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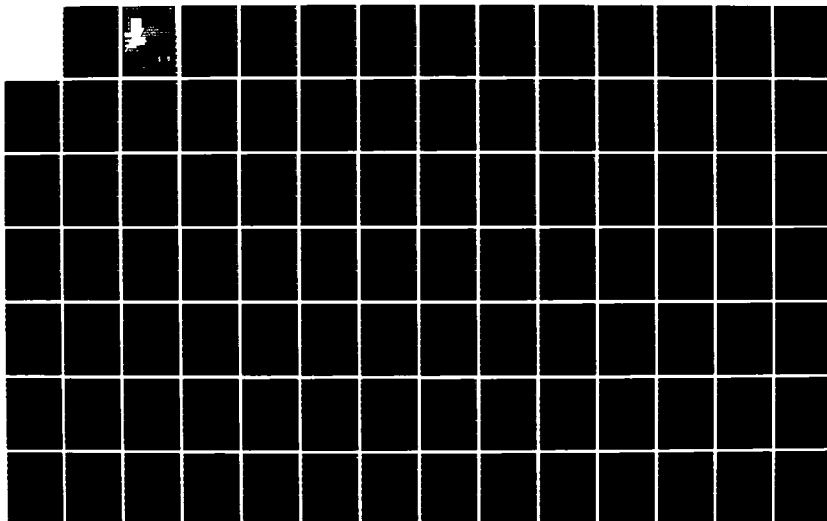
GUIDE TO CANADIAN AEROSPACE RELATED INDUSTRIES(U) AIR
FORCE SYSTEMS COMMAND WASHINGTON DC D J PEARSON ET AL.
28 FEB 86 AFSC-TR-86-001

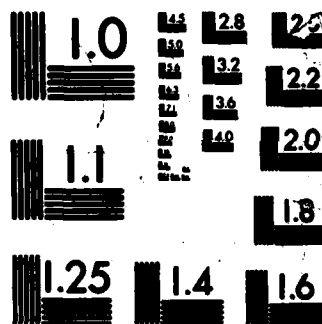
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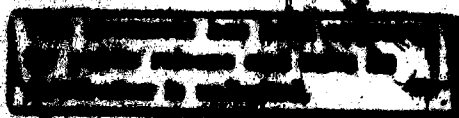
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**USAF SYSTEMS COMMAND
LIAISON OFFICE
OTTAWA, ONTARIO, CANADA
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19. ABSTRACT (Continue on reverse if necessary and identify by block number) This guide is a contracting source list of Canadian aerospace related industries to be used by USAF procurement offices, program managers, project engineers, and scientists. It provides company profiles, a company keyword index, and contact points for each company. <i>Referred to</i>				
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83 APR edition may be used until exhausted.
All other editions are obsolete.

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Section I

INTRODUCTION

One of the functions of the Air Force Systems Command Liaison Office in Ottawa is to stay current on Canadian industrial capabilities and trends, and to make this information available to the USAF R&D community. This Guide was prepared in pursuit of that objective. It presents descriptive data on 184 companies that have expressed interest in doing business with the USAF. All information was provided by each of the respective companies. Leads to new entries were obtained through newspapers, magazines and through contacts with various departments of the Canadian Government. This Guide presents a representative cross-section of the Canadian aerospace industry.

Canada has a very large industrial commitment to the aerospace, communications, electronics, and space areas. As one might expect, these industries are primarily concentrated in the Ontario-Quebec corridor, extending from Windsor through Toronto and Ottawa and terminating in Montreal. Other locations with expanding industrial bases are the Winnipeg (Manitoba), Edmonton-Calgary (Alberta), and Vancouver (British Columbia) areas. Substantial contributions to the Canadian industrial capability are also afforded by the Quebec City (Quebec) and Halifax (Nova Scotia) areas.

As in the other editions of this Guide, this fourth edition does not attempt to group companies into specific categories such as aerospace or electronics. Neither does this Guide attempt to differentiate R&D capabilities from pure product lines. While most companies have product lines, some are very R&D oriented and seem eager to engage in R&D contracts. For those companies that appear primarily product oriented, it is assumed that they do have an R&D capability within their area of expertise.

Section II of this Guide presents Canadian industrial capabilities as a compilation of individual company profiles. The general format for the company profiles include the following subsections: NAME, ADDRESS, CONTACT POINT, HISTORY, CAPABILITY, AVERAGE WORK FORCE, GROSS SALES, PLANT SIZE, EQUIPMENT, EXPERIENCE, KEYWORDS and the date of the material.

Section III (Company Keyword Index) relates company capabilities in the form of keywords. The specific keywords are presented in columnar form in alphabetical order. The second column lists the company associated with the keyword. The company index forms Section IV.

There are several Canadian trade publications that can be used to supplement this Guide. They include:

- *Canadian Defense Products Guide*, published by the Canadian Department of External Affairs.
- *Electronic Products for World Markets*, published by the Canadian Department of External Affairs. This is an index of Canadian electronic hardware and component manufacturers.
- *Communications Products for World Markets*, published by the Canadian Department of External Affairs. This is a brochure of Canadian telecommunications hardware manufacturers, systems managers, and consultants.
- *Computer and Software Products for World Markets*, published by the Canadian Department of External Affairs. This is an index of Canadian companies who manufacture computers and related products and software.
- *Canada in Space*, prepared by the Interdepartmental Committee on Space, Ministry of State for Science and Technology.
- *Canada's Aerospace Industry: A Capability Guide - 1985/86*, produced by MacLean Hunter Ltd in cooperation with the Air Industries Association of Canada and the Canadian Departments of Regional Industrial Expansion and External Affairs.
- *The CATALOG*, May 1985, publication of the Canadian Advanced Technology Association.

Copies of these documents may be obtained by contacting the Trade Commissioner at a local Canadian Consulate, by writing to the Department of External Affairs, US Division (TDU), Ottawa, Ontario, Canada K1A 0G2, or from the AFSC Liaison Office - Ottawa.

For the most part, Canada's high-technology industrial capability is on an even par with that of the United States, but on a smaller scale. It may certainly be considered another source base for USAF R&D procurements, as well as for commodity buys. It is hoped that this Guide will help provide the user with some insight into the Canadian system and encourage its use if deemed appropriate. Increased competition and "new blood" can only reduce USAF procurement costs and hopefully lead to better products.

Section II

COMPANY PROFILES

ADGA SYSTEMS INTERNATIONAL Ltd

Code: ASI

Address: 116 Albert St, Suite #400
Ottawa, Ontario, Canada K1P 5G3

Contact: Mr. J Kevin Burke, Dir, Business Development -
(613) 237-3022

History: The ADGA Group was established in 1969 to serve the needs of clients throughout the world. ADGA is owned and operated by the employees numbering approximately 300, of whom some 90 are professionals.

With the head office located in Ottawa, Canada's capital, branch offices in Halifax, Montreal, Toronto and Vancouver, plus an associate office in Geneva, Switzerland, ADGA can offer a broad range of services on a truly international basis.

ADGA is without direct ties to any specific suppliers, government or fiscal agencies and offers truly independent and objective consulting services to its clients.

The ADGA Group is a Canadian-owned professional engineering organization operating in Canada and abroad under certificates of authorization granted by appropriate professional engineering organizations.

Capability: The Group possess wide and proven experience in consulting, design, installation, operation and maintenance of technical facilities and in the provision of professional services for the support of a wide range of domestic and international projects, both inplant or in the field.

Major areas of company activity include all aspects of communications, navigation aids, air traffic control, satellite systems, marine vessel traffic management and communication programs, computer applications/systems and software development. System engineering and project/program management are also major features of the company's capabilities.

Additional, comprehensive consulting services are made available through our working associates and affiliated consultants. These include, industrial development and expansion programs, joint-venture projects and consulting services to clients interested in Canadian Government procurements.

Professional technical documentation services can be provided directly in English, French or Spanish with translation to most other major languages available as required.

Average Work Force: Professional - 90
Technologist/Technicians - 165
Others - 45

Gross Sales: 1984 - \$12.0M
1985 - \$15.0M (Est'd)

Equipment: Electronic R&D and test facility, and in-house computer systems.

Experience: Present customers include all major departments in the Canadian Government, as well as numerous departments of the provincial governments and industries in both Canada and the US. The company is interested in developing business with DOD in the area of defense communications

Keywords: Consulting (Navigation/Communications); Systems Engineering (Navigation/Communications); Air Traffic Control; Radar; Fire Control; Software Services; Secure Communications; Communications; Satellite Communications; Radio Communications.

