ADVANCED POLYMER COMPOSITES DIRECTORY

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

Canada

ADVANCED POLYMER COMPOSITES DIRECTORY

Advanced Industrial Materials Directorate
Materials Branch
Industry, Science and Technology Canada

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PREFACE

The interest in advanced polymer composites, which has gained considerable momentum over the past few years, has facilitated increased development and manufacture of new materials in Canada. This increased attention is a direct result of more and more potential users evaluating and recognizing the advantages of incorporating advanced polymer composites into the design of new products as well as into the redesign of existing products. Industry, Science and Technology Canada (ISTC) prepared this directory to assist the development and use of these new technologies. The directory, which describes briefly the Canadian activities in advanced polymer composites, should act as a catalyst in bringing together developers, designers, manufacturers and users of advanced polymer composites to collaborate in the development of this segment of Canadian industry.

The scope of this directory is limited to Canadian companies and organizations active in the field of polymer composites. Included are manufacturers that use a polymer other than standard epoxy resin, or a reinforcing fibre/particulate other than standard E-glass or inert fillers. Also included are manufacturers that use unique processes and first-time end uses.

The information contained in this directory is based on responses to a survey and to in-person and telephone interviews. While every effort was made to cover all activities taking place in Canada, as is the case with many new publications, there may be some omissions or errors. We would be grateful if any such inaccuracies would be brought to the attention of ISTC to ensure that the information is included in future issues. Please address any comments to:

Advanced Industrial Materials Directorate
Materials Branch
Industry, Science and Technology Canada
235 Queen Street
OTTAWA, Ont.
K1A 0H5

ISTC thanks all those who assisted in the preparation of this directory.

OVERVIEW

More than 30 years have passed since glass fibre-reinforced plastics (FRP) came into full-scale use. Currently, in various fields, their strength, light weight, and corrosion resistance are still making great contributions to society.

In the meantime, the technological advances, experiences and data accumulation have caused the development of many new composites using high performance reinforcing materials, such as boron fibre, carbon fibre and aramid fibre. These reinforcements, combined with new resins and resin alloys, are substituting for many traditional materials with great success and providing the entrepreneurs in this field with a competitive edge. Many new applications for these materials are being actively developed throughout the world.

As a result, use of these materials in the aerospace, sporting goods, and automotive industries has generated a much improved product that has taken the marketplace by storm. The expectations are that this trend will continue and that traditional materials will be replaced at an ever-increasing rate.

However, today, as the reinforcing fibres for advanced composite materials (ACM) are being developed at an unprecedented rate, boron fibres, silicon carbide fibres, and even superfibres from high-density polyethylene, are providing opportunities for design engineers in the areas of direct material substitution and assembly replacement. As for the polymer matrix, wide-ranging research and development (R&D) is providing new materials and blends that offer better characteristics that, when combined with the new fibres, can exceed existing temperature, strength and durability criteria for existing ACMs.

As there are more Canadian companies, research establishments and universities entering this field every day, it is important to maintain active communications within this group. To this end, this directory was designed to provide a basis for improved networking.

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COMPANIES

ACADEMIC INSTITUTIONS

PROVINCIAL AND FEDERAL RESEARCH ORGANIZATIONS

COMPANIES

ACM COMPOSITES

Composite Products	Tanks, Piping, Scrubbers, Ventilation
Engineers	Engineering — 1 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 1
Resins	Epoxy, Polyester, Phenolic
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven Tape, Woven Fabric, Mat Material, Unidirectional Tape
Fibre Type	Continuous, Short, Long
Process	Compression Moulding
Contact	Rémi Lussier, President 1130 Rocheleau DRUMMONDVILLE, Que. J2C 6Y5
Telephone	(819) 474-6917
Fax	(819) 474-6919

AC PLASTIQUES CANADA INC.

Composite Products	Tanks, Piping, Scrubbers, Ventilation
Engineers	Engineering — 2 Manufacturing — 0
Technicians	Engineering — 2 Manufacturing — 0
Resins	Polyester, Vinylester
Fibre	E Glass, Carbon/graphite
Reinforcement	Woven Fabric, Mat Material, Chop Material, Thread/strand
Fibre Type	Continuous, Short
Process	Hand Layup, Filament Winding
Contact	Éric Tremblay, Vice-President 1285 montée Chénier LES CÈDRES, Que. J0P 1L0
Telephone	(514) 455-3311
Fax	(514) 452-2037

ADVANCED COMPOSITE STRUCTURES INC.

Advanced Composite Structures offers leading edge composite curing systems, custom designed and controlled to meet customer specifications. They also offer a range of customized advanced coating applications, and the Quality Assurance Department ensures rigorous attention to mask-off requirements and paint specifications.

Composite Products	Repair and overhaul for composite structures
Engineers	Engineering — 1 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 7
Resins	Epoxy
Fibre	S Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven Fabric, Mat Material, Unidirectional Tape
Process	Hand Layup
Contact	Bruce D. Anning, Plant Manager 1686 Dublin Avenue WINNIPEG, Man. R3H 1A8
Telephone	(204) 694-1942
Fax	(204) 694-3524

AMHERST AEROSPACE INC.

An aircraft component manufacturer for over 30 years, Amherst is dedicated to its quality products and on-time deliveries. In addition to manufacturing aircraft structural components, Amherst manufactures corrosion resistant equipment casings and products for transit vehicles.

Composite Products	Aircraft subassemblies, Equipment casings
Engineers	Engineering — 2 Manufacturing — 2
Technicians	Engineering — 1 Manufacturing — 20
Resins	Epoxy
Fibre	E Glass, S Glass, Kevlar
Reinforcement	Prepreg, Woven Fabric, Woven Tape, Chop Material, Mat Material
Fibre Type	Continuous, Short, Long
Process	Hand Layup, Sprayup
Contact	D. Beswick, Director of Engineering P.O. Box 10 AMHERST, N.S. B4H 3Y7
Telephone	(902) 667-3315
Fax	(902) 667-1047

AVCORP INDUSTRIES
PLASTAL DIVISION

Composite Products	Aircraft components
Engineers	Engineering — 0 Manufacturing — 2
Technicians	Engineering — 0 Manufacturing — 2
Resins	Epoxy, Polyester
Fibre	E Glass, Kevlar
Reinforcement	Prepreg, Woven Fabric, Chop Material, Mat Material
Fibre Type	Continuous, Short
Process	Hand Layup, Platen Press
Contact	M.E. Artus, President 840 Vadnais GRANBY, Que. J2J 1A7
Telephone	(514) 378-8439
Fax	(514) 378-8699

BARSKI INDUSTRIES (1985) LTD.

Barski Industries manufactures lift stations, fibreglass pipe, fittings and tanks. Barski also has experience in the manufacture of municipal water and sewer products.

Composite Products	Pipes, Tanks, Fittings
Engineers	Engineering — 0 Manufacturing — 2
Technicians	Engineering — 0 Manufacturing —
Resins	Polyester, Vinylester
Fibre	E Glass, Carbon/Graphite, Kevlar
Reinforcement	Woven Fabric, Woven Tape, Chop Material, Mat Material, Unidirectional Tape
Fibre Type	Continuous, Long, Short
Process	Hand Layup, Filament Winding, Sprayup
Contact	Daniel Chailler, President 2378 Westlake Road KELOWNA, B.C. V1Z 2V2
Telephone	(604) 769-6848
Fax	(604) 769-6334

BAY MILLS LTD.
BAYCOMP

Bay Mills Ltd. offers high quality fibre moulding compounds for injection, bulk and compression moulding applications.

Composite Products	Pipes, Shafts, Moulding compounds
Engineers	Engineering — 5 Manufacturing — 1
Technicians	Engineering — 1 Manufacturing — 0
Resins	Polymide, Polycarbonate, Polypropylene, Polybutylene, Polyetherimide
Fibre	E Glass, Carbon/graphite, Kevlar
Reinforcement	Thread/strand
Fibre Type	Continuous
Process	Impregnation
Contact	Paul Habib, Marketing Manager A1-5035 N. Service Road BURLINGTON, Ont. L7L 5V2
Telephone	(416) 332-0991
Fax	(416) 332-0433

BEAUCE FIBRE DE VERRE (1986) INC.

Composite Products	Industrial transport products, Recreation and Specified products
Engineers	Engineering — 1 Manufacturing — 2
Technicians	Engineering — 0 Manufacturing — 20
Resins	Epoxy, Polyester, Vinylester
Fibre	E Glass, S Glass, Carbon/Graphite, Kevlar
Reinforcement	Woven Fabric, Woven Tape, Thread/strand, Unidirectional Tape, Mat Material
Fibre Type	Continuous, Long, Short
Process	Hand Layup, Platen Press, Sprayup
Contact	Christian Bernard, Director General 1036, rue Principale SAINTE-CLOTHILDE, Que. G0N 1C0
Telephone	(418) 427-2622
Fax	(418) 427-3278

BELL HELICOPTER TEXTRON

Bell Helicopter Textron, a division of Textron Canada Ltd. is the only totally integrated helicopter manufacturing company in Canada. It has the people, expertise and equipment to design, manufacture, market and support a complete range of helicopters.

Composite Products	Airframe, Rotor Hubs, Blades
Engineers	Engineering — 6 Manufacturing — 4
Technicians	Engineering — 0 Manufacturing — 20
Resins	Epoxy, Polycarbonate, PEEK
Fibre	E Glass, S Glass, Carbon/Graphite
Reinforcement	Prepreg, Woven Fabric, Thread/Strand, Unidirectional Tape
Fibre Type	Continuous, Short
Process	Hand Layup, Filament Winding, Platen Press

Mandate
To design and manufacture components to make Bell Helicopters the world's safest and most efficient.

Contact	Bob Fews, Manager, Technology 12800, rue de l'Avenir SAINT-JANVIER, Que. J0N 1L0
Telephone	(514) 437-3400
Fax	(514) 437-6010

BLAYD CORPORATION

Composite Products	Agricultural, Industrial, Corrosion resistant products
Engineers	Engineering — 0 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 3
Resins	Polyester, Vinylester
Fibre	E Glass
Reinforcement	Woven Fabric, Mat Material, Chop Material, Thread/strand
Fibre Type	Continuous, Short, Long
Process	Hand Layup, Resin Transfer Moulding, Sprayup
Contact	Earl Calverley, General Manager Box 939 184 Main Street North CARMAN, Man. R0G 0J0
Telephone	(204) 745-2878
Fax	(204) 745-2878

BOEING CANADA TECHNOLOGY LIMITED

Boeing Canada Technology is a leading fabricator of high technology fibre, aircraft and aerospace composite components for space and other advanced technology applications. Boeing is well known for the quality of its design and fabrication. The company has the engineering, manufacturing and development expertise to design and build solid laminate or sandwich panel components. The Winnipeg division currently produces both structural and non-structural advanced fibre composite components for a diversified range of products covering a technology spectrum from aircraft and satellite components to high temperature turbine engine and missile components.

Composite Products	Aerospace Components
Engineers	Engineering — 23 Manufacturing — 16
Technicians	Engineering — 12 Manufacturing — 3
Resins	Epoxy, Polyester, PEEK, Bismaleimide
Fibre	E Glass, S Glass, Carbon/Graphite, Kevlar
Reinforcement	Prepreg, Woven Fabric, Thread/Strand, Unidirectional Tape, Mat Material
Fibre Type	Continuous
Process	Hand Layup, Filament Winding

Mandate
To establish the company as a centre of excellence for composite manufacture within the Boeing Company and as the Canadian leader in the composite industry.

Contact	E. Murray Sloane, Director, Marketing/Contracts 99 Murray Park Road WINNIPEG, Man. R3J 3M6
Telephone	(204) 888-2300
Fax	(204) 888-2951

BOEING CANADA
DE HAVILLAND DIVISION

The de Havilland Division is a fully integrated airframe manufacturer, producing the Dash-8 family of regional airliners. The division also provides technical and product support for a fleet of over 2 500 aircraft. de Havilland continues to lead the way in development of aircraft that will improve air transport for regional passengers around the world.

Composite Products	Aircraft components
Engineers	Engineering — 5 Manufacturing — 3
Technicians	Engineering — 2 Manufacturing — 2
Resins	Epoxy, phenolic
Fibre	E glass, carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven fabric, Unidirectional Tape
Fibre Type	Continuous
Process	Hand Layup
Contact	Leonard K. John, Chief, Advanced Composites & Chemical Technology Garrett Boulevard DOWNSVIEW, Ont. M3K 1Y5
Telephone	(416) 633-7310
Fax	(416) 633-8302

BRISTOL AEROSPACE LIMITED

Bristol Aerospace entered the composites field over 25 years ago. Since that time the company has manufactured a wide range of composite components. All manufacturing is performed to aerospace or military specifications. Bristol's engineering division creates the plans, programs and tool designs for the components they manufacture. Bristol's testing and inspection facilities have been refined over the 55 years the company has served the aerospace industry.

Composite Products	Aircraft components
Engineers	Engineering — 2 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 4
Resins	Epoxy, polyester
Fibre	E Glass, carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven fabric, Unidirectional Tape, mat material
Fibre Type	Continuous
Process	Hand Layup
Contact	D. Hopper, Supervisor, Production Engineering P.O. Box 874 WINNIPEG, Man. R3C 2S4
Telephone	(204) 775-8331
Fax	(204) 885-3195

CAMOPLAST INC., ROSKI

Composite Products	Automotive and marine engine components, skis, plastic gadgets
Engineers	Engineering — 4 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 1
Resins	Epoxy, polyester, polyethylene, polypropylene
Fibre	E Glass
Reinforcement	Prepreg, thread/strand, Unidirectional Tape, mat material
Fibre Type	Continuous, long, short
Process	Hand Layup, platen press, resin injection moulding, resin transfer moulding
Contact	Réal Thibault, Director General 130, rue de l'Église ROXTON FALLS, Que. J0H 1E0
Telephone	(514) 548-5821
Fax	(514) 548-5803

CANADIAN AIRCRAFT PRODUCTS

Technical excellence in metal and composite materials is Canadian Aircraft Products' primary manufacturing strength. Over the last 30 years, the company has become the largest aerospace manufacturing facility in British Columbia. The company ensures complete quality control through every phase of component evolution, from design through certification. The company engineers and fabricates high quality structural and aerodynamic components for aircraft and the aerospace industries.

