics and software to make it a reality.

"Fingers" has become the flagship of Mr. Brunet's operation. A combination of hardware and software, the system is desk-top size, measuring about 50 cm (20 in.) wide, 46 cm (18 in.) deep and about 18 cm (seven in.) high. It gets its name from the finger-like mechanism that holds the frame in place while it is being traced.

In a production environment, the tracing unit sends digitized size and shape measurements of the frame to a mechanism on an "edger" which then shapes the lens to match. The "edger" module allows an operator with minimum skills to cut a lens exactly.

"Fingers", the device that eases the task of matching lenses to eyeglass frames, designed and produced by Moncton-based Ocean Optical.

Although Mr. Brunet's primary goal had been to solve a practical manufacturing problem for Ocean Optical, the potential for "Fingers" became obvious when he saw how effective it was in improving production methods in his own firm.

He soon realized that "Fingers" had much broader applications. Not only did it reduce spoilage, increase accuracy of lens measurement and reduce labour costs, it provided a direct interface between the vision specialists — dispensing opticians and optometrists — and lens-making establishments that did not exist before.

"Fingers" can be hooked up to a computer (Ocean Optical uses PCs) to collect and transfer data from the vision specialists to the lens-makers. This is how it works as a tool for the dispenser: he or she can trace the eyeglass frame selected by a customer, then enter the prescription data, lens style, lens material, etc., into the computer. A graphic display of the lens is then called up on the screen, to scale, allowing the dispenser to see exactly what the lens will look like.

The dispenser can then determine if there is a lens blank that will accommodate the prescription for the chosen frame. If not, a different frame is selected.

A graphic profile of the lens in different materials can also be pulled up on the screen, showing the thickness and weight of each one. This enables the dispenser to select the right material and advise the customer on proper frame selection. It also eliminates the common occurrence of ordering a prescription that cannot be processed for a particular style of frame.

The optician or optometrist sends all the prescription and frame data to the lens-making laboratory by modem directly from the computer. The lab technicians can then grind and shape the lens to perfect size without ever having to see the actual frames. This is an especially useful feature for those customers who want to keep their old frames and change only the lens. They avoid the delay and inconvenience of having to send the frames off to a lab for measurement.

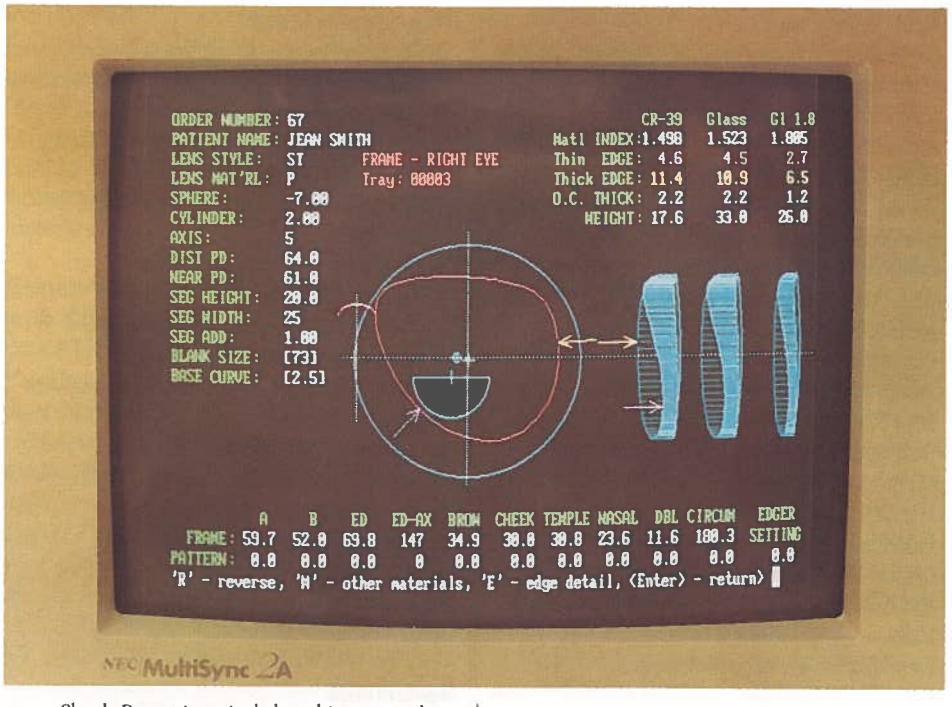
"Fingers" is only the most recent of a number of technological innovations that Claude Brunet has developed in his quest for improved efficiency in lens-manufacturing techniques. His forays into the world of invention led to the establishment of a second company in 1983, called Ocean Software. His innovations have earned both his companies international recognition in the ophthalmic industry.

Mr. Brunet says that he searches and develops new techniques and products to solve practical problems within his own company: but they have spun off into the industry where they have made a big splash. "Selling them is a nice result," he says. But it is not necessarily the original intent. Ocean Software exports 75 percent of its products now to the United States and Great Britain.

"Fingers" was launched at several international trade shows within the last year and a dazzled industry has responded with enthusiasm. The potential market for the product includes both lens manufacturers and technicians in labs and production facilities, as well as the front-line dispensers — the vision specialists — who see the customers, fill lens prescriptions and fit and sell the frames.

Sales networks are in place to handle "Fingers" in Australia and are being set up in Canada, Britain and the United States. A franchise of 300 retail stores in the United States has already told Mr. Brunet that they "want to proceed as quickly as possible" in supplying all their locations with the device. He says that, at $7500 per unit, "the savings generated by Fingers could make the system pay for itself in as little as six months." Since the unit can be hooked up to any standard IBM-PC for screen graphics display and modem-to-modem communication, it is easy to link it into existing computer systems.

Computer monitor, used with Ocean Optical's "Fingers", showing details of an eyeglass lens.



Claude Brunet is excited about his new product: "Fingers" is opening up new markets — both local and international — for his Ocean Optical. The industry is excited about the product too. It is already carving a niche for itself in both production and sales. Vision specialists and lens-makers really can let "Fingers" do the walking for them, saving both time and money.

"Fingers" is the latest innovation from Claude Brunet. It certainly will not be the last: in the optical industry Claude Brunet is a man to keep an eye on.