Revised: Aug 85

A.E.I. TELECOMMUNICATIONS (Canada) Ltd

Code: AEI

Address: 419 Notre Dame Ave
Winnipeg, Manitoba, Canada R3B 1R3

Contact: Mr. K R Yates, President - (204) 942-7221

History: AEI, an established Canadian company for over 55 years, is a wholly owned subsidiary of the General Electric Company of England. There are no other Canadian locations.

Capability: AEI is involved in the engineering, manufacturing, distribution and installation of telecommunication switching systems. They have supplied major local and toll switching systems for Canadian metropolitan areas, as well as smaller dial offices, PABX systems, and peripheral equipment.

Average Work Force: Engineers - 10
Others - 122

Gross Sales: 1984 - \$ 9.0M
1985 - \$11.0M

Plant Size: 40,000 sq ft

Equipment: The company has the following equipment available for use on projects:

- **Laboratory Equipment:** SWPT 6800 Computer Software System, Soroc Software Programming (Development) System, etc.

- **Machinery Equipment:** Ragen 750 Automatic Self Programmable PC Board Assembly System, Econopak 229 Automatic PC Board Soldering System, etc.

- **Test Facilities:** Environmental Chamber, adjustable from 0 to 70°C (32.0 - 158°F) for burn-in testing of various integrated circuits (PC boards).

Experience: AEI is involved in the production of Automatic Number Identification (ANI) systems and 911 Emergency Reporting Systems for world-wide markets. They have over 20 years of experience with ANI systems manufacture and have over 2.5 million lines of ANI equipment installed in North America and other world-wide markets.

Keywords: Communications; Telecommunications; Switching; PABX Systems; Peripheral Equipment; Automatic Number Identification Systems; Telephone Gear; Emergency Reporting Systems.

Revised: Aug 85

AERO MACHINING Ltd

Code: AER

Address: 5411 Industrial Blvd
Montreal-North, Quebec, Canada H1G 3H7

Contact: Mr. Bruno Julien, Marketing Director - (514) 324-4260

History: Aero Machining Ltd is a small machining company incorporated in 1963 in the Province of Quebec. There are no other Canadian or US locations.

Capability: Aero Machining Ltd provides services in tool design, production, maintenance, sub-assemblies, die and mold development, and fabrication. They specialize in general machining, three axis profiling or four spindle profilers, high tensiles, titanium, and D-6-AC material. Their quality control is governed by the "Aero Machining Ltd" quality control manual in accordance with MIL-Q-9858A and MIL-C-45662A. The company is approved for the manufacture of aircraft hydraulic servos, landing gear components, and missile and airframe machined parts. Accumulative quality control records are kept to provide necessary traceability of inspection data. Their quality control policy is approved to meet the requirements of various US DOD QC specifications, as well as the Canadian DND 1016 specification, for the manufacture of aircraft mechanical parts and mechanical and hydraulic assemblies.

Average Work Force: Total - 90

Gross Sales: 1984 - \$2.0M
1985 - \$2.25M

Plant Size: 27,000 sq ft

Equipment: Their equipment includes NC lathes, borers, milling machines, profilers, drills, honing machines, and grinders. They have a hydraulic assembly and test facility for all hydraulic assemblies and parts manufactured by the company.

Experience: Aero principal customers include McDonnell Douglas Corp, Grumman Aerospace Corp, Pratt & Whitney, Cleveland Pneumatic, Air Canada, DeHavilland, Canadian Marconi, Versatile Vickers, and GE.

Keywords: Machining; Titanium; Tooling; Die Fabrication; Hydraulic Servos; Landing Gear Components; Airframe Parts; Missile Parts; Actuators.

Revised: Aug 85

AIRBORNE DATA SYSTEMS Ltd

Code: ADS

Address: C-5455 Airport Road South Richmond,
British Columbia, Canada V7B 1B5

Contact: Mr. Britt Whitaker, Executive Vice President -
(604) 276-2332

History: Airborne Data Systems Ltd was incorporated in 1983 as a wholly owned, private Canadian company to provide management information systems to the aviation industry. In November 1985, Airborne became a publicly listed company, trading on the Vancouver Stock Exchange. The company has a branch office in Toronto, Ontario and expansion to the New York and Los Angeles areas is anticipated in the near future.

Capability: Airborne Data Systems Ltd is an aviation management information service company specializing in computer software for Aircraft Maintenance, Inventory, Flight Operations and Accounting applications. Airborne's software is a management

product intended to improve administrative cost effectiveness, operational efficiency, flight safety and regulatory compliance. Airborne's design approach has resulted in concise, user-friendly, generic software modules for aircraft maintenance, inventory, flight operations and accounting which can be easily modified for specific customer requirements.

Airborne Data Systems Ltd offers a full range of consultation services for the automation of all phases of aviation operations. Their software product is written for a wide variety of hardware from micro to mainframes, including IBM, Sperry, Digital, Honeywell, NCR, etc. An overview of Airborne's software follows:

Maintenance - the maintenance module tracks aircraft components by ATA 200 or 100 Code, aircraft zone, part number and serial number, under a variety of maintenance plans - hard time, on condition and condition monitored - for either periodic or components continuous inspection regimes. The maintenance system features include:

- The ability to handle any fleet size and aircraft type mix.
- Component tracking by any combination of flight hours, flight cycles, landings or dates.
- Component history and reliability tracking.
- Equipment discrepancies tracking.
- Future maintenance requirements.
- Inventory system interface.
- Single entry data capture which eliminates redundant data entry.
- Aviation industry standard terminology.
- Menu organization by employee job classification or task function.

Inventory - the inventory module manages inventory in four categories - rotables, consumables, tools and supplies. The inventory module features include:

- Controls for availability, suspense, quarantine, shelf life, calibration, repair, expiry, lead time, on order and minimum stock.
- Full performance and cost history on rotatable components.
- Warranty claim situations identified.
- Report generator facilities.
- Single entry data capture which eliminates redundant data entry.
- Aviation industry standard terminology.
- Menu organization by employee job classification or task function.

Flight Operations - the flight operation module provides for the control of all pilot and aircraft log information including crew and aircraft scheduling - for use by air carriers conducting passenger and/or freight operations. Cost and statistical data are monitored by aircraft and pilot, and a variety of user-defined reports are available for management and operational purposes.

Accounting - the accounting module consists of an integrated system for:

- Passenger and freight revenue accounting.
- Accounts Receivable
- Accounts Payable
- General Ledger

Average Work Force: System Analysts - 4
Programmer/Analysts - 10
Marketing & Customer Support - 5
Aircraft Maintenance Planners - 3
Others - 5

Gross Sales: No Data

Plant Size: 9,000 sq ft

Equipment: Airborne Data Systems Ltd develops software for a wide range of Intel 808X, 80286 and Motorola 68000 based hardware. In-house computer facilities include the IBM XT/AT, Compaq Plus, Pertec and CIE, with peripheral devices (plotters, printers and CRT's) including NCR, WYSE and Hewlett Packard.

Experience: Airborne Data Systems Ltd has developed an excellent reputation with its customers with respect to scheduling budget, product performance and customer support. Airborne's diversified Canadian customer base include major international jet charter, regional, and commuter carriers as well as multinational oil and gas and forestry based corporate customers. American customers include a major air frame manufacturer. In addition, Transport Canada has endorsed Airborne's software product "as a viable option for meeting . . . (Transport Canada's) Computerized Airworthiness Information System specifications for use in Department of Transport airworthiness applications". The Airborne product has also gained favorable recognition in Airline Executive Magazine (July 1985).

Keywords: Aviation Management; Aviation Consultants; Computers; Aviation Software; Aircraft Maintenance; Aircraft Inventory; Flight Operations; Flight Planning; Accounting; Ticketing; Programming; Data Acquisition; Software Services; Application Software; Computer Systems; Data Processing; Software Development; Software Systems; Crew Scheduling; Aircraft Scheduling.