Composite Products	Aircraft components
Engineers	Engineering — 2 Manufacturing — 0
Technicians	Engineering — 2 Manufacturing — 0
Resins	Epoxy, polyester
Fibre	E Glass, carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven fabric, Unidirectional Tape
Fibre Type	Continuous
Process	Hand Layup
Contact	R. Bailey, Manufacturing Engineer 2611 Viscount Way RICHMOND, B.C. V6V 1M9
Telephone	(604) 278-9821
Fax	(604) 278-9618

CANADAIR DIVISION
BOMBARDIER INC.

Canadair has designed and brought into production a substantial number of secondary structural components fabricated out of advanced composite materials.

Composite Products	Aircraft components
Engineers	Engineering — 30 Manufacturing — 5
Technicians	Engineering — 5 Manufacturing — 0
Resins	Epoxy
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven fabric, Unidirectional Tape
Fibre Type	Continuous, Long
Process	Hand Layup, Compression Moulding
Contact	L.J. Munro, Vice-President, Business Planning P.O. Box 6087, Station A MONTREAL, Que. H3C 3G9
Telephone	(514) 744-1511
Fax	(514) 744-6586

CELLPACK AEROSPACE LIMITED

Cellpack Aerospace Limited, was incorporated in 1987 for the development, production and sale of advanced composite components and sub-assemblies for military and aerospace applications. Cellpack is also involved in the electrical and sporting industries.

Cellpack's project management is thoroughly experienced in aerospace and defence applications and guarantee correct and efficient implementation of large and small projects from the planning phase through to delivery.

Composite Products	Aerial technology, Satellite structures, Tanks, Vessels, Containers, Munition components, Infantry bridges, and Aerospace and Defence structures
Engineers	Engineering — 4 Manufacturing — 2
Technicians	Engineering — 2 Manufacturing — 5
Resins	Epoxy
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven Fabric, Woven Tape, Thread/strand Unidirectional Tape, Mat Material
Fibre Type	Continuous, Long, Short
Process	Hand Layup, Filament Winding

Mandate
To remain on the leading edge of advanced composite technologies, including materials, manufacturing processes, design and applications.

Contact	Ted Squires, Sales/Marketing Manager 71 Hall Street P.O. Box 1150 LUNENBURG, N.S. R0J 2C0
Telephone	(902) 634-8448
Fax	(902) 634-3993

CHEMCOR INDUSTRIAL PLASTICS INC.

Chemcor Industrial Plastics Inc. started in 1982. Chemcor has designed, fabricated and installed more than 150 major FRP projects in Canada, the U.S. and Asia. Chemcor provides the best quality FRP equipment for the pulp and paper, oil refining, mining and chemical industries. Chemcor has gained invaluable experience and expertise in designing FRP equipment to meet different requirements and applications.

Composite Products	Tanks, Vessels, Piping, Masts, Beams and booms, Helicopter rotary blades, Airplane fuselages and Custom fabrication products
Engineers	Engineering — 2 Manufacturing — 1
Technicians	Engineering — 2 Manufacturing — 3
Resins	Epoxy, Polyester, Vinylester
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven Fabric, Mat Material, Chop Material, Thread/strand
Fibre Type	Continuous, Short
Process	Hand Layup, Filament Winding, Sprayup
Contact	Samuel Lam, President 7903 Webster Road, R.R. #7 DELTA, B.C. V4G 1E4
Telephone	(604) 946-7688
Fax	(604) 946-7038

CITY ENGINEERED PLASTICS LTD.

Composite Products	Storage tanks, Hoods, Pipe and fittings, Grating, Custom products
Engineers	Engineering — 1 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 1
Resins	Polyester, PEEK
Fibre	E Glass
Reinforcement	Woven Fabric, Woven Tape, Chop Material, Thread/strand, Unidirectional Tape, Mat Material
Fibre Type	Continuous, Short, Long
Process	Hand Layup, Filament Winding, Sprayup
Contact	Tom Fisher, Estimator/Designer 1440 River Road RICHMOND, B.C. V6V 1L4
Telephone	(604) 521-3455
Fax	(604) 270-9443

C.P.F. DUALAM

Composite Products	Tanks, Towers, Piping, and Chemical Equipment
Engineers	Engineering — 1 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 3
Resins	Polyester, Vinylester
Fibre	E Glass, Carbon/graphite
Reinforcement	Woven Fabric, Thread/strand, Mat Material
Fibre Type	Continuous, Long
Process	Hand Layup, Filament Winding
Contact	J.A. Kidd, President 9961 Plaza Avenue MONTREAL, Que. H1H 4L5
Telephone	(514) 321-4280
Fax	(514) 321-4282

EDO CANADA LTD.

From a modest beginning in 1978, EDO Canada Ltd. has grown into a multi-division, high technology company serving the aerospace and defence industries. EDO Canada's 5 570-m^2 facility is located in Northeast Calgary. The facility houses the administrative and plant headquarters for EDO Canada's Defence Electronics Division, Advanced Composites Division and Structural Ceramics Division. EDO's production complex offers the flexibility to accommodate large-scale output or single-task projects, as well as the capability to direct your project from concept to completion or apply specific technology to any stage of development.

Composite Products	Aircraft, Military, Space and Transportation Components, Missile launch tubes, Cross sections of helicopter blades, External fuel tanks for H-3 Airforce Helicopter
Engineers	Engineering — 10 Manufacturing — 2
Technicians	Engineering — 10 Manufacturing — 6
Resins	Epoxy, Polyester, HDPE
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Unidirectional Tape, Woven Fabric, Thread/strand
Fibre Type	Continuous
Process	Hand Layup, Filament Winding, and Compression Moulding

Mandate
Composite design and fabrication; scientific advancements in underwater and aerospace technologies.

Contact	W.H. Mcallister, Sales/Marketing Manager 1940 Centre Avenue N.E. CALGARY, Alta. T2E 0A7
Telephone	(403) 569-5400
Fax	(403) 569-5499

ENGINEERED PLASTICS CORPORATION
FIBRECRAFT CANADA/ENGINEERING PLASTICS

Composite Products	Aerospace, Industrial, Architectural, Furniture
Engineers	Engineering — 1 Manufacturing — 5
Technicians	Engineering — 1 Manufacturing — 25
Resins	Epoxy, Polyester, Vinylester
Fibre	E Glass, Carbon/graphite, Kevlar
Reinforcement	Woven Fabric, Woven Tape, Chop Material, Unidirectional Tape, Mat Material
Fibre Type	Continuous, Short
Process	Hand Layup, Compression Moulding, Resin Transfer Moulding
Contact	K.E. Szekely, President Suite 518 710 Dorval Drive OAKVILLE, Ont. L6K 3V7
Telephone	(416) 842-8287
Fax	(416) 842-5459

EXEL LIMITED

Exel has 20 years of experience and practical application. This expertise has taken Exel into various fields such as construction, electrical, medical, transport and machine manufacturing. Exel works with its customer to assist in the design of products that fit its customers needs, by utilizing Exel's expertise, innovative thinking and material testing laboratories.

Composite Products	Tubes, Rods, Profiles
Engineers	Engineering — 1 Manufacturing — 1
Technicians	Engineering — 1 Manufacturing — 5
Resins	Polyester, Vinylester
Fibre	E Glass, Carbon/graphite
Reinforcement	Thread/strand, Mat Material
Fibre Type	Continuous
Process	Pultrusion

Mandate
Exel has a solid commitment to the R&D of fibreglass reinforced plastic (FRP) technology and its unlimited possibilities.

Contact	Colin Snow, President P.O. Box 537 435 Pido Road PETERBOROUGH, Ont. K9J 6Z6
Telephone	(705) 748-9141
Fax	(705) 748-4366

FIBRES DONNITE INC.

Composite Products	Wall panels, Tabletops, Flooring, Camper Trailer components, Snowmobile components, Ski box components
Engineers	Engineering — 3 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 1
Resins	Polyester, Epoxy, Polyamide
Fibre	S Glass
Reinforcement	Woven Fabric
Fibre Type	Continuous
Process	Compression Moulding
Contact	Yvon Fournier, Manager P.O. Box 1218 250 Gouin RICHMOND, Que. J0B 2H0
Telephone	(819) 826-5921
Fax	(819) 826-5203

FIBREGLASS REINFORCED PLASTIC SYSTEMS (FRP SYSTEMS)

Since its inception, Fibreglass Reinforced Plastic Systems has worked hand in hand with its supplier and end users to develop new and better ways to eliminate corrosion and process problems found in industry today. FRP Systems sustain a high level of product quality and remain flexible for ever changing market requirements. FRP Systems has the capacity to design, fabricate and install all of its products. Some of its industrial applications are pulp and paper, chemical, air pollution control, petrochemicals, potash, uranium, sewage and water treatment and electroplating.

Composite Products	Tanks, Hoods, Stacks, Ducting, Pipe, Custom products
Engineers	Engineering — 0 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 2
Resins	Polyester, Vinylester
Fibre	E Glass
Reinforcement	Thread/strand, Mat Material, Woven Fabric, Chop Material
Fibre Type	Continuous, Short
Process	Sprayup, Filament Winding
Contact	Loris Levtri, Manager 804 Macdonnel Street THUNDER BAY, Ont. P7B 4A6
Telephone	(807) 345-2171
Fax	(807) 345-8215

FIBROVAN INTL. LTD. (LES VÉHICULES)

Composite Products	Trailer-recreation vehicles, Industrial custom construction
Engineers	Engineering — 2 Manufacturing — 2
Technicians	Engineering — 0 Manufacturing — 0
Resins	Epoxy, Polyester
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Woven Fabric, Woven Tape, Chop Material, Unidirectional Tape, Mat Material
Fibre Type	Continuous, Short, Long
Process	Hand Layup, Compression Moulding, Sprayup
Contact	Marcel Guindon, President 24 Pacific East BROMONT, Que. J0E 1L0
Telephone	(514) 534-3581
Fax	(514) 534-0285

FLEET INDUSTRIES

Founded in 1930, the company is now a division of Fleet Aerospace Corporation. The company's 46 486-m^2 facility is located a few Kilometres from the U.S. border. Fleet produces aircraft radar, satellite and sonar assemblies for both civilian and military customers around the world. The company has developed extensive expertise in most aerospace manufacturing techniques including metal fabrication, honeycomb and metal-to-metal bonding and composite bonding. Fleet Industries is one of Canada's leading manufacturers of components and subsystems to the international aerospace industry.

Composite Products	Aerospace Components
Engineers	Engineering — 2 Manufacturing — 0
Technicians	Engineering — 6 Manufacturing — 5
Resins	Epoxy, Polyester
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Unidirectional Tape, Woven Fabric, Woven Tape
Fibre Type	Continuous
Process	Hand Layup

Mandate
Fleet's major emphasis is on quality products, competitive pricing and on-time delivery.

Contact	Brian M. Oakley, Manager, Sales & Marketing P.O. Box 400 Gilmore Road FORT ERIE, Ont. L2A 5N3
Telephone	(416) 871-2100
Fax	(416) 871-2722

FRE COMPOSITES

FRE Composites has been designing and manufacturing advanced composite products for more than 20 years. FRE offers total design to specification services; taking a product from concept, through development and prototyping and on to final full-scale production.

Composite Products	Aerospace, Defence, Industrial, Electrical and Recreational Components
Engineers	Engineering — 16 Manufacturing — 4
Technicians	Engineering — 3 Manufacturing — 2
Resins	Epoxy, PEEK, Nylon
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Thread/strand, Unidirectional Tape
Fibre Type	Continuous
Process	Hand Layup, Filament Winding, Pultrusion
Contact	T.W. Sutherland, President Suite 350 1223 Michael Street North OTTAWA, Ont. K1J 7T1
Telephone	(613) 745-4464
Fax	(613) 745-1598

GARLOCK DU CANADA LTÉE

Composite Products	Cloth for luminates, Yarns for braded packings, Yarns for friction materials
Engineers	Engineering — 5 Manufacturing — 2
Technicians	Engineering — 0 Manufacturing — 37
Fibre	E Glass, Kevlar
Reinforcement	Prepreg, Woven Fabric, Woven Tape, Thread/strand
Process	Yarn Coating, Weaving, Dreff Spinning
Contact	Gilles Vallée, Vice-President 4100 Garlock SHERBROOKE, Que. J1L 1W5
Telephone	(819) 563-8080
Fax	(819) 563-5620

GENERAL COMPOSITE TECHNOLOGY LTD.

General Composite Technology Ltd. was founded in 1986. General Composite Technology Ltd. is one of the founding members of the Advanced Materials Engineering Centre (A.M.E.C.) in Halifax giving the company access to the best advanced materials R&D facility in Canada. General Composite Technology provides product design and development service toward the development of industrial applications for pultruded components.

Composite Products	Panels
Engineers	Engineering — 4 Manufacturing — 2
Technicians	Engineering — 2 Manufacturing — 2
Resins	Epoxy, Polyester, Vinylester, Phenolic
Fibre	E Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven Fabric, Mat Material, Thread/strand
Fibre Type	Continuous, Long
Process	Pultrusion

Mandate
General Composite Technology is striving to advance state-of-the-art pultrusion technology.

Contact	Roy Campbell, Director, Marketing 1248 Bedford Highway BEDFORD, N.S. B4A 1C6
Telephone	(902) 835-4673
Fax	(902) 835-0134

GRAHAM PRODUCTS LTD.

Graham Products, founded in 1954, is a leader in engineered polymer composites in Canada. Graham produces and markets cladding and glazing materials utilizing its expertise and flexibility as a continuous process manufacturer of flat and profiled composites.

Graham Products serves a diverse North American market, focussed on commercial, industrial and residential construction and industrial fabrication customers.

Graham Products provides building products of engineered quality through cost effective marketing systematic product R&D and responsiveness to special customer needs.

