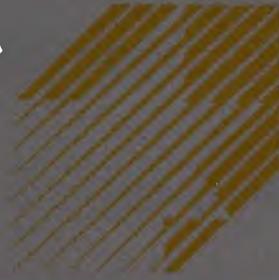


Nov. '85

CANADA AWARDS  
FOR EXCELLENCE  
1985



Productivity  
Entrepreneurship  
Marketing  
Labour/Management  
Co-operation  
Invention  
Technology Transfer  
Innovation  
Industrial Design  
Engineering Design



Supplement to Canada Commerce

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**Eight-Page Centre Spread:** Colour photos of winners of Awards of Excellence (Gold) and of Awards of Merit (Silver) plus list of finalists in each category.

## The New Canadian Way

**D**uring the first few years of this decade, it became popular in business publications to underscore Canada's mediocre performance in productivity and innovation compared to other industrialized nations.

*In commenting on the international competition that has an impact on so much of Canada's business, Sinclair Stevens, Minister of Regional Industrial Expansion, says, "Going international is a stimulating experience." He noted that it provides exposure to new ideas that filter through the entire system and "can trigger responses that lead to a new sense of competitiveness."*

*At midpoint in this decade the movement to a more competitive stand seems to be emerging within our overall business community.*

Analysis of the participants, and especially the finalists, in the *Canada Awards for Excellence* competition provides strong supporting evidence that hundreds of Canadian enterprises are adopting attitudes (which once might have been considered "un-Canadian") of aggressiveness and innovation in the growing drive towards productivity and profit.

Part of the revolution is recognition of the important role played by smaller businesses in creating jobs. Another part is recognition of the need for changes in managerial style in all, and especially larger, businesses.

The role of small business has been as difficult to define as the definition of what constitutes a "small" business.

Businesses, large and small, are being goaded into change by outside forces.

These forces and the challenges they offer are highly evident in success stories told by each of the finalists in the awards program. In later sections we will hear more about the specific challenges they faced and about their innovative responses.

Automation is perhaps the most significant catalyst. It is flattening business hierarchies, altering control systems and drastically changing the relationships between workers and management. Computerization and robotics are having an impact from the plant floor to the executive suite.

The conditions under which work is performed are becoming increasingly determined by worker-management committees. And, as we shall see in the Productivity section of this special supplement of *Canada Commerce*, means of remuneration are also undergoing a revolution in thinking.

There is a growing emphasis on payment for accomplishment. And this accomplishment is being achieved by less structured hierarchies now giving way to work teams that are the offspring of quality circles and other personnel innovations borrowed from other countries.

The change in the workplace dictates a change in management style. As corporate cultures shift from the authoritarian and bureaucratic to the performance-oriented and entrepreneurial, managers are becoming facilitators rather than "bosses". They are becoming responsible for linking people and information for greater productivity.

For, in spite of the technological revolution, people continue to be the wellspring of ideas. People continue to be both obstacles and the means of clearing obstacles.

Fred Veuger, president of CAE Machinery, Vancouver, British Columbia, characterizes the situation. "If my labour costs are too high," he says, "we must adopt policies of operation that can stand those costs. I must invest in smart people, the people that can design and run the kinds of machines that new technology demands. This means training and upgrading the people on our team."

He points out, however, that the size of the Canadian market means other markets must be penetrated in order to make our developments viable in terms of the economics of scale. And this means competing in the world marketplace.

Analysis of the finalist entries in the *Canada Awards for Excellence* competition reveals, perhaps surprisingly, that most of these companies rely heavily on markets outside of Canada. With a few exceptions, Westar Mining for example, the United States is, hands down, the major customer.

Less surprising then, is the August 12 headline from the *Globe and Mail*, "Competitiveness, Responsibility Hold Key to Growth".

How do these Canadian companies, many of them quite small, compete? How do they penetrate the United States and other markets?

For openers, they operate from an array of comparative economic advantages. Sinclair Stevens, Minister of Regional Industrial Expansion, referred to this as "The Canadian Edge" in an August article in *Chimo* magazine. "We have an advanced technological infrastructure, sophisticated banking and financial systems, excellent access to markets, abundant energy and natural

resources and one of the world's highest standards of living."

And he underlined the fact that "the world is becoming increasingly interdependent on both macro-economic and micro-economic levels".

But every Canadian company operates from the same base, you say.

Yes, but the examples we have examined demonstrate a set of top management characteristics and a style of management that could have been taken directly from the pages of the business best-sellers of 1985.

In each case, the key person — project engineer, project manager, divisional manager or president — exhibits the courage, determination, often risk-taking entrepreneurial attitudes that are essential to the environment of the 1980s. And this is combined with an openness and dependency on other members of the managers' teams to create a leadership style that stimulates full-fledged participation and commitment from all members.

And their organizations are young. In most cases the finalist companies or the divisions that entered are less

than five years old. Democratic and dynamic, they point the way to the future.

Where high-tech is their strong suit they do not rest on their laurels. Technical arrogance and the belief that "the product will sell itself" give way to well thought out, aggressive marketing. Process Technology of Oromocto, New Brunswick, and Mobile Data Systems of Richmond, British Columbia, are leading examples.

"We can sell on the basis of design" is a motto of many members of Canada's design fraternity. Ontario Bus of Mississauga, Ontario, and Ergoform of Dorval, Québec, have substantiated that statement.

Two of the "biggies" that demonstrate the progressive mindset for management in the 1980s are Garrett Manufacturing Ltd. of Rexdale and Firestone Textiles of Woodstock. Their ratings for excellence were earned on the basis of innovative approaches in human resources utilisation. Their policies regarding human resources are actually written into the business strategy of each company.

This begs the question of how far we can go with incorporating this "newthink" into the most traditional document of all — the annual (and quarterly) report.

## *To Pick the Best . . . Call in the Jury*

*"We went all out for two full days . . .  
What a fantastic learning experience" — Jury Member*

Picture a senior member of the business or academic establishment. The attitudes caricatured on posters of the 1960s and early 1970s are disappearing before the onslaught of changes that are reshaping Canadian enterprise. Outward appearances to the contrary, attitudinal shifts are becoming increasingly rampant.

And the distinguished members of the Grand Jury of the *Canada Awards for Excellence* exemplify this change.

In the search for more perspectives on the awards program, *Canada Commerce* spoke with several members of the 1985 Grand Jury.

The findings?

When questioned, these senior members of business and academia exuded an air of almost unbridled enthusiasm with words and phrases like "competitive", "determined", "risk taking". They spoke from first-hand exposure to the qualities of today's Canadian businesses revealed in the entries to the awards competition.

Marie Taylor, chairman of the B.C. Public Utilities Commission, comments, "We need gamblers. We can't sit back and wait for somebody else to do it. This kind of competition is what life is about. Striving. Taking the good with the bad for the chance you might win."

Or, Ms. Diane Hall, senior vice-president of Nova Corporation, based in Alberta, ". . . a good idea to have other companies in the country know what is happening to other competitive companies."

"Canada's economic future depends to a large extent on its competitiveness in the global context. This program — to promote competitiveness in Canadian business and industry — is a very positive step. It enhances the opportunity for recognition." That, from Mrs. Angela Cantwell-Peters of Halifax, Nova Scotia, retired chief executive officer of Bowrings, who began as a stenographer and worked her way to the top in that company and sits on the boards of several others.

"Considering the geographical and sectoral cross-section of exam-

ples from most of our country (I was) . . . pleased more than surprised. It is encouraging, as a Canadian-based businessman, to see what really is happening and especially what has been achieved by so many individuals and companies in the difficult early years of this decade," said R.C. Frost, director of marketing, Hawker Siddeley Canada, Inc. of Trenton, Nova Scotia.

"Even if there is only ONE Award of Excellence in a category, second is awfully good," says Mr. Frost as he enthusiastically discusses the high level of quality among the entries in the competition.

The humanistic aspects of business in the 1980s that emerge so frequently in the entries are underlined by J. Finkleman, past-president of the Public Service Staff Relations Board in Ottawa, who speaks from over 50 years of personal experience in fields related to the topic.

"How the entrants managed 'change' is one of the criteria and an issue that is affecting our country right now. The awards competition recognizes admirably (the successful handling of) the situations that might have been traumatic for many employees and the companies." Mr. Finkleman was chairman of the Labour/Management category.

Professor Roger Blais of L'École Polytechnique, Université de Montréal (whose personal credentials

In their landmark book *A Passion For Excellence*, Tom Peters (co-author of *In Search of Excellence*) and Nancy Austin raise the issue of including the measurement of customer service as a means for remuneration. Moving from "counting beans" to assessing the human resources contribution may be a next step for progressive companies in their quest for increased productivity.

Customer service. Product quality. Do they have a place on the corporate balance sheet?

They are pointed out by many of the entrants as key factors in beating their competition and particularly necessary considerations in world markets.

Gaining market share on price alone can have short-term, dubious success. Maintaining market share where the corporate policy is satisfied with the philosophy that "we are no worse than anybody else" is well high impossible.

If we are trapped by a corporate culture that focuses only on costs, it is difficult to build a "quality ethic" or a "service ethic".

And yet innovative utilization of quality and service is a downstream requirement of the decade. And this is even more important for smaller businesses if it proves

true that Big Business is increasing its concentration on market niches as a means of expansion. As *Inc.* magazine has said, "When companies as big as Campbell start thinking like entrepreneurs, small companies had better start thinking about new ways to compete."

So another facet of the Canadian renaissance must be a sense of urgency. Managers, in business and government and at every level in their new role of facilitators, must concentrate on removing blockages in the bureaucracy and encourage speed of response.

Improving productivity can come from innovation. And productivity and innovation together can improve individual companies, and Canada's competitiveness. But, as one Canada Awards finalist says, "Having the idea is one thing; translating it into action is the key. Canadians are great thinkers. The time has come for action."

The leaders of the enterprises that placed highly in the Canada Awards symbolize that activism. Their success stories emphasize most of the characteristics needed by businesses to compete successfully in the last half of this decade.

And sharing their successes is what the *Canada Awards for Excellence* program is all about.

include a Master of Science degree in geology from Laval University, a Ph.D from the University of Toronto and a certificate in Research and Innovation Management from M.I.T. and, recently, The Order of Canada) served on the jury for his second term. As chairman of the Innovation category, he was impressed by the improvement in the quality of entries in all categories and views them as being of international calibre. Stressing the importance of basic invention, however, he hopes for more entries in future in this vital category.

Speaking from his vantage point as chairman of the Technology Transfer category, and director, industrial technology transfer, for the Saskatchewan Research Council in Saskatoon, Alan Scharf focuses on the important aspect of information-sharing using the Ontario Bus entry as an example. With many engineers trying to develop new elevators, new ways to lift people — and especially disabled persons — Ontario Bus Company came up with an alternative. Its entry featured a new design which in effect "lowers" the bus.

Publicity of innovative approaches may encourage more "inventors" to seek alternatives. In some cases it will require the transfer of technology from an institution in one end of the country to a business thousands of miles away. In others, it requires business to

"shop" in other countries to discover technology that may be modified to the particular requirements of the Canadian environment.

"The awards demonstrate that we have strength in specific areas such as communications, transportation, ergonomics, etc.," says Koen de Winter, president, Association of Canadian Industrial Designers. The entries also demonstrate an ability to innovate and adapt to the Canadian climate, particularly in the fields of energy exploration and mining. And the expertise in specific industries such as pulp and paper is also in strong evidence.

Risk taking, a most outstanding feature of the entrepreneur, is much in evidence in many other categories as well as in the Entrepreneurship category, according to George Urquhart, past-chairman, Canadian Chamber of Commerce and chairman of the category.

"The results achieved and turned into profitable enterprise demonstrate that Canadians can do it," he says.