Revised: Nov 85

AIRCRAFT APPLIANCES AND EQUIPMENT Ltd

Code: AAE

Address: 1550 East Drive
Bramalea, Ontario, Canada L6T 1C1

Contact: Mr. W J White, President, TSSD - (416) 791-1666

History: Aircraft Appliances and Equipment Ltd (AAE) was founded in 1949 and was incorporated (Ontario Chapter) the same year. The principal operation at the beginning of the existence of the company was the repair and overhaul of aircraft accessories and distribution of aircraft electrical product accessories in Canada built by US companies

AAE commenced their design and manufacturing of fuel filters and coalescers in the year 1959. In 1966, they commenced to design and manufacture aircraft tachometer generators and this was followed in 1973 by the design and manufacturing of ground power AC/DC generators and generator sets. This product was sold in 1984. The principal market for AAE services and their product covered all aircraft manufacturers in Canada and US military requirements, which include US and Canadian Navy requirements, commercial ship builders, etc. The generator division, which has been sold, also catered to industrial agricultural, and the export market. AAE is a privately-owned Canadian company

Capability: Presently AAE operates three basic Divisions

- Repair and Overhaul and Service Division (R&O) - For over 35 years, this division has been overhauling military and commercial components and products produced by leading manufacturers in the US and Canada. Some of the

products handled by this division are automatic flight controls, aircraft controls, electrical power sensing devices to ground power units, motor generators, test stands, search lights, etc. This division is also capable of rewinding AC and DC air or oil cooled generators and stators. It has manufacturing and design capabilities for various power and test equipment for aircraft support.

- Fluid Power Division (FP) - This division is involved in design and manufacturing of a wide variety of filtration equipment. It has now over 26 years of research and development in filtration and coalescing equipment (water separators). The major filtration systems are being supplied to all US built frigates and destroyers, as well as Canadian frigates.

- Technical Sales and Service Division (TSSD) - This division is stocking distributor for other manufactured products. It has catered to the Canadian aerospace industry now for over 30 years. It has distribution rights for aircraft electrical, avionics, and fuel accessories produced by LSI division, such as AC/DC generation systems, pitch trim actuators, controllers, heading reference units, land navigation, muzzle velocity radar, radar antenna, display and transceivers, fuel booster and lube and scavenge pumps. It also has a supply of RFI/EMI filters. For industrial application, it handles self and ground air conditioning systems and commercial and military aircraft. It also represents Ramco Inc and manufactures water pollution equipment and water recovery systems for municipal, industrial, recreational use, fish farming, etc.

Average Work Force: Engineers - 12
Engineering Technicians - 18
Others - 90

Gross Sales: 1984 - \$10.8M
1985 - \$13.6M

Plant Size: 80,000 sq ft

Equipment: Numerous NC equipment in manufacturing areas, avionics and flight control testing equipment, various electrical test stands, hydraulic and coalescing test stands, and in-house Qantel computer system.

Experience: AAE has 35 years of experience in R&O and TSSD catering to Canadian and US government agencies, commercial aerospace industry i.e., de Havilland, Canadair, Beech, Cessna, Piper and caters to other airlines through LSI/International Division. Fluid Power Division has catered for over 20 years with their filters and coalescing equipment to major US ship builders, i.e. Ingalls Shipyards, Bath Iron Works, Todd Shipyards, etc. It has also exported its equipment to Spain, Australia, commercial marine companies, etc. In Canada, they supply their equipment to DDH 280 and new Canadian built patrol frigates. Various aircraft filters are supplied to aircraft industries in Canada, i.e. Pratt & Whitney, de Havilland and Canadair

Keywords: Separators (Oily Water), Coalescing Filters, Filters, Fuel Filters, R&O (Avionics), R&O (Aircraft Components), R&O (Ground Power), Distribution (Aircraft Parts)

Revised: Sep 85

ALBERTA RESEARCH COUNCIL

Code: ARC

Address: Executive Offices
7th Floor, Terrace Plaza
4445 Calgary Trail South
Edmonton, Alberta, Canada T6H 5R7

Contact: Ms. Dorothy M Hollands, Corporate Secretary & Dir of Public Relations - (403) 438-1666

History: The Alberta Research Council is a provincial Crown Corporation founded in 1921 to advise the Alberta Government on scientific affairs and to promote the economic growth of Alberta through scientific and engineering research. It has over 500 employees at offices and laboratories mainly in Edmonton, and at offices in Calgary, Red Deer, Nisku, Devon and Lethbridge.

Capability: The Research Council has established six major areas of research - industrial and engineering research and assistance, oil sands, energy processing, advanced technologies, natural resources, and applied sciences. The industrial and engineering research program provides service to industry through an assistance program for small business. Oil Sands Research includes geology studies, heavy oil cracking, and in-situ recovery. Energy Processing includes geology studies, liquefaction, pyrolysis, coal property definition, and gasification. Natural resources research activities include geological survey, terrain sciences, civil engineering, and atmospheric sciences research. Applied sciences projects include research into new catalysts, electro-organic reactions, low temperature biology, and enzyme design studies using genetic engineering techniques. The ARC also sponsors the Electronic Tests Center, a \$10M initiative of the Alberta Government.

Average Work Force: Scientists, Engineers, & Research Technicians

Gross Sales: The Research Council operates on a \$40 million budget in 1985-86, half of which comes in the form of an annual provincial grant, and the other half which comes from contracts with provincial government departments and private industry.

Plant Size: 505,250 ft² (47,000 m²) (1984)
580,500 ft² (54,000 m²) (1987)

Equipment: The Research Council has a range of equipment for carrying out studies on oil sands and coal technology from fundamental science to bench scale pilot work; sophisticated chemical analytical instruments; distributed computing equipment. Its digital weather radar system uses computer program interactive graphics to produce displays of vertical cross sections from digital weather radar data archived on magnetic tape. The overall display allows the analyst to examine radar echoes. These data are used for storm analysis, hail description, flood prediction, aircraft-storm interaction or avoidance and spacecraft re-entry.

Experience: Weather Modification - Contract with Alberta Agriculture.

Flood Forecasting - Contract with Alberta Environment.

Radar Development - Contract with Environmental Research and Development (US).

Digital Radar - Contract with Fundacao Educacional Data Processing de Bauru, Brazil.

Satellite/Radar - Contract with Canadian Atmospheric Rainfall Measurement Environment Service.

Experience in other areas of natural resources research and in research on oil sands, coal liquefaction, applied sciences (biotechnology and hydrocarbon research), and industrial and engineering areas available on request (see keywords below).

Keywords: Chemistry; Energy; Environment; Radar; Software Services; Space Systems; Testing/Test Equipment; Meteorology; Digital Data Processing; Computer Graphics; Statistical Analysis; Weather Forecasting; Cloud Seeding; Cloud Physics; Weather Modification; Convective Storms; Hydrometeorology; Precipitation Measurement; Flood Forecasting; Air Pollution; Numerical Modelling; Biology; Microbiology; Chemical Processing; Industrial Engineering; Products Testing; Materials Testing; Transportation; Oil Sands; Coal Liquefaction; Coal Pyrolysis; Geology; Soils; Water; Ground Water; Surface Water.

Revised: Aug 85

AMTEK MANAGEMENT Inc

Code: AMI

Address: 493 Richmond Road
Ottawa, Ontario, Canada K2A 0G3

Contact: Mr. L E McClare, VP Operations - (613) 728-1831

History: AMTEK was formed in 1981 as a wholly owned Canadian company. It was formed to provide services to governments and industries on Integrated Logistic Support (ILS); Automatic Test Equipment; and contract and program management.

Capability: AMTEK is a leader in Canada in the field of integrated logistic support having supplied services to Canada's major acquisition programs CP140 Aurora purchased from Lockheed, CF18 from McDonnell-Douglas, the Canadian Patrol Frigate Program, Low Level Air Defense, and Gun Alignment and Control System. ILS development services have been provided to DND, Litton Systems Ltd, Canadian Marconi, Leigh Instruments Ltd as well as other Canadian, US, and foreign companies.

AMTEK has provided field service support to the Canadian government for Automatic Test Equipment. The company also provides training in electronics, ATE, procurement and contract management.

Average Work Force: 35 (Engineers & Technologists)

Gross Sales: 1984 - \$2.0M
1985 - \$2.5M

Plant Size: 15,000 sq ft

Experience: AMTEK clientele includes Department of National Defense, Department of Supply and Services, Royal New Zealand Air Force, Canadian Marconi, Litton Systems Ltd, Bristol Aerospace Ltd, Leigh Instruments Ltd, Lockheed Aircraft, Hughes Aircraft, British Aerospace, Aviation Electric (Bendix), and Sperry.