Composite Products	Industrial cladding, Wall panels, Corrosion resistant panels
Engineers	Engineering — 2 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 0
Resins	Polyester
Fibre	E Glass
Reinforcement	Woven Fabric, Chop Material, Thread/strand
Fibre Type	Continuous
Process	Pultrusion
Contact	Ian A. Graham, President 104 Maple Avenue INGLEWOOD, Ont. L0N 1K0
Telephone	(416) 457-5290
Fax	(416) 838-3386

GSM PRODUCTION

GSM is a collection of highly skilled technically oriented *hands-on* craftsmen specializing in composite products development. GSM has a policy of providing quality and service in every project undertaken, from the smallest component to the largest design and fabrication contract. GSM in association with GSM Design Group, focuses its efforts in the areas of process and product development, prototyping and production of moulded parts for automotive and industrial application, as well as the development of composite technology.

Composite Products	Motor vehicles
Engineers	Engineering — 2 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 10
Resins	Epoxy, Polyester
Fibre	E Glass, Carbon/graphite, Kevlar
Reinforcement	Woven Fabric, Woven Tape, Unidirectional Tape, Mat Material
Fibre Type	Continuous, Long
Process	Hand Layup, Resin Transfer Moulding
Contact	Morley L. Smith, President 1400 Pomba Street SAINT-LAURENT, Que. H4R 2A1
Telephone	(514) 337-3041
Fax	(514) 336-2763

ICL ENGINEERING

ICL Engineering has a background of 34 years in the manufacturing of corrosion-resistant products and custom fabrication of fibreglass reinforced plastics (FRP). ICL services involve the design, engineering and custom fabrication of corrosion-resistant FRP products for all types of industrial application, including mining and smelting, chemical, and pulp and paper industries. ICL fabricates products and systems for servicing the North American and world markets.

Composite Products	Tanks, Pipes, Stacks, Hoods, Towers, Scrubbers, Specialty products
Engineers	Engineering — 2 Manufacturing — 4
Technicians	Engineering — 1 Manufacturing — 0
Resins	Polyester, Vinylester, Bisphenol A
Fibre	Kevlar, ECR Glass
Reinforcement	Woven Fabric, Chop Material, Mat Material
Fibre Type	Continuous, Short
Process	Hand Layup, Filament Winding
Contact	David Yuen, Chief Engineering 10111 River Drive RICHMOND, B.C. V6X 1Z2
Telephone	(604) 278-9721
Fax	(604) 270-6286

INDUSTRIES TROIS-RIVIÈRES INC.

Industries Trois-Rivières Inc. is dedicated to the manufacturing of top quality texturized glass fabrics.

Composite Products	Cloth, Ropes, Cables, Fabrics
Engineers	Engineering — 0 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 0
Resins	Phenolic
Fibre	E Glass, Kevlar, Nylon, Silica, Asbestos
Reinforcement	Thread/strand
Fibre Type	Short
Process	Weaving, Braiding
Contact	R. Chaîné, PDG 15 Route 116 DANVILLE, Que. J0A 1A0
Telephone	(819) 839-2793
Fax	(819) 839-2797

INSULEC LTD.

Insulec Ltd. is a diversified Canadian company with an international reputation for innovative research and constructive problem-solving.

Composite Products	Prepreg, Electrical insulation, Bottlecap lining materials, Supplier for aircraft
Engineers	Engineering — 3 Manufacturing — 1
Technicians	Engineering — 3 Manufacturing — 2
Resins	Epoxy, Polyester, Polymide, Silicone, Phenolic
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven Fabric, Mat Material
Fibre Type	Continuous, Long
Process	Dip coating
Contact	G.M. Hogarth, President 125 Edward Street AURORA, Ont. L4G 1W3
Telephone	(416) 727-0114
Fax	(416) 727-8544

INTERNATIONAL COMPOSITES INC.

International Composites Inc. was created in March 1989 to manufacture fibreglass reinforced plastic (Epoxy) piping for the chemical process, industrial, petroleum and marine markets.

Composite Products	Pipe
Engineers	Engineering — 1 Manufacturing — 2
Technicians	Engineering — 0 Manufacturing — 4
Resins	Epoxy
Fibre	E Glass
Reinforcement	Thread/strand
Fibre Type	Continuous
Process	Filament Winding
Contact	Donald Rhodenizer, General Manager 140 Joseph Zatzman Drive DARTMOUTH, N.S. R3B 1M4
Telephone	(902) 468-4303
Fax	(902) 468-2335

MBB HELICOPTER CANADA LTD.

At MBB Helicopter Canada Ltd. development is the foundation for the success of their helicopters. MBB's capabilities range from preliminary design and development schemes to detailed electrical and mechanical design, specifications for materials and processes, inspections and the final preparations of drawings. MBB Helicopter also has the in-house capability to design and manufacture advanced composite structures for the aerospace community.

Composite Products	Aerospace components
Engineers	Engineering — 3 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 1
Resins	Epoxy, Polyester
Fibre	E Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven Fabric
Fibre Type	Continuous
Process	Hand Layup
Contact	Jim Johnston, Senior Design Engineer P.O. Box 250 FORT ERIE, Ont. L2A 5M9
Telephone	(416) 871-7772
Fax	(416) 871-3320

NORTEX
DIVISION DE CANAM-MANAC

Composite Products	Transport panels, building panels, specialized products
Engineers	Engineering — 1 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 1
Resins	Polyester, Vinylester
Fibre	E Glass, S Glass, Kevlar
Reinforcement	Woven Fabric, Woven Tape, Thread/strand, Mat Material
Fibre Type	Long, Short
Process	Compression Moulding
Contact	P. Lapierre, Director General 2280, 43rd Avenue LACHINE, Que. H8T 2J8
Telephone	(514) 636-5687
Fax	(514) 636-9610

OSHAWA GLASS FIBRE PRODUCTS LTD.
RAYPLEX

Composite Products	Corrosion equipment, custom composites
Engineers	Engineering — 1 Manufacturing — 1
Technicians	Engineering — 1 Manufacturing — 1
Resins	Polyester
Fibre	E Glass, S Glass, Carbon/graphite
Reinforcement	Woven Fabric, Woven Tape, Thread/strand, Unidirectional Tape, Chop Material, Mat Material
Fibre Type	Continuous, Long, Short
Process	Hand Layup, Compression Moulding, Filament Winding
Contact	R. Bilsky, President P.O. Box 1094, Station B OSHAWA, Ont. L1J 5Y9
Telephone	(416) 579-1433
Fax	(416) 579-1431

PULTRALL INC.

Composite Products	Profiles, rods and bars
Engineers	Engineering — 1 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 0
Resins	Epoxy, Polyester, Vinylester
Fibre	E Glass, S Glass, Carbon/Graphite, Kevlar
Reinforcement	Prepreg, Woven Fabric, Woven Tape, Thread/strand, Unidirectional Tape, Mat Material
Fibre Type	Continuous, Long, Short
Process	Pultrusion
Contact	Christian Bernard, Director General 275 Monfette North THETFORD MINES, Que. G6C 7H4
Telephone	(418) 335-3202
Fax	(418) 335-5117

PULTRUSIONS CANADA LTD.

Composite Products	Uniforms cross-section profiles (tubes, rods, bars)
Engineers	Engineering — 1 Manufacturing — 2
Technicians	Engineering — 0 Manufacturing — 1
Resins	Polyester, Vinylester
Fibre	E Glass, A Glass
Reinforcement	Woven Fabric, Mat Material
Fibre Type	Continuous
Process	Pultrusion
Contact	W.M. Matto, Sales Manager 247 Armstrong Avenue GEORGETOWN, Ont. L7G 4X6
Telephone	(416) 873-2830
Fax	(416) 873-3980

QUICKSILVER MANUFACTURING LTD.

Composite Products	Septic and trunk tanks
Engineers	Engineering — 0 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 0
Resins	Polyester, Vinylester
Fibre	E Glass, Kevlar
Reinforcement	Woven Fabric, Chop Material, Mat Material
Fibre Type	Continuous, Short
Process	Hand Layup, Sprayup
Contact	J. Rasmussen, President P.O. Box 160 STROME, Alta. T0B 4H0
Telephone	(403) 376-3502
Fax	(403) 376-3502

REINFORCED PLASTIC SYSTEMS INC.
ABCO PLASTICS DIVISION

ABCO Plastics has over 30 years' experience in designing and engineering fibreglass reinforced plastic piping systems for a wide variety of industries.

Composite Products	Piping systems, ducts, containers, scrubbers, lifeboats, vehicle components, custom fabrication
Engineers	Engineering — 1 Manufacturing — 0
Technicians	Engineering — 4 Manufacturing — 5
Resins	Polyester, Vinylester
Fibre	E Glass, Carbon/graphite, ECR, Nexus
Reinforcement	Woven Fabric, Chop Material, Mat Material, Unidirectional Tape, Thread/strand
Fibre Type	Continuous, Short, Long
Process	Hand Layup, Filament Winding, Compression moulding
Contact	Sheila Tanner, Sales Coordinator P.O. Box 299 MAHONE BAY, N.S. B0J 2E0
Telephone	(902) 624-8383
Fax	(902) 624-6395

RENÉ FIBRE DE VERRE LTD.

René Ltd. began operations in Beauce, Quebec in 1977 with a 465-m^2 facility, five employees and incredible ambition. Today, René Ltd. employs 160 people and occupies an area of 9 755 m^2 of office, manufacturing and warehouse space. René Ltd. facilities house their own laboratories to conduct ongoing testing for product quality uniformity, and maintain a group of chemists, product engineers and production engineers to guarantee a high level of quality.

Composite Products	Auto parts
Engineers	Engineering — 4 Manufacturing — 6
Technicians	Engineering — 150 Manufacturing — 0
Fibre	S Glass
Reinforcement	Mat Material
Fibre Type	Short, Long
Process	Resin Transfer Moulding, Resin Injection Moulding
Contact	R. Grenier, President 55 Route 271 SAINT-ÉPHREM, Que. G0M 1R0
Telephone	(418) 484-5282
Fax	(418) 484-5296

RESINJECT DEVELOPMENTS

Composite Products	Composite tooling
Engineers	Engineering — 0 Manufacturing — 0
Technicians	Engineering — 0 Manufacturing — 1
Resins	Epoxy, Polyester, Vinylester, Methacrylates
Fibre	E Glass, Carbon/graphite, Kevlar
Reinforcement	Woven Fabric, Mat Material
Fibre Type	Continuous
Process	Resin Transfer Moulding
Contact	Don Panzer, President Unit #11 2364 Haines Road MISSISSAUGA, Ont. L4Y 1Y6
Telephone	(416) 897-2199
Fax	(416) 897-2256

ROWFIBRE CORPORATION

Rowfibre Corporation was incorporated in September 1985 for the purpose of developing and manufacturing advanced composite aerostructures. The company's founder and president has been involved in the development and manufacture of advanced composites for over 10 years. The vice-president of business development has over 25 years' experience in aerospace and defence and the vice-president of manufacturing engineering has 30 years' experience in tool design and aerospace projects.

Composite Products	Aircraft components
Engineers	Engineering — 2 Manufacturing — 0
Technicians	Engineering — 1 Manufacturing — 9
Resins	Epoxy, Vinylester, Phenolic, PVC
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Prepreg, Woven Fabric, Woven Tape, Unidirectional Tape, Mat Material
Fibre Type	Continuous
Process	Hand Layup
Contact	Robert White, President 170-12417, No. 2 Road RICHMOND, B.C. V7E 2G3
Telephone	(604) 277-7722
Fax	(604) 275-3323

SAIL CRAFT OF CANADA
DELTA MARINE INDUSTRIES LIMITED

Composite Products	Racing catamarans
Engineers	Engineering — 0 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 1
Resins	Epoxy
Fibre	E Glass, S Glass
Reinforcement	Woven Fabric, Unidirectional Tape
Fibre Type	Short, Long
Process	Hand Layup
Contact	Bruce Hopgood, President 284 Adrien-Patenaude VAUDREUIL, Que. J7V 5V5
Telephone	(514) 424-1382

SCEPTER MANUFACTURING COMPANY LTD.
ENGINEERING DIVISION

Composite Products	Storage, fuel, ammunition containers, cases, pipe fittings, special purpose products
Engineers	Engineering — 6 Manufacturing — 10
Technicians	Engineering — 2 Manufacturing — 4
Resins	Polyester, Polypropylene, Polycarbonate
Fibre	E Glass, S Glass, Carbon/graphite
Reinforcement	Prepreg, Chop Material
Fibre Type	Long, Short
Process	Resin Injection Moulding, Blow Moulding
Contact	Grant Farrell, Manager, Product Development 67 Lesmill Road DON MILLS, Ont. M3B 2T8
Telephone	(416) 441-2292
Fax	(416) 441-6303

SEA GLASS INDUSTRIES LTD.

Sea Glass Industries Ltd. was established in 1989 to offer services to the marine and technical glass reinforced plastics industries. The company offers complete service for boats and marine equipment including high tech industrial glass reinforced plastic laminations, manufacturing, assembly, repair and refinishing.

Sea Glass specializes in tooling, development of moulds and hauling of vessels for quick inspections or lengthy repairs. It also provides emergency haulout and damage repair, design, consultation, surveys and appraisals, marine hardware and equipment, and electronic and electrical services.

Composite Products	Boats, custom fabrication
Engineers	Engineering — 0 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 1
Resins	Epoxy, Polyester, Vinylester
Fibre	S Glass, Carbon/graphite, Kevlar
Reinforcement	Woven Fabric, Woven Tape, Chop Material, Mat Material, Unidirectional Tape, Thread/strand
Fibre Type	Continuous, Short, Long
Process	Hand Layup, Sprayup
Contact	Ryland Evans, Plant Manager 38 Bancroft Drive Comp. 2 Burnside Industrial Park DARTMOUTH, N.S. B3B 1G3
Telephone	(902) 466-6967
Fax	(902) 464-0069

TECHNICAL PULTRUSION INC.