Improved productivity is the sum of many activities directed at improving the competitiveness of a business — or a country. Marcel Desjardins, president of CEGIR, served as chairman of the Grand Jury in 1984 and is both a member of the current Grand Jury and chairman of the Productivity category. A

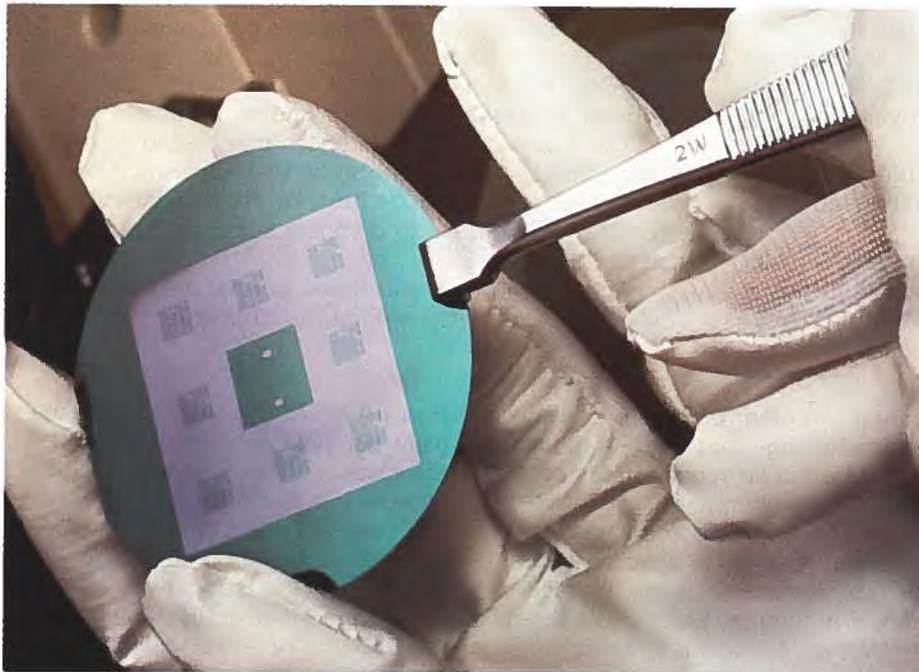
Harvard MBA who worked with the giant Bechtel Corporation in San Francisco prior to founding CEGIR at Montréal in 1970, Mr. Desjardins has been occupied with many international studies on productivity.

Among the Productivity entries — and the other entries that faced the Grand Jury — he vouches for the fact that improved productivity is evident throughout. At the same time, he is concerned about the missed opportunities in smaller as well as large companies to "formalize" approaches to increased productivity. As will be seen in the section on Productivity, the finalists demonstrated excellent examples of how to integrate productivity enhancement in the business plan.

While summer wound down for the Labour Day weekend, the Grand Jury wound up the process of selecting winners. The process, which had begun in early summer with dozens of qualifying entries reduced to five finalists in each category, ended with the Grand Jury winnowing out the best in each category.

Selection of the jury itself was a major task as the standards were high. Among the key criteria? "Eminence in the field on the part of the individual member," says Lucie Cartau, program head for the Department of Regional Industrial Expansion, "and regional and industry sector representation."

## Improved Productivity Ensures Survival



Today's business environment is different from that of even five years ago. The marketplace, for instance, is now more international, technology continues to rapidly change the workplace and dramatic shifts have occurred in the values of the workforce.

Similarly, today's successful managers are different from a few years ago and they are searching for ideas — ideas that will rejuvenate their companies and make them more productive and profitable.

The stakes are high for Canadian businesses to improve their productivity and competitiveness. The companies that succeed gain valuable competitive position but those that fail to improve their situation will likely not survive the next five years.

One of the most successful corporate strategies to help ensure survival is to focus directly on improving productivity. So, it is no surprise that the Productivity award of the *Canada Awards for Excellence* is the most prestigious.

### Winners and Finalists

While there are many shining examples of productivity improvement, the winners and finalists in this award category have exhibited outstanding efforts.

Winner of the *Award of Excellence* in this category was Garrett Manufacturing Limited of Rexdale, Ontario, while Inco Limited (Ontario Division) of Copper Cliff, Ontario, won the *Award of Merit*. Other finalists were Camco Limited of Orangeville, Ontario; Firestone Canada Inc. of Hamilton, Ontario; and Cooperators General Insurance Co. of Guelph, Ontario.

**The award is given to the company that best demonstrates optimum use of its potential relative to its resources and the market situations it faces. To be eligible, companies must operate in Canada and meet the following criteria:**

- The improvement in productivity must have taken place in Canada within the past five years.

- The achievement must enhance both the company's and Canada's efforts to be competitive.
- The productivity improvement must have played a major role in achieving the company's corporate objectives.

While there is no magic solution, cure-all or recipe for others who wish to duplicate these success stories, several common themes and characteristics do emerge from the finalists' stories.

### Top-Level Commitment

Senior managers in these successful firms had a vision about the future of their company, were able to translate that vision into a sense of mission for all and then clearly convey it to employees. They encouraged others to work toward accomplishing specific results.

At Firestone, for example, a vision plus a mission statement were developed by a senior management team with the co-operation, advice and support of union representatives. This participative style helped to build a cohesive team of middle managers which resulted in a five-fold improvement in their return on assets between the years 1982 and 1984.

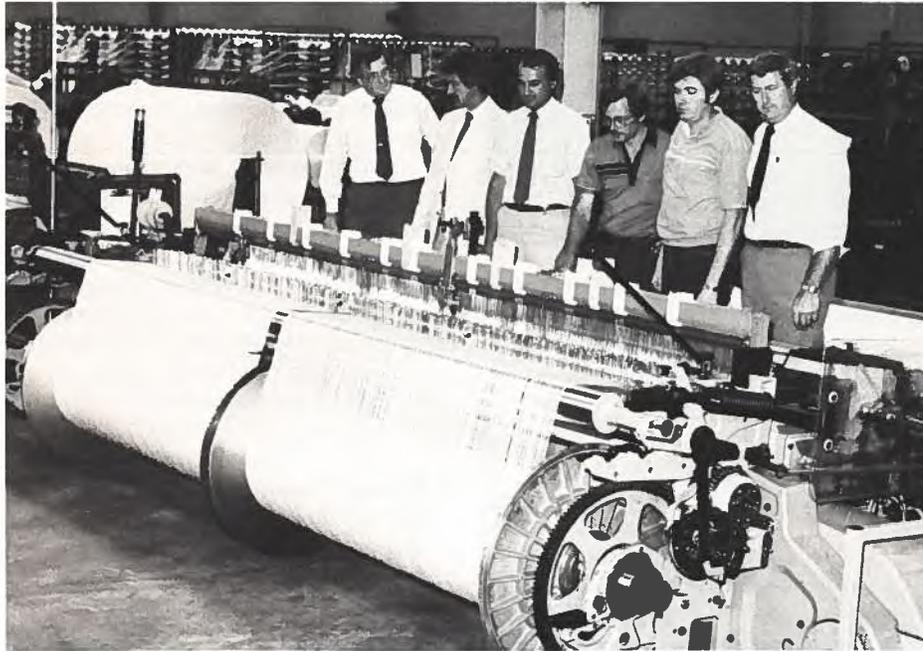
The Cooperators provides casualty insurance across Canada. With its 4 000 employees, the company launched a productivity improvement program in 1982 that was intended to realign management, redefine organizational structure, increase computerization, more fully develop its human resources and be understood by all, management and employees alike.

At one board meeting, the directors discussed the productivity program and how they saw it progressing. It was videotaped, shown to all employees and, in this way, the corporate vision was translated into purpose.

## Employee Involvement

When all employees are working hard toward a common purpose, synergism develops within the organization. A sense of pride and power develops among employees, which encourages everyone to continue their efforts.

At Garrett, the growing market has permitted controlled growth. With about 900 employees, the company talks about its "family" type atmosphere. These people realize that their job security comes from doing things right the first time — that quality and productivity go hand in hand — and from using the most advanced technology to gain competitive advantage in the world market.



Improving productivity is a clearly stated Garrett objective and is one part of a seven-year strategic plan to incorporate this attitude into the company's corporate culture. Communication is emphasized through small work groups, newsletters and celebrations of success — which occur frequently.

This "family" rapport, however, does not replace the drive for hard-nosed results and decisions. Productivity measurements are taken monthly by senior management and a multi-disciplined productivity council which represents all departments.

At Firestone and Inco the market situation is different. Nonetheless, employees talk openly about a new "spirit" that has recently developed.

They suggest it is one of openness, co-operation and fairness.

In fiercely competitive and fluctuating markets, companies like these face extinction unless their productivity efforts succeed. Co-operation and working with employees is a cornerstone for success.

But even with the best of intentions, management cannot avoid making decisions. In order to keep the business operating and ensuring employment for most, hardships (such as layoffs and early retirement programs) are inevitable for these types of businesses and for some of their employees. One of the real tests, however, is how such unpopular decisions are managed fairly.

## Management Innovations

A participative management style is favoured by all finalists. The managers all have strong leadership qualities and encourage others to achieve the corporate objectives by sharing responsibility.

While this approach may threaten those who want to keep the status quo, it usually proves best for the majority and for the well-being of the business. Regularly rejuvenating the business is an integral part of the job.

Camco recognized the need to be more competitive when foreign microwave oven manufacturers invaded "their" market. Camco had to do something different or results would likely stay the same. Rather

than simply telling employees or just hearing suggestions as in the past, this time management listened closely and acted promptly.

Employees were included in productivity action teams and recommended changes. Innovatively, those doing the job were asked what they thought should be done to make it more productive and enjoyable. Now, ideas keep popping up all over the plant and are being implemented in record numbers.

At Inco, innovations included building enriched jobs, flattening the organization structure and creating more work teams that consisted of fewer but more skilled and adaptable workers. In addition, the benefits resulting from improved productivity were shared with employees who now can earn up to 40 per cent more than base salary, depending on their production.

A rejuvenated Firestone management team approached innovations by managing assets more effectively and working in an even more creative yet highly logical fashion. Storyboarding and brainstorming techniques resulted in introducing a "just-in-time" inventory system that halved work in process inventory. In addition, a "rapid change" team cut machine set-up time by 70 per cent.

## Technological Changes

Successful companies are always looking ahead. They don't wait for equipment and machinery to become obsolete because of someone else's innovations. Rather, they are proactive, making their own innovative improvements and causing other companies to react. They are always looking for better equipment, computers, CAD/CAM, lasers, numerically-controlled machines, and so on.

Garrett is a world leader in some of its technology and has one-of-a-kind equipment in Canada, all because of a strategic plan to maintain this position by making sure it had such equipment. It needs this manufacturing edge if exports are to continue to be some 75 per cent of its sales.

To improve its mining efficiency, Inco developed specialized machines which it now sells as specialty products to other companies worldwide. Exporting more than 90 per cent of its total production, Inco must have

and use the most advanced methods and equipment to stay competitive.

The Cooperators launched a major program to computerize and is now the 10th largest user of IBM equipment in Canada. Such improvements in efficiency did not come by chance but were the results of concerted effort to reduce costs and improve effectiveness.

### **Entrepreneurial Activities**

While some firms wait for things to happen and tend to get stodgy and secure in their size, other companies are strategically poised to assault markets for their share. New ideas and innovations are continually needed to retain a competitive position.

Perhaps for the first time in history, a powerful blend of those who wish to have entrepreneurial freedom to innovate within the security of a larger firm is not only possible but, more likely, will become a necessity. An exciting business renaissance, it is needed not only in small companies, but perhaps more importantly in the sometimes more complacent and vulnerable larger ones.

### **Successful companies encourage entrepreneurial activities and make it appropriate to test different ideas, allowing people to make mistakes but also to make potentially big gains. For example:**

- Garrett's controlled growth has been accelerated by encouraging some high-performance people to take risks. After a three-year investment of time and energy, it paid off handsomely with a new product line and sales worth an estimated \$5 000 000.
- Inco selected its best plant engineer and put him in charge of developing new products and equipment. After a few years, the results were a brand new product line and a whole new operation.

### **Results . . . Results . . . Results**

Results count! Without them there is no profit and no business. For instance, the finalists in the Productivity award competition had results for many reasons — because of their market niche, performance management and various reward systems and ways of holding their people accountable.



Garrett's approach worked. It balances participative planning, small work groups, strict measurements, state-of-the-art technology, energy conservation programs and quality control measures.

These efforts have catapulted Garrett into a position in which it is approximately 15 per cent more productive than most of its competition. In a tough market where two per cent gains in productivity are significant, Garrett has averaged four per cent over each of the last three years.

Camco's efforts and successes were small at first but gained momentum and were sustained. The company's perseverance yielded an astonishing 24 per cent productivity gain in the first year, representing a \$1 000 000 saving. Based on a gain-sharing plan, 50 per cent of that saving was shared with those responsible for achieving the results, or about \$1 600 per person for the year.

The Cooperators retains its top-ranked position in the casualty insurance field with a solid reputation for service while maintaining a stable 4.2 per cent market share in a price-competitive market. Because of its productivity efforts, its general

expenses average 15 per cent below those of its competitors — a benefit passed on to its policy holders.

### **A Specific Approach**

There is no one approach that will work in all situations or corporations. As is shown by the efforts of each finalist, each productivity improvement approach must be custom-tailored for each company.

One common theme of the finalists is that each approach was different. This was one of the keys to their success — what they did varied with what they had and worked in the time available.

Another theme was that, while many companies pay attention to clients or customers or employees, the high performance companies pay attention to **all** people.