Keywords: Integrated Logistic Support; ILS; Program Management; Logistic Support Analysis; Level of Repair Analysis; Training; Automatic Test Equipment; Contract Management.

Revised: Aug 85

ANATEK MICROCIRCUITS Inc

Code: ANA

Address: 240 Brooksbank Ave
North Vancouver, British Columbia, Canada
V7J 2C1

Contact: Mr. Scott C Lewis, President - (604) 980-7061

History: Anatek is a Canadian owned company incorporated in 1969. It is active in both the Canadian and US electronics markets. The company manufactures thick film hybrid microcircuits.

Capability: Anatek's expertise is in the areas of custom thick film hybrids, epoxy die attach, gold ball bonding, laser passive and active trimming, and ceramic packaging.

Average Work Force: 25 - Total

Gross Sales: 1984 - \$1.4M
1985 - \$2.0M

Plant Size: 10,000 sq ft

Experience: Customer list includes - NCR, GTE, IBM, Allied, Motorola, and Pratt & Whitney Aircraft.

Keywords: Electronics; Thick Film Microcircuits; Thick Film Hybrid Parts; RF Components; Amplifiers; Filters; PCM Filters; Resistor Networks; Active Filters; RF Amplifiers; Oscillators.

Revised: Aug 85

APPLIED MICROSYSTEMS Ltd

Code: AML

Address: 2035 Mills Road
Sidney, British Columbia, Canada V8L 3S1

Contact: Mr. George L James, General Manager -
(604) 656-0771

History: Applied Microsystems Ltd is a 100% Canadian-owned, high-technology manufacturing company. The company was formed in British Columbia in 1976. It specializes in the manufacturing of high-technology sensors and data logging instrumentation.

Capability: Applied Microsystems' primary business is design and manufacture of both standard and custom electronic instruments for use underwater. The products are primarily high-precision, high-reliability instruments designed for long term deployment based on battery power. The company designs and manufactures their own sensors, electronics and pressure housings. The company is especially well known for its innovative engineering and short turn around on custom products. Approximately 50% of the company's products are sold in Canada, 33% in the US and 33% throughout the remainder of the world. Although a number of products are sold directly by the factory, the company is represented in a series of countries around the world through an agency structure. In the US, agents in Texas, California and Virginia represent all of the standard products manufactured by Applied Microsystems Ltd.

Average Work Force: Engineers - 4
Others - 12

Gross Sales: 1984 - \$0.8M
1985 - \$1.0M (Est'd)

Plant Size: 17,500 sq ft

Equipment: Applied Microsystems has a complete machine shop, a complete electronics assembly and production facility, a complete software development system, and test equipment specific to oceanographic instrumentation.

Experience: Past customers include nearly every Oceanographic and Hydrographic Government Research Institution around the world.

Keywords: Oceanographic Instrumentation; Underwater Instrumentation; Data Acquisition; Data Logging; Meteorological Instruments; Conductivity Sensors; Temperature Sensors; Depth Systems; Sound Velocity Systems; Current Meter Systems; Underwater Acoustics.

Revised: Aug 85

THE ARMSTRONG MONITORING CORP

Code: AMC

Address: 215 Colonnade Rd South
Nepean, Ontario, Canada K2E 7K3

Contact: Mr. David M Jenkins, Marketing Dir - (613) 225-9531

History: The AMC is a Canadian owned electronic gas detection firm founded in Jan 81. The company has offices throughout Canada and the US.

Capability: The AMC is primarily involved in the manufacturing of fixed and portable dangerous gas detection equipment. In the fixed, they offer rack and wall mount systems incorporating a remote calibration sensor/transmitter that produces a time and money-saving factor. In the area of sensors, they range from electrochemical, catalytic and solid state. Offered in the solid state is the specific H₂S sensor which is poison-proof. On the portable side, they range from hand-held units to the 'amc 3000' series. In the 3000, AMC offers their exclusive 3 meter and 3 sensor concept which allows 3 separate conditions to be monitored simultaneously (oxygen deficiency, toxic and combustible gases). AMC's human resources allows them to comprehensively maintain all levels of manufacturing from in-house R&D (consisting of engineering staff and chief product technician), to Quality Control, Quality Assurance, right through to their on-the-job training program.

Average Work Force: Engineers - 4
Degrees - 7
Others - 15

Gross Sales: No Data

Plant Size: 14,000 sq ft

Equipment: Calibration chambers, environmental chambers, Monroe OC8820 (In-house Computers), and analog electronics production facility.

Experience: Customers both US and Canadian, range from coal mining (methane) applications in Gillette, Wyoming to carbon monoxide detection in various institutions in major centers in Canada. They are interested in doing business with the USAF.

Keywords: Chemistry; Electronics; Environment; Security & Safety; Hazardous Gas Detectors; Toxic Gas Detectors; Electronic Gas Detectors; Sensors; Electrochemical Devices; Catalytic Sensors; Solid State Devices; Hydrogen Sulfide Sensors; Pollution Monitoring Equipment; Combustible Gas Monitoring Equipment; Data Acquisition Capability; R&O (Environics); Thermal Conductivity Devices; Calibration Capability; Ammonia Gas Detection; Chlorine Gas Detection; Carbon Monoxide Gas Detection; Gas Detectors.

Revised: Aug 85

ATLANTIS AEROSPACE Corp

Code: AAC

Address: 951 Rowntree Dairy Road
Woodbridge, Ontario, Canada L4L 4E4

Contact: Mr. Dale Simmons, General Manager - (416) 851-8531

History: Atlantis is a wholly owned Canadian company incorporated in 1978. There are no other Canadian divisions or US subsidiaries.

Capability: Atlantis manufactures avionics test equipment, simulators/computer assisted training systems and specialized aerospace instrumentation/control systems.

The company has a firm commitment to the ongoing design and development of new products for the avionics test equipment line. A series of Interface Panels support bench test applications on a variety of avionics systems ranging from VHF navigation systems to cockpit voice recorders. Two new pieces of test equipment provide Autoland and Ground Proximity Warning System testing on the new digital avionics aircraft such as the Boeing 757/767, as well as on aircraft using analog avionics. A complete line of ARNIC 429 test equipment is now entering production ranging from bench and automatic test equipment (ATE) units to portable flightline versions. The firm also markets MIL-STD-1553 test equipment. The DCM-1553 Digital Bus Communicator is a bench top unit designed to ease the technicians task of communicating with 1553 bus avionics. It was initially developed to

support the Canadian CF-18 fighter aircraft. Featuring a touch-sensitive CRT and automatic word building from engineering units entered by the operator, the DCM-1553 is the flagship of a new line of bench and ATE 1553 test equipment.

A major portion of the company's activities is devoted to cockpit procedure simulators, maintenance trainers and specialized simulator systems. Projects in this field include Animated Systems Trainers and a Cockpit Procedures Simulator for the Canadair Challenger business jet, an Environmental Control Systems Maintenance Simulator for the CF-18 fighter and an "Automated Pilot Selection System" for the Canadian Military. A recent contract award involves the development of Boeing-Vertol H-46 Helicopter Maintenance Trainers for the US Navy and Marine Corp. The firm is also producing Australian F-18 Maintenance Simulators for avionics, armament, flight control electronics, hydraulics, fuel and environmental control systems. The development of a light helicopter instrument procedures simulator is also underway for the Canadian Department of Defense.

Atlantis also offers R&D and manufacturing services, especially custom applications of microprocessor hardware and software to instrumentation/control packages. They are currently designing and manufacturing a Digital Autopilot/Guidance Systems for a rocket-powered drone for the Canadian Department of Defense. Previous projects have included industrial control systems and software for nuclear power station monitoring systems. Presently, they are also developing the field-hardened prototype of a Muzzle Reference System (MRS) for the Canadian Leopard tank. The MRS is a microprocessor technology designed to allow the tank fire control computer to compensate for "barrel-droop", which results from thermal gradients along the gun barrel. Atlantis is developing the hardware, microprocessor and other related electronics for the system, while another firm is developing the optics and mechanics of the system.

Average Work Force: PhDs - 1
Engineering - 35
Manufacturing - 9
Others - 21

Gross Sales: 1984 - \$1.0M
1985 - \$5.5M

Plant Size: 21,000 sq ft

Experience: Atlantis has supplied equipment to the Canadian Department of Defense, original equipment manufacturers (e.g., Canadair, Boeing), the corporate aviation sector, major avionics facilities and airlines. The company has also made significant gains in the international aerospace market with recent sales to the Royal Australian Air Force and Boeing-Vertol. Although other sales to the US have been mainly commercial with no sales to the USAF, Atlantis is very interested in expanding their business to include the US military.