For further information, contact:
Ocean Optical Ltd.
P.O. Box 1150
5 Orange Lane
Moncton, New Brunswick
E1C 8P6
Tel: (506) 857-0220
FAX: (506) 859-1662
Telex: 014-2359

Technology Transfers

Offered

Canada
- New Bonded Cellulosic Materials and Chemical Process for Bonding Cartons, Paper, Cloth
- Meat Skinning Machine
- Elevator for Harvesting Delicate Agricultural products
- Variable Depth Sonar Line-Handling System
- Inclusion Complexes of Cyclodextrins by Agglomeration
- Energy-Storing Gypsum Wallboard
- Human Monoclonal Antibodies Reactive with Haemophilus Influenzae Type B
- Quasi-Optical Stripline Devices
- High-Pressure Infrared Spectroscopic Technique for Monitoring Recombinant Protein Production
- Isotopic Fibre Optics
- Process for the Production of Fermentable Sugars from Biomass
- Dual Polarization Microstrip Array Antenna
- Synthetic Potato Skin
- Magnetic Sensor
- Biodegradable Plastic
- Drapery Heat Guard
- NETFLEX Technique for Screen Printing on Plastic Mesh
- Hydrofoils for Microlight Seaplanes
- Contour Hand-Sander

Australia
- Bicycle Seat

European Community
- Process for Recycling Waste Plastic
- Ergonomic Typing Keyboard
- Heat Transfer Pump
- Display System with Hexagonal Pixels

France
- Automatic Card Filing System
- Safety Barrier

German Democratic Republic (East Germany)
- "Gabatron" — Controlling System for Cooking and Baking
- Technique for the Biological Elimination of Phosphate from Sewage
- Technique for the Re-plasticization of Rubber Powder
- BIOVERIT® — New Bioglass Ceramics for Medicine
- Residue-free Extraction of Pectin
- Technique for Manufacturing Low-wear Elastic Sealing Elements
- Coated Titanium Carbide (TiC) Hard Metal for Cutting and Shaping
- Tactile Sensor for Automatic Assembly
- Robot Wrist with Snake-like Mobility
- Narrow-Slit Welding of Thick Metal Sheets
- Alternating Current Aerial Dust Filter
- Plant and Technique for Granulated Drying with Fluidized Bed Technique
- Pneumatic Stepping Motor
- Automatic Device for Bottling Liquid Media of Different Viscosities
- Interference-Optical Way Sensor

New Zealand
- Water-Operated Turbine

Switzerland
- Camping Grill Kit

United States of America
- Hedge Trimmer Extension Device
- Insect and Roach Spray
- Electronic Early Pregnancy Testing Device

Offered

Canada

New Bonded Cellulosic Materials and Chemical Process for Bonding Cartons, Paper, Cloth

A Canadian company is offering to firms in Canada and the United States the patents and know-how, for outright sale or licensing or joint-venture arrangements, of its new bonded cellulosic materials useful for filling and reinforcing thermoplastic polymers. The materials are characterized by low price, low density and durability at low temperatures. The firm also offers a new chemical process for bonding cartons, paper, cloth, etc., with thermoplastic film such as polyethylene.

For further information, contact: Dr. Alphons D. Beshay, 3595 de Courval, Trois-Rivières, Quebec G8Z 1S8; Tel: (819) 376-1930.

Meat Skinning Machine

A Canadian company is offering for outright sale or licensing arrangements its patents for a meat skinning machine designed remove the thin membraneous skin from fresh meat of any kind. The device features an adjustable blade-bearer that can adapt itself to the membraneous skin to be removed. A stainless steel drive roller makes its operation fast and easy.

For further information, contact: Gilbert Simon, 475, rue Caroline, Apt. 26, Longueuil, Quebec J4H 3K6.

Elevator for Harvesting Delicate Agricultural products Case #8514
This device is designed to lift, without damage, delicate agricultural products, particularly those with irregular shapes, from the digging bed of a harvester to a height suitable for loading onto a vehicle. It consists of a rotating cylinder with a resilient surface and an endless belt. Products are caught between the surface and the belt, gently lifted to the desired height and released.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100;
FAX: (613) 990-8528. *Please quote the case number.*

Variable Depth Sonar Line-Handling System Case #8704
This system eliminates lateral deflections of the line or cable between the inboard sheave and the drum, allowing the cable to be taken off along the pivot axis of the boom. Its design accommodates variations in tension in the cable while cutting cable tension at the inboard end.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100;
FAX: (613) 990-8528. *Please quote the case number.*

Inclusion Complexes of Cyclodextrins by Agglomeration Case #8911
This is a process in which inclusion complexes are formed from guest molecules and cyclodextrins during agglomeration. High shear agitation, in the presence of a small amount of water, produces complexes bonded into strong agglomerates for use in foods, pharmaceuticals or agrochemicals.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100;
FAX: (613) 990-8528. *Please quote the case number.*

Energy-Storing Gypsum Wallboard Case #8939
Use of this wallboard in spot locations, such as behind a wood-burning stove or opposite a southern-exposure window, is claimed to provide energy savings for many years.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100;
FAX: (613) 990-8528. *Please quote the case number.* Companies requesting access to the technical report will be asked to sign a confidential disclosure agreement.

Human Monoclonal Antibodies Reactive with Haemophilus Influenzae Type B Case #9064
These monoclonal antibodies were produced against outer membrane antigens of Haemophilus influenzae type B by heterohybridomas using human tonsillar lymphocytes. They can be used for diagnostic research, therapeutic or prophylactic purposes.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100;
FAX: (613) 990-8528. *Please quote the case number.*

Quasi-Optical Stripline Devices Case #9072
These devices can be used as short centimetre to sub-millimetre wavelengths antennas or as feeds to reflector antennas. One integrated structure could be designed to replace feed systems normally used in multi-beam reflectors. The device can be integrated with new, low noise superconductor-insulator-superconductor (SIS) mixer junctions or with transistor amplifiers which can be mounted directly on the stripline structure. Also its quasi-optical properties allow lenses and reflectors to be built into the structure to control the shape of beams in satellite relay antennas.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100;
FAX: (613) 990-8528. *Please quote the case number.*

High-Pressure Infrared Spectroscopic Technique for Monitoring Recombinant Protein Production Case #9097
This technique is said to be uniquely adapted for use in commercial processes to monitor the production of recombinant proteins (including soluble proteins) without disrupting the biological process. It is based on the discovery that, when measured under pressure, infrared spectra of E. coli strains and transformants producing recombinant proteins show a distinct shifting pattern in specific spectral parameters of transformants.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100;
FAX: (613) 990-8528. *Please quote the case number.*

Isotopic Fibre Optics Case #9116
The invention is related to an optical fibre in which the core material is an isotope of the cladding material so that light attenuation at the core-cladding interface is minimized. In addition, since light confinement is achieved by the difference in the refractive index between the two isotopes rather than by doping, the fibre would be immune to radiation which can easily damage ordinary fibres.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100;
FAX: (613) 990-8528. *Please quote the case number.*

Process for the Production of Fermentable Sugars from Biomass Case #9118
This is a process for the production of sugars from wood or other cellulose-containing biomass and consists of several steps including pyrolysis. The resulting sugars can be fermented into alcohol.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100;
FAX: (613) 990-8528. *Please quote the case number.*