The Cooperators, for instance, places a major emphasis on quality relationships with all people. Camco is regarded as *the* place to work in Orangeville. Garrett is a family-style business where all feel a part of the company.

In these companies, customer relations and corporate philosophy reflect a dedication and commitment to service and quality relationships with their people and their communities.

### **A Strong Foundation**

These winning themes can provide a strong foundation for virtually any company in any industry to initiate productivity action. But they are not panaceas and do not fully address the question of how to do it. Care should be taken and skilled assistance sought before starting a productivity program.

Judging by the success of the Productivity award finalists, however, significant gains *are* possible if there is the will to make them happen. It all starts with the commitment of the chief executive officer who works to encourage a more participative and open management style.

For their survival and well-being, Canadian businesses would be wise to listen and learn from these companies' lessons. That, of course, by itself is not enough. Action — prompt action — is needed, even more so in a world of increasingly protectionist trade barriers.

## Entrepreneurship — Watchword of the Eighties

**W**illpower. Determination. Tenacity. Pluck. Courage. Blend well with large dollops of innovativeness and hard work and you have the key ingredients for the entrepreneur — the high wire artist of the business world.

In most, if not all cases, successful businesses owe their start-up to individuals with an uncommon amount of the entrepreneurial spirit. Those who are prepared to work without the safety of a large corporation are today's pioneers.

The winners and all of the companies selected as finalists in the *Canada Awards for Excellence* Entrepreneurship category are led by such individuals. And these business pioneers have attracted fellow travellers with usually similar daring attitudes.

Winner of the *Award of Excellence* was Process Technology Limited of Oromocto, New Brunswick, while Chart Industries of Pickering, Ontario, won the *Award of Merit*. Other finalists were Three Buoys Houseboat Vacations Ltd. of Calgary, Alberta; Dynatec Mining Ltd. of Richmond Hill, Ontario; and Nexus Engineering Corporation of Burnaby, British Columbia.

### Process Technology Limited

Consider the award-winning Process Technology Limited (PTL) which began with four people in 1982. It has grown to 126, manufacturing semi-conductor products and processing equipment far from the world's "Silicon Valleys".

George Jenkins, PTL's president, invested personal and family savings to start the company. He obtained a licence from Northern Telecom for an invention he developed while employed there.

But, there was the problem of being far from potential customers and the incredible challenge of developing a high-tech business in a region away from established centres of the industry.

Overcoming remoteness and other barriers to doing business and competing in world markets was a matter of willpower and a positive attitude on the part of management and staff. Even delivering PTL products to customers meant purchasing an aircraft to make connections with U.S. airlines in order to beat the competition with rapid service.

The results of the company's will to succeed are significant. PTL's projected sales for its third year of operation are \$7.3 million. And the original garage space has grown to a company-owned building of 4 087 square metres (44 000 square feet).

A growing company providing 126 jobs in an area of traditionally high unemployment is the visible result of the entrepreneurial spirit at PTL.

### Chart Industries Ltd.

Award of Merit winner Chart Industries Ltd. also began operations in 1982. Guy Chart Tools, a 24-year-old automotive company, was going bankrupt when entrepreneurs G. P. Horan and E. Seysmith bought it.

Mr. Horan, a great believer in the human spirit, initiated "survival" tactics to keep the business going and protect the 100 jobs that were on the line.

He reorganized the company to eliminate any "fat"; brought suppliers into his confidence; adopted the team approach to problem solving; and kept employees fully informed. He applied stringent financial controls to solve cash flow problems and was able to convince plant employees to live with a two-year pay freeze.



The result? A financial turn-around from a loss of \$896 000 in 1981 to a profit of \$822 000 in 1984. With 70 per cent of sales in export, Chart Industries is successfully penetrating the Japanese market and is now seeking out other countries.

### **Nexus Engineering Corporation**

During the same time, in Burnaby, British Columbia, Nexus Engineering Corporation has been growing.

Begun in the spring of 1982 by J. Basil Peter and Peter van der Gracht, the company already employs 55 people creating products for cable television in international markets. A Satellite Master Antenna System and a Community Antenna System with high performance modulators and signal processors provide residents of multiple-dwelling buildings with the technological ability to receive television signals.

"We all work in an atmosphere of innovation," says President van der Gracht. "In fact, the enthusiasm is so high here, people tend to jog from one place to another at their work." This enthusiasm is a familiar by-product of the working environment created by an all-pervading entrepreneurial spirit.

### **Three Buoys Houseboat Vacations Ltd.**

Another awards finalist company that also began in 1982 is Three Buoys Houseboat Vacations Ltd. It all started with "two boys" and an idea, when Dave Steele and Phil Carroll launched their business during one of the worst economic recessions in Canada.

Both 22 years old in 1982, they saw a business opportunity to put down a \$3 000 deposit on a run-down marina in Sicamous, British Columbia. This depleted their personal savings but they managed to rent a farmer's barn for \$50 a month as their manufacturing facility.

The challenge they saw was to improve the image of the houseboat from merely a box that floats, lacking in creature comforts, to a comfortable and fun vacation experience. They had 30 days to raise \$150 000 to finance marina equipment and material to build two houseboats. Ten bankers were approached. The last one said, "Yes."

With their bank financing exhausted that summer, they conceived the idea to package and sell houseboats to investors and manage the houseboats for them. Because of the high interest rates at the time, initial results were disappointing but, like all true entrepreneurs, they simply wouldn't quit. By late fall, the tide began to turn in their favour to the tune of \$800 000 in sales.

That required expanded or new manufacturing facilities. Time for more risk taking.

Each step had become a highly daring leap. But their enthusiasm and self-confidence were contagious.



Now Three Buoys Houseboat Vacations Ltd. is fully integrated from manufacturing, to selling, to marketing vacation time, to buying, financing, building and operating marinas.

Booking revenues for 1985 are forecast at \$2.3 million and houseboat sales orders are running to \$8.75 million.

### **Dynatec Mining Ltd.**

The Dynatec success story began, inauspiciously, in 1980. After 17 years with a well-known mining firm, Bob Dengler, like many Canadians during the recession, became an unemployment statistic.

He spent six months coming to terms with his new-found freedom while deciding what to do with his business life. Then, with an initial personal investment of \$250 000

and the help of three associates from his previous employer, he launched Dynatec Mining Ltd. to offer construction and consulting engineering services to the mining industry.

What a time to start!

The industry was in one of the worst economic periods ever faced. Mines closures, layoffs and financial losses by major mining firms were being announced almost daily.

The most difficult obstacle faced by a young mining company, even during "good times", is establishing a corporate track record for both banking and bonding institutions. (A company must be bonded to secure contracts. This guarantee ensures the work will be completed for the original contract price.)

Many, many days were spent familiarizing banking institutions with Dynatec's type of business. The bonding companies were even more difficult to convince.

Dynatec was in a classic "Catch-22" situation — no proven track record, no bonding. And, without bonding, the company could not bid and secure contracts.

Perseverance eventually paid off and, after the first application was approved, it was followed by a rapidly growing list.

Since those first difficult months, Dynatec has been awarded 50 contracts in Canada and in South America. In 1984, after only four years of operation, it became a major participant in Canadian mining and has expanded from engineering to conventional contracting work, developing a highly respected reputation in raiseboring. The firm now owns and operates the largest piece of raiseboring equipment in the country, and owns 60 per cent of Dynatec Mining Corp. in the U.S.

Dengler says that developing innovative ways to carry out work has been a major factor . . . that and people skills. The company is employee-oriented with bonuses, profit-sharing, physical fitness and equity programs.

To keep people growing with the company requires ingenuity. It also requires a team effort. An abundance of these qualities built on the true entrepreneurial spirit has helped Dynatec overcome its "Catch-22" situation.

## Five Finalists Demonstrate What Marketing Can Do

Wait a minute. Did somebody say marketing was dead? That practice, begun by the soap companies in the United States in the mid-1920s, has undergone many steps in its evolution and countless books have been generated to define what it is. But, as we shall see, the basic tenets are still intact and very valuable to the enterprise that takes the topic seriously.



Some pundits have recently characterized marketing simply as "creating customers at a profit". A recent definition reads: "The manner in which an organization relates to its environment."

This definition is particularly concerned with large corporations whose relationships with governments, unions, school teachers, journalists and all opinion leaders dramatically affect their business as much as do their relations with customers.

But to get down to brass tacks about what marketing does, it is what makes a company or a product unique and distinct. And this

approach — this search for a demonstrable difference, this "edge", if you will — is where the marketing process pays off.

One oft quoted airline executive characterizes his company's approach to the subject in this manner: "We would rather be one per cent better (than our competition) at a thousand things, not 1000 per cent better at one thing."

Creating this demonstrable edge has been a successful marketing approach for the two winners and the three other companies which qualified as finalists in the Marketing category of the *Canada Awards for Excellence* competition.

Winner of the *Award of Excellence* was Mobile Data International Inc. of Richmond, British Columbia, while Process Technology Limited of Oromocto, New Brunswick, won the *Award of Merit*. The other finalists were Sun Ice Ltd. of Calgary, Alberta; Westar Mining Limited of Vancouver; and Monaco Group Inc. of Toronto.

### Mobile Data International Inc.

In an industry characterized by concentrating on technology and ignoring marketing, Mobile Data International (MDI) is profitably paying attention to both. Lateral thinking about potential buyers is adding new markets to the firm's established success in supplying equipment to law enforcement agencies, fire departments and ambulance services. It has also built a handsome headquarters plant in Richmond, B.C., for the four-year-old company.

A new organization of market managers within MDI formulated marketing plans that considered business categories, financial payback, product positioning with user benefits, competitive advantages and advertising/promotion strategies.

And they singled out the four new target markets with the greatest potential for adoption of MDI's systems.

MDI proved that specific target marketing pays off and now presents customers with turnkey systems rather than merely selling terminals. MDI includes back-up management, training, on-site installation and support. A sales staff, comprising account, product and market managers, replaces the individual sales representatives system used by competitors.

### Process Technology Limited

Overcoming remoteness and other barriers to doing business in world markets was a matter of willpower and a positive attitude for Process Technology Limited (PTL), as we find in the Entrepreneurship section of this special supplement.

Another key success element for this Oromocto, N.B., company was creating a marketing plan and following it.

Recognizing that experts in producing high technology, semiconductor products and processing equipment were not necessarily the

people to write the plan, PTL retained an outside consultant.

The consultant, free of any corporate inhibitions, dug deep into the company, analyzing its real strengths and weaknesses and its potential markets. The outcome? A thorough, detailed approach to marketing sophisticated products.

Company executives not only read, but followed the marketing plan. (When was the last time you dusted off your marketing plan . . . and really thought about it? Many companies seem to leave that to a mysterious "somebody else".)

PTL's marketing strategy to provide rapid product delivery included purchasing its own aircraft to connect with U.S. airlines and major markets. The company hired a competitor's marketing vice-president and targeted sales to major companies rather than minor users.

PTL focused on state-of-the-art production equipment for high quality products now ranked among the best in the world.

Strong marketing combined with innovative technical expertise make a winning combination, even if your company is geographically remote from the international marketplace.

"Plan your work . . . and work your plan!"

### **Westar Mining Limited**

Coal. It's black, lumpy, dirty and it isn't high-tech. What a marketing challenge! How does one find an edge?

Vancouver-based Westar Mining Limited is western Canada's largest producer of metallurgical coal for use in steel production and also produces thermal coal for power generation. But there are only a few dozen buyers worldwide.

Experienced, sophisticated and conservative customers did not want western Canadian coal in Europe. It is technically different from European and eastern U.S. varieties and was considered unacceptable until Westar proved that Canadian coal can meet European requirements.

Westar changed the attitudes of European buyers with extensive research and stringent cost-cutting to overcome the transportation advantage of competitors. A total of 1 850 Westar jobs depended on finding a new market.

In 1984, Westar contracted for \$50 million in new export sales to Europe, first as an alternative source of supply, then as a reliable, ongoing supplier.

Aggressive marketing, creating that definable difference that benefits customers, can open up new markets in unlikely places.

### **Sun Ice Ltd.**

The Rempel family in Calgary whipped a recession in the garment manufacturing business by adopting a new marketing strategy that turned Sun Ice Ltd., their company, around — profitably.



Canadian athletes were wearing outfits made by foreign manufacturers. Sun Ice supplied special uniforms to the Canadian teams in both the winter and summer Olympics of 1984 and to the Mt. Everest Team Canada and became directly associated with other athletes and teams.

Adding the value of national promotion to Sun Ice ski wear enabled the company to eliminate discounts. High profile athletes wearing Sun Ice garments introduced a new way for retailers to do business, maintaining profit margins by utilizing the creative marketing and strong advertisement program provided by Sun Ice.