Composite Products	Custom parts, Rox covers
Engineers	Engineering — 7 Manufacturing — 0
Technicians	Engineering — 2 Manufacturing — 0
Resins	Polyester, Vinylester
Fibre	E Glass, Carbon/graphite, Kevlar
Reinforcement	Woven Fabric, Thread/strand, Mat Material
Fibre Type	Continuous, Short, Long
Process	Pultrusion
Contact	J.L. Dufresne, President 1860 Marie-Victorin Street SAINT-BRUNO, Que. J3V 4P6
Telephone	(514) 653-1731
Fax	(514) 653-8478

TEKTRON EQUIPMENT CORPORATION

Composite Products	Boats, masts/booms, industrial parts
Engineers	Engineering — 1 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 2
Resins	Epoxy, Polyester
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Woven Fabric, Woven Tape, Thread/strand, Unidirectional Tape, Mat Material
Fibre Type	Continuous, Long, Short
Process	Hand Layup, Sprayup
Contact	E. Tekatch, President 230 Arvin Avenue STONEY CREEK, Ont. L8E 2L8
Telephone	(416) 662-7820
Fax	(416) 662-8436

THE STEWART GROUP

Composite Products	Coated yarns
Engineers	Engineering — 2 Manufacturing — 2
Technicians	Engineering — 0 Manufacturing — 0
Resins	Epoxy
Fibre	E Glass
Reinforcement	Thread/strand
Fibre Type	Continuous
Process	Pultrusion
Contact	W.O. Morris, President 259 Steelcase Road West MARKHAM, Ont. L3R 2P6
Telephone	(416) 475-0800
Fax	(416) 479-9547

TRIPLE M FIBREGLASS LTD.

Composite Products	Pipe, tanks, flanges, elbows, custom moulding, structural shapes, floor grating
Engineers	Engineering — 0 Manufacturing — 1
Technicians	Engineering — 0 Manufacturing — 1
Resins	Epoxy, Polyester, Vinylester, Bisphenol
Fibre	E Glass
Reinforcement	Woven Fabric, Woven Tape, Chop Material, Thread/strand, Unidirectional Tape, Mat Material
Fibre Type	Continuous, Long, Short
Process	Hand Layup, Filament Winding, Resin Transfer Moulding
Contact	G. Maber, President 8135 Wagner Road EDMONTON, Alta. T6E 4N6
Telephone	(403) 465-0726
Fax	(403) 466-9801

VOYAGEUR CANOE COMPANY LTD.

Composite Products	Canoes, containers, protective masks, custom moulds, orthopedic supports
Engineers	Engineering — 1 Manufacturing — 0
Technicians	Engineering — 2 Manufacturing — 2
Resins	Epoxy, Polyester
Fibre	E Glass, S Glass, Carbon/graphite, Kevlar
Reinforcement	Woven Fabric, Woven Tape, Chop Material, Unidirectional Tape, Mat Material
Fibre Type	Continuous, Long, Short
Process	Hand Layup, Pultrusion, Compression Moulding
Contact	G.A. Fallis, President Dept. BG 3 King Street MILLBROOK, Ont. L0A 1G0
Telephone	(705) 932-2131

WALTEC INC.
WALTEC PLASTICS

Composite Products	Computer cabinets, appliance and electrical parts, military and automotive parts
Engineers	Engineering — 0 Manufacturing — 3
Technicians	Engineering — 0 Manufacturing — 4
Resins	Polyester, Polystyrene, Polypropylene, Phenolic
Fibre	Glass filled nylon
Reinforcement	Woven Fabric, Woven Tape, Chop Material, Prepreg
Fibre Type	Short
Process	Compression Moulding, Resin Injection Moulding, Resin Transfer Moulding, Platen Press
Contact	D. Webster, Finance Manager 320 Elizabeth Street MIDLAND, Ont. L4R 4L6
Telephone	(705) 526-0591
Fax	(705) 526-3521

ACADEMIC INSTITUTIONS

ACADIA UNIVERSITY INSTITUTE

Faculty Box 67
Acadia University
WOLFVILLE, N.S.
B0P 1X0

Telephone (902) 542-2201, ext. 113
Fax (902) 542-1454

Director John Starr

Board Chairman Dr. Peter Mullen

Employees 2 professional and administrative

Mandate
To expand the contribution of Acadia University to its surrounding community and, in general, to the province of Nova Scotia, and to conduct research in any field and implement the results of such research.

Advanced Materials Component
No advanced materials component; however it "may conduct and implement research in any field" and thus may make available any resources helpful to a materials problem.

OFFICE OF RESEARCH SERVICES

University of Alberta
1-3 University Hall
EDMONTON, Alta.
T6G 2J9

Telephone	(403) 492-5787
Fax	(403) 492-2230
Technology Management Officer	Dr. W. MacDonald

Advanced Materials Component
Several researchers are involved in advanced materials in a number of departments:

Alberta Microelectronic Centre	John Zupancic
Alberta Telecommunications Research Centre	Ray Fortune
Centre for Frontier Engineering Research	Dr. Touraj Nasseri
The Laser Institute	Dr. Donald McKen
Contact	Directly through the centres or through Dr. W. MacDonald

ALBERTA LASER INSTITUTE

University of Alberta
9924-45 Avenue
EDMONTON, Alta.
T6E 5J1

Telephone (403) 436-9750
Fax (403) 437-1240

Director Dr. Donald McKen

Employees 17 scientists, engineers and technicians

Annual Budget $1 000 000

Mandate
To contribute to economic expansion and diversification through laser technology.

Advanced Materials Component
Laser technology for advanced manufacturing, including processing of advanced materials. Advanced materials technologies include optical fibres, powders for ceramics and catalysts, and diamond film for protecting optics.

Major Materials Equipment
5 000 watt CO_2 laser coupled to a 5-axis CNC workstation
1 000 watt CO_2 laser coupled to a 3-axis CNC workstation

Contact Dr. Donald McKen

ALBERTA MICROELECTRONIC CENTRE

University of Alberta, University of Calgary
Edmonton Fabrication Facility/Head Office
318, 11315-87 Avenue
EDMONTON, Alta.
T6G 2C2

Telephone	(403) 492-3914 (Edmonton)
Fax	(403) 492-1643

Calgary Design Facility
200, 3553-31 Street
CALGARY, Alta.
T2L 2K7

Telephone	(403) 289-2043 (Calgary)
Fax	(403) 289-2047

President	John F. Zupancic
Board Chairman	H. G. Schaefer
Employees	25 in Edmonton and 9 in Calgary
Annual Budget	$2 500 000

Mandate
To develop skills in microelectronics technologies and access tools and expertise to assist regional industry, educational institutes and the public to increase industrial productivity, competitiveness of products and services and regional economic diversification.

Advanced Materials Component
Active where products will assist in microelectronics area.

Employees	4 in the Centre and 10 university researchers.

Specialty Areas, Laboratories and Services
Photolithography; Microelectronics; Thin Film Growth and Characterization; Materials Structural Modelling

Major Materials Equipment
FR and DC Sputtering, Thermal and E-Beam Evaporation

Contact	Graham McKinnon, Laboratory Manager

ALBERTA TELECOMMUNICATIONS RESEARCH CENTRE (ATRC)

University of Alberta, University of Calgary
Suite 200, 4245-97th Street
EDMONTON, Alta.
T6E 5Y4

Telephone (403) 461-3830
Fax (403) 463-3010

President Ray F. Fortune

Board Chairman Del Lippert

Employees 50 to 60

Annual Budget Total revenue (1989) $3 267 000

Mandate
Through industry-university collaboration in applied telecommunications research, to contribute trained people and innovative technology to achieve: economic growth for government sponsors, business growth for industry sponsors and academic and research growth for university sponsors.

Advanced Materials Component
ATRC has no materials groups but is a market and interested participant in new telecommunications materials technology. Interested in advanced materials as they pertain to telecommunications.

Research Divisions are: Systems and Networks, Photonics, Wireless Communications

OFFICE OF RESEARCH SERVICES AND INDUSTRY LIAISON

University of British Columbia
Room 331
2194 Health Sciences Mall
VANCOUVER, B.C.
V6T 1W5

Telephone	(604) 224-8580
Fax	(604) 224-8589
Executive Director	Dr. James W. Murray
Employees	8 technology transfer officers and 4 support

Mandate
To transfer university developed and owned technology to the private sector and assist faculty to collaborate with industry.

Advanced Materials Component
The office has extensive involvement with advanced materials through:

University of British Columbia
Forward Building
Department of Metals and Materials Engineering
6350 Stores Road
VANCOUVER, B.C.
V6T 1W5

Telephone	(604) 228-3672
Fax	(604) 228-3619
Materials Manager	Dr. John Lund Head, Department of Metals and Materials Engineering Dr. J. Keith Brimacombe Director, Centre for Metallurgical Process Engineering
Annual Budget	$2 500 000
Employees	17 faculty, 7 research technicians, 15 research engineers and 7 research associates

Specialty Areas, Laboratories and Services

Advanced Composite Laboratories	Dr. Anoush Poursartip — fibre composite preparation and testing
Ceramics Laboratories	Dr. A.C.D. Chaklader — broad range of facilities
Semiconductor Crystal Growing Facility	Dr. F. Weinberg
Advanced Metallic Alloys	Dr. A. Mitchell — superalloy, titanium alloy research
Materials Process Modelling	Dr. J.K. Brimacombe — Centre for Metallurgical Process Engineering

Major Materials Equipment

Advanced Composites	production scale drum winder for prepregs; large autoclave for curing; mechanical testing fatigue equipment; relevant analytical facilities
Advanced Ceramics	particle characterization equipment; TGA; DTA; hot pressing equipment; equipment for plasma synthesis of carbides and nitrides
Semiconductor Facility	two commercial crystal growing units (used for silicon and gallium arsenide), crystal cutting equipment.
Advanced Alloys	VAR; electron beam; HF induction and other melting/remelting casting units.
Materials Processing	instrumented pilot-scale rotary kiln; flash smelting pilot reactor facility; Gleeble 1 500 thermomechanical process simulator.
Shared Facilities	SEM Facility with EDAX; 200 kV STEM facility; SIMS analytical laboratory; electron beam microprobe analyzer; X-Ray diffraction; X-Ray fluorescence; IR spectrometers; AAU facility; specialized analytical instruments; optical image analyzer; metallographs; large servo-hydraulic testing equipment; screw-type tensometers; corrosion measurements laboratory; computer facilities.

Contact Main switchboard or individuals as above.

UNIVERSITY TECHNOLOGIES INTERNATIONAL INC.

University of Calgary, Foothills Provincial General Hospital
Suite 620
Earth Sciences Building
2500 University Drive N.W.
CALGARY, Alta.
T2N 1N4

Telephone	(403) 220-3790
Fax	(403) 292-6139
President and CEO	John Fraser
Board Chairman	Hugh Planche
Employees	President, Science and Engineering Technologies; Manager, Science and Engineering Technologies; Assistant Manager, Marketing; Administrative Assistant, Communication; Administrative Assistant, Financial.
Annual Budget	$700 000

Mandate
To develop and market technology-based business opportunities resulting from research at the university hospital.

Advanced Materials Component
No formal materials component, but researchers working in: mechanical alloys using polymers, composite materials testing, non-linear optical crystals for electronic devices, selective ion transport through membranes, pillared clays for catalysts, sulfur and selenium-nitrogen frameworks for novel conductors.

Contact	UTI Office

SCIENCE TECHNOLOGY CENTRE

Carleton University
Room 140
Herzberg Building
Colonel By Drive
OTTAWA, Ont.
K1S 5B6

Telephone (613) 788-4442
Fax (613) 788-4445

Executive Director A.A. Raffler

Managers A.L. Peter (Mechanical)
L.L. Boissonneault (Mechanical)
J.D.E. Wong (Electronics)

Employees 40 technologists, technicians and engineers.

Annual Budget $2 000 000

Mandate
To provide technical support for the Faculty of Science, to perform R&D activities in collaboration with other universities and research institutions and to assist local industry and entrepreneurs.

Advanced Materials Component
The technology transfer office directs toward advanced materials capabilities. There are also advanced electro-mechanical facilities with computer-aided design and manufacturing.

Contact Executive Director or Managers as above.

CENTRE FOR BUILDING STUDIES

Concordia University
(Associated with the Société informatique de recherche pour l'industrie de la construction — SIRICON)
1455 de Maisonneuve Blvd. West
MONTREAL, Que.
H3G 1M8

Telephone (514) 848-3200
Fax (514) 848-3198

Director Dr. Paul Fazio, Eng.

Board Chairman F.H. Ernst (SIRICON)

Employees 16 full time and 6 adjunct faculty members.

Annual Budget $4 000 000

Mandate
To address the educational, R&D, and information transfer needs of the building sector.

Advanced Materials Component
Involved with advanced materials in the construction materials field, including polymers and polyblends, adhesives, sealants and phase change materials for energy conservation in buildings. Building products are wallboards, concretes and composite tiles.

Contact Dr. D. Feldman

CONCORDIA COMPUTER-AIDED VEHICLE ENGINEERING (CONCAVE) RESEARCH CENTRE

Department of Mechanical Engineering
Concordia University
Room CR-200
1455 Maisonneuve Blvd. West
MONTREAL, Que.
H3G 1M8

Telephone	(514) 848-7930
Fax	(514) 848-8635
Director	Dr. Seshadri Sankar
Employees	access to 29
Annual Budget	$1 000 000

Mandate
To conduct specialized research in Vehicle Engineering within the Department of Mechanical Engineering.

Objectives
Deployment of computer-aided design for effective technology transfer to industries through development of computer software packages for off-road, road, rail, and air vehicle system analysis, design and testing.

Training of highly specialized professionals in vehicle engineering for effective and innovative industrial resource development and R&D leadership in Quebec and the rest of Canada.

Advanced Materials Component
R&D on conventional and Advanced Materials with the following tasks:
- systems identification and re-evaluation using finite element analysis
- conception and development of fail safe design strategies with the added capability to expedite trouble shooting
- reliability engineering analysis for minimum maintainability
- material properties characterization that facilitates identification, classification, prognosis, or isolation of damage in vehicle structures and components
- investigational analysis and damage surveys to enhance the assessment of the fracture and fatigue characteristics of advanced materials such as composites

Development and *customization* of structural design assistance packages and knowledge-based expert systems.