Keywords: Avionics, Computers, Electronics, Software Services, Testing/Test Equipment, Test Equipment, Test Equipment (Digital 1553), Training Aids, Radio/Radar Altimeters, VHF Navigation Systems, HF Transceivers, Flight Data Recorders, Cockpit Voice Recorders, Engine Component Simulator, Animated System Trainers, Simulators, Software Development, System Simulation, Training Simulators

Revised: Aug 85

AVTECH ELECTROSYSTEMS Ltd

Code: AVT

Address: (Mailing)
P. O. Box 5120, Station F
Ottawa, Ontario, Canada K2C 3H4

(Location)
15 Grenfell Crescent, Suite #205
Nepean, Ontario, Canada K2G 0G3

Contact: Dr. W J Chudobiak, President - (613) 226-5772

History: Avtech Electrosystems Ltd is a small, private Canadian, high technology company incorporated in 1975. There are no other branches or affiliates in Canada or the US. The company is represented in France, W. Germany, Japan, Austria, the UK, and Italy.

Capability: Avtech was established for the purpose of designing and marketing nanosecond waveform instrumentation. Since its start, it has become recognized as a leading supplier of nanosecond waveform generators and accessories with over 100 models. Their product line includes pulse generators, impulse generators, monocyte generators, pulse amplifiers, transformers, power splitters, bias insertion units, and scope probes.

The all solid-state waveform generators are available as stand alone lab instruments, or as miniature DC powered modules. The amplitude and the voltage rate of rise for some of their units are at least an order of magnitude higher than those provided by standard tunnel diode pulse generators. The combination of some aspects of microwave integrated circuit technology with ultra-fast semiconductor device switching technology (including SRD, hot carrier diodes, avalanche, VMOS and bipolar switches), has yielded 100 psec rise and fall times, PRF beyond 250 MHz, amplitude to 350 volts, peak currents to 100 amperes, and single cycles of RF to 1500 MHz. They can design, develop and build to customer requirements.

Avtech's inverting and impedance transformers are designed to be used with general purpose laboratory pulse generators, with subnanosecond risetime pulse generators and circuits, and other units. They provide inverted output pulse with a magnitude equal to the input signal magnitude, and can match to other impedance levels or can obtain higher output currents.

Avtech's power splitters provide two outputs which are either both in phase (non-inverted) with the input signal, or with one output non-inverted and with one inverted. They are designed for use with nanosecond speed laboratory pulse generators, with CW signals, or with other units to frequencies as high as 1.0 GHz. Their bias insertion unit is designed for both CW and subnanosecond risetime baseband pulse applications. The scope probe was designed to be used with a 50 ohm sampling oscilloscope, to allow probing of test points in microstrip structures and in discrete RF circuits and subnanosecond pulse circuits, operating at frequencies as high as 5 GHz and with risetimes as low as 100 psec.

Average Work Force: Total - 7

Gross Sales: 1984 - \$800K
1985 - \$1.0M

Plant Size: 3,000 sq ft

Experience: Approximately 98% of Avtech's sales are export. Their products have been supplied worldwide to companies, universities and government agencies, e.g., USAF, Harry Diamond Laboratories, Los Alamos Scientific Laboratories, Hewlett Packard, Honeywell, Hughes Aircraft, Lawrence Livermore Laboratories, Martin Marietta, Bell Northern Research, etc.

Keywords: Waveform Instrumentation, Waveform Generators, Nanosecond, High Speed Pulsers, Pulse Generators, Impulse Generators, Monocyte Generators, Pulse Amplifiers, Transformers, Solid State, Power Splitters, Bias Insertion Units, Scope Probes, Stand Alone Lab Instrumentation, DC Powered Modules, Linear Pulse Amplifiers, Inverting Transformers, Impedance Transformers

Revised: Aug 85

BACHAN AEROSPACE OF CANADA Ltd

Code: BAC

Address: 300 East Pike Creek Road
P. O. Box 39
Emeryville, Ontario, Canada N0R 1C0

Contact: Mr. Keith Branston, Director of Marketing -
(519) 727-6666

History: Bachan Aerospace of Canada Ltd was incorporated in the Province of Ontario in 1975 as a division of Bachan Aerospace Corporation. The company is owned by LGM Corporation.

Capability: Bachan Aerospace is a modern manufacturer engaged in the design, fabrication and test of gears, gear boxes and precision assemblies for the aerospace and defense industries. Bachan maintains a complete gear facility for design, manufacture and test of gear boxes, precision spur, helical and bevel gears. This facility includes CNC machining, gear grinding, and gear inspection equipment. Bachan operates to MIL-Q-9858A.

Average Work Force: 75 (Total)

Gross Sales: \$3.5 - \$4.0M (Annually)

Plant Size: 35,000 sq ft

Equipment: CNC machining and turning centers, gear cutting, grinding and lapping equipment, OD grinding, ID grinding, surface grinding, milling, lathes, cutting, computer co-ordinate measuring machine, gear checking equipment, NDT testing, copper plating and complete inspection facilities.

Experience: Bachan manufactures flap actuator gears for the Boeing 767, pump gears for Pratt & Whitney's JT 15, PT 6 and PW 100 engines, gas turbine disks for United Technologies Power Systems Group, cable and shaft assemblies for the Bendix FJ-A fuel control system, and Radar Azimuth Drives for Norden systems. Bachan has been surveyed by Avco Lycoming, Bendix Energy Control, Cleveland Pneumatic, General Dynamics, Hamilton Standard, Hawker Siddeley, McDonnell Douglas, Norden, Pratt & Whitney, Plessey Dynamics, Rolls Royce, Sunstrand Aviation and TRW Power Accessories.

Keywords: Gears; Gear Boxes; Machining; Precision Machining; CNC Machining; Radar Drives; Landing Gear Components; Missile Components; Shaft Assemblies; Cable Assemblies

Revised: Oct 85

BARON COMMUNICATIONS Ltd

Code: BCL

Address: 717 E Hastings Street
Vancouver, British Columbia, Canada V6A 1R3

Contact: Mr. Harry Baron, President - (604) 254-0577

History: Baron Communications was formed in 1960 as a wholly owned Canadian Corporation with representatives in Washington, Oregon, California, Arizona, Texas, Michigan, and Illinois.

Capability: Baron specializes in the manufacture, design, and development of various types of tone signalling, alarm & status, and control systems, radio, and telephone interconnect terminals & associated mobile control heads.

Average Work Force: 8

Gross Sales: 1984 - \$0.45M
1985 - \$0.55M

Plant Size: 2,000 sq ft

Equipment: Baron's equipment consists of Exorcisor II - Computer Development System 96K RAM, 1M Disc Capacity Development Module for 6800-6802 & 6801 Processors, PROM Programmer, and EPROM Programmer with Exorterm 150 console & Model 703 printer. They also have the usual assortments of oscilloscopes, VTVMs, spectrum analysers, temperature environment chambers, transmission test sets, etc., necessary for the design and development of advanced circuitry.

Experience: Baron is a recognized and accredited supplier of tone signalling equipment and systems (DTMF, in band, single-tone, two tone simultaneous or sequential) to - Motorola, GE, Pacific Northwest Bell Telephone Co, Michigan Bell Telephone Co, General Telephone & Equipment, Getty Oil Company, ALASCOM, AT & T, US Army Corp of Engineers, and the RCMP.

Keywords: Communications; Computers; Electronics; Microprocessors; Tone Signalling; Telephone Systems; Microwave Systems; Status Systems; Alarm Systems; Telephone Interconnect Terminals; Mobile Control Heads; Based Tone Signalling.

Revised: Aug 85

BARRINGER RESEARCH Ltd

Code: BRL

Address: 304 Carlingview Drive
Rexdale, Ontario, Canada M9W 5G2

Contact: Mr. John Davies, President - (416) 675-3870

History: Barringer Research was founded in 1961 to develop geophysical/geochemical techniques and instrument systems relating to mineral exploration. Barringer Resources Inc (formerly Barringer Research Inc) was incorporated under the laws of the State of Delaware on 7 Sep 67 for the purpose of acquiring all of the issued and outstanding voting stock of Barringer Research Ltd, an Ontario (Canada) corporation.