New insulation made products machine washable — and produced a new reason for new sales. Some 45 per cent of Sun Ice sales now

are to non-skiers who want to wear the fashionable gear worn by top Canadian athletes. A growth market was created for active-styled casual wear.

Value-added marketing works. It creates a visible difference.

### **Monaco Group Inc. — Alfred Sung**

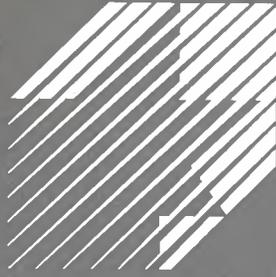
One of the hottest names in the Canadian fashion industry today is Alfred Sung. Four years ago it was relatively obscure but an aggressive advertising campaign by the Monaco Group in Toronto (of which Alfred Sung is a part) promoted the Sung image of fashion excellence.

As a result, Alfred Sung's collection is now perfectly positioned in the North American fashion market for career-oriented women.

The Monaco Group continues its strong commitment to innovative marketing with spectacular advertising and promotion, new licensed fashion lines and retail concepts. "Sungsport" is a new line for the middle-of-the-road price buyer. Monaco's "shop-in-shop" boutiques appear in major fashion retailers' stores in Canada and the U.S. along with "free-standing" Sung boutiques in some markets.

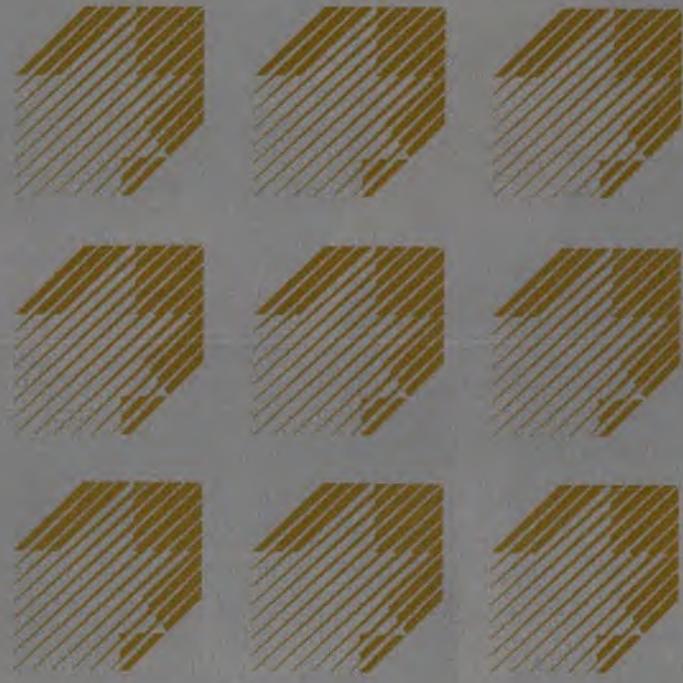
With skill in co-ordinating sportswear design, quality Canadian manufacturing and expert marketing, Alfred Sung has become a fashion superstar.

CANADA AWARDS  
FOR EXCELLENCE  
1985



Productivity  
Entrepreneurship  
Marketing  
Labour/Management  
Co-operation  
Invention  
Technology Transfer  
Innovation  
Industrial Design  
Engineering Design

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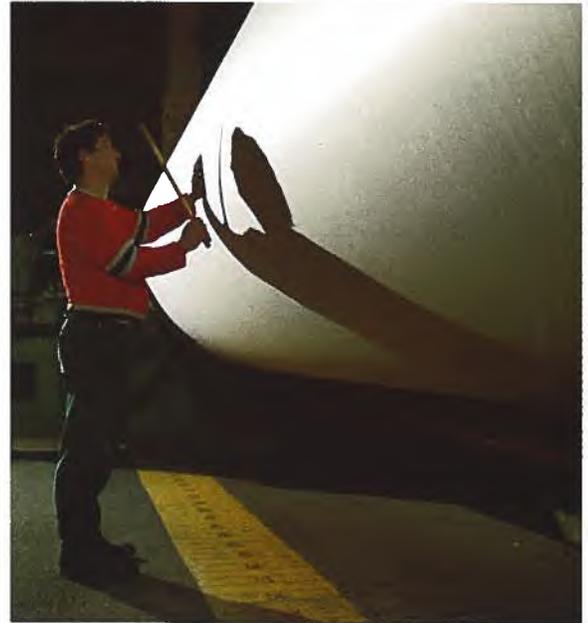


*Business must develop a "Passion  
for Excellence" to succeed  
(Tom Peters)*

# GOLD

## A W A R D

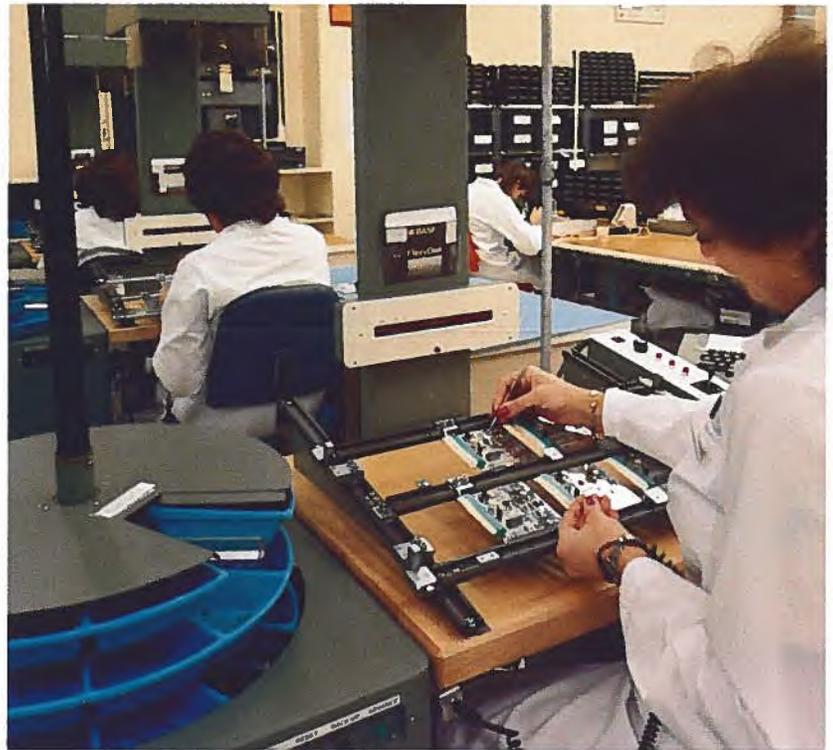
*The nine gold award winners are all committed to EXCELLENCE, not only in their respective categories but in all facets of their businesses ... an indefinable edge which sets them apart from the pack... if you will, they have a Passion for Excellence!*



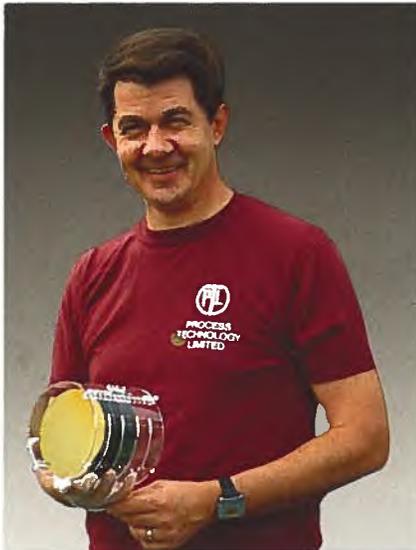
**INVENTION** — A new improved pulping process for the pulp and paper industry wins for C-I-L Inc.'s Forest Products Division of Mississauga.



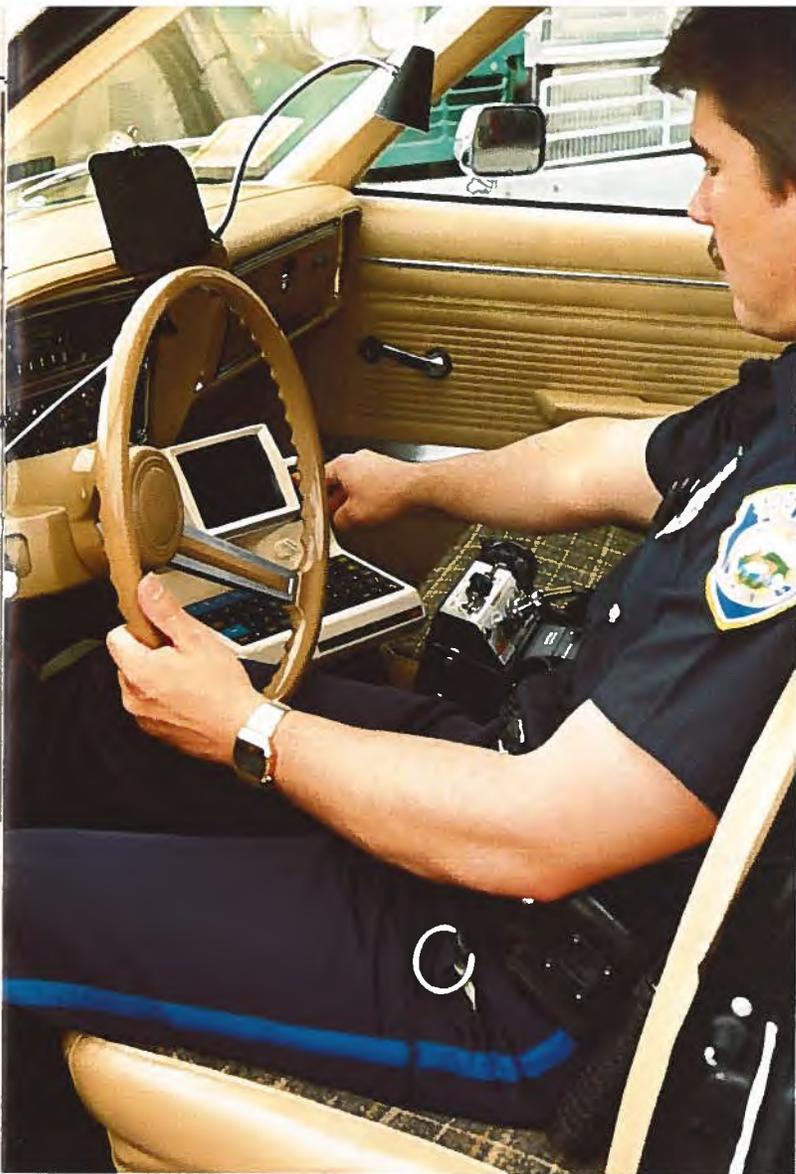
**LABOUR/MANAGEMENT** — Firestone Textiles Company of Woodstock, Ontario, has met the challenge of upgrading equipment and human resources.



**PRODUCTIVITY** — Garrett Manufacturing Limited of Rexdale, Ontario, a major Canadian electronics equipment manufacturer noted for its "family" type atmosphere which instills a sense of pride in its workers.



**ENTREPRENEURSHIP** — Process Technology Limited of Oromocto, New Brunswick, has developed the entrepreneurial ability to overcome distances.

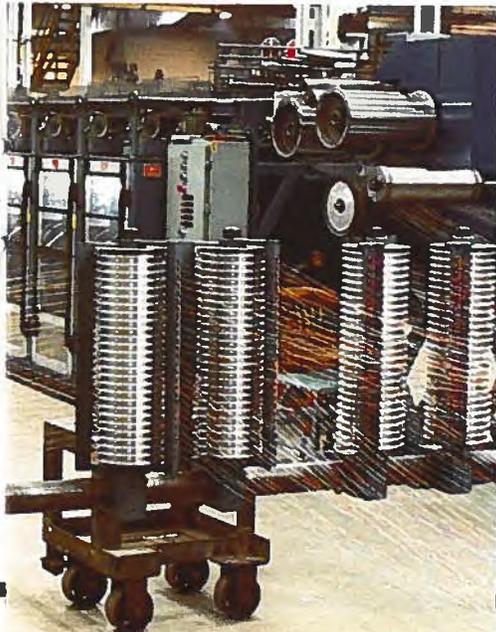


**MARKETING** — Mobile Data International Inc. of Richmond, British Columbia, is profitably paying attention to both advanced technology and marketing techniques in selling its electronic security equipment.



**INNOVATION** — Innovative work on gallium arsenide computer wafers brings award to Cominco Electronic Material Division of Trail, British Columbia.

**ENGINEERING DESIGN** — Tandem twister machine for copper cord brings gold to Jean Bouffard and Northern Telecom Canada Ltd. of Montréal.



**INDUSTRIAL DESIGN** — Ontario Bus Industries and Gidman Design Assocs. Ltd., both of Mississauga, win gold on a bus for the handicapped.