Employment of probabilistic micromechanics to refine traditional structural dynamics analysis models and methodologies to elucidate the response pattern of a material's microstructure.

Facilities and Equipment

Computing Facilities include:

- CYBER 835 and CYBER 830
- computer research and interactive graphics laboratory with VAX 11/780, NORPAK VDP high performance colour video graphics system, a CALCOMP drum plotter and a Tektronix 4663 flatbed plotter
- Nicolet structural analysis system with Micronova MP 200 computer, with modal analysis and structural modification software and a direct link to the multi-axis vibration test rig
- two Apollo Computers with Ato Trol 3D-CAD
- IRIS 2400 workstation with high resolution raster graphics
- network of IBM PC/XTs and PC-CAD software (AUTO-CAD, MEGACAD, PC-ANSYS software)
- much additional software

The experimental laboratory facilities include:

- two Electro-hydraulic shakers for testing large structures
- electro-dynamic shaker
- FFT Analyzer, 2-channel, Nicolet Model 660 B, line connection to VAX 11/780
- dedicated computer-aided testing facility with animated graphics
- all required recording, measuring and analyzing instruments

Contact Dr. S. Sankar

SOCIÉTÉ INFORMATIQUE DE RECHERCHE POUR L'INDUSTRIE DE LA CONSTRUCTION (SIRICON)

The Centre for Building Studies
Concordia University
1455 Maisonneuve Blvd. West
MONTREAL, Que.
H3G 1M8

Telephone (514) 848-8770
Fax (514) 848-3198

Room 243
1257 Guy
MONTREAL, Que.
H3H 2K5

Director General Dr. Paul Fazio

Board President Fred Ernst

Employees 10

Annual Budget $1 000 000

Mandate
To transfer technology and research results for the Canadian construction industry.

Advanced Materials Component
SIRICON concentrates on introduction of computerization to the construction industry. Priorities are Energy, Computer Assisted Design, Construction Management and Expert Systems. It has recently entered a new area of Control Systems for heating and ventilation products. Advanced materials are not primary interest (see "Centre for Building Studies").

CENTRE DE DÉVELOPPEMENT TECHNOLOGIQUE (C.D.T.)

École polytechnique de Montréal
C.P. 6079, Succursale A
MONTREAL, Que.
H3C 3A7

Telephone (514) 340-4171
Fax (514) 340-4019

Director Denis N. Beaudry

Board Chairman Rolland Doré

Employees 9

Annual Budget $500 000

Mandate
To promote and exploit technologies developed in the institution.

Advanced Materials Component
Groups involved in advanced materials development

- Centre for Characterization and Microscopy of Materials, (CM)2
- Polymers Applied Research Centre (PARC)
- Thin Films Research Group (TFRG)
- Advanced Ceramics and Special Refractories

Contact

(CM)2	Prof. Gilles L'Espérance, Director
PARC	Prof. Pierre J. Carreau, Director
TFRG	Prof. Arthur Yelon, Director

Annual Budgets

(CM)2	$ 600 000
PARC	$1 700 000
TFRG	$1 400 000

Employees

(CM)2	30 professionals, 100 technical, 50 students
PARC	19 professionals, 6 technical, 45 students
TFRG	18 professionals, 10 technical, 40 students

Specialty Areas, Laboratories and Services
(CM)2 — materials development — examples are welding electrodes, cavitation resistant steels, steel powders, turbine blade rejuvenation, MMCs, superconductors analytical techniques training.

PARC — high frequency heating of UHMWPE, blow film processes, computer applications in injection moulding, polymer processing, polymer characterization, mechanical behaviour and tribology.

TFRG — amorphous hydrogenated silicon, nuclear techniques for microelectronics materials and processes, deposition of thin layers and etching by *cold* plasma, semiconductors, adhesion, surface activation, amorphous alloys, polarons, quantum transport.

Ceramics — advanced characterization, evaluation of ceramics for high temperature applications, characterization of ceramic composites

Major Materials Equipment
(CM)2 — 2 300 kV STEM, Philips CM30 (unique in Canada), 200 kV STEM, JEOL 2 000, JEOL Jamp 30 scanning auger microscope, JEOL JSM 840 & 820 SEMs, Philips PW 1 130 X-Ray Diffractometer, KONTRON Image Analyzing System.

PARC — Battenfeld Injection Molding machine — 80-tonne, Killion single screw extruder; Killion blow film tower; Leistritz 35-mm twin screw extruder; 200-tonne vertical press; 20 & 30-tonne vertical presses with hot plates; Infrared heating thermoforming machine; Piston extruder with microwave heating; Brabender mixer; rollmill; extruder; gel permeation chromatographs; DSC II and DuPont 990 scanning calorimeters; Instron tester and capillary rheometer; Rheovibron; rheogoniometer; elongation viscometer; plasma reactors; traction machines; fatigue machines; dynamic mechanical analyzer; work benches for gears, friction and bearings.

TFRG — Nuclear techniques — ERD, RBS, PIXE, ion implantation Physicochemical techniques — IR; AES; photoelectron spectroscopy; SIMS; UPS; Scanning tunnelling microscopy; contact angle goniometry; mass spectrometry; ESR.

Electro-optical — optical absorption: conductivity: drift mobility: thermopower: constant photocurrent Device evaluation — DLTS; contact resistance; C-V-w; I-V-dark; I-V-light.

Contact Individuals as above or central switchboard.

OFFICE OF RESEARCH

University of Guelph
GUELPH, Ont.
N1G 2W1

Telephone (519) 824-4120
Fax (519) 821-5236

Manager of Technology Development Christopher M. Ostrovski

Advanced Materials Component
No materials component as such, but has R&D techniques and expertise to offer as ancillary capabilities for an industry with a materials problem.

Materials Capabilities
Facilities available for materials investigations:

- Light Scattering Analysis
- Rutherford Backscattering Spectrophotometry
- Proton Induced X-Ray Emission (PIXE): Dr. T.H. Craig, ext. 3989
- Mass Spectrometry: Dr. Robert Boyd, ext. 3795
- Ultrastructural Research: Dr. T.A. Beveridge, ext. 3366; Dr. R.L. Peterson, ext. 3278
- Crystal Structure Analysis: Dr. G. Ferguson, ext. 3548
- NMR Spectroscopy: Dr. R.E. Lenkinski, ext. 2268

OFFICE OF TECHNOLOGY TRANSFER
BUREAU DE VALORISATION DES APPLICATIONS DE LA RECHERCHE (BVAR)

Faculty of Science and Engineering
Laval University
SAINTE-FOY, Que.
G1K 7P4

Telephone (418) 656-5623
Fax (418) 649-6184

Director Pierre Pedneau

Mandate
To transfer university developed technology to industry; especially interested in local light metal industry.

Advanced Materials Component
Four groups working in polymers, polymer processing, ceramics, metal powders and wood composites.

Specialty Areas, Laboratories and Services
- Centre de Recherche en Sciences et Ingénierie des Macromolecules (CERSIM) — Robert Prud'homme, Director
- Metal Powders and Ceramics — Roche Angers in collaboration with the Department of Mines and Metallurgy
- Modelling of plastic injection and extrusion — Phillipe Tanguy, Department of Chemical Engineering
- Wood Composites — Faculty of Forestry and Geomatics

CERSIM
CERSIM is a major effort concentrating on polymer blends and composites, natural molecules and molecular orientation, both characterization and the effects of processing.

It has 9 professors and 17 researchers and support persons.

In addition to the use of equipment in the various faculties, CERSIM has:
- solution characterization — osmometers; photogoniodiffusometer; viscometers; densitometer and calorimeter; adiabatic calorimeters and GPC steric exclusion chromatographs
- solid state characterization — DSC; Instron; DMTA and rheovibron viscoelastometers, dielectric apparatus; mini-max molder; polarizing microscopes with hot stage; laser small angle light scattering apparatus; x-ray diffractometer

- engineering research — 65-tonne injection molding press; CYBER 930 computer and graphic terminals for computer-aided design
- spectroscopy — raman spectrometers; fourier transform infra-red spectrometers and spectrofluorometers

Contact As above or Dr. Gilles Y. Delisle, Vice Dean, Development and Technology Transfer. Telephone (418) 656-2981 or fax (418) 656-5902

INSTITUTE FOR TECHNOLOGICAL DEVELOPMENT

Faculty of Engineering
University of Manitoba
Room 227
Engineering Building
WINNIPEG, Man.
R3T 2N2

Telephone (204) 474-8929
Fax (204) 261-3475

Director R.P. Hoemsen, P.Eng.

Chairman Ralph Bullock, Vice-President, Engineering and Quality

Employees 3 engineering and secretarial personnel

Annual Budget $250 000

Mandate
To develop and recommend mutually acceptable guidelines to ensure that ITD can provide reasonable access to University technological resources; identify and encourage cooperative use of expertise and resources within the private sector, government, the University and associated engineering R&D organizations; identify and encourage cooperative venture opportunities and initiatives by technology networking; and identify potential areas of interest for future R&D by University researchers.

Advanced Materials Component
ITD has an Advanced Materials component within the Faculty of Engineering.

Contact Dr. J.R. Cahoon

Employees 7

Specialty Areas, Laboratories and Services
Materials Testing; Transmission Electron Microscopy; Scanning Electron Microscopy; X-Ray Diffraction; Corrosion Testing

Major Materials Equipment
Tensile Testing; Creep Testing; Fatigue Testing Equipment; SEM and TEM; Corrosion Test Unit; Quantitative Analyzer

Contact Listed professors, Dr. J.R. Cahoon or R.P. Hoemsen.

OFFICES OF INDUSTRIAL RESEARCH (IR McGILL)

McGill University
3550 University Street
MONTREAL, Que.
H3A 2A7

Telephone (514) 398-4200
Fax (514) 398-6878

Director Dr. Bitten Stripp

IR McGill has two offices:

Office of Contract Research Director V. Arlene Sproule, telephone (514) 398-4200

Office of Inventions and Patents
Invention Manager R.D. Brassinga, telephone (514) 398-4201

Employees 5

Mandate
To foster and catalyze the interaction between McGill faculty and private industry, government or other non-profit organizations for the purpose of establishing contractual agreements in R&D.

The mandate for the Office of Inventions and Patents is to catalyze *technology transfer* and commercialization of McGill's most promising inventions and to assist entrepreneurial researchers in interacting with industry through grants, patenting, licensing and other mutually advantageous arrangements.

Advanced Materials Component
Materials expertise exists with numerous faculty members and is accessible through these offices.

MANAGEMENT OF TECHNOLOGY AND INNOVATION INSTITUTE INC.

McMaster University
1276 Sandhill Drive
P.O. Box 7070
ANCASTER, Ont.
L9G 3L3

Telephone	(416) 648-7344
Fax	(416) 648-7311
Executive Director	Walter F. Petryschuk, P.Eng., Ph.D.
Board Chairman	Larry Smokorowski, Manager, Development and Technical Operations, IBM Canada Limited
Employees	5 permanent plus access to 4 part-time support and 44 business associates, on a contract basis

Mandate
To improve management of resources in application and development of technology in which innovation will flourish. To build upon Canadian talents and work with Canadian industry to exploit technological advances through seminars, education materials, information access, consulting and sponsoring. National in scope.

Advanced Materials Component
MTI creates and markets intellectual property. All activities can be brought to bear on technology transfer involving advanced materials.

RESEARCH GROUP FOR THIN FILMS AND SOLAR ENERGY

Université de Moncton
MONCTON, N.B.
E1A 3E9

Telephone (506) 858-4337 or (506) 858-4339
Fax (506) 858-4541

Executive Director Dr. Truong Vo-Van

Employees 7 professors, 1 adjunct professor, 1 research assistant, 4 graduate students and 2 technicians

Annual Budget $170 000

Mandate
To perform research on optical and electrical properties of materials and thin films and their applications to various areas, especially in optics and solar energy.

Advanced Materials Component
Active areas are electrochromic materials that change colour when an electric field is applied and advanced optical materials, especially cermets.

Contact Dr. Fernand E. Girouard, Chairman, Physics

CENTRE FOR RESEARCH IN ENGINEERING AND APPLIED SCIENCE

University of New Brunswick
P.O. Box 4400
FREDERICTON, N.B.
E3B 5A3

Telephone	(506) 453-4674
Fax	(506) 453-4599
Executive Director	Dr. R.S. Stuart
Employees	4, including an Executive Director and a Director of Contract R&D.
Annual Budget	$180 000

Mandate
To match the problem-solving requirements of industrial and government sectors and the professional expertise of the University's faculty members.

Advanced Materials Component
There is no formal program in materials. At this time CREAS has no sister organization within the University with expertise in Advanced Industrial Materials. Inquiries are assessed and either assigned to individual faculty members, referred to the New Brunswick Research and Productivity Council or declined, according to context. The University is at this time considering a program to enhance its capabilities in this regard.

INCUTECH NEW BRUNSWICK INC.

University of New Brunswick
Bag Service 69000
FREDERICTON, N.B.
E3B 6C2

Telephone	(506) 453-4500 In N.B. only 1-800-561-4038
Fax	(506) 453-4510
Manager	Donald Doucet
Chairman	Dr. Knut Grotterod
Employees	2

Mandate
To assist in the creation and growth of new, technology intensive companies in New Brunswick.

Advanced Materials Component
No specific component.

ADVANCED MATERIALS ENGINEERING CENTRE

Technical University of Nova Scotia
P.O. Box 1618, Station M
HALIFAX, N.S.
B3J 2Y3

Telephone	(902) 425-4500
Fax	(902) 422-7907
Vice-President, Technical Operations	Dr. J. Gordon Murphy
Board Chairman	D. Andrew Eisenhauer
Employees	10 technical, 7 support and 7 secondments
Annual Budget	$1 300 000

Mandate
To assist Nova Scotian and other Canadian industry in the development and commercialization of structures, systems and components using advanced materials, and in the automated production of composite materials by pultrusion, filament winding and hybrid techniques.

Advanced Materials Component
AMEC has composite materials design, fabrication and testing facilities supported by a small, highly trained engineering team. Members and affiliated companies include aerospace, construction and materials companies. These companies conduct joint research and contract research at AMEC and second staff to use AMEC equipment.

Materials Employees	2 composite engineers, 2 materials scientist/engineers, 1 mechanical engineer/designer, 2 computer-aided engineer/designers, 3 technical support and 7 seconded technical personnel

Specialty Areas, Laboratories and Services
- composites fabrication — pultrusion, filament winding and autoclave layup
- plasma spray coating
- materials design
- materials testing and characterization
- composites design and analysis

Major Materials Equipment

- 12' x 5' thermoplastic/thermoset autoclave
- 4-tonne resin injection pultrusion machine
- 20' x 5'5" axis filament winder
- 90 kW automated plasma spray
- 4 thermal spray systems
- 2 scanning electron microscopes
- clean rooms
- 200 kN Instron
- -200°C to + 600°C Instron test chambers
- +1 600°C 4-point bend
- -200°C 4-point bend
- metallographic facilities

Contact Michael L. Taylor, Programs Manager

APPLIED MICROELECTRONICS INSTITUTE

Technical University of Nova Scotia, Dalhousie University
Applied Microelectronics Institute
1127 Barrington Street
HALIFAX, N.S.
B3H 2P8

Telephone	(902) 421-1250
Fax	(902) 429-9983
President	Dr. Douglas Pincock
Employees	20 technical plus support

Advanced Materials Component
Involved with materials only as they relate to microelectronics.

NOVA SCOTIA CAD/CAM CENTRE

Technical University of Nova Scotia
P.O. Box 1000
HALIFAX, N.S.
B3J 2X4

Telephone (902) 420-7763
Fax (902) 422-8380

Director Dr. Aftab A. Mufti, P.Eng.

Board Chairman Dr. I. Duvar, P.Eng.

Employees 10, including a technical staff of 7 engineers and 3 graduate students and a marketing manager.

Annual Budget $750 000

Mandate
To establish and maintain an industry oriented CAD/CAM Centre to assist provincial manufacturers and consulting engineers to develop, design and utilize CAD/CAM applications.

Advanced Materials Component
Works with the Advanced Materials Engineering Centre and the Technical University of Nova Scotia's (TUNS) departments of Civil and Mechanical Engineering. The Marketing Manager facilitates technology transfer to industry. Currently establishing a Plastics Division.

Annual Materials Budget $120 000

Employees 4 engineers

Specialty Areas, Laboratories and Services
- concrete, wood and fibre/epoxy composites
- structural testing
- mold/dies design and manufacture capabilities
- structure laboratory at TUNS

Major Materials Equipment
CNC Mill; CNC Lathe; Access to Pultrusion Machine; Structures Testing Equipment

Contact Leigh M. Beauchamp, Manager, Marketing

ONTARIO CENTRE FOR MATERIALS RESEARCH

McMaster University, Queen's University, University of Toronto, University of Waterloo, University of Western Ontario

Ontario Centre for Materials Research
P.O. Box 1146
KINGSTON, Ont.
K7L 3N6

Telephone (613) 545-6519
Fax (613) 545-6510

Managing Director Dr. J. Peter McGeer
Board Chairman Dr. Joseph D. Wright

Mandate

- to conduct, manage and promote long-term research in advanced materials and processes for producing and improving traditional materials of economic importance to Ontario;
- to respond to needs of Ontario's materials industries by organizing long-term pre-competitive materials research programs, to ensure the growth of industrial participation in the Centre and to promote the efficient transfer and diffusion of research knowledge to industry;
- to promote and conduct interactive materials research that cuts across traditional disciplinary, institutional and technological boundaries;
- to operate the Centre as a materials research network and to provide its university and industrial members the means to conduct and to benefit from interactive research;
- to provide and disseminate basic knowledge, train and develop personnel of the highest calibre in a variety of areas of value to the materials industries of Ontario;
- to hold grants, contracts, etc., for these purposes.

Advanced Materials Component
All activities of OCMR are relevant to advanced materials technologies.

Annual Materials Budget $8 000 000

Prime Contacts

Biomaterials	Dr. D.C. Smith, University of Toronto
Interface Science and Technology	Dr. P.R. Norton, University of Western Ontario
Metals and Ceramics	Dr. J.D. Embury, McMaster University
Optoelectronic Materials	Dr. D.A. Thompson, McMaster University
Polymers and Composites	Dr. R.T. Woodhams, University of Toronto

Major Materials Equipment
The equipment list for this world-class organization is comprehensive. For specific information please contact Dr. Peter McGeer or any of the specialized contacts listed above.

ONTARIO LASER AND LIGHT WAVE RESEARCH CENTRE

University of Toronto, McMaster University, Wilfrid Laurier University, University of Western Ontario

McLennan Physical Laboratories
University of Toronto
Suite 331
60 St. George Street
TORONTO, Ont.
M5S 1A7

Telephone	(416) 978-3926
Fax	(416) 978-3936
Executive Director	Dr. Boris Stoicheff
Associate Director, Facility	Dr. H. Van Driel
Facility Manager	Dr. M. Hubert
Employees	13 Principal Investigators, 12 Associates and approximately 100 Graduate Students

Mandate
To stimulate long-term advanced research, foster and enhance laser and light wave research and applications, train and develop world class researchers, and encourage the transfer and diffusion of technology to industry. Specifically, this will assist industry to perform feasibility studies to develop new techniques of quality and process control, to obtain information concerning laser applications and to train personnel in lasers and laser based instrumentation.

Advanced Materials Component
The facility has equipment useful in characterizing and processing advanced materials. Modern laboratories with state-of-the-art laser and optical equipment, available to industry for R&D.

Specialties and Equipment
The equipment useful for characterizing and diagnosing advanced materials include fourier transform spectrometer in the near infra-red region, a Raman macro-microprobe spectrometer, a thermal imaging system and a scanning confocal microscope. It also has a wide variety of laser sources covering the spectral range from ultra violet to infra red with power levels from a few watts to over 100 watts. These lasers can be used to process novel advanced materials.

Contact	Dr. M. Hubert, Facility Manager
Telephone	(416) 978-2939

OFFICE OF RESEARCH SERVICES

University of Ottawa
115 Séraphin Marion
Room 209
OTTAWA, Ont.
K1N 6N5

Telephone (613) 564-3282
Fax (613) 564-5952

Director Dr. Jean Farrall

Employees 5 Administrators, 2 Radiation Safety Officers

Mandate
- to negotiate and administer research grants and contracts
- to transfer university developed technology to industry
- to administer patenting and licensing
- to facilitate contacts and collaboration between university research staff and industry.

Advanced Materials Component
Industrial Membrane Research Institute Director: Dr. S. Sourirajan
Electrochemical Science and Technology Centre Director: Dr. W. Adams
Centre for Automated Manufacturing of Composite Materials Director: Dr. M. Munro

Other AIM related research includes semiconductors, polymer processing, organometallic catalysts, welding, high quality pulps and papers.

Contact Dr. Jean Farrall or any of the Directors

OFFICE OF RESEARCH SERVICES

Queen's University
KINGSTON, Ont.
K7L 3N6

Telephone (613) 545-6081
Fax (613) 545-6853

Director Dr. Tony R. Eastham

Employees 2 professionals, 3 support

Mandate
To facilitate and promote research at Queen's University.

Advanced Materials Component
Materials capability is not centralized. Many of the professors are involved in materials investigations.

Contact Dr. Vedene Smith, Acting Director, Materials Research Unit, Faculty of Applied Science

Telephone (613) 545-2650
Fax (613) 545-6300

Employees Approximately 50 professors and 100 technicians and graduate students

Specialty Areas, Laboratories and Services
Biomaterials, ceramics, composites, failure analysis, high tensile steels, insulating materials, metallurgy, microgravity applications, non-destructive testing, polymers, recycling, semi conductors, surface modification, thin films

Major Materials Equipment
X-ray facility, low temperature laboratory, fatigue and tensile test equipment, fabrication and processing facilities, scanning and transmission electron microscopes

PARTEQ RESEARCH AND DEVELOPMENT INNOVATIONS

Queen's University
KINGSTON, Ont.
K7L 3N6

Telephone	(613) 545-2342
Fax	(613) 545-6622
Executive Director	Dr. Calvin R. Cupp
Board Chairman	Dr. Duncan G. Sinclair
Employees	Executive Director; Director, Commercial Development; Director, Patents and Licensing; NRC-IRAP Industrial Technology Advisor; 2 Administrators
Annual Budget	$300 000 to $500 000 range

Mandate

- to stimulate increased participation by the academic and research community in industrial/business growth and development in Ontario and Canada
- to encourage the promotion of technology transfer between the academic and research community and the industrial and business sector to their mutual advantage.

Advanced Materials Component

PARTEQ does not have an AIM component per se but works in close concert with:

- Ontario Centre for Materials Research, with headquarters on the Queen's campus
- Queen's Materials Research Institute — successor of Advanced Materials Technology Unit
- Office of Research Services, which administers all research grants and contracts for the University

CANADIAN INSTITUTE FOR BROADBAND AND INFORMATION NETWORK TECHNOLOGIES INCORPORATED (CIBINT)

Faculty of Engineering
University of Regina
REGINA, Sask.
S4S 0A2

Telephone	(306) 585-4381
Fax	(306) 586-8202
President and CEO	Pieter Van Vliet, P.Eng.
Employees	Director of Research and Development, researchers, graduate students
Annual Budget	$250 000

Mandate
To bridge between industry and the university, performing R&D for industry in fibre-optic technology. CIBINT also serves as the facilitator to effect transfer of technology to industry from the university and CIBINT's Fibre-Optics Laboratory.

Advanced Materials Component
CIBINT utilizes advanced materials technology in fibre optics and optoelectronic technology; these are being used in automated and intelligent buildings.

Specialty Areas, Laboratories and Services
Optoelectronic Circuitry and Fibre Optic Wiring Systems through:
- contract research; and
- licensing agreements.

Contact

Laboratories	Dr. Elmer H. Hara
Telephone	(306) 585-4438
Contracts and Services	Pieter Van Vliet
Telephone	(306) 585-4381

Major Materials Equipment
- design and testing facilities for network and product development
- computer-aided design tools for circuit design and testing, printed circuit board layout, master prints and VLSI design
- programmable array logic (PAL) and programmable logic devices (PLD) to solve complex electronic system problems

ENERGY RESEARCH UNIT

University of Regina
3737 Wascana Parkway
REGINA, Sask.
S4S 0A2

Telephone (306) 585-4269
Fax (306) 585-5205

Director Dr. Brian D. Kybett

Board Chairman Dr. C. Blachford, Associate Vice-President, Research and Graduate Studies

Employees 7 faculty, 4 research students, 3 research assistants and 5 graduate students

Annual Budget $350 000 (research grants)

Mandate
To encourage and coordinate energy research within the University and make R&D services available to outside clients.

Advanced Materials Component
Research is done on carbon solids from coal and pitch (carbon fibre related) and surfactants (thin films), important as advanced materials.

Annual Materials Budget $50 000

Specialty Areas, Laboratories and Services
- Carbon and Surfactants (thin films)
- Major Materials Equipment
- Visible, FTIR and UV fluorescence microscopy

Contact Dr. B. Kybett
Telephone (306) 585-4261
Fax (306) 586-9862

OFFICE OF RESEARCH AND INNOVATION

Ryerson Polytechnical Institute
350 Victoria Street
TORONTO, Ont.
M5B 2K3

Telephone (416) 979-5042
Fax (416) 979-5336

Director Stephen G. Guerriere, P.Eng.

Employees 7 members (the Director, an NRC-ITA representative, a Grants Officer and 4 support personnel)

Mandate
ORI promotes, encourages and supports research among Ryerson faculty, students and staff; oversees the quality of research and adherence to research policy; provides an institute-wide focus and central administration for basic and applied research and research-related activities that include the commercialization of technology.

Advanced Materials Component
Ryerson's Materials Investigation Group provides, as an industry resource, professional services and technical support in materials investigations.

Specialty Areas, Laboratories and Services
The Materials Investigation Group provides hands-on expertise in: Polymer Chemistry, Failure Analysis, Process Control, Quality Control and Surface Investigations.

Major Materials Equipment
Technological facilities include x-ray diffraction, energy dispersive and spectrographic methods, for analysis of minerals, ceramics and metals. The standard physical testing equipment is available as well as non-destructive examination techniques, along with electron and light microscopy with concomitant analytical techniques.

Contact Stephen G. Guerriere

OFFICE OF RESEARCH SERVICES

University of Saskatchewan
50 Murray Building
SASKATOON, Sask.
S7N 0W0

Telephone (306) 966-8576
Fax (306) 966-5756

Director Dr. P. Wells, Technology Transfer Officer

University President Dr. George Ivany

Employees 12 engaged in materials science

Annual Budget $40 000 000 (all disciplines)

Advanced Materials Component
Faculty involved in materials research are in the Departments of Electrical Engineering, Mechanical Engineering, Civil Engineering and Chemical Engineering.

Specialty Areas
- evaluation of materials and systems for cold climate, especially where frost formation and freeze-thaw problems are encountered
- masonry engineering
- use of fly ash to replace cement in concrete
- in situ test methods for strength of concrete
- air content and workability of concrete
- bonding behaviour between concrete and steel
- tensile strength and spalling resistance of concrete
- steel and concrete composites
- theory and modelling of structural materials
- numerical stress analysis
- rational design optimization
- expert systems for materials selection and design
- preparation of amorphous semiconductor devices
- electrical properties of amorphous semiconductor films
- electrophotographic photoreceptors
- properties of chalcogenide films
- composite materials analyses
- deformation mechanisms in crystalline polymers
- polymeric coatings
- HLSA steels
- elastic plastic fracture mechanics

- steel design
- investigations of steel and composite structures
- structural analyses by micro computers
- thin-walled structures
- erosion-corrosion in slurry pipelines
- corrosion of nuclear waste disposal
- containers pitting and crevice corrosion
- stress corrosion
- corrosion fatigue

Major Materials Equipment

- Frost Studies Experimental Facility for measuring frost growth rate, frost density and heat transfer rates across frosted surfaces
- Thermal Microhardness Analysis System measures hardness as a function of temperature for crystalline and amorphous materials
- Thermal Analysis System includes DSC, TMA and TGA
- Vacuum coating equipment, SEM, closed cycle He cryostat, polariscope, Instron, MTS and ENERPAC structural loading systems, holographic interferometry, TEM and fatigue testers

Contact	Dr. Peter Wells
Telephone	(306) 966-8751
Fax	(306) 966-5756

RESEARCH OFFICE

Université de Sherbrooke
2500 boulevard de l'Université
SHERBROOKE, Que.
J1K 2R1

Telephone	(819) 821-7840
Fax	(819) 821-7880
Recteur	Aldée Cabana
Employees	580 professors and 737 *others*.
Annual Budget	$30 000 000 has been allocated for research projects this year.

Mandate
To develop university-industry relations. All companies wishing to establish collaborations with the university, whether through project participation or technology transfer, can contact the Research Office.

UNIVERSITY/INDUSTRY LIAISON OFFICE

Simon Fraser University
BURNABY, B.C.
V5A 1S6

Telephone (604) 291-4144 or (604) 291-4292
Fax (604) 666-7037

Director Dr. Alan B. Cornfeld

Employees 5, including a Director, a Business Officer, a Technology Transfer Officer, a Projects Officer and a Secretary

Annual Budget $500 000

Mandate
To strengthen linkages among university and business and industry and to transfer university research results and technology into commercial settings

Advanced Materials Component
Some of the technologies represented are in the advanced materials area.

Specialty Areas, Laboratories and Services
- Microelectronics and Solid State Devices
- a Direct-write Laser System capable of producing semicustom integrated circuits
- conducting soluble polymer
- catalysts
- ultra-fine alumina
- AI/Robotics/Automated Manufacturing

Contact Dr. Alan B. Cornfeld

INNOVATIONS FOUNDATION

University of Toronto
Suite 205
203 College Street
TORONTO, Ont.
M5T 1P9

Telephone (416) 978-5117
Fax (416) 978-6052

Executive Director Pauline M. Walsh

Board Chairman Prof. Gordon Slemon

Employees 6, including an Executive Director, a project manager, 3 support personnel and legal counsel

Annual Budget $600 000

Mandate
Facilitating technology transfer. The Innovations Foundation is broadening its mandate to assist in licensing out technologies from all areas of public sector R&D: universities, hospitals, government labs, etc. Prepared to work with individuals as well as institutions.

The Foundation also provides technology consulting services to corporations (e.g. identifying potential researchers to assist with particular problems, including problems in the AIM area).

Advanced Materials Component
All staff can handle AIM technology and the Foundation presently assists with much AIM technology — for example the composites inventions of Professor Woodhams that are licensed to several Japanese companies.

AEROSPACE STUDIES INSTITUTE

University of Toronto
4925 Dufferin Street
DOWNSVIEW, Ont.
M3H 5T6

Telephone (416) 667-7700
Fax (416) 667-7799

Director Dr. Roderick Tennyson

Employees 20 professors, 90 graduate students and 50 support personnel

Annual Budget $6 000 000

Mandate
To educate at both the undergraduate and graduate levels and to conduct extensive research in the aerospace field.

Advanced Materials Component
There is a large advanced materials component.

Prime Contact Dr. Roderick Tennyson
Telephone (416) 667-7717

Materials Employees 4 professors, 20 graduate students and 7 support personnel

Specialty Areas, Laboratories and Services
Thin films and composites are specialty areas with a Fibre Optics Smart Structures laboratory and a Structures and Materials laboratory. Materials projects include Materials Processing in Space, Materials Under Extreme Conditions and Structural Mechanics and Materials Science.

Major Materials Equipment
- MTS computer-controlled testing machine
- computer-controlled composite manufacturing system
- autoclave
- fibre optics sensing laboratory
- materials characterization laboratory
- scanning electron microscope
- four-space simulator facilities for materials testing

Contact Dr. Roderick Tennyson
Telephone (416) 667-7717

CHEMICAL ENGINEERING RESEARCH CONSULTANTS LTD. (CERCL)

Deptartment of Chemical Engineering
University of Toronto
200 College Street
TORONTO, Ont.
M5S 1A4

Telephone (416) 978-6182
Fax (416) 978-8605

President Dr. Colin R. Phillips

Employees approximately 35 professors plus support personnel

Annual Budget $250 000

Advanced Materials Component
There is no central materials area; many of the CERCL members are involved with materials projects.

Prime Contacts

Metals	Prof. Alex McLean
Composites	Prof. M. Piggot
Ceramics	Prof. Tom Coyle
Self-Reinforced Plastics	Prof. R. Woodhams

Materials Employees 5 professors from CERCL, 15 professors in other disciplines and support personnel.

Specialty Areas
Metals, ceramics, composites, plastics

Major Materials Equipment
Comprehensive facilities are available in all areas including equipment for growing single crystal metals and an extensive plastics processing facility.

Contact Prof. Colin R. Phillips or other professors as above.

OFFICE OF RESEARCH

University of Waterloo
200 University Avenue West
WATERLOO, Ont.
N2L 3G1

Telephone (519) 885-1211
Fax (519) 746-7151

Dean of Research Dr. Arthur Carty

Director, Research Services and Development Arthur Headlam

Employees 12 professionals and 19 support personnel

Annual Budget $50 000 000, of which $14 000 000 is for contract research.

Mandate
- development of research policy
- liaison with outside organizations
- distribution of grant information and regulations
- processing of faculty grant applications (including industrial research grants)
- development and administration of contracts (through the Waterloo Research Institute)
- assistance to the university research community in technology transfer
- commercialization of research spinoff technologies on behalf of the researcher and the university
- liaison, development and administration of international projects and financial administration for all research activities (including activities of all research groups, centres and institutes on campus)

Advanced Materials Component
- the Institute for Polymer Research
- the Ontario Centre for Materials Research.

In addition, faculty members in Mechanical and Civil Engineering are involved in materials research.

Materials Budgets research support exceeding $1 500 000.

Specialty Areas, Laboratories and Services
IPR synthesizes, characterizes and processes polymers. The Material Science area of Mechanical Engineering works in welding; casting; plastic deformation; tribology; MMCs; PMCs; and adhesive lap joints.

Major Materials Equipment
A range of chromatographs and detectors, osmometers for molecular weight determinations, rheological equipment, polymer processing, polymer characterization and spectroscopic equipment.

Contact Dr. Arthur Carty telephone (519) 885-1211, ext. 3431
Arthur Headlam telephone (519) 885-1211, ext. 3141

INTERFACE SCIENCE WESTERN

University of Western Ontario
LONDON, Ont.
N6A 5B7

Telephone	(519) 679-2111
Fax	(519) 661-3022

Contact

Department of Chemistry	Prof. P.R. Norton
Department of Physics	Prof. I.V. Mitchell
Administrative Assistant, OCMR Office	Janis Zaborniak

Employees	2 NSERC Industrial Research Professors, 13 research scientists, technologists, post doctoral and graduate students.

Mandate
To carry out research on interfaces relevant to modern materials and processes. These include fabrication and operation of microelectronic materials, study of corrosion and catalytic phenomena, adhesion and friction. To interact with industry and undertake contract research. Closely allied with OCMR and Surface Science Western, through which long and short range research is carried out on the entire spectrum of modern materials.

Advanced Materials Component
Microelectronic materials, biomaterials, polymers and composites, catalysts, high performance metals and alloys, etc.

Specialty Areas, Laboratories and Services
ISW operates a wide range of surface and near surface characterization methods.

- MeV ion beam methods to study ideal crystalline surfaces and practical surfaces for D-content and oxide thickness, etc., a source of absolute calibrations for surface analysis
- Rutherford backscattering (RBS) and channelling
- nuclear reaction analysis (NRA)
- particle induced x-ray emission (PIXE)
- high-energy and high-current ion implantation
- low energy electron diffraction (LEED)
- x-ray and UV photoelectron spectroscopy (XPS and UPS)
- synchrotron radiation based photoemission
- Auger electron spectroscopy (AES)
- work function methods
- thermal desorption spectroscopy

Materials-related Capabilities
The university has a number of centres to assist in transferring materials technology to industry.

Applied Electrostatics Research Centre
- agricultural spraying
- beneficiation of mineral ores
- coatings and paints
- medical
- electrophotography
- space applications

Chemical Reactor Engineering Centre — fluidized bed reactors, catalytic cracking, hydrocarbon synthesis, catalyst preparation, particle classification, gasification, novcel reactors, bubble columns and three-phase fluidized beds

Design Automation and Manufacturing Research Laboratory

Power Engineering Analysis and Research Laboratory

Geotechnical Research Centre

The Boundary Layer Wind Tunnel Laboratory

Contact

Department of Chemistry	Prof. P.R. Norton at (519) 679-2111
Department of Physics	Prof. I.V. Mitchell at (519) 661-3393
OCMR Office	Janis Zaborniak at (519) 661-3779

SURFACE SCIENCE WESTERN

University of Western Ontario
LONDON, Ont.
N6A 5B7

Telephone	(519) 661-2173
Fax	(519) 661-3292

Contact

Manager of Scientific Operations	R. Davidson
Employees	14 research engineers, scientists and technologists

Mandate

Research and consulting in all material surface properties. Processes such as corrosion, wear, adhesion, catalysis, electrical switching, mineral dressing and fixation all depend on surface chemical and physical properties.

Contract research for Canadian and foreign industries in microelectronic, metallurgical and mining sectors. Shorter term consulting for local companies on a routine basis.

Advanced Materials Component

Surface Science Western and Interface Science Western comprise Canada's best instrumented surface research facility.

Specialty Areas, Laboratories and Services

Surface Characterization by:

- scanning electron microscopy with x-ray analysis
- x-ray photoelectron spectroscopy (ESCA)
- Auger electron microscopy
- secondary ion mass spectrometry (ion microscopy)
- optical microscopy
- Raman spectroscopy
- image analysis

Electrical Characterization by:

- current-voltage technique
- electron beam induced current measurement (EBIC)

Process Simulation and Characterization using:

- pressure reactors
- plasma CVD reactors
- ozone reactors

Failure Analysis, Process Mineralogy and Electrochemical Corrosion Testing by the usual techniques

THE RESEARCH CENTRE FOR MANAGEMENT OF NEW TECHNOLOGY (REMAT)

Wilfrid Laurier University
WATERLOO, Ont.
N2L 3C5

Telephone	(519) 884-1970, ext. 2662
Fax	(519) 884-8853
Co-Director	Dr. Hamid Noori
Co-Director	Dr. Bruce Fournier
Employees	Co-directors plus administrative assistant

Mandate
To aid small and medium-sized manufacturing companies in adopting and implementing new technologies. REMAT is committed to assisting industry in coping with change through a focus on strategic planning and technological justification and training.

Advanced Materials Component
A tool for managers using all new technologies, including materials.

INDUSTRIAL RESEARCH INSTITUTE

University of Windsor
401 Sunset Avenue
WINDSOR, Ont.
N9B 3P4

Telephone (519) 973-7032
Fax (519) 973-7050

President Dr. G. Monforton, Dean of Engineering

Employees 2 administrative, 20 faculty as needed

Annual Budget Sales of $100 000 to $500 000 per year.

Mandate
To be an independent non-profit organization performing the legal, commercial and administrative functions of contract research. To assist industrial development of local area, although contracts are undertaken from other parts of Canada and the U.S. The Institute provides professional expertise and laboratory facilities to business, industry and government and has become self supporting.

Advanced Materials Component
Advanced Materials research is done in the university's Department of Mechanical Engineering.

Contact Ronald J. Kocela, Research Services

INNOVATION YORK

York University
117 Farquharson Bldg.
4700 Keele Street
NORTH YORK, Ont.
M3J 1P3

Telephone (416) 736-5026
Fax (416) 736-5698

Board Chairman Deszo Horvath

Employees Director, an Administration Officer and Operations and Secretarial Support

Mandate
To assist in the commercial development of intellectual properties owned by universities, hospitals and research intensive organizations. To provide support for the capture, protection, exploitation, packaging and transfer of technology. It does this primarily by working with spinoff companies at the pre-venture capital stage.

Advanced Materials Component
None

Contact Bette Kosmolak, Administrative Officer, Operations

PROVINCIAL AND FEDERAL RESEARCH ORGANIZATIONS

ALBERTA RESEARCH COUNCIL (ARC)

250 Karl Clark Road
P.O. Box 8330, Station F
EDMONTON, Alta.
T6H 5X2

Telephone	(403) 450-5111
Fax	(403) 461-2651

President	Dr. C.W. Bowman
Employees	626
Annual Budget	$45 000 000
Materials Manager	Dr. T.R. Heidrick, P.Eng.

Materials Capabilities
The Alberta Research Council has fully developed capability in materials and advanced materials, focusing on advanced materials and materials testing. Activities are diverse and include, by sector:

Agriculture	Seed Coating Sulfur Fertilizer Sulfur Herbicide
Energy	Hydrogen Exchange Gasoline Testing
Environment	Waste Exchange Polymer Recycling Environmental Monitoring Containment Pond Liners
Forestry	Coating of Debarking Knives Wood Chemistry
High Technology	Ceramic Coatings
Minerals	Clay Analysis Extractive Metallurgy
Materials Employees	25 (in the designated materials area)

Space, Facilities and Major Equipment in the Materials Area
There are laboratories for polymer membrane development, chemical activities, polymer testing, plasma spray and structural ceramics.

Special Equipment
- Scanning Electron Microscope (JEOL 840A)
- low-pressure inert gas Plasma Spray Reactor (Plasmadyne, 100kW)
- Weather-O-Meter
- Clima Chambers for Instrons (-30°C; 25°C; 50% R.H.)
- Guarde Hot Plate
- Metallograph MeF3
- Hardness Testing Equipment
- Wear Testing Equipment
- Plasma Spray Reactor
- Computerized Universal Tensile Tester
- Complete Chemical Testing Laboratory and Mechanical and
- Metallurgical Testing Laboratory

Special Services
- Wear Testing (abrasion, slurry erosion, particle erosion)
- Environmental Testing (Weather-O-Meter)
- Mechanical Testing (divers instrons, cold temperature testing, ambient room)
- Low pressure inert gas plasma spray reactor
- SEM with Tracor Northern 5400 X-ray Analysis (low atomic number element detector)

ARC can conduct searches for new materials technology in Canada and abroad. In addition, ARC has an Industrial Technology Advisor Network, a collaborative program with National Research Council Canada (NRC), providing an in-plant technical support service to industry. ITAN also operates through the NRC to access global technology. ARC can assist in establishing join ventures through its Joint Research Venture Program that encourages SMEs in Alberta to participate in cost-shared research projects.

Contact Dr. Ted Heidrick or Dr. Ed Bertram, Advanced Polymers

BC RESEARCH
BRITISH COLUMBIA RESEARCH CORPORATION

3650 Wesbrook Mall
VANCOUVER, B.C.
V6S 2L2

Telephone (604) 224-4331
Fax (604) 224-0540

President Dr. T.E. Howard

Employees 140

Materials Manager Bill McEachern, Research Engineer

Materials Capabilities
BC Research is an independent industrial research corporation that has no current research program in industrial materials. They do have ongoing activities in the analysis and design of structures to be fabricated from composites.

The remaining materials capability is largely chemical, and they are able to carry out analyses, identification of properties and syntheses of various materials.

Employees 5 in materials area

Space, Facilities and Major Equipment
Pilot plant area available for materials projects with a 100-tonne instrumented squeeze casting press.

The materials staff is active primarily in organic materials areas, including polymers and composites. There is no ceramic activity, but half the materials activity is in other inorganics, with a minor component in metals.

Special Services
Technology searches, technical market surveys, establishing joint ventures with technical assistance, market feasibility assessments, costing and financial consulting.

Contact Bill McEachern, Research Engineer

CENTRE DE RECHERCHE INDUSTRIELLE DU QUÉBEC (CRIQ)

333, rue Franquet
Case postale 9038
SAINTE-FOY, Que.
G1V 4C7

Telephone (418) 659-1550
Fax (418) 652-2251

President and General Director Guy Bertrand

Employees 425

Annual Budget $27 000 000

Materials Manager Jean-Marie Vincent, Group Leader

Materials Capabilities
Fully developed materials capability. Approximately 20 percent of the effort is *advanced* and CRIQ specializes primarily in composites technology and plans expansions, especially in resin matrix composites capabilities. All usual materials equipment with emphasis on plastics processing and pilot plant space for prototyping products and processes.

Materials Employees 16 full-time personnel

Special Equipment
- environmental test chamber
- automatic and global box ovens
- corrosion test cabinet — QUV accelerated aging
- mechanical test system (Instron)
- electron microscope
- microdurometer
- impact tester
- Weather-o-Meter
- impact tour
- injection moulding thermoplastic
- injection polyurethane
- extruder
- rolling mill
- vacuum forming machine

Special Capabilities

Mechanical Testing Systems	Sarah Bégin
Accelerated Aging	Jean Rousseau
Prototype Development	Jean Rousseau
	Christian Laing
	Daniel Grenier

In Advanced Materials CRIQ specializes in:

Organic Matrix Composites	Julie Péloquin (418) 659-1550
Metal Matrix Composites	Jean Rousseau (418) 659-1550

Special Services

Technology transfer activities associated with technology searches in Canada and abroad.

A staff of 10 in Technical Marketing Services and 3 in Information Services can assist with market surveys for technical products.

Also offered is a complete range of services for technology transfer including information on products, standards, trademarks, aid programs, technical evaluations, acquisition of intellectual property, contract negotiations, patent possibilities and procedures, etc.

Contact Any of the specialists named above.

MANITOBA RESEARCH COUNCIL (MRC)

420-155 Carlton Street
WINNIPEG, Man.
R3C 3H8

Telephone (204) 945-2031
Fax (204) 945-1354

President Dr. Erling Nyborg, P.Eng.

Employees 80 scientific, technical and support

Annual Budget $5 420 000

Materials Manager Dr. Kedar N. Tandon

Materials Capabilities
The Advanced Industrial Materials initiative is a cooperative initiative between MRC and the Department of Mechanical Engineering at the University of Manitoba. There are three elements: joint R&D; joint technology transfer in metallurgy and materials science; and advisory services to industry. The R&D includes work in advanced industrial materials such as rapidly solidified alloys, super alloys, new steels, plastics, ceramics and composites. Program objectives are to improve productivity of manufacturers using or producing these materials, and to assist Manitoba companies in adopting new materials or processes.

Materials Employees 3 permanent employees have access to the University materials group on a project basis.

Special Equipment
- MTS and Instron Universal Testing Machines
- Optical Microscope
- Complete Metallographic Laboratory
- SEM at the University
- Heat Treat Furnaces

In advanced materials, MRC specializes in coatings, metallic glasses, metals and ceramics.

Special Services

- facilities for coatings, wear analysis, structural testing, a pilot plant, etc.
- materials technology searches in Canada and abroad, and specialized technical searches in invention literature
- market surveys

Contact

Dr. K.N. Tandon
Mechanical Engineering Department
University of Manitoba
WINNIPEG, Man.
R3T 2N2

NATIONAL RESEARCH COUNCIL CANADA (NRC)

The National Research Council Canada (NRC) was established in 1916 to coordinate and promote scientific and industrial research in Canada. Beginning in the 1920s, the council set up in-house laboratories to make available scientific and technical expertise to industry. The NRC network now extends from coast to coast.

In addition to operating its laboratories, the NRC provides financial and technical support for industry through its Industrial Research Assistance Program.

The NRC has several units that carry out research activities in the field of advanced polymer composites. In addition, there is a considerable effort placed on the collection and dissemination of technical information and data. The primary contact with respect to materials research and technology is the Industrial Materials Institute. The contact for bibliographic information is the Canada Institute for Scientific and Technical Information. There are several other groups within the NRC that deal with research and technology in a specialized area that requires advanced polymer composites expertise. A listing of these various centres appears below.

INDUSTRIAL MATERIALS INSTITUTE
75 de Mortagne Boulevard
BOUCHERVILLE, Que.
J4B 6Y4
Dr. J.G. Martel
Tel.: (514) 641-2280

INDUSTRIAL RESEARCH ASSISTANCE PROGRAM OFFICE (IRAP)
Materials/Advanced Manufacturing
333 Franquet Street
SAINTE-FOY, Que.
G1V 4M6
G. Dupont
Tel.: (418) 648-4924

CANADA INSTITUTE FOR SCIENTIFIC AND TECHNICAL INFORMATION
Montreal Road
OTTAWA, Ont.
K1A 0R6
M. Montgomery
Tel.: (613) 993-2341

Institute for Aerospace Research
Institute for Environmental Chemistry
Institute for Information Technology
Institute for Mechanical Engineering
Institute for Microstructural Sciences
Institute for Research in Construction

NEW BRUNSWICK RESEARCH AND PRODUCTIVITY COUNCIL (RPC)

921 College Hill Road
P.O. Box 20000
FREDERICTON, N.B.
E3B 6C2

Telephone (506) 452-8994
Fax (506) 452-1395

Executive Director Dr. R.S. Boorman

Employees 110

Annual Budget $7 400 000

Materials Manager Dr. A.B. Mitchell, Head, Engineering Materials

Materials Capabilities
Developed in response to New Brunswick's needs — activities in metals, ceramics, polymers and composites with specialty areas in metallurgical services, non-destructive examinations and electronics.

Also of strategic importance is the signing of agreements with Maine for the provision of assistance to Maine's industries.

Materials Employees 13

Special Facilities
- Low Frequency Ultrasonics — non-destructive testing of composites, ceramics, wood products and concrete — J. Goszczynski
- AC Impedence — testing of coatings and concrete — Dr. S. Clarke
- Creep Machines — testing of high temperature polymers — P. Chan
- Universal Testing Machine (Instron) — fracture, tensile, compression testing of polymers, ceramics, etc. — K. Sedman
- Environmental Test Cabinets — general testing and conditioning — Dr. S. Clarke
- Inert Gas Glove Boxes for Reactive Materials — for lithium alloys, battery assembly, etc. — D. Desjardins

Special Services
Materials technology searches in Canada and abroad. Market surveys for technical products, assistance in setting up joint ventures and commercializing new materials products.

Contact	
Non Destructive Testing	J. Goszczynski
High Temperature Polymers	J. Speelman
Fractography	P. Chan
Battery Materials	D. Desjardins
Microchip Processing	L. Danisch
Concrete Formulation	L. Lewczuk

NOVA SCOTIA RESEARCH FOUNDATION CORP. (NSRFC)

P.O. Box 790
DARTMOUTH, N.S.
B2Y 3Z7

Telephone (902) 424-8670
Fax (902) 424-4679

President T.B. Nickerson, P.Eng.

Employees 113

Annual Budget $7 000 000

Materials Managers
Director Laboratory Services Dr. J.W. Thorpe

Director Research and Development Dr. J.J. Starzomski

Materials Capabilities
Developed from local needs with a background of service to marine industries, including welding and corrosion specialties. Advances into the new materials include ceramics technologies.

Materials Employees 8

Special Facilities
- environmental test centre — testing products for ability to withstand vibration, heat/cold, abrasion, pressure and shock
- a sol gel high shear mixer
- metallography hardness testing

Special Equipment
- Impact Testers — 2, 5, 30, 45 & 385-joule instruments for Ceramics and Plastics
- Abrasion Tester — Sintered Ceramics, final properties
- Hardness Testers
- Erosion Test Apparatus
- Magnetic Monitoring Probe
- Microscopes, Metallographic with cameras and TV monitors
- Instron Tester, 20 KIPS; and MTS Materials Tester, 220 KIPS
- Mechanical Properties of Composites
- Induction Furnace — Thermal Shock Resistance
- Programmable Sintering Furnace — Ceramics Production
- Sol Gel High Shear Mixer — Ceramic Powder Production

In the Advanced Materials Areas Nova Scotia Research Foundation Corp. specializes in:

- ceramic powders — production of the powders and sintered products
- composites — fibre reinforced metal matrix
- welding technology

Special Services

Materials technology searches in Canada and abroad. Market surveys. Joint ventures assisted by working with the Department of Industry, Trade and Technology of Nova Scotia, the Federal Business Development Bank, and Venture Capitalists.

The organization has a history of commercializing new products and spinning off enterprises to the private sector through licensing agreements.

Regular liaison with most Nova Scotia manufacturers to maintain awareness of the capabilities and expertise in the province.

Contact Industry Services or:

Director, Laboratory Services	Dr. J.W. Thorpe
Director, Research and Development	Dr. J.J. Starzomski
Laboratory Services	Dr. Akram Kazi
Corrosion Engineering	Terezia Betancourt

ORTECH INTERNATIONAL

2395 Speakman Drive
Sheridan Park Research Community
MISSISSAUGA, Ont.
L5K 1B3

Telephone (416) 822-4111
Fax (416) 823-1446

President Dr. Ross Lawford

Employees 400

Annual Budget $25 000 000

Materials Manager David Heaslip, BES, V.P., Materials Technology

Materials Capabilities
ORTECH focuses on technical areas of transportation, environmental management and materials technologies — plastics, adhesives, metals and ceramics. It now offers professional services in materials development and characterization, product formulation, process development
and problem solving.

The handbook, *Technological Resources*, lists many facilities available, among which are numerous materials laboratories, facilities and capabilities.

Employees

Polymers	20
Other Organics	10
Metals	15
Ceramics	4
Other Inorganics	15
Composites	9
Resin Matrix	5
Others	4

Space, Facilities and Major Equipment
- Water and Gas Atomization
- Melt Spinning Wheel
- Hot Press
- Physical Vapour Deposition Apparatus
- Chemical Vapour Deposition Apparatus
- Plasma Spray

- Plastic Processing Equipment
- Rheology Equipment
- Polymer Characterization Equipment and Analytical Instrumentation
- Scanning Electron Microscope
- Transmission Electron Microscope
- Mechanical and Electrical Test Equipment
- Thermography Equipment

In the Advanced Materials areas ORTECH International specializes in:

Rapid solidification Technology	Troy Lassau
Metal Matrix Composites	Troy Lassau
Ceramics	Bradley Fox
	Troy Lassau
Powder Technology for Injection Molding	Bill Fossen
Ceramic Materials (magnetic applications)	Bradley Fox
	Brian Sellars
Liquid Crystal Processing for Electronics	Omar Caproletti
	Peter Bruyn
Surface Modification	Tom Kilp
	Omar Caproletti
Polymer Photochemistry	Tom Kilp
Plastics Processing	Steve Nazar
Resin Matrix Composites	Jacob Leidner
UV Coatings	David Hacker
Thin Film	Omar Caproletti

Special Services

- Environmental Dynamic Simulations Test Equipment
- Materials Technology Searches in Canada and Abroad
- Market Surveys
- Assistance with Joint Ventures by Industry Networking and Direct Involvement
- Ability to Commercialize New Materials Products but generally involvement through the prototype stage
- Project Funding Contacts and Private Industry Funding Networking

Contact General switchboard

SASKATCHEWAN RESEARCH COUNCIL

15 Innovation Boulevard
SASKATOON, Sask.
S7N 2X8

Telephone (306) 933-5400
Fax (306) 933-7446

President James Hutch

Employees 223

Annual Budget $16 500 000

Materials Manager John Bergsteinsson (Pro Tem)

Materials Capabilities
Currently at an early planning stage in materials activity. Initial focus will be on technology transfer with testing and research to follow.

Polymers, metals, ceramics and construction materials projects are being pursued.

Employees 7

Special Services
- materials technology searches in Canada and abroad
- many types of market surveys

Through strategic partnering it assists with joint ventures. Seeking to raise awareness among local manufacturers of the benefits of AIM.

Contact Dr. R. Maithel or John Bergsteinsson

DATE DUE
DATE DE RETOUR