Dual Polarization Microstrip Array Antenna Case #9269

The antenna array is designed for efficient reception or transmission of electromagnetic waves over a wide range of frequencies and angles of incidence. It is suitable for high-frequency operation for which other antennas and associated circuitry would be more difficult to make and more expensive. Also, its relatively higher power handling capacity makes it suitable for use as a rectanna for power reception.
For further information, contact: Canadian Patents and Development Limited, 275 Slater Street, Ottawa, Ontario K1A 0R3; Tel: (613) 990-6100; FAX: (613) 990-8528. *Please quote the case number.*

Synthetic Potato Skin

The shell of this synthetic potato skin is a film composed of natural ingredients, has the physical appearance of a natural potato skin and encloses a filling of mashed potatoes and potato granules. It tastes like natural potato but has additional nutritional and sanitation advantages.
For further information, contact:
Dr. W. R. MacDonald, Technology Transfer Program, Office of Research Services, 1-3 University Hall, University of Alberta, Edmonton, Alberta T6G 2J9; Tel: (403) 492-5787; FAX: (403) 492-2230.

Magnetic Sensor

This is a CMOS compatible, lateral magnetic field sensor that can convert a magnetic field into an electronic signal. It eliminates idle currents, has superior sensitivity and good linear response to magnetic fields. An application is as a component in such devices as electrical utility meters.
For further information, contact:
Dr. W. R. MacDonald, Technology Transfer Program, Office of Research Services, 1-3 University Hall, University of Alberta, Edmonton, Alberta T6G 2J9; Tel: (403) 492-5787; FAX: (403) 492-2230.

Biodegradable Plastic

This invention concerns the hyperproduction of a biodegradable, biocompatible, thermoplastic (poly-beta-hydroxybutrate, pHB) by mutant strains of Azobacter vinelandi. Production is economical, using inexpensive, unrefined sugar sources. Potential uses exist in medicine and as a replacement for certain non-biodegradable plastics.
For further information, contact:
Dr. W. R. MacDonald, Technology Transfer Program, Office of Research Services, 1-3 University Hall, University of Alberta, Edmonton, Alberta T6G 2J9; Tel: (403) 492-5787; FAX: (403) 492-2230.

Drapery Heat Guard Ref. No. 603A

Featuring 100 percent aluminum construction, this heat guard protects draperies, vertical blinds and furniture from excessive heat exposure. The guard is easy to install and has been approved by the Canadian Standards Association (CSA) and fire marshall. Available for licensing along with tooling and equipment.
For further information, contact: Lomar Associates®, Worldwide Licensing Consultants, 1384 Tyandaga Park Drive, Burlington, Ontario L7P 1N3; Tel: (416) 336-0002; Telex: (FELL-FAB) 061-8673; FAX: (416) 560-9846. *Please quote the reference number.*

NETFLEX Technique for Screen Printing on Plastic Mesh Ref. No. 234

This technique was developed in Finland, licensed to a Canadian company and is now available for sub-licensing and complete training in Canada and the United States. It provides for printing a message in one or more colours on one side of thin polyester or nylon net. The message is seen only from one side of the net and does not obstruct vision from the other side. Typical use is for messages on the rear windows of cars or in shop windows.
For further information, contact: Lomar Associates®, Worldwide Licensing Consultants, 1384 Tyandaga Park Drive, Burlington, Ontario L7P 1N3; Tel: (416) 336-0002; Telex: (FELL-FAB) 061-8673; FAX: (416) 560-9846. *Please quote the reference number.*

Hydrofoils for Microlight Seaplanes Ref. No. 604

This invention is designed to interact with floats, ski-like devices, etc., to separate their buoyant support from planing and then recombine the two functions to provide light and stronger structure with less drag and added lift, reducing the power needed for take-off.
For further information, contact: Lomar Associates®, Worldwide Licensing Consultants, 1384 Tyandaga Park Drive, Burlington, Ontario L7P 1N3; Tel: (416) 336-0002; Telex: (FELL-FAB) 061-8673; FAX: (416) 560-9846. *Please quote the reference number.*

Contour Hand-Sander Ref. No. 335

Shaped like a bow with a handle at one end, this sander is designed to produce convex contours. Cut and stretched across the bow, the sandpaper's tension is adjusted to even out irregularities or to feather into an existing finish.
For further information, contact: Lomar Associates®, Worldwide Licensing Consultants, 1384 Tyandaga Park Drive, Burlington, Ontario L7P 1N3; Tel: (416) 336-0002; Telex: (FELL-FAB) 061-8673; FAX: (416) 560-9846. *Please quote the reference number.*

Australia

Bicycle Seat

An Australian inventor is seeking a Canadian company to manufacture, through licensing arrangement, his revolutionary bicycle seat, anatomically designed to give a more comfortable, safer ride. Statistics show that standard bicycle seats cause discomfort and can cause serious damage, mostly to male riders. This seat is designed with two buttock- or cheek-supporting lobes located so as to give no pressure on sensitive organs. A lip at the rear of each lobe acts as a surface to absorb the backward pressure of the cyclist's pedalling.
For further information, contact: Alan Swarbrick, No. 3 Residence "Colanda", P.O. Box 285, Colac, Victoria 3250, Australia.

European Community

Process for Recycling Waste Plastic Ref. GSSW

A European company offers licence rights to its process for recycling plastics. The process uses most thermoplastics which are sorted prior to granulation and plastification through a patented extruder feeding water-cooled moulds. The resulting products are almost similar in quality to those made from new plastic granulate.
For further information, contact: Götz Schaude, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

France

Ergonomic Typing Keyboard Ref. CLIP

A French scientist offers for licence a new ergonomic keyboard which uses only a third of the keys on a standard keyboard. It is IBM PC compatible and allows a choice between languages and characters (standard, Russian, Greek, Hebrew, scientific, chemical, etc.).
For further information, contact: Götz Schaude, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

Heat Transfer Pump Ref. CALO

Through an arrangement of heat exchangers, vessels, valves and pipes, this heat transfer pump uses the thermal difference between the sources of heat and cold to transport the liquid in a closed system which carries the heat to where it is needed.
For further information, contact: Götz Schaude, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

Germany, Federal Republic of (West Germany)

Display System with Hexagonal Pixels
Ref. GSBR

A German company offers for licence its displays with hexagonal pixels which give visibility three times better than with round or square pixels. All letters and figures, even pictures or Arabic characters, can be displayed.

For further information, contact: Götz Schaude, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

France

Automatic Card Filing System

A French firm is looking for a licensee in Canada to produce and market its CASCADE™ card filing system for vertical planning boards. Based on toothed lateral racks, the open-ended CASCADE™ system places a new card over the card already filling the spot which now automatically drops down a slot, creating a "domino" effect for all the cards in lower slots. This eliminates time-consuming manual repositioning of cards.