**TECHNOLOGY TRANSFER** — Profit resulted from the successful transfer of NRC excimer laser technology to Lumonics Inc. of Kanata, Ontario.

# SILVER

## AWARD

*The eight silver award winners were close seconds in their categories and, as such, were deserving of recognition among their peers for their innovative handling of the challenges of the 1980s... challenges which all Canadian businesses must face.*



**ENGINEERING DESIGN** — An improved chip-board waferizer machine a winner for Chief Engineer Brian T. Stroud's team and CAE Machinery Ltd.



**TECHNOLOGY TRANSFER** — Using design technology transferred from Japan, Bombardier Inc. has developed its award-winning R-62A subway car.

**LABOUR/MANAGEMENT** — Successful consultation with union representatives resulted in Continental Can Canada Inc. of Toronto being able to convert three plants to modern technology to produce two piece cans.



**PRODUCTIVITY** — At Inco Limited's Copper Cliff, Ontario, operation, a sense of openness and fairness has helped to improve productivity.

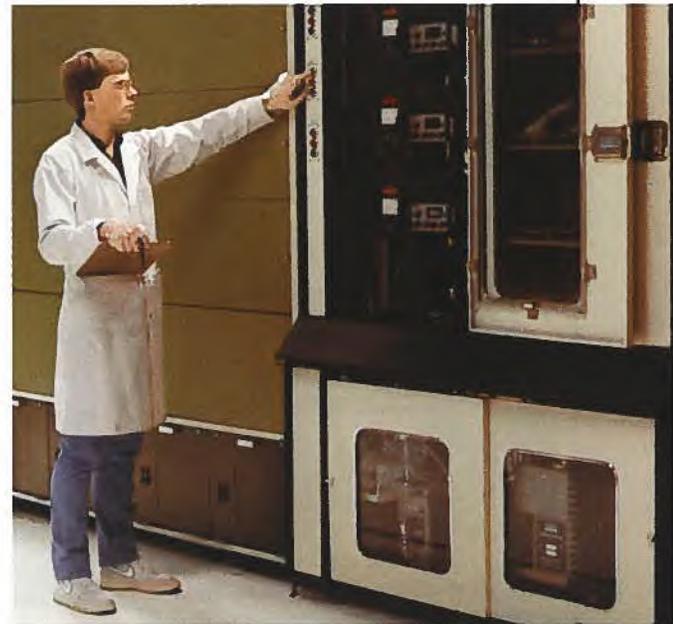




**ENTREPRENEURSHIP** — The entrepreneurial spirit helped save a bankrupt firm and 100 jobs for Chart Industries Ltd. of Pickering, Ontario.



**INDUSTRIAL DESIGN** — Ergoform Inc. of Dorval, Québec, has developed a unique work seat designed to solve the problem of lower back pain.



**MARKETING** — Already an award winner, Process Technology Limited of Oromocto, New Brunswick, wins with a successful marketing program.



**INNOVATION** — Toronto's Urban Transportation Development Corporation a winner with its Advanced Light Rapid Transit (ALRT) systems.

# FINALISTS IN THE NATION-WIDE COMPETITION FOR THE CANADA AWARDS FOR EXCELLENCE

**Productivity:** Garrett Manufacturing Limited, Rexdale, Ontario (Award of Excellence); Inco Limited, Ontario Division, Copper Cliff, Ontario (Award of Merit); Camco Inc., Mississauga, Ontario; Cooperators General Insurance Co., Guelph, Ontario; Firestone Canada Inc., Hamilton, Ontario.

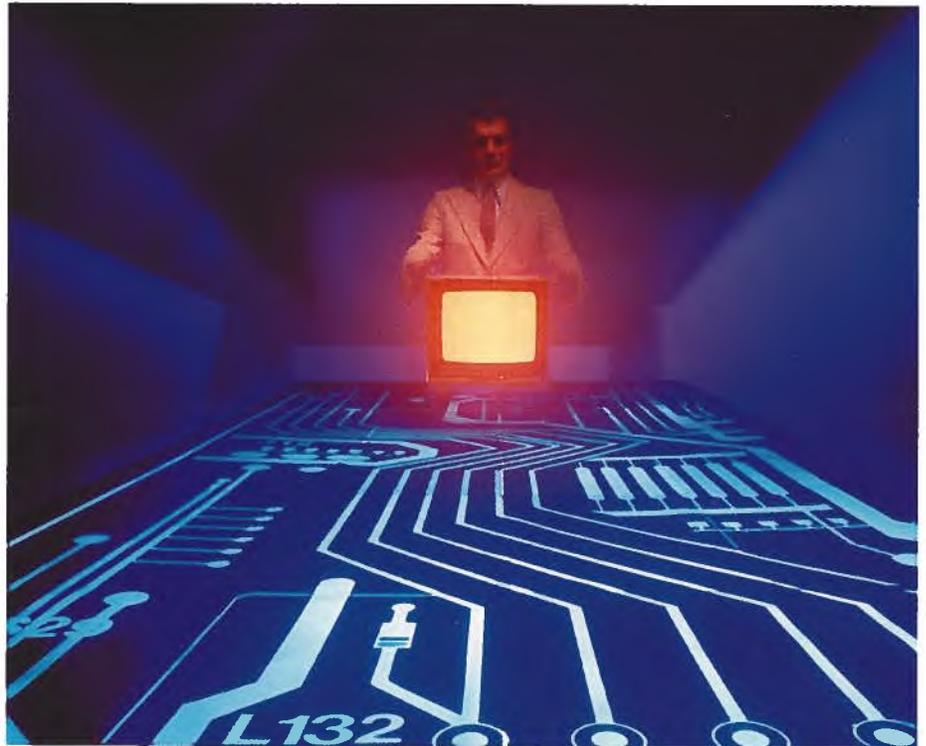
**Entrepreneurship:** Process Technology Limited, Oromocto, New Brunswick (Award of Excellence); Chart Industries Ltd., Pickering, Ontario (Award of Merit); Dynatec Mining Ltd., Richmond Hill, Ontario; Nexus Engineering Corporation, Burnaby, British Columbia; Three Buoys Houseboat Vacations Ltd., Calgary, Alberta.



**Marketing:** Mobile Data International Inc., Richmond, British Columbia (Award of Excellence); Process Technology Limited, Oromocto, New Brunswick (Award of Merit); Monaco Group Inc./Alfred Sung, Toronto, Ontario; Sun Ice Ltd., Calgary, Alberta; Westar Mining Ltd., Vancouver, British Columbia.

**Labour/Management:** Firestone Textiles Company/Local 115 United Textile Workers of America, Woodstock, Ontario (Award of Excellence); Continental Can Canada Inc./Local 2541 United Steelworkers of America, Toronto, Ontario (Award of Merit); Suncor Inc./Local 1 McMurray Independent Oil Workers, Fort McMurray, Alberta.

**Technology Transfer:** Lumonics Inc., Kanata, Ontario, *Transfer Agent* National Research Council (Award of Excellence); Bombardier Inc., Public Transportation Division, Boucherville, Québec (Award of Merit); CAE Machinery Ltd., Vancouver, British Columbia; Pulp and Paper Research Institute of Canada, Pointe-Claire, Québec, *Recipient* Corrosion Service Company Limited, Downsview, Ontario; Softwords Ltd., Victoria, British Columbia, *Transfer Agent* National Research Council.



**Invention:** C-I-L Inc., Forest Products Division, Mississauga, Ontario (Award of Excellence); Research Centre for Molecular Endocrinology at the Hospital Centre of the University of Laval, Sainte-Foy, Québec; Himsley Engineering Limited, Toronto, Ontario; Mobil Oil Canada Limited, Toronto, Ontario; Pro Staff Fuels Ltd., West Vancouver, British Columbia.





**Industrial Design:** Ontario Bus Industries and Gidman Design Associates Ltd., both of Mississauga, Ontario (Award of Excellence); Ergoform Inc., Dorval, Québec (Award of Merit); La Compagnie Résestel Ltée and Michel Dallaire Designers Inc., both of Mariville, Québec; Northern Telecom Canada Ltd., London, Ontario, and Bell Northern Research, Ottawa, Ontario; NCR Canada Ltd., Waterloo, Ontario.



**Innovation:** Cominco Ltd., Electronics Materials Division, Trail, British Columbia (Award of Excellence); Urban Transportation Development Corporation, Toronto, Ontario (Award of Merit); Electrovert Ltd., Montréal, Québec; International Submarine Engineering Ltd., Port Moody, British Columbia; Mobile Data International Ltd., Richmond, British Columbia; Versatile Farm Equipment Ltd., Winnipeg, Manitoba.

**Engineering Design:** Jean Bouffard and Northern Telecom Canada Ltd., Montréal, Québec (Award of Excellence); Brian T. Stroud and CAE Machinery Ltd., Vancouver, British Columbia (Award of Merit); Wallace G. Chalmers and Chalmers Suspensions International Ltd., Toronto, Ontario; Legrand Industries Ltd., Calgary, Alberta; Charles F. Wood and Indal Technologies Inc., Mississauga, Ontario.

**ENQUIRY  
FORM**

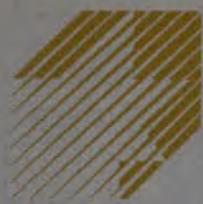
**DEMANDE  
DE RENSEIGNEMENTS**



Name — Nom \_\_\_\_\_  
 Title — Titre \_\_\_\_\_  
 Firm — Société \_\_\_\_\_  
 Address — Adresse \_\_\_\_\_  
 City — Ville \_\_\_\_\_ Province \_\_\_\_\_  
 Postal Code — Code postal \_\_\_\_\_ Tel. No. — N° de tél. \_\_\_\_\_  
 Type of Business — Type d'entreprise \_\_\_\_\_

**Information requested on the following categories:  
 Des renseignements sont requis pour les catégories suivantes :**

- |  |   |
|--|---|
| <input type="checkbox"/> All categories — Toutes catégories                                    | <input type="checkbox"/> Invention — Invention                          |
| <input type="checkbox"/> Productivity — Productivité   | <input type="checkbox"/> Technology Transfer — Transfert de technologie |
| <input type="checkbox"/> Entrepreneurship — Esprit d'entreprise                                | <input type="checkbox"/> Innovation — Innovation                        |
| <input type="checkbox"/> Marketing — Commercialisation   | <input type="checkbox"/> Industrial Design — Design industriel          |
| <input type="checkbox"/> Labour/Management Co-operation —<br>Collaboration syndicale-patronale | <input type="checkbox"/> Engineering Design — Design en ingénierie      |



Awards and Design Directorate  
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Government  
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Regional Industrial  
Expansion

Expansion industrielle  
régionale

Canada

## *Co-operation the Key to Labour-Management Relations*



**L**abour-management confrontation over the introduction of new processes and technology is as old as the Industrial Revolution itself. In the early 1800s, the Luddites, English workers from Leicestershire, destroyed labour-saving machinery as a protest. This adversarial climate has persisted in many forms to the present, particularly in unionized shops.

It is small wonder that, in the face of increasing pressures throughout the world for the benefits of productivity improvement, a major factor in the Labour/Management Co-operation category of the *Canada Awards for Excellence* would be the response to challenges faced in implementing technological change in the workplace.

Because of the difficulties in implementing such changes, only three companies qualified as finalists.

Firestone Textiles Company of Woodstock, Ontario, won the *Award of Excellence* for integrating two plants into one operation. Continental Can Canada Inc. of Toronto took the *Award of Merit* for introducing a new high-tech process to produce two-piece cans into its plants. Suncor Inc. of Fort McMurray, Alberta, was a close runner-up for bringing in computerized control systems without shutting down its refining and upgrading operations.

### **Firestone Textiles/Local 115 United Textile Workers of America**

Firestone Textiles found itself facing a difficult problem with its two plants in Woodstock. One, an 80-year old relic, was obsolete and losing money. The other, at the far end of the city, was more modern but still required technological improvement to meet increasing competition.

The alternatives to upgrading the existing operations were to expand the newer plant or produce the yarns in a U.S. plant — a critical decision that would increase unemployment in Woodstock.

Harold Dynna, general manager of the old plant, says, "It was costing us more to make the fabric than we could sell it for. And it has been a borderline operation for the past couple of years."

The decision was made to consolidate operations at the newer facility. With the assistance of a million dollar advance loan from the Ontario government, Firestone embarked upon a \$5.3 million expansion and upgrading of the newer textile plant.

"With all of its benefits," Dynna continues, "it still wasn't worth a \$5 million investment as far as Firestone was concerned. Without the advance, the project would likely not have gone ahead."

"Having the government backing certainly gave us a moral boost as well as a financial one."