Capability: Barringer has undertaken research projects primarily in the earth sciences in the disciplines of geology, geochemistry, electro-optics, electromagnetics, magnetics and atmospheric physics. As a result of such projects, they have developed instrument systems and techniques in the fields of airborne and ground mineral exploration and environmental and process monitoring. They have, during the past five years, devoted a substantial portion of their efforts toward adapting for oil and gas exploration instrument systems and technology that they initially developed for mineral exploration. Recently, emphasis has been placed on military equipment for trace gas and liquid detection, and on rapid detection of drugs, explosive vapors and counterfeit bullion.

- Airborne Electromagnetic Systems - INPUT* (INduced Pulse Transient), the most widely used airborne EM system in the western world for over 20 years, COTAN* (CORrelation of TRANsients), an improved EM system offering greater depth penetration, and TIVAC, an adaptation for hydrocarbon exploration

- Metal Detection Systems - Adaptation of above EM systems to specialized applications, and Counterfeit bullion detector systems

- Reflectance Spectroscopy for Remote Sensing - Hand-held Rationing Radiometer (HHRR), Field portable reflectance spectrometer (REFSPEC), and Airborne laser fluorosensor systems

- Trace Gas Detection - SO₂ or NO₂ remote sensor, COSPEC*, Gas filter correlation spectrometer for passive infrared remote sensing, GASPEC*, Drug and explosive vapor detection by ion mobility spectrometry, Mercury and its compounds in the environment, and Microwave

emission detection for gas chromatographic studies of pesticides and organics in the environment.

- Collection Systems for Analytical Geochemistry Studies - AIRTRACE* helicopter of fixed-wing collection of aerosol samples; SURTRACE* helicopter or ground based collection of surface samples; and LASERTRACE, a rapid, inexpensive multi-element analysis of samples.

- On-line Process Stream Analysis - Heavy water analysis for CANDU nuclear reactors and heavy water manufacturing.

Average Work Force: (Canada Only)
Engineers & Scientists - 26
Technical Support - 27

Barringer Research retains on staff a diverse group of Scientists and Engineers in the physical sciences. Barringer Magenta retains expertise in analytical chemistry, geochemistry and microbiology. The professional and supporting technical staffs shown above are for the metropolitan Toronto location only. The total US and Canadian professional strength is 35 Scientists and Engineers.

Gross Sales: 1984 - \$4.9M
1985 - \$7.3M

Plant Size: Barringer Resources Inc, Barringer Research Ltd, and Barringer Magenta Ltd lease the following office and laboratory space:

Location	Sq Ft	Purpose
1626 Cole Blvd Golden, Colorado	12,000	Office & Laboratory
304 Carlingview Dr Rexdale, Ontario	28,700	Office, Laboratory & Mfg
1455 Deming Way Sparks, Nevada	7,200	Laboratory
5161 Ward Road Wheat Ridge, Colorado	3,000	Laboratory
3750 19th St. N. E. Calgary, Alberta	2,900	Laboratory
44 Fasken Drive Rexdale, Ontario	3,500	Storage, Warehouse
Field Aviation Hangar Malton (Toronto), Ontario	1,000	Avionics Workshop

Experience: Barringer experience is world-wide. Recent R&D clients include British Petroleum, Petro-Canada Explorations Inc, TRW Systems Group (USA), National Research Council of Canada, Canadian Department of National Defense, Ontario Hydro, Department of Supply & Services (Canada), Rexnord Inc (USA), Atomic Energy of Canada Ltd, NASA Langley Research Center (USA), and Atmospheric Environment Services (Canada). USAF clients include Wright-Patterson AFB, OH - "Remote Detection of Chemical Vapors using Correlation Interferometric Techniques", and Brooks AFB, TX - "Development of a Hydrazine/Carbon Monoxide GASPEC".

Keywords: Infrared Instrumentation, Airborne Surveys, Environmental Analysis, Remote Sensing, Trace Gas Detection, Spectroscopy, Geographic/Geologic Analysis, Electro-Optics, Signal Processing, Data Analysis, Metal Detection, Instrument Manufacture, Remote Gas Detection, Airborne Laser Fluorosensor, Hazardous Gas Detection

Revised: Aug 85

BELL AEROSPACE CANADA TEXTRON (Division of Textron Canada Ltd)

Code: BEL

Address: P. O. Box 160
Grand Bend, Ontario, Canada N0M 1T0

Contact: Mr J B Timbrell, Managing Director - (519) 238-2333

History: Bell Aerospace was registered to do business in Canada in 1966. The parent company is Bell Aerospace Textron located in Buffalo, New York.

Capability: Bell Aerospace concentrates in the areas of design, development, manufacturing, and production. They specialize in air cushion vehicles and systems.

Average Work Force: Engineering - 6
G & A - 9
Others - 80

Gross Sales: 1984 - \$30M
1985 - \$25M

Plant Size: 38,000 sq ft

Equipment: Data processing on all operations.

Experience: US Army (LACV-30 Program); deHavilland Aircraft (special components and tooling for Dash-8 Program); LACTA Program; Bell/Canadian Federal Government Joint Development Program (Light air cushion triphibious aircraft); Canadian/USAF Joint Defense Program (Air Cushion Equipment Transporter - ACET - Program); and Canadian Coast Guard - Voyageur.

Keywords: Air Cushion Vehicles; Air Cushion Systems; Air Cushion Equipment Transporters.

Revised: Aug 85

BENDIX AVELEX Inc

Code: BAI

Address: Mailing: P. O. Box 2140
St Laurent, Quebec, Canada H4L 4X8

Plant: 200 Laurentien Blvd
St Laurent, Quebec, Canada H4M 2L5

Contact: Mr. John Beaven, Director, Marketing - (514) 744-2811

History: A pioneer in Canadian aviation and a recognized leader in technological innovation and engineering design, Bendix Avelex Inc is a major domestic and international supplier of aviation, defense and aerospace products. Founded in 1931 in Montreal, Quebec, Canada as Aviation Electric Ltd, the company name was changed to Bendix Avelex Inc in January 1985. With a dedicated and experienced work force, Bendix Avelex provides the defense and aerospace industry a wide range of products and services. Products include Vehicle Navigation Systems, Artillery Gun Alignment and Control Systems and Aircraft Engine Control Systems and accessories. Services include Repair and Overhaul and comprehensive after sales service and Product Support.

Capability: Bendix Avelex has developed broad expertise in a wide range of engineering disciplines which include electronics, software generation, electro-optics, including lasers, geomagnetics, pneumatics, fluid dynamics and hydro-mechanics

These engineering skills are applied to the design of a variety of highly reliable products meeting stringent specifications in the fields of general aviation and tactical ground military systems for national and international customers.

The Manufacturing Electronics facility has been equipped with the latest in continuous flow soldering and conformal coating equipment and an environmental test capability which includes sinusoidal and quasi-random vibration systems, burn-in chambers and automatic test equipment for PCB diagnostics and repair. The Machine Shop includes precision machine tools reflecting the latest advances in metal removal technology, capable of consistently achieving tolerances of 50 millionths of an inch. High performance machines include 3 and 4 axis CNC and DNC machining centers, CNC lathes, programmable precision grinders and many other sophisticated machine tools.

The Bendix Avelex total quality concept ensures that reliability and dependability are designed in the product. This philosophy is an essential requirement when meeting the stringent demands of the Aerospace and Defense market place. This quality control system meets Canadian, US and NATO Defense standards and is approved by the Canadian airworthiness authorities.

The Repair and Overhaul Department of Bendix Avelex services both its own diverse products and a wide variety of equipment originally manufactured by over 250 companies around the world, for over 300 customers in 50 countries.

Aircraft accessories, radar aids, gyros, engine and flight instruments, hydraulic components, turbine engine fuel controls, electric generating equipment, wheels and brakes, airborne computers, gas turbine auxiliary power units and many more components that contribute to the efficiency, safety and smooth operation of world-wide air and sea transportation, leave the Bendix Avelex Repair and Overhaul facilities in an "as new" condition, ready for another full period of service.

A team of highly skilled field service representatives and logistics support specialists are ready to deal with any customer request. Support includes investigation and analyses of field problems and devising modification and repair schemes suitable for field implementation to improve the overall product quality and reliability.