For further information, contact: R. Valery, c/o Christian Salaun, ELAN, 13, rue Jean Brunet, 92190 Meudon, France; Tel: 011.33 (1) 46.26.33.80.

Safety Barrier

A French company offers the technology to Canadian firms, on a joint-venture partnership or licensing arrangement, for its Modular Absolute Control Barrier (BAIM). BAIM acts as a regular vehicle barrier under normal conditions and as an anti-terrorist device under attack. Consisting of a gate-like device with "stop" signs, BAIN is connected to from one to three spring-loaded modular metal barriers that rise from a horizontal position if the control, gate-like barrier is improperly lowered. It has been tested to stop motor vehicles weighing as much as 180 tonnes travelling at speeds of up to 52 km/hr (32 mph).

For further information, contact: Gérard Mothe, SERTA, C.P. 37, avenue de Bordeaux, Saint-Jean-d'Illac, 33127 Martignan-sur-Jalle, France; Tel: 011.33 (56) 47.81.06; FAX: 011.33 (56) 34.85.81.

German Democratic Republic (East Germany)

"Gabatron" – Controlling System for Cooking and Baking
Ref. No. ZLB-111

"Gabatron" is a new method of controlling cooking and baking. A plug-in sensor measures the temporal change of impedance in the objects being cooked or baked — meats or cakes — evaluates it to give the best degree of cooking or baking. The device consists of a probe, which is inserted into the product to be cooked or baked, and an on-line electronic automatic control.

For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Technique for the Biological Elimination of Phosphate from Sewage
Ref. No. ZLB-112

Bacteria, with an increased capability of absorbing phosphates in sewage sludge, are used in an anaerobic-aerobic process which eliminates up to 70 percent of the phosphates. The process guarantees continuous operation, summer and winter, for low-cost elimination and economic use of the resultant phosphorus.

For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Technique for the Re-plasticization of Rubber Powder
Ref. No. ZLB-113

Based on a newly developed mechanico-chemical technique, rubber powder, obtained from old material with a grain size up to 1 mm, is devulcanized on the grain surface in a way that will guarantee good miscibility in fresh mixtures and in high concentrations. In addition, a complete co-vulcanization is reached.

For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

BIOVERIT® – New Bioglass Ceramics for Medicine
Ref. No. ZLB-114

As long-term, stable bio-materials for the replacement of hard tissue in medicine, glass ceramics open new avenues of medical advance. Applications include: as dorsal vertebra in orthopaedics; as middle ear implantations in head and neck surgery; as tooth-root implantations and tooth reconstruction in stomatology.

For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Residue-free Extraction of Pectin
Ref. No. ZLB-115

A new technology produces residue-free pectin from virtually all pectin-containing vegetable tissues, including those from cells grown in vitro. The technology uses well-known engineering solutions which are, however, unusual in the production of pectin. Exact process control through a new type of analytical system provides excellent adjustability of the process.

For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Technique for Manufacturing Low-wear Elastic Sealing Elements
Ref. No. ZLB-116

This technique modifies the surface of sealing elements so that significant improvements in friction and wear can be achieved at low cost. It is reported to eliminate the stick-slip phenomenon and increase substantially both wear resistance and resistance to aging.

For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Coated Titanium Carbide (TiC) Hard Metal for Cutting and Shaping
Ref. No. ZLB-117

This is a new development that improves the cutting and shaping performance of titanium carbide hard metals. A system of layer-coating the TiC hard metal makes it possible to increase the service life of the the hard metal during metal cutting of structural, carbon and mass steels.

For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Tactile Sensor for Automatic Assembly
Ref. No. ZLB-118
This tactile sensor provides reliable surveillance to help ensure safe automatic assembly operations which use industrial robots and flexible automatic assembly systems. The sensor helps reduce costs, improve accuracy, protect against break-down.
For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Robot Wrist with Snake-like Mobility
Ref. No. ZLB-119
Highly flexible extensions of robot wrists and arms have been developed enabling movements comparable to those of an elephant's trunk or a snake's body. They can be inserted into conventional industrial robots or incorporated as integral parts of self-sufficient, highly mobile robots.
For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Narrow-Slit Welding of Thick Metal Sheets
Ref. No. ZLB-120
This new technological and engineering development, the narrow-slit pendulum wire welding (EDP-welding), allows the efficient and economical welding of metal sheets up to 350 mm in thickness. The system reduces energy use and material expenditure, shortens production periods and improves welding quality.
For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Alternating Current Aerial Dust Filter
Ref. No. ZLB-121
Using high-voltage, alternating current, this filter effectively separates even the finest of high-resistant dusts and mists from suspensions-containing gases at temperatures up to 250° C. It is well suited to continuous and batch operations of small and medium-sized engineering plants and can be miniaturized for separation of dust in gas conduits.
For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Plant and Technique for Granulated Drying with Fluidized Bed Technique
Ref. No. ZLB-122
This newly developed technique makes it possible to achieve uncomplicated and economic granulation of suspensions, solutions and melts in large quantities. The technique guarantees granulates of high quality that can trickle with batching and abrasion resistance; prevent separation; improve storage and transportation abilities.
For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Pneumatic Stepping Motor Ref. No. ZLB-123
Newly developed stepping motor provides exact positioning of pneumatic components to meet the exacting demands of modern, flexible manufacturing and assembly lines, such as instant adjustment to a change in working conditions. The motor's applications include use in machine-tool construction, robotics industry and handling engineering.
For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Automatic Device for Bottling Liquid Media of Different Viscosities Ref. No. ZLB-124
This automatic bottling device was designed for bottling abrasive materials which cause wear on the piston and cylinder of conventional bottling equipment. It can be used to bottle acids, bases, abrasive materials, inflammable liquids as well as chemicals, foodstuffs and coating materials. The volume to be filled can be adjusted for each operation and adapted to all sizes of package.
For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

Interference-Optical Way Sensor Ref. No. ZLB-125
This new interference-optical way sensor is used for highly accurate linear contact measurement with a high degree of resolution. The use of modern light-wave technology offers minimum run-in times; protection against disturbances by electromagnetic fields. This precision sensor is well suited to control and ensure quality in the manufacture of optical instruments and in precision mechanics.
For further information, contact: Zentrales Büro für Internationalen Lizenzhandel der Deutschen Demokratischen Republik, Schicklerstrasse 5/7, Berlin, DDR-1020; Tel: 2 14 80; Telex: 114 894. *Please quote the reference number.*

New Zealand

Water-Operated Turbine
A New Zealand firm offers its technology for a water-operated turbine to Canadian companies for sales and distribution of the turbine throughout Canada and the United States. The "Martin" water-operated turbine uses run-off, or waste, water from springs, waterfalls, drainage and small streams or diversions from lakes and rivers to create energy which can be used to power various other devices or to pump water to best advantage. The turbine needs no fuel or electricity; is easily installed; can pump in two different directions at once; can use dirty water for energy while pumping clean water from a separate water source.
For further information, contact: Roy Martin, Director, Martin Research and Development Limited, P.O. Box 621, Dunedin, New Zealand.