Plant and technology improvement were but a part of the problem. The new technology brought with it the need to upgrade people skills and combine two separate seniority lists as well as easing the burden on displaced employees. The local union and its international representatives worked closely with management to smooth the transitional problems.

Special benefits were established for senior displaced employees; a labour-management committee introduced the reclassification program and developed retraining provisions.

This improved communication between labour and management has resulted in the preservation of 85 jobs and greater job security for another 175 workers.

Production of tire cord fabric, nylon resins and yarn now approaches \$3 million a year. There has been an 8.3 per cent increase in plant capacity and a 13.6 per cent increase in productivity.

But from a corporate point of view, perhaps the best payoff is an enhanced image for Firestone Textile in Woodstock and across Canada.

### **Continental Can Canada Inc./Local 2541 United Steelworkers of America**

When Continental Can Canada decided to invest \$60 million in converting three of its 13 manufacturing plants in Montreal, Toronto and Edmonton to the production of two-piece cans, Plant 639 in Weston was chosen as a model.

The challenge was to update aging and obsolete equipment to improve productivity and quality and increase diversity and capacity. This was accomplished by replacing the older, three-piece batch can process with the more modern continuous manufacturing system that produces two-piece cans using computer technology in forming, soldering and welding.

To ease the transitional problems, agreements were signed with each of the local plants under the master agreement negotiated by the United Steel Workers of America (USWA) and major can manufacturers throughout North America.

These local agreements were hammered out well in advance so employees could participate in every phase of the switch-over. Committees from each aspect of plant operation were established with members from USWA, management and elected local employee representatives.

Employees also selected uniforms and logos, established orientation programs and elected full-time facilitators and co-ordinators. By involving employees, each shift group has access to communication channels to resolve problems, generate new ideas, and implement work improvements.

An employee committee is now developing a work practices handbook to be used instead of the usual manual of rules developed solely by management.

To introduce computer technology, training programs are designed

by in-house core groups assisted by local community colleges. The new work force will be more than doubled with 200 of the new positions filled by retraining existing personnel and relocating 100 employees from other locations where new technology has caused jobs to disappear.

At plant 639, the company is now producing three million, two-piece steel and aluminum beverage and beer cans . . . a day! The plant has achieved a position of leadership in quality, allowing it to operate with integrity and humanity.

### **Suncor Inc./Local 1, McMurray Independent Oil Workers**

It was estimated that installing a new control centre at Suncor's oil sands plant upgrader that refines bitumen into synthetic crude oil would cost \$2 million a day in lost revenues if the plant were shut down. However, management and the 96 operating personnel — assisted by outside and on-site experts — developed a swing-over program called PILE (Productivity Improvement through Labour Expertise) which all but eliminated down time.

PILE used two-way communications in meetings among employees, managers and contractors to discuss all aspects of the job. Training programs on safety, planning, problem shooting, company procedures, and job retraining for those who run the equipment were essential.

"PILE was for the operators," explains Steve Yanciw, control project manager. "It was used to prepare operators and maintenance employees to take over ownership of the new system."

Bert Lang, manager of upgrading/central maintenance adds, "Every employee is a manager, and they have a definite sense of ownership in their plant. For someone to go into their work area and start altering things without their consent would be like me digging in my neighbor's back yard without his permission."

PILE got people talking informally without waiting for a steering committee meeting to be called.

Direct communication was the main mechanism for keeping the work force informed. Bert Lang believes that, if supervisors and

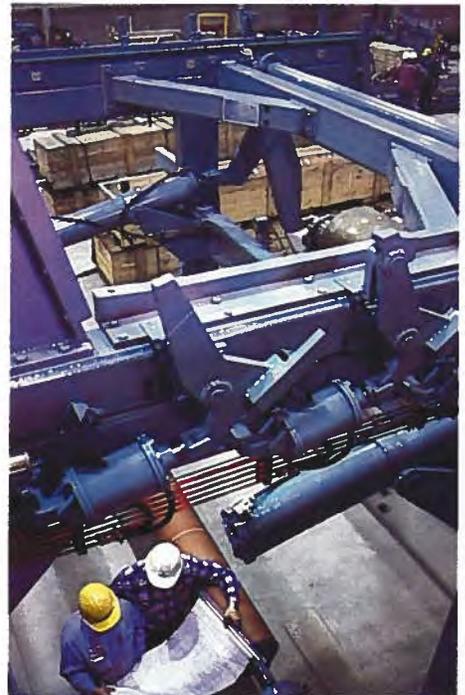
managers take the time to explain to employees the whys of a project and the parameters management has to work within — such as scheduling, scope and budget constraints — they all will understand the problem better.

Variances were addressed by close communication between project management and the operations group and, as a result of this cooperative approach, the majority of the operator training was done on a "days off" basis during normal operation of the plant.

Some employees felt they would not be able to learn to operate the plant with the new computerized equipment's control system. The collective agreement gave them the opportunity to apply for transfer to other areas of the plant. The end results of recognizing sensitivities was that no operators transferred.

The Suncor story ends well. Conversion of the plant was accomplished without any restrictions to production and with co-operation between the operators and management. About \$270 000 in construction time was saved, and the project was \$2 million under budget.

Early completion also meant that the swing-over didn't have to be attempted during the extreme Fort McMurray winters that could have put a strain on the entire 1 900 strong Suncor work force.



## *New Concepts and Products Vital to Survival*

**F**aced with ever-increasing competition on worldwide and domestic markets, Canadian firms must devote more time and energy to developing new concepts and products if they are to survive.

However, pure research is expensive and often takes years to develop into useful, saleable products. For this reason, competitors in the Invention category of the *Canada Awards for Excellence* must exhibit significant commercial potential before they are considered.

C-I-L Inc.'s Forest Products Division of Mississauga, Ontario, was the 1985 winner of the *Award of Excellence* in this category with the development of a new, improved pulping process.

Other finalists were the Research Centre of Molecular Endocrinology at the Hospital Centre of the University of Laval in Sainte-Foy, Québec, with a treatment for cancer of the prostate; Himsley Engineering of Toronto for its ion-exchange metal concentrator which extracts metals from trade wastes; Pro Staff Fuels, Ltd. of West Vancouver, British Columbia, which has developed a method whereby a two-cycle engine can be retrofitted to burn diesel fuel interchangeably with natural gas or propane; and Mobile Oil Canada, Ltd. of Toronto which has developed a method of measuring stresses and forces in icebergs.

### **C-I-L Inc. (Forest Products Division)**

Faced with steadily rising costs in the kraft pulping industry, C-I-L's Forest Products Division in Mississauga devised a new system using anthraquinone (AQ) as a pulping catalyst.

When added at a rate of one pound per ton of wood during the kraft or soda pulping process, the AQ reduces chemical and energy consumption, eliminates bottlenecks in the recovery furnace, digester or

lime kiln, increases production, diminishes sulphur emissions and reduces environmentally hazardous mill discharges.

The C-I-L licensed process is now being used in Canada, New Zealand, Australia, Japan, Finland and Spain, and it is estimated that the 70 mills now using AQ pulping will each save about \$11 million a year in production costs.

### **Research Centre of Molecular Endocrinology**

The University of Laval's research centre has developed a new method for successfully treating cancer of the prostate, a disease that strikes 8 000 Canadians a year and has the second highest mortality rate among cancer patients. The centre recently received a licence to use the treatment "in Canada and elsewhere".

The treatment involves the administration of a powerful synthetic hormone (an analogue of LHRH) with an anti-androgen to cause a chemical castration, replacing surgery normally required.

According to company officials, other medical uses of the treatment are being studied.

The centre began its research in 1977 and now has a staff of 90 and an annual research and development budget of \$3.5 million.

### **Pro Staff Fuels, Ltd.**

Pro Staff Fuels, Ltd. reached the finals of the awards program with the development of a dual-fuel, two-stroke engine for use in trucks and buses.

The engine was invented by J. S. Foster, president of Pro Staff, and constructed with the assistance of staff and materials from Fred Holmes Fuel Injection Co. of Vancouver. Bench-testing was completed at the King Edward Campus facilities of Vancouver Community College.

As the new system does not add any moving parts, retrofits of existing two-cycle engines are easily accomplished, allowing vehicles to operate either on pure diesel or a mixture of diesel and natural or propane gas.

The designers claim the diesel-gas mixture gives improved hill climbing capability, reduces exhaust and other emissions and cuts fuel and maintenance costs.

### **Mobil Oil Canada Ltd.**

The hazards posed by icebergs and their smaller cousins — known colloquially as "growlers" and "berg bits" — are of major concern to oil companies exploring in the dangerous waters of the North Atlantic and the Arctic.

Faced with these problems, Mobil Oil Canada and its exploration partners devised a system which allows them to measure these dangers without having to place research parties aboard bobbing ice pans or icebergs which can easily be rolled over.

The Mobil system uses tunnels 15 metres long drilled into the ice masses and hydraulic rams capable of exerting a total force of four million pounds to measure the pressures of the ice against standing objects.

This information, combined with ice samples and side-scan sonar "photographs" of ice formations, enables company engineers to design more efficient platforms for use in ice-infested offshore waters.

### **Himsley Engineering Ltd.**

Himsley Engineering's entry into the ranks of the finalists is an invention which utilizes an ion-exchange system, one similar to those used in home water-softening, to extract metals from trade wastes.

The system was patented in 1975 and sales to date have built a multi-million-dollar firm with 14 employees at its Toronto plant.

The Himsley system exchanges resins of ions to continuously extract and concentrate metals — such as uranium, copper, nickel, gold, etc. — without pre-clarification of trade wastes. It can also be adapted for the recovery of streptomycin and other antibiotics from liquid broths.

## *Technology Transfer Plus Team Effort Equals Commercial Potential*

**T**he Technology Transfer category of the *Canada Awards for Excellence* was established to honour the synergistic relationship that exists between research teams and commercial producers.

The awards stress the team effort of the process and the resulting commercial potential, and are open to teams of various disciplines from the scientific research and business communities.

While the transferred technology may be from any source of invention and any national origin, it must have been applied within the last five years and have been used by a Canadian firm for a sufficient time for its market acceptance or for its impact to be assessed.

Entries were judged on the basis of the team effort involved in identifying, developing and transferring the results of scientific and engineering research.

This year, the *Award of Excellence* went to Lumonics Inc. of Kanata, Ontario, and the National Research Council of Ottawa for development of a commercially-acceptable excimer laser, while the *Award of Merit* was given to Bombardier Inc. of Boucherville, Québec, for its Model R-62A subway car.

Other finalists were the Pulp and Paper Research Institute of Canada of Pointe-Claire, Québec, and Corrosion Service Co. Ltd. of Downsview, Ontario; Softwords Ltd. of Victoria, British Columbia, and the National Research Council; and CAE Machinery Ltd. of Vancouver.

### **Lumonics Inc./National Research Council**

Lumonics Inc.'s successful development and exploitation of excimer laser technology transferred to it from the National Research Council between November 1979 and May

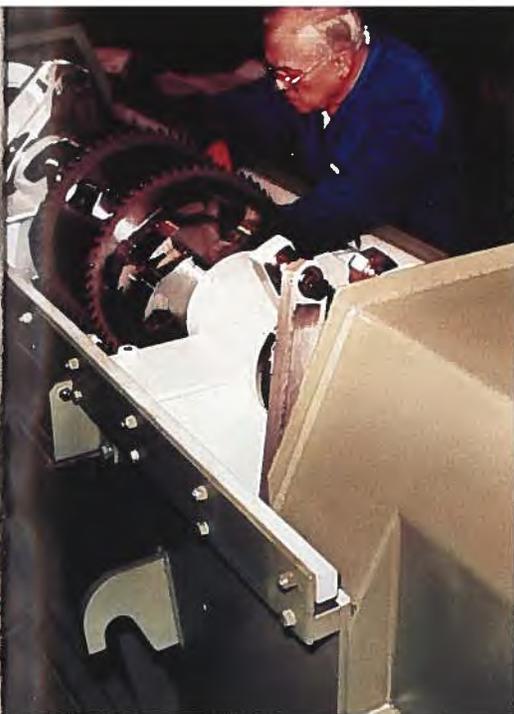
1981 enabled the firm to maintain its highly competitive position in the world's commercial laser market.

Researchers have developed ultraviolet lasers using rare gas and rare gas/halide combinations whose atoms, when excited, combine in pairs to form "dimers", leading to the term "excited dimers" or "excimer", now the accepted generic term for such lasers.

Among the world leaders in such research were the Laser and Plastic Plasma Physics Section of the NRC Division of Physics and the Laser Chemistry Group of the NRC Division of Chemistry.