Average Work Force: Engineering - 71
Production - 480
Marketing - 41
Others - 122

Gross Sales: 1984 - \$69M
1985 - \$74M (Est'd)

Plant Size: 220,000 sq ft

Experience: Bendix Avelex Inc's present customers include: Department of National Defense - repair and overhaul of aircraft instruments, accessories, navigation aids and airborne radar; Pratt and Whitney Canada - engine fuel control systems; Air Canada - wheel and brake parts and instruments; deHavilland - avionics equipment, flight and engine instruments and accessories; Canadair - electrical connectors, drone alignment systems and aircraft accessories; and General Electric (USA) - engine fuel control systems.

Keywords: Avionics; Electronics; Machining; Radar; R&O (Components); R&O (Avionics); Engine Fuel Control Systems; Compass Systems; Navigation Systems; Artillery Alignment and Control Systems; Precision Machining; Design; Design to Requirements; Wheel Parts; Brake Parts; Instruments; Avionics Equipment; Drone Alignment Systems; Accessories.

Revised: Aug 85.

BATA ENGINEERING **(Division of Bata Industries Ltd)**

Code: BET

Address: Parry Drive
Batawa, Ontario, Canada K0K 1E0

Contact: Mr. J M Mainville, Sales Manager, Precision Products
- (613) 398-6106

History: Bata Engineering is a Canadian-owned, high-technology machining facility established in 1939 in Batawa, Ontario. This division of the world-wide Bata organization was originally formed to develop, design and manufacture shoe making machinery for its world-wide footwear divisions. In the ensuing years, Bata Engineering was expanded into other markets. These other markets were established due to Bata's heavy concentration of numerical control equipment and manufacturing technology to include Aircraft/Aerospace, Military/Defense, Nuclear/Candu Industries, Commercial/Offroad Equipment, and Transportation/Light Rapid Transit Systems.

Capability: Bata Engineering is primarily involved in the manufacture of precision products using the latest state-of-the-art in manufacturing technology.

- **Aircraft** - They continue to supply Flap Fittings and Splice Fittings for the MD-80 Aircraft. In addition, they manufacture a large variety of sophisticated components for the helicopter haul down system (RAST).

- **Military** - Over and above major sub-assemblies, their military production for US ground support vehicles include a complete range of military hydraulic cylinders, power assist assemblies, gear boxes and individual components.

- **Nuclear** - Working in co-operation with AECL, major equipment is machined, assembled and tested at their Batawa facility for the Canadian Candu Reactors.

- **Commercial** - Their commercial production meets the rigid demands required in the construction, forestry and mining industries and off-road equipment. This production includes Ride Struts, Steer and Hoist Cylinders ranging in size from 2 to 14" ID with lengths from 12" to 20 ft. Other commercial products include machining of V-4, V-6 and V-8 engine blocks and fly wheel covers.

- **Transportation** - This area of production is dedicated to the manufacture, assembly, test and supply of Trucks (undercarriage) to railway specifications for the Light Rapid Transit System serving Toronto and Vancouver.

Average Work Force: Engineering - 6
Marketing - 8
Accounting - 8
Production (Direct & Indirect) - 249
QA/QC - 23

Gross Sales: 1984 - \$31.8M
1985 - \$35.6M (Est'd)

Plant Size: 150,000 sq ft (Manufacturing)
47,000 sq ft (Raw Material Storage)
5,000 sq ft (Inspection)
24,000 sq ft (Administration)

Experience: Bata Engineering does business with an extensive list of contractors associated with the Defense and Aerospace community.

Keywords: Machining; Precision Machining; CAD/CAM; NC/CNC Equipment.

Revised: Aug 85

BOEING OF CANADA Ltd Arnprior Division

Code: BOA

Address: Arnprior Airport
Arnprior, Ontario, Canada K7S 3M1

Contact: Mr. Ken Laver, Vice President & General Manager - (613) 623-4267

History: Piasecki Helicopter Corporation of Canada Ltd was formed in 1953 as a repair and overhaul base for R.C.A.F. H-21 helicopters. In 1956, Piasecki was changed to Vertol Aircraft Company (Canada) Ltd, and in 1959, it was renamed Canadian Vertol Aircraft Ltd. In 1960, Boeing purchased Vertol and the name was changed to Boeing of Canada Ltd. Boeing of Canada Ltd, Arnprior Division, is a subsidiary of The Boeing Company located in Seattle, Washington.

Capability: The following is a breakdown of some of the programs Boeing of Canada Ltd, Arnprior Division, is currently involved in:

- **Boeing Commercial Airplane Program:** Manufacture of machine shop and sheet metal shop detail parts in support of 727/737/747/757/767 Boeing Commercial Airplane programs. Includes manufacture and assembly of all 757/767 electronic trays and shelves and is the key supplier of major components for the Engine Strut.
- **Lag Damper Program:** The Arnprior Division is the principal manufacturer under license of the 107 type helicopter lag damper. The lag damper is a sophisticated hydraulic component which forms part of the helicopter rotor hub assembly. This product is distributed world-wide.
- **Pedal Box Program:** This program consists of the manufacture, assembly and modification of Chinook 47D Model pilot and copilot flight control pedal box.
- **Search and Rescue Helicopter Program:** The Arnprior Division carried out a major modification program to update fourteen CH113/113A Search and Rescue helicopters for the Canadian Forces. The program included changes to utility hydraulic system, integrated rescue hoist system, auxiliary power unit, fuel capacity, cockpit instrumentation and flight display, radar communication/navigation systems and electrical systems.
- **Depot Level Inspection and Repair Program:** This program includes airframe repair and overhaul for CH113/113A/147 helicopters.
- **Component Repair and Overhaul Program:** A repair and overhaul program for dynamic and non-dynamic components for the CH113/113A/147 helicopters.
- **Technical Publications:** Provides revisions and updates for Technical Publications in support of CH113/113A/147 helicopters.
- **General Helicopter Support Programs:** Boeing of Canada Ltd, Arnprior Division, is extensively involved in Technical Investigations and Engineering Services, Manufacture of Airframe Parts, Tooling and Ground Support Equipment, Painting of Aircraft and Detail Parts, Flight Test Equipment and Logistics Support.

Average Work Force: Production Workers - 260
Engineering & Technical Support - 32
Administration & Management - 90

Gross Sales: 1984 - \$22M
1985 - \$28M

Plant Size: 25,000 sq ft (Aircraft Overhaul Facility)
60,000 sq ft (Manufacturing Facility)
130,000 sq ft (Total Facility)

Equipment: Complete range of Sheetmetal and Machine Shop capabilities including support facilities for Process, Heat Treat, NDT and Paint. Intergraph CAD/CAM System to be installed in 1986.

Experience: Present customers include Canadian Forces, Boeing Commercial Airplane Company, Boeing Vertol Company, US Navy, US Marine Corp, and Swedish Navy.

Keywords: R&O (Aircraft); Machining; Precision Machining; Sheet Metal Detailed Parts; R&O (Components); Heat Treating; Electrical/Electronic Modification; Engineering Services; Technical Investigations; Publication Service; Flight Test Equipment; Tooling; Ground Support Equipment; Painting (Aircraft); Logistic Support.

Revised: Oct 85

BOEING OF CANADA Ltd Winnipeg Division

Code: BOE

Address: 99 Murray Park Road
Winnipeg, Manitoba, Canada R3J 3M6

Contact: Mr. L L Bryson, Vice President - (204) 888-2300

History: The Boeing Winnipeg plant was established in 1971 and is a wholly owned subsidiary of The Boeing Company of Seattle. There is one other Canadian division located in Arnprior, Ontario.

Capability: Boeing is a Canadian leader in high strength/weight ratio fiber composite plastic components for aircraft, space, and other advanced technology applications. The company has the engineering, manufacturing and development expertise to design and build solid laminate or sandwich panel components. Glass, high-modulus graphite and organic fibers, and thermosetting resin systems, including epoxies, polyesters, phenolics or polyimides, are used with state-of-the-art capability. Structural and nonstructural glass fiber, and advanced fiber composite components are currently produced for a diversified range of products covering a technological spectrum from aircraft and satellite components.

A stated objective of the company's management team is to establish Boeing of Canada as a center of excellence for composites manufactured within the Boeing Company, and as the Canadian leader in the composite industry. To achieve this objective, an expanded research and development program and increased engineering tool design and fabrication capabilities have been initiated.