Switzerland

Camping Grill Kit
Available for manufacture under licence is this kit from a Swiss company. The kit includes a vertically and horizontally adjustable grill for use over an open fire; camping grill which can be used with charcoal over an open fire or with gas, electricity or coal in the home and incorporates a table; and newly developed grill accessory fish tongs specially designed to grill seafoods, such as fish, shrimp or crayfish, which can also be used to cook vegetables and certain fruits or adapted for chicken or steaks.
For further information, contact: CONYOU DESIGN, René Huber, Kasthoferstrasse 50, CH-3006 Berne, Switzerland; Tel: 0041-31/44 41 15.

United States of America

Hedge Trimmer Extension Device
A New York inventor offers his technology for a hedge trimmer extension device that can reach the tops and sides of tall bushes for trimming and clipping. It attaches to all makes of power hedge and tree cutters and trimmers to cut and trim hedges and bushes with ease and safety.
For further information, contact: Invention Prototypes & Marketing, 22 Walter Street, Pearl River, New York, NY 10965, U.S.A.; Tel: (914) 735-7774.

Insect and Roach Spray

Available from a New York inventor for outright sale or licensing arrangement is his technology for an insect and roach spray that is claimed to keep working to kill pests longer than most sprays. A special ingredient holds the spray solution in an active form for months.

For further information, contact: Invention Prototypes & Marketing, 22 Walter Street, Pearl River, New York, NY 10965, U.S.A.; Tel: (914) 735-7774.

Electronic Early Pregnancy Testing Device

The Iowa State University offers, for licensing arrangement or research funding, a portable electronic early pregnancy testing device for cows and swine. Based on ultrasonic technology, the device can be used to detect pregnancy in cows 14 to 18 days after breeding, and in swine 13 days after breeding.

For further information, contact: Dr. Steven C. Price, Biotechnology Industrial Liaison, 1010 Agronomy Building, Iowa State University, Ames, Iowa, IA 50011; Tel: (515) 294-9440.

Requested

Brazil

- Diagnostic Reagents Kits
- Digital Distributed Control Systems

Great Britain

- Animal Health Care Products and Technology

Germany, Federal Republic of (West Germany)

- Work Station Security Device

Spain

- Irrigation Equipment
- Precision or Flow Meter Electronic Equipment
- Application Software

Brazil

Diagnostic Reagents Kits

Ref. No. BRE/0294/95/EN

A Brazilian company is seeking, through a joint-venture agreement, the technology to produce diagnostic reagents kits using latex agglutination, radioimmunoassay, enzymeimmunoassay, for domestic and international markets.

For further information, contact: E. Mastracchio, Head of Business Co-operation Centre, TASK FORCE SME, rue d'Arlon 80, B-1040 Bruxelles, Belgium. *Please quote the reference number.*

Digital Distributed Control Systems

Ref. No. BRE/0293/33/EN

A Brazilian firm seeks a joint-venture arrangement to produce digital distributed control systems, technology or association for flight simulators and 32-bits industrial microcomputers plus the technology for mathematical models for industrial automation and process control.

For further information, contact: E. Mastracchio, Head of Business Co-operation Centre, TASK FORCE SME, rue d'Arlon 80, B-1040 Bruxelles, Belgium. *Please quote the reference number.*

Great Britain

Animal Health Care Products and Technology Ref. No. 319/BE/88

Products, systems, technology and research projects are sought by a British company, through joint ventures, licences or product distribution agreement, related to farm animal health care products; animal productivity and carcass quality enhancers; dairy, beef, pig and poultry health care products; pet animal health care products; animal hygiene products; anti-parasitics; veterinary antibiotics and antibacterials; mastitis treatments; hormones for pet and farm animals; vaccines for pet and farm animals.

For further information, contact: PAX Technology Transfer Limited, 112 Boundary Road, London NW8 0RH, England; Tel: 01 328 8823; Telex: 268048 EXT LDN; FAX: (Gp.3) 01 624 1242. *Please quote the reference number.*

Germany, Federal Republic of (West Germany)

Work Station Security Device Ref. No. 8856
Agreements for either licensing, purchasing the know-how or in sales corporation are sought for the production of a security device for office work stations which would consist of a desk with drawers and a computer. The computer would automatically lock all desk drawers when the operator leaves the work station and unlock them when the operator returns.
For further information, contact: Götz Schaude, Finkenstrasse 14, D-7534 Birkenfeld, Bundesrepublik Deutschland; Tel: (0 72 31) 48 07 23; FAX: (0 72 31) 48 16 68. *Please quote the reference.*

Spain

Irrigation Equipment Ref. No. GAS 94
A manufacturer in Spain of irrigation equipment incorporating fertilizers and phyto-sanitary products, seeks an exchange of technology and possible joint-venture arrangement to manufacture and market similar products.
For further information, contact: François-Xavier Artigues, I.D. Conseil-Brossard, 12 bis, rue Jean-Jaurès, 92807 Puteaux Cedex, France; Tel: (1) 47 76 42 01; Telex: BROSSARD 613 715 F. *Please quote the reference number.*

Precision or Flow Meter Electronic Equipment Ref. No. MAS 105
A Spanish manufacturer of electric meters and telemeasurement equipment would like to produce, under licence or other similar arrangement, precision or flow meter electronic equipment. The company would also like to participate in joint design projects for electronic equipment.
For further information, contact: François-Xavier Artigues, I.D. Conseil-Brossard, 12 bis, rue Jean-Jaurès, 92807 Puteaux Cedex, France; Tel: (1) 47 76 42 01; Telex: BROSSARD 613 715 F. *Please quote the reference number.*

Application Software Ref. No. LAS 96
Technical co-operation is sought by a Spanish company for the development of application software for a variety of products. The company also seeks reciprocal distribution agreements.
For further information, contact: François-Xavier Artigues, I.D. Conseil-Brossard, 12 bis, rue Jean-Jaurès, 92807 Puteaux Cedex, France; Tel: (1) 47 76 42 01; Telex: BROSSARD 613 715 F. *Please quote the reference number.*

R&D Notes

Video Cassette on "Technology Transfer" Available

A new video cassette illustrating many of the important challenges of technology licensing and transfer, "Technology Transfer", has been jointly produced by the Licensing Executives Society (U.S.A. and Canada), Inc. (LES U.S.A./Canada), the Institute of Electrical and Electronic Engineers and the Industrial Innovation Centre of Montréal.

The cassette is available from LES U.S.A./Canada and can be obtained by writing: Licensing Executives Society (U.S.A. and Canada), Inc., 71 East Avenue, Suite S, Norwalk, Connecticut, CT 06851-4903, U.S.A.

Scientific Collaborative Agreement Signed Between Canada and West Germany

A collaborative agreement on Co-operation and International Technology Transfer (CITT) has been signed between the National Research Council Canada (NRC) and the Technologie-Vermittlungs-Agentur Berlin e.V. (TVA) of West Berlin, Federal Republic of Germany (FRG).

The CITT Agreement is intended to create and maintain a co-operative framework between NRC and TVA to facilitate collaborative action in technological innovation between companies in Canada and West Berlin.

For further information, contact: J. A. (Han) Koster, Project Manager, Industrial Research Assistance Program, Collaborative Projects, National Research Council Canada, Ottawa, Ontario K1A 0R6; Tel: (613) 993-8238.

Memorandum of Understanding

In an effort to strengthen international competitiveness of the Canadian consulting engineering industry, Industry, Science and Technology Canada (ISTC) has entered into a Memorandum of Understanding (MOU) with the Association of Consulting Engineers of Canada.

The MOU will facilitate discussions between ISTC and the industry on a number of issues of vital concern to the industry.

For further information, contact: Mercedes Ballem, ISTC, Ottawa, Ontario K1A 0H5; Tel: (613) 996-3915.

Alberta Grant to Help MBA Students

Promising Master of Business Administration (MBA) students at the University of Calgary will have the opportunity to gain international business experience this year with the help of a grant from the Alberta Department of Technology, Research and Telecommunications.

The grant has been made to the Projects for International Technology Transfer (PROFITT) program of the University of Calgary Faculty of Management. PROFITT offers MBA students the means to help Alberta companies open up new international markets for their products and services.

For further information, contact: PROFITT, University of Calgary, 2500 University Drive N.W., Calgary, Alberta T2N 1N4; Tel: (403) 220-6331.

University of New Brunswick Student Branch of American Nuclear Society Recognized

A group of science and engineering students at the University of New Brunswick (UNB) has been formally recognized as a student branch of the American Nuclear Society (ANS). The only other Canadian student branch of ANS is at the University of Toronto.

The aim of the ANS is the advancement of the peaceful use of nuclear technology and it is dedicated to the exchange of technical information and to the creation of an awareness of the benefits of nuclear technology.

For further information, contact: Brenda Petersen, Department of Public Relations and Information, University of New Brunswick, Fredericton, New Brunswick E3B 5A3; Tel: (506) 453-4793.

Special Events

Summary

Canada

- BUSINESS OPPORTUNITIES SASKATCHEWAN
  Regina — October 1989
- AGRI-TRADE '89
  Red Deer — November 1989
- GRAPHIC TRADE '89
  Toronto — November 1989
- CANADIAN CONSTRUCTION SHOW
  Toronto — February 1990
- CANADIAN ENVIRONMENTAL EXPOSITION-CEX
  Toronto — March 1990
- CANADIAN PLANT ENGINEERING & MACHINE TOOL SHOW
  Montréal — May 1990

Australia

- 5th ANNUAL GENERAL MEETING AND CONFERENCE OF THE INTERNATIONAL ASSOCIATION OF SCIENCE PARKS
  Adelaide — November 1989

Bahrain

- MEFEX 90
  Bahrain — February 1990

Belgium

- EUROTECH 90
  Brussels — April 1990

France

- EUROPLAST 90
  Paris — June 1990
- IRC EXHIBITION
  Paris — June 1990

Germany, Federal Republic of (West Germany)

- SYSTEMS 89
  Munich — October 1989
- PRODUCTRONICA 89
  Munich — November 1989
- IKOFA 90
  Stuttgart — June 1990
- TRANSPORT '90
  Munich — June 1990

Hungary

- TECHEX '90
  Budapest — February 1990

Saudi Arabia

- SAUDIAGRICULTURE 89
  Riyadh — March 1990

Spain

- TECHNOVA 89
  Madrid — October 1989

Turkey

- COMMUNICATIONS TURKEY 89
  Istanbul — November 1989

United States of America

- EXPO '89
  Chicago — November 1989

Canada

Business Opportunities Saskatchewan 3rd Business Opportunities Marketplace

Canada Centre, Exhibition Park
Regina, Saskatchewan
October 27 to 29, 1989
For further information, contact: Jay-Ann King Clyde, Saskatchewan Economic Development and Tourism, 1919 Saskatchewan Drive, Regina, Saskatchewan S4P 3V7;
Tel: (306) 787-1608.

Agri-Trade '89
Exhibition of Agricultural Products and Farm Equipment

Westerner Exposition Grounds
Red Deer, Alberta November 9 to 12, 1989
For further information, contact: Pat Kennedy, Red Deer Chamber of Commerce, 3017 Gaetz Avenue, Red Deer, Alberta T4N 5Y6; Tel: (403) 347-4491.

Graphic Trade '89
Graphic Arts Printing Equipment and Supplies Exhibition

Toronto International Centre of Commerce
Toronto
November 17 to 20, 1989
For further information, contact: Bernie Loveridge, Show Manager, Southex Exhibitions, 1450 Don Mills Road, Don Mills, Ontario M3B 2X7;
Tel: (416) 445-6641; FAX: (416) 442-2077.

Canadian Construction Show

Construction and Building Equipment, Supplies, Products and Services
International Centre
Toronto
February 14 to 16, 1990
For further information, contact: Peter McLean, Show Manager, Industrial Trade & Consumer Shows Inc., 20 Butterick Road, Toronto, Ontario M8W 3Z8;
Tel: (416) 252-7791; FAX: (416) 252-9848;
Telex: 06-219547 (ITCS).

Canadian Environmental Exposition-CEX
Plumbing, Heating, Air Conditioning, Ventilation Equipment and Materials

Metro Toronto Convention Centre
Toronto
March 11 to 13, 1990
For further information, contact: Nancy Shield, Harry Shield, H. D. Shield and Associates Ltd., 25 Bradgate Road, Don Mills, Ontario M3B 1J6; Tel: (416) 444-5225.

Canadian Plant Engineering & Machine Tool Show

Place Bonaventure
Montréal
May 14 to 17, 1990
For further information, contact: Steve Utting, Group Show Manager, Industrial Trade & Consumer Shows Inc., 20 Butterick Road, Toronto, Ontario M8W 3Z8;
Tel: (416) 252-7791 or (toll-free) 1-800-268-0387;
FAX: (416) 252-9848; Telex: 06-219547 (ITCS).