Using technology transferred from these NRC units, Lumonics contributed its world leadership in laser technology, combined with its demonstrated engineering, manufacturing, management and marketing skills to develop and market the TE-860-4 excimer laser.





In addition to the TE-860-4, which was voted "Product of the Year" in 1983 by *Lasers and Applications* publication, Lumonics also developed a new, lower-cost, compact excimer laser (Model TE-430).

To the end of 1984, 215 of the new units had been sold for gross revenues of \$8.9 million. Lumonics expects the excimer lasers to establish themselves as industrial tools in the semi-conductor processing industry within the next two years and predicts sales of \$100 million by 1990.

Since 1982, Lumonics has expanded both by internal product development and acquisition of existing companies. The Lumonics Group, which includes the British subsidiary J. K. Lasers Limited and U.S. subsidiaries Lumonics Corp. and Laser Identification Systems Inc., is the world's third largest commercial laser manufacturer with sales approaching \$40 million a year.

#### **Bombardier Inc.**

Using design technology transferred from Japan's Kawasaki Heavy Industries, Bombardier engineers designed the R-62A subway car which earned the Boucherville firm a billion-dollar order for 825 units to be delivered by 1987 to the New York City Metropolitan Transportation System.

Transfer and adaptation of the design technology was completed in October 1982 and by 1984 the first subway car took to the tracks. The first 11-car train was ready a month early for its 30-day trial.

The 15.6-metre (51-foot) long 34 240-kilogram (37.75-ton) cars are designed to accommodate 44 seated and 182 standing passengers in air conditioned or heated comfort. The cars are specifically designed for easy maintenance.

Bombardier, begun in 1942 as a small snowmobile manufacturer, now has 6 000 employees in its three divisions in Québec and Austria, all competing successfully.

#### **CAE Machinery Ltd./A. Ahlstrom OY of Finland**

CAE Machinery Ltd. of Vancouver has made a successful transfer of technology from the Finnish firm of A. Ahlstrom OY to produce a highly efficient edger optimizer for the saw-mill industry.



The transfer was a cross-licensing agreement between the two companies in which Ahlstrom received the technology for a CAE-developed bandmill and CAE acquired the design and technology for the small board edger optimizer.

The CAE/Ahlstrom edger optimizer is designed for optimum use of computers to position, hold, scan and cut a variety of edges with maximum precision and efficiency. It has been termed "the best small board edger optimizer in the world".

#### **Softwords Ltd./National Research Council**

NATAL (National Authoring Language) is a computer language developed by the National Research Council to fill the need of educators and trainers looking for innovative ways to meet new training demands.

Through support from the Program for Industry/Laboratory Projects (PILP), the technology for developing and marketing NATAL was successfully transferred to the Victoria, British Columbia, book publishing/software company, Softwords Ltd.

NATAL is an "application oriented" language allowing the author of a course to express in a natural form the operation to be carried out in linking the student to the subject matter.

#### **Pulp and Paper Research Institute of Canada (PAPRICAN)/Corrosion Service Co., Ltd. (CSCL)**

Papritection is an electrochemical corrosion protection system developed and patented by PAPRICAN to significantly reduce corrosion of

bleach plant washers — the largest single corrosion expense in pulp mills.

After developing the technology for the crevice corrosion monitoring kits, PAPRICAN transferred the technology to CSCL which provided the expertise for final engineering, marketing, supplying and servicing new installations.

Since the first unit was installed five years ago, 64 of them have been sold, 33 on the export market. Revenues over the five years have exceeded \$3.5 million and have paid royalties of \$585 000. A sub-licensing agreement has been signed with a Swedish firm.

In a typical plant, according to CSCL estimates, the life of a washer will be extended to 16 years from four at an annual saving of \$390 000.

## Transportation Needs Sparked Innovative Impulse

It was more than mere whimsy that dictated the choice of *communications* and *transportation* as the twin themes for Vancouver's Expo 86. It was sheer logic.

From the days of the earliest explorers, Canadians have been obsessed by the problems of traversing their immense land and of keeping in touch with one another across the vast distances.

Their stubborn determination to conquer the nation's geographic imperatives, when harnessed to their energy and their inventiveness, led them to solutions — sometimes elegant, often simplistic — to the problems imposed by a remote, often harsh, land.

From railroads and telegraph networks to bush planes and remote radio bases to jet aircraft and communications satellites to remote-control deep-sea submarines and the workaday Canadarm, Canadians have shown themselves to be pioneers and world leaders.

Thus, it should come as no surprise that all of the finalists in the *Canada Awards for Excellence*, Innovation category, are firms involved in either transportation or communications.

The Innovation awards were established to provide suitable recognition to Canadian firms that succeeded in applying technology to products, services or production processes. Originality of the application and its effect on performance and market success were key criteria.

This year's *Award of Excellence* went to the Electronics Materials Division of Canadian mining giant Cominco Ltd. of Trail, British Columbia, for its work on gallium arsenide computer wafers. The *Award of Merit* was given to Toronto's Urban Transportation Development Corporation for its Advanced Light Rapid Transit (ALRT) systems.

Other finalists included International Submarine Engineering Ltd. of

Port Moody, British Columbia; MDI Mobile Data International Ltd. of Richmond, British Columbia; Electrovert Ltd. of Laprairie, Québec; and Versatile Farm Equipment Ltd. of Winnipeg, Manitoba.

### Cominco Ltd.

In 1980, Cominco drew on its long-time experience in the production of ultra-high-purity metals to begin development of the "next generation" gallium arsenide (GaAs) wafers for use in semi-conductor electronic devices.

Although more expensive than the silicon wafers they seek to replace, gallium arsenide wafers offer greater speed and higher performance, require less power and have a higher permissible operating temperature.

In the Cominco process, extremely pure gallium arsenide is synthesized and converted into a single-crystal ingot. This ingot is then shaped, sliced, lapped and polished, using a Cominco-developed proprietary chemical-mechanical polishing process which produces the flattest wafer in the industry.

A finished 7.6-cm (three-inch) diameter wafer sells for about \$300.

Cominco already has established itself in a leadership position in the production of the gallium arsenide wafers and is the first in the field to introduce such features as wafer edge rounding (for added strength), double-sided wafer polishing (for non-warping and flatness), orientation edge flats (for automatic location) and crystal heat treatment (for water thermal stability).

Cominco estimates the world market for semi-conductor electronic devices at about \$20 billion annually, with wafers accounting for five per cent of that — \$1 billion a year. At present gallium arsenide wafers have about a five per cent slice of the wafer market, equivalent to \$50 million a year.

In 1984, Cominco's gallium arsenide sales soared 137 per cent over 1983, with 95 per cent of them in the export market.

The three-person staff of 1980 has now grown to 36 employees and the firm is building a \$3.5 million expansion at its Trail plant to accommodate what it foresees as a growing demand for the new wafers.

### Urban Transportation Development Corporation (UTDC)

Most visitors travelling from the main Expo 86 site on Vancouver's False Creek to the Canadian Pavilion on Burrard Inlet will probably choose to take a free, two-kilometre (1.2 mile) ride on a dedicated segment of Vancouver's brand new, \$850 million Advanced Light Rapid Transit (ALRT) system.

The system, which will go into operation this winter, will give Canadians a first-hand look at the innovative technology which has already made Ontario's Urban Transportation Development Corporation a world leader in the field of lightweight high-speed urban transit systems.

Based on the number of vehicles sold in the seven cities worldwide with ALRT installations, UTDC has a 41 per cent market share, followed by Japan with 36 per cent, France with 20 per cent and the U.S. with three per cent.

UTDC was established by the Ontario government in 1973 and its officials quickly learned that urban centres, faced with a choice between high-cost subways and lower-priced rail systems, were opting for the latter. Market research showed that what was needed was a quiet, highly efficient, easy-to-operate intermediate system that could handle about 30 000 passengers per hour, each way.

UTDC began its initial ALRT research and development in 1979 and three years later produced its first cars. First-year sales of



\$5.2 million have swelled to an estimated \$445.8 million this year and the company now employs more than 1 600 people. Company officials estimate that UTDC production has created more than 56 000 jobs in all sectors of the economy.

Technological developments that have moved UTDC to the head of the industry include the use of linear induction motor propulsion (LIM) and steerable axle trucks, the introduction of lightweight car bodies and development of the moving-block train control system.

Developed by Spar Aerospace under contract to UTDC, LIM-equipped vehicles are propelled along the rails by magnetic reaction. As the wheels do not drive the vehicles, braking and hill-climbing abilities are improved and because there are no moving parts, operations are quieter and maintenance is easier and cheaper.

#### **Electrovert Ltd.**

When an in-company committee warned Electrovert officials in 1979 that the firm must develop a computer-controlled wavesolder system (used in the electronics industry to solder printed computer boards) or risk losing its dominant share of the market, the firm launched an immediate research program.

Four years and \$1 million later the \$120 000-per-unit Century 2000 system was launched.

The results, said a company official, were "stunning." Even before the first delivery was made, the company had 30 orders in hand, and

to date the firm has sold 67 units, 80 per cent of them to the export market.

The program has created 55 jobs in the Laprairie, Québec, plant and has been responsible for more than \$5 million of spending in the Montréal area alone.

Advantages of the Century 2000, the firm claims, are that it can be controlled by a remote computer rather than an operator; increases throughput by up to 250 per cent; requires 50 per cent less space; and can handle boards up to 12.7 cm (five inches) wider than similar-sized machines.

Patented in Canada and around the world, the Century 2000 has already brought repeat orders from such firms as IBM, AT&T, Texas Instruments and Northern Telecom. Export sales to England, France, Japan and other countries have brought in \$6.5 million and are projected to reach \$10 million a year by 1988.

#### **Mobile Data International Ltd. (MDI)**

Another communications-oriented awards finalist was Mobile Data International Ltd. of Richmond, B.C., producer of the Series 9000 mobile data terminals.

These micro-based communications terminals, when mounted in vehicles, transmit to and receive data from a central base where MDI interface equipment and a host computer are located.

In its first four years, the Series 9000 has generated 12 000 sales,

grabbing an estimated 80 per cent of the market. Sales in 1984 reached \$23.5 million and are expected to top \$37 million within three years.

Because the series requires a large population base for economy-of-scale, 98 per cent of the sales have been exports, primarily to the U.S., Hong Kong, Australia, Norway and Sweden.

The terminals have set new industry standards for speed, accuracy, channel efficiency and throughput of information transmitted by radio. Terminals are used by Federal Express throughout the U.S. and are also popular with fire and police departments and ambulances.

#### **International Submarine Engineering LTD. (ISEL)**

With 120 of its remotely operated underwater vehicles already operating in offshore oil fields around the world, ISEL set out in 1982 to design a system that could be used in record depths down to 2 500 metres (8 200 feet).

A year later the company launched the DOLPHIN (Deep Ocean Logging Platform Instrumented for Navigation), destined to become the deepest-diving commercial system ever used in offshore exploration.

The six-metre (19.6-foot) long, 1.8-metre (5.9-foot) diameter, 2 600-kg. (5 732-lb.) vessel is powered by a 120 horsepower diesel engine and has a top speed of 15 km/hr. (9.3 mph).

Because it operates in a semi-submersible mode, the DOLPHIN provides an extremely stable instrument platform, a fact the company feels will open up the possibility of multi-million-dollar sales to the military and hydrographic markets.

#### **Versatile Farm Equipment Ltd.**

Winner last year of Best of Show and Design Canada Grand Prize (Industrial Design) for its Versatile 256 bi-directional tractor, Winnipeg's Versatile Farm Equipment this year made it to the final grouping for the Innovation category award.

Its 1985 submission was in support of the technologically innovative Designation 6 tractor. The four-wheel drive, 210 to 360 horsepower vehicle features a closed centre load sensing implement circuit and a large, quiet cab.

## Outstanding Achievements in Industrial Design

To honour outstanding achievements in the design of Canadian products, the Industrial Design category was added to this year's *Canada Awards for Excellence* program.

To qualify, products had to be of Canadian origin and manufacture and have been on the market at least six months, but not more than three years. Awards were presented jointly to the manufacturing and design firms.

### **Ontario Bus Industries/Gidman Design Associates Ltd.**

In 1982, at a time when most businesses were cutting back on their research budgets, Ontario Bus Industries began work on a new type bus to fill a major gap in the transit vehicle market.

Until then, no manufacturer anywhere had produced a genuine low-floor bus, without steps, to accommodate disabled and elderly passengers more conveniently.

mation about the specific needs of the handicapped and elderly. In Toronto, the general manager of the Toronto Transit Commission, Al Huson, himself handicapped, provided advice and support and the TTC has since purchased 33 of the 55 buses ordered.