The Winnipeg Division's Quality Assurance Program operates to one standard of quality which is in conformance with the requirements of the Ministry of Transport Engineering and Inspection Manual (FAR Part 21, Subpart G), NATO Quality Control Systems Requirements for Industry AQAP-1 (equivalent to MIL-Q-9858A), and with the Boeing Company Corporate Document DI-8000A. Quality is maintained throughout the manufacturing process by inspectors appointed by the Manager of Quality Assurance who in turn is approved by the Ministry of Transport. Complete laboratory tests are carried out on process test panels as required by customers and/or pertinent authorities. All raw materials are purchased from qualified suppliers and incoming shipments are subject to Quality Control receiving inspection to ensure that all requirements are met.

Average Work Force: Engineering Design - 20
Quality Assurance - 45
Production - 325
Admin - 240

Gross Sales: 1984 - \$27M
1985 - \$50M

Plant Size: 228,000 sq ft (Manufacturing Space)

Equipment: Boeing's major equipment includes:

- An autoclave 15 ft in dia, 35 ft long, capable of 95 psi pressure and 625 F ambient temperature.
- An autoclave 10 ft in dia, 30 ft long, capable of 95 psi and 625 F ambient temperature.
- An autoclave 4 ft in dia, 10 ft long, capable of 95 psi pressure and 625 F ambient temperature.
- Air-heated oven with two compartments 8 ft wide, 13 ft long and 8 ft high, with a maximum ambient temperature of 800 F.
- An air-heated oven with compartments 7 ft wide, 9 ft long, 7 ft high, with maximum ambient temperature of 800 F.
- 44 inch vertical core cutting bandsaw.
- Traverse saw capable of cutting up to 16 ft wide material with variable cutting speed.
- Core milling machine capable of handling core sheets 10 ft long, 6 ft wide and up to 6 inches thick, and capable of milling from 0 to 15 degrees a tenth of a degree.
- Special taper core milling machine capable of handling sheets 6 ft long, 1.5 ft wide and 2 inches thick, and capable of milling from 0 to 15 degrees.
- Hydraulic core forming press with 4 ft x 4 ft platen.
- One 8 ft x 22 ft and one 8 ft x 15 ft waterfall spray painting booth.
- An 8 ft x 20 ft flame spray booth and apparatus capable of hard and soft ferrous and non-ferrous metal spraying.
- Assorted saws, routers' drills, punches, shears, finishing equipment, etc. equipped with tungsten carbide and diamond cutters.
- Automated through transmission, water jet scanning ultrasonic system with C-scan data acquisition.
- Assorted ultrasonic bond, thickness and flaw detection equipment.
- A McLean Anderson, Explorer Model D, Filament Winding Machine, capable of producing a part approximately 150 inches long and nine (9) inches in diameter
- Entech Filament Winding Machine.

Experience: Boeing-Winnipeg assumed production responsibility for the majority of all Boeing commercial aircraft. Significant contracts for graphite composites for Satcom and Anik D satellite programs were secured. A technology transfer program, including establishment of a tool design group and upgrading of tooling and part fabrication capability, was initiated in preparation for increased graphite and hybrid work on the new Boeing 757/767 aircraft programs.

Some of Boeing-Winnipeg customers include

- *Canadair (Challenger)* - fairing flap hinge, assembly wing tips, leading edge flap, access panels, smoke sensor, side

console, cover assembly, inboard fairing, latch housing, aft wing-to-body fairing, and horizontal stabilizer tips.

- *deHavilland* - panels, fairings, DHC 7 kevlar trough, and nose avionics bay, DHC-8 Nose Equipment bay.
- *Hughes* - satellite components.
- *SPAR Aerospace* - graphite epoxy plates, and waveguides & satellite components.
- *Boeing Vertol* - rain gutters, and CH47 inlet screens.
- *Boeing* - 707, 727, 737, 747, 757, and 767.
- *Geonics* - magnetometer booms.
- *Geophysics* - magnetometer booms.
- *Aerodat* - magnetometer booms.
- *Avco* - Graphite-epoxy missile components.

Keywords: Space Systems; Airframe Components; Airframe Structures; Composite Components; Fiberglass Components; Laminates; Graphite Epoxy Components; Sandwich Components.

Revised: Aug 85

BRISTOL AEROSPACE Ltd

Code: BAL

Address: 660 Berry St
P.O. Box 874
Winnipeg, Manitoba, Canada R3C 2S4

Rockwood Propellant Plant
Stony Mountain, Manitoba, Canada
(20 miles from main plant)

Contact: Mr. Keith Burrows, Marketing VP - (204) 775-8331

History: Bristol was founded in 1930 and incorporated in Canada in early 1947. It is a wholly owned subsidiary of Rolls Royce Holdings Canada Ltd. Bristol owns and operates the Rockwood Propellant Plant at Stony Mountain, Manitoba.

Capability: Since inception in 1930, Bristol has moved from manufacturing and repairing seaplane floats (1930-1943) to a company with many distinct products and areas:

- Bristol manufactures "Hot End" gas turbine components under contract to GE, Pratt & Whitney and Rolls Royce, and remanufactures afterburner assemblies.
- Bristol manufactures light alloy aircraft structures for three major aircraft (DHC-7, DHC-8 & the P3/CP140). They also manufacture small structures including their new Wire Strike Protection System for helicopters.
- They offer repair and overhaul of military and commercial fixed wing and rotary wing aircraft.
- CANDU nuclear in-core reactor components are produced at Bristol
- Engineered products manufactured by Bristol include - rocket engines and propellants, electronic data instrumentation for payloads and satellites, electronic data instrumentation for remote site applications. They also provide services in mechanical, electrical, aeronautical and propulsion design and development engineering. Other services include precision weldments of high temperature stainless steel alloys, titanium and corrosion resistant materials, and a helicopter component test cell for transmissions and gear boxes

• Bristol also manufactures:

Black Brant – sounding rocket

CRV7 – air to surface rocket

DCP – electronic data collection for remote site application

READAC – automatic weather station designed for untended use in airport application

Average Work Force: Salaried – 451
Hourly – 759
Technical – 135

Gross Sales: 1984 – \$ 86.0M
1985 – \$104.4M (Est'd)

Plant Size: Production – 561,000 sq ft
Warehouse – 95,000 sq ft
Office – 121,000 sq ft
Acreage – 3,000 Acres

Equipment: Complete facilities and equipment for metal forming, welding, machining and metal treating. They have a complete range of Computer Numerical Control (CNC) Machining Equipment such as Sandstrand S80/S60/OM2A, 5 axis machining center, Mozak V20/V5, 3 axis machine center (4) Giddings Lewis 48" swing CNC Vertical Turning Lathes (VTL), (3) Mori Seiki CNC Horizontal Turret Lathes and a Mozak CNC Horizontal Mill Center with Robot loading. They also have (2) Raycon CNC EDM machines, (2) Electron Beam Welders (EBW) – one of which is a Sciaky CNC machine with 54" x 50" x 54" chamber.

Also included is a McAuto CAD/CAM system with (3) VAX 11/750 computers, (14) design terminals, and Calcomp Platten – a masterlink DNC system to the CNC machines.

Special facilities include a Helicopter Test Cell, Non-Destructive Test Laboratory, Electronic Test Laboratory and a CNC (4) axis Co-ordinate Measuring Machines (CMM).

Experience: In 1984, approximately 60% of Bristol's sales were exported with over 50% of these sales to the US military.

Canadian business includes – DND, National Research Council, Pratt & Whitney of Canada Ltd, Atomic Energy of Canada, Boeing Canada Ltd, Canadair Ltd, the deHavilland Aircraft of Canada Ltd, and others. International clients include – Dornier GmbH – Germany, Royal Netherlands Air Force, the Swedish Space Corporation, and the Romanian Government.

Bristol has been approved by the Canadian Ministry of Transport for Canadian Aircraft maintenance, and the Canadian Forces for manufacturing testing and overhaul. The quality requirements of MOT and FAA and the Canadian DND 1015 or MIL-Q-9858A are met for manufacturing, repair and overhaul.

Keywords: Electronics; Machining; Airframe Components; Airframe Structures; Engine Components; Engine Systems; Helicopters/Subsystems; Hydraulics; R&O (Aircraft); R&O (Engines); Nuclear Reactor Components; Meteorological Stations/Equipment; Remote Inspection Systems; Metalworking; Heat