Australia

5th Annual General Meeting and Conference of the International Association of Science Parks
Convention Centre Adelaide, Australia
November 14 to 16, 1989
For further information, contact: The Organising Committee, 5th Annual General Meeting and Conference, International Association of Science Parks, c/-Technology Development Corporation, Innovation House, First Avenue, Technology Park, South Australia, 5095 Australia. *OR* Australian Trade Commission, 175 Bloor Street East, Suite 316, Toronto, Ontario M4W 3R8; Tel: (416) 323-3909; FAX: (416) 323-3910; Telex: (06) 219762 AUSTRADETOR.

Bahrain

MEFEX 90
6th Middle East Food and Equipment Show and Salon Culinaire
Exhibition Centre
Bahrain
February 10 to 13, 1990
For further information, contact: Overseas Exhibition Services Ltd., 11 Manchester Square, London W1M 5AB, England; Tel: 01-486 1951/487 5831/935 4672; FAX: 01-486 8773; Telex: 24591 MONTEX G.

Belgium

EUROTECH 90
Incorporating International Fairs on Industrial Electricity, Industrial Equipment, Packing, Sub-contracting, Plastics, Materials Handling, Robotics, Industrial Hydraulics
Brussels Exhibition Centre
Brussels, Belgium
April 24 to 28, 1990
For further information, contact: Foire internationale de Bruxelles, A.S.B.L./Internationale Jaarbeurs van Brussel V.Z.W., Place de Belgique/Belgiëplein, B-1020 Bruxelles/Brussel; Tel: 32/2/478 48 60; FAX: 32/2/478 80 23; Telex: 23643 foire b.

France

EUROPLAST 90
International Plastics Exhibition
Parc de Paris-Nord
Paris
June 11 to 16, 1990
For further information, contact: Association pour le Développement des Matériaux de Synthèse (ADMS), 59, rue Boissière, 75116 Paris, France; Tel: (33-1) 47 27 84 86; FAX: (33-1) 47 55 18 50; Telex: 640 541.

IRC EXHIBITION
International Rubber Exhibition
Parc de Paris-Nord
Paris
June 11 to 16, 1990
For further information, contact: Association pour le Développement des Matériaux de Synthèse (ADMS), 59, rue Boissière, 75116 Paris, France; Tel: (33-1) 47 27 84 86; FAX: (33-1) 47 55 18 50; Telex: 640 541.

Germany, Federal Republic of (West Germany)

SYSTEMS 89
11th International Data Processing and Telecommunications Exhibition
Munich Trade Fair Centre
Munich, Federal Republic of Germany
October 16 to 20, 1989
For further information, contact: Munich Trade Fair Corporation, Münchener Messe- und Ausstellungs-gesellschaft, Messegelande, Postfach 121009, D-8000 München 12, Bundesrepublik Deutschland; Tel: (089) 51 07-0; FAX: (089) 51 07-506; Telex: 5 212 086 ameg d.

PRODUCTRONICA 89
8th International Trade Fair for Electronics Production
Munich Trade Fair Centre
Munich, Federal Republic of Germany
November 7 to 11, 1989
For further information, contact: UNILINK, 50 Weybright Court, Unit 41, Agincourt, Ontario M1S 5A8; Tel: (416) 291-6359; FAX: (416) 291-0025.

IKOFA 90
International Food Fair
Stuttgart Trade Fair Centre
Stuttgart, Federal Republic of Germany
June 9 to 12, 1990
For further information, contact: Messe Stuttgart, Am Kochenhof 16, Postfach 9 90, D-7000 Stuttgart 1, Bundesrepublik Deutschland; Tel: 07 11/25 89-0; FAX: 07 11/25 89-4 40; Telex: 7 22 584 killb d.

TRANSPORT '90
4th International Trade Fair for Freight and Passenger Transport
Munich Trade Fair Centre
Munich, Federal Republic of Germany
June 19 to 23, 1990
For further information, contact: UNILINK, 50 Weybright Court, Unit 41, Agincourt, Ontario M1S 5A8; Tel: (416) 291-6359; FAX: (416) 291-0025.

Hungary

TECHEX '90
The Technology Exchange
Budapest Convention Centre
Budapest
February 13 to 16, 1990
For further information, contact: Ipari Reklám és Propaganda Vállalat, 1081 Budapest VIII, Rákóczi út 57, Hungary; Tel: (361) 136-602; FAX: (361) 133-257; Telex: 22-7224.

Saudi Arabia

SAUDIAGRICULTURE 89
9th Agriculture, Irrigation & Agri-Industry Show
Riyadh Exhibition Centre
Riyadh, Saudi Arabia
March 11 to 15, 1990
For further information, contact: UNILINK, 50 Weybright Court, Unit 41, Agincourt, Ontario M1S 5A8; Tel: (416) 291-6359; FAX: (416) 291-0025.

Spain

TECHNOVA 89
International Innovation and Technology Exhibition
Recinto Ferial Casa de Campo
Madrid, Spain
October 17 to 20, 1989
For further information, contact: Institucion Ferial de Madrid, Recinto Ferial Casa de Campo, Avenida de Portugal, s/n.28011 Madrid, Spain; Tel: (91) 470 10 14/463 90 80; FAX: (91) 464 33 26; Telex: 44025-41674 IFEMA-E.

Turkey

COMMUNICATIONS TURKEY 89
2nd International Electronic Communications Exhibition
Istanbul Hilton Convention and Exhibition Centre
Istanbul, Turkey
November 1 to 5, 1989
For further information, contact: UNILINK, 50 Weybright Court, Unit 41, Agincourt, Ontario M1S 5A8; Tel: (416) 291-6359; FAX: (416) 291-0025.

United States of America

EXPO '89
Food and Dairy Exposition
McCormick Place
Chicago, Illinois
November 11 to 15, 1989
For further information, contact: Dairy & Food Industries Supply Association, 6245 Executive Boulevard, Rockville, Maryland, MD 20852, U.S.A.

Design: Stephen Shewchuk

Regional Offices

NEWFOUNDLAND
ISTC
Parsons Building
90 O'Leary Avenue
P.O. Box 8950
St. John's, Nfld.
A1B 3R9
Tel.: (709) 772-4866
FAX: (709) 772-5093

PRINCE EDWARD ISLAND
ISTC
Confederation Court Mall
134 Kent Street, Suite 400
P.O. Box 1115
Charlottetown, P.E.I.
C1A 7M8
Tel.: (902) 566-7400
FAX: (902) 566-7450

NOVA SCOTIA
ISTC
1496 Lower Water Street
P.O. Box 940, Station M
Halifax, N.S.
B3J 2V9
Tel.: (902) 426-4782
FAX: (902) 426-2624

NEW BRUNSWICK
ISTC
Assumption Place
770 Main Street
P.O. Box 1210
Moncton, N.B.
E1C 8P9
Tel.: (506) 857-4782
FAX: (506) 857-6429

QUEBEC
ISTC
Tour de la Bourse
800 Victoria Place
Suite 3800
P.O. Box 247
Montreal, Que.
H4Z 1E8
Tel.: (514) 283-8185
FAX: (514) 283-3315

Local Offices
Alma
Tel.: (418) 668-3084
Drummondville
Tel.: (819) 478-4664
Québec
Tel.: (418) 648-4826
Rimouski
Tel.: (418) 722-3282
Sept-Îles
Tel.: (418) 968-3426
Sherbrooke
Tel.: (819) 564-5904
Trois-Rivières
Tel.: (819) 374-5544
Val-d'Or
Tel.: (819) 825-5260

ONTARIO
ISTC
Dominion Public Building
4th Floor
1 Front Street West
Toronto, Ont.
M5J 1A4
Tel.: (416) 973-5000
FAX: (416) 973-8714

Local Offices
London
Tel.: (519) 645-5820
Ottawa
Tel.: (613) 993-4963

MANITOBA
ISTC
300 Portage Avenue, Room 608
P.O. Box 981
Winnipeg, Man.
R3C 2V2
Tel.: (204) 983-4090
FAX: (204) 983-2187

Local Office
Thompson
Tel.: (204) 778-4486

SASKATCHEWAN
ISTC
105 — 21st Street East, 6th Floor
Saskatoon, Sask.
S7K 0B3
Tel.: (306) 975-4400
FAX: (306) 975-5334

Local Office
Regina
Tel.: (306) 780-6108

ALBERTA
ISTC
Canada Place, Room 540
9700 Jasper Avenue
Edmonton, Alberta
T5J 4C3
Tel.: (403) 495-4782
FAX: (403) 495-4507

Local Office
Calgary
Tel.: (403) 292-4575

BRITISH COLUMBIA
ISTC
900 — 650 West Georgia Street
P.O. Box 11610
Vancouver, B.C.
V6B 5H8
Tel.: (604) 666-0434
FAX: (604) 666-8330

Local Office
Prince George
Tel.: (604) 561-5158

YUKON
ISTC
108 Lambert Street, Suite 301
Whitehorse, Yuk.
Y1A 1Z2
Tel.: (403) 668-4655
FAX: (403) 873-5763

NORTHWEST TERRITORIES
ISTC
Precambrian Building
P.O. Bag 6100
Yellowknife, N.W.T.
Tel. : (403) 920-8578
FAX: (403) 873-5763

Atlantic Canada Opportunities Agency
Tel.: (toll-free) 1-800-561-7862

FedNor
Tel.: (toll-free) 1-800-461-6021

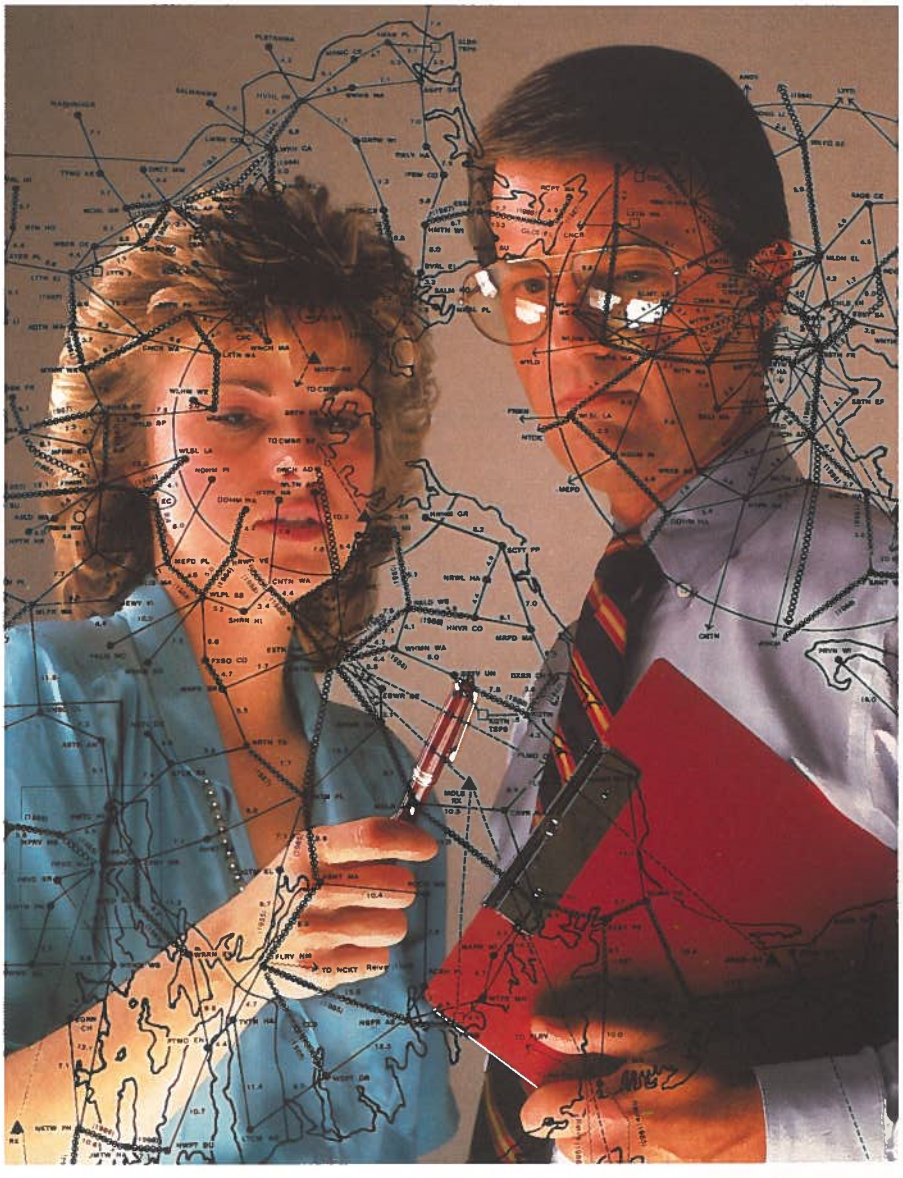
Western Economic Diversification
Tel.: (403) 495-4164
FAX: (403) 495-4557

If undelivered return to:
Innovation
Industry, Science and Technology Canada
Ottawa, Canada K1A 0H5

Canada Post Postage paid
Postes Canada Port payé

Bulk third class
En nombre troisième classe

K1A 0H5
OTTAWA



Industry, Science and Technology Canada
Industrie, Sciences et Technologie Canada

Canada