The final product is a bus which features a low, flat floor throughout, an air bag suspension which lowers the unit to curb height at the front door and to ground level at the rear door, and configurations which allow random entry and exit by wheelchairs.

The basic unit also can be configured for fixed route transit, feeder routes to rail transit, suburban bus service, airport shuttle service and ambulance service.

The 100 per cent Canadian-owned company employs 360 persons in Canada and 115 in New York State. Last year the firm produced 294 transit buses, 85 per cent of which were exported to the U.S.

### **Ergoform Inc.**

Spinal back disorders are believed to be responsible for 75 per cent of all days lost in the workplace and billions of dollars lost to health care costs, productivity and compensation assessments.

Christopher Scarse, a Doctor of Chiropractic and a specialist in bio-mechanics, and Bernard Shalinsky, an industrial designer and professor with the industrial design department at the University of Montreal, decided that one of the causes of bad backs was the design of seating used in the workplace.

They began research into the solution in 1981 and by 1984 were on the market with their answer — the Ergoform I Work Seat which incorporates all the essential factors necessary for allowing the ideal mini-



The *Award of Excellence* was won by Ontario Bus Industries and Gidman Design Assocs. Ltd., both of Mississauga, for the Orion II transit bus. The *Award of Merit* went to Ergoform Inc. of Dorval, Québec, for the unique Ergoform I work seat.

Other finalists included NCR Canada Ltd. of Waterloo, Northern Telecom Canada of London (design firm: Bell Northern Research of Ottawa), and La Compagnie Résestel Ltée of Marieville, Québec (design firm: Michel Dallaire Designers Inc. of Montréal.)

Donald Sheardown, president of Ontario Bus, says the initial budget for the Orion II bus was set at \$1.7 million, but by the time the prototype was completed the figure had nearly doubled.

Early in the life of the project, Ontario Bus officials realized it would be necessary to set aside conventional bus design practice and establish an entirely new arrangement of space and mechanical components.

According to Mr. Sheardown, Ontario Bus consulted experts all over North America to gather infor-



mum curve (lordosis) in the lower spine to be maintained in the seated work posture.

The key to the Ergoform is the forward incline principle, which completely eliminates the rounding of the spine. By passively controlling the degree of tilt with natural body mechanics, the user is assured of the correct lumbar curve.

Extensive on-the-job testing showed how effective the Ergoform was. Fully adaptable, with a base that rotates 360°, it can accommodate persons from 147 cm (4 ft. 10 in.) to 196 cm (6 ft. 5 in.). By taking into account the inherent principles of human biomechanical functions, the Ergoform is designed to solve the problem of lower back pain.

Fabricated entirely in Québec by subcontractors, Ergoform had first year sales exceeding \$500 000 and is projecting sales of \$1.15 million by the third year of manufacturing.

#### **Northern Telecom Canada/ Bell Northern Research**

When Northern Telecom introduced the Harmony residential telephone set to the marketplace in February 1984, it quickly learned it had a smash hit on its hands.

Designed as a replacement for the 500 set, dubbed "the Model T of telephones", the Harmony has more than a million users worldwide and in Canada has gained a 79 per cent share of the basic residential telephone market.

The Harmony contains only half the parts of its predecessor and can be produced for just 1/3 the labour cost because robots were assigned to tedious tasks and the functional testing of sub- and final assemblies.



#### **NCR Canada Ltd./NCR Design Staff**

The NCR 7770 Proof and Encode Workstation is an upgradable cheque-processing machine designed to allow customers to tailor the system to their needs. It is aimed at financial institutions with high-volume cheque processing requirements.

The machine operator reads the dollar amount on the cheque, enters that data and any processing instructions through use of a keyboard and then drops the document into a moving track.

A track-driving mechanism is activated electronically and moves the document past an encoder and into one of 20 optional, user-selected pockets.

#### **La Compagnie Résentiel Ltée/ Michel Dallaire Designers Inc.**

L'Attaché, a lightweight, extremely versatile briefcase was introduced to the marketplace in 1984 and was honoured by being selected for sale at the prestigious boutique of the Museum of Modern Art in New York City.

The unit, which is available in a wide range of colours, is constructed of injection-moulded polypropylene and has a durable nylon latch and a metal hinge core.

Measuring 30.5 x 42 x 8.3 cm (12 x 16½ x 3¼ in.), L'Attaché has a usable space of 4 129 cm³ (640 cu. in.) to carry documents, books, cassettes, games, toys, tools, cameras, clothing, art supplies, etc. High quality at a reasonable price, it retails for approximately \$15.

## Engineering Design Brings Its Own Reward

**A**n engineering team from Northern Telecom Canada Ltd. of Lachine, Québec, has received the first-ever *Award of Excellence* in the Engineering Design category, which was added to the Canada Awards program this year along with one for industrial design.

The Northern Telecom team, represented by Jean Bouffard, won the award for its efforts in designing a unique, computer-controlled system that cut costs and increased the efficiency of the firm's production of telephone cables.

The *Award of Merit* went to a CAE Machinery Ltd. team headed by Chief Engineer Brian T. Stroud for the design of an improved waferizer machine used in the production of chipboard.

Finalists in the Engineering Design category were Legrand Industries Ltd. of Calgary, Charles F. Wood of Mississauga (Indal Technologies Inc.) and Wallace G. Chalmers of Toronto (Chalmers Suspensions International Ltd.).

### Jean Bouffard (Northern Telecom Canada Ltd.)

Patents are pending on no less than seven inventions which a Northern Telecom engineering team devised during its successful efforts to design an improved method of manufacturing Multiple-Unit Pulp Cables and provide Northern Telecom a marketing edge over its U.S. competitors.

At the heart of the operation is the tandem twister machine, nicknamed "Tee-Tee" by its developers, which eliminates two steps required to convert raw copper cord into 7.6-cm (three-inch) cables, each of which may contain as many as 7 200 pulp-insulated wires.

**Prior to the introduction of "Tee-Tee", cable production required seven steps:**

- Rolling/drawing copper cords into thin copper wire;
- Insulating the wires with pulp (Northern Telecom introduced pulp-insulated cables in 1966 and now uses millions of pounds of pulp from Canadian mills each year);
- Twisting two such wires together;
- Storing, inspecting and transporting paired wires to the next machine;
- Stranding these pairs into units of up to 100 pairs;
- Stranding 100-pair units into cable of the desired size; and
- Drying, sheathing and inspecting the final cable.

The tandem twister developed by Northern Telecom eliminates steps 3 and 4 through the use of a single machine which can twist the colour-coded wires into pairs and then strand them into 100-pair units in a single operation.

In addition to increasing the efficiency of the production process, the new system improves the quality of

the finished "feeder" cables which are used in inter-office trunk lines and wiring of telephone companies' central offices.

The high degree of automation also provides the flexibility to move from one twist system to another as the machinery reacts to orders from a central computer.

### Brian T. Stroud, (CAE Machinery Ltd.)

A major supplier to the forest products industry on a worldwide scale, Vancouver's CAE Machinery in the late 1970s found its chipboard wafer-producing machinery facing severe competition from new German machinery just at the time wafer-utilizing chipboard was beginning to steal some of the market from more expensive plywood.

After extensive surveys of the market, CAE determined that what was required was a larger and more sophisticated version of a "waferizer" it had first introduced in 1959.



The end result is a technique that utilizes a multi-knife disc 35 metres (115 feet) in diameter and weighing 5 200 kilograms (11 500 pounds) to produce "uniform, geometric wafers with the minimum of fines generation" from such "weed" trees as aspen, birch, poplar and willow.

Since 1980, CAE has sold 47 of the units, 42 of them in the U.S. where 22 of 24 waferboard plants chose the CAE equipment. Clients include Forintek, Weyerhaeuser, Northwood, the University of Idaho and Virginia Technical College and CAE currently is actively pursuing inquiries from China, France, Australia and the USSR.

#### **Charles F. Wood (Indal Technologies Inc.)**

Landing a helicopter is a delicate matter at the best of times. Landing one on the tiny flight deck of a ship pitching and rolling in heavy seas was a pilot's nightmare until the introduction of Indal Technologies' RAST (Recovery, Assist, Securing and Traversing) system.

A substantial advance over previous hauldown and rapid securing devices, RAST is the only recovery system which interfaces with the helicopter before touchdown.

The system was developed under a contract with the U.S. Navy, which already has ordered 70 of them for its ships. Total USN procurement is expected to reach 115 units by 1990, with an estimated value of \$400 million. RAST-type systems have also been selected by the Australian and Spanish navies and for the new Canadian navy patrol frigates.

Unlike other systems, RAST allows the handling of 10-tonne helicopters on small ships in seas creating a roll of  $\pm 31^\circ$  and a vertical heave of 6.1 metres (20 feet) per second. With the system, the helicopter can be landed, secured and into the hangar in minutes.

To utilize RAST, the helicopter pilot hovers the machine over the flight deck and lowers a light "messenger" cable to the ship. This is attached to a heavier cable which is hauled up and secured to the helicopter.



The cable is attached to a winch controlled by a landing officer on the ship, enabling constant tension to be maintained on the cable as the helicopter lowers towards the deck. As touchdown nears, the tension is increased to ensure a probe in the belly of the machine slots itself into a locking device on the deck.

The pilot then lowers the tail-wheel into a slotted rail and the helicopter is towed into the hangar.

Take-offs, which normally take about 20 minutes, can be done in two minutes using the RAST system.

#### **Legrand Industries Ltd.**

When Legrand Industries of Calgary first approached oil companies with a proposal to develop an Off Vertical Pump Unit, company officials discovered they had an idea whose time just hadn't yet arrived.

Undismayed, they continued to work at developing the unit and, when the drive to attain Canadian oil self-sufficiency came in the early 1980s, these same oil companies discovered Legrand had solved the problem of how to draw the oil from otherwise inaccessible pools.

What Legrand's engineers had come up with was an oil field pump that could be used in drill holes slanted anywhere from  $0^\circ$  to  $45^\circ$ , making it ideal for bringing oil up from shallow pools located beneath rivers, lakes or inhabited areas, or for exploring from artificial islands in lakes or rivers.

In rural areas, the slant-hole pumps allow oil companies to drill several holes from a central location, minimizing the amount of land lost to the farmer. The technique also is ideally suited for use in shallow, heavy-oil fields both for steam-injection and pumping of the product.

To provide the easiest possible assembly and maintenance, whenever possible the Legrand engineers used field-proven units from the company's existing product line.

Since their introduction in 1983, Legrand Off Vertical Pump Units have been used by Suncor, Dome, Koch, Canadian-Occidental and American Resources. Several other firms in Canada, Venezuela, Colombia and Trinidad are also considering their use.

#### **Wallace G. Chalmers, (Chalmers Suspensions International Ltd.)**

The Toronto firm's submission was for a lightweight, heavy-duty tandem axle truck suspension rated at 19 199 kg (44 000 lb.) for three axle spacings.

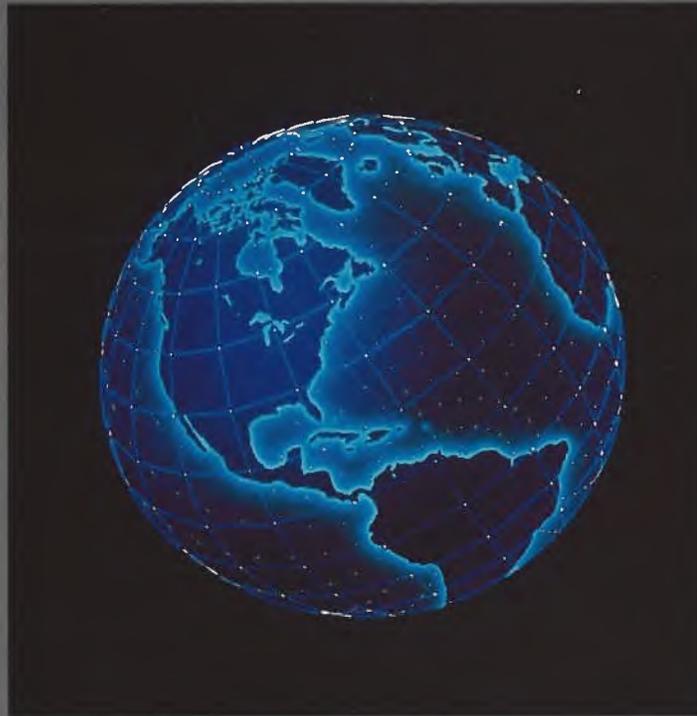
The suspensions use variable rate hollow rubber springs first designed by Mr. Chalmers at the University of Waterloo in 1971 and since patented in countries such as Canada, the U.S. and Britain.

The springs are made in Canada exclusively for Chalmers Suspensions International.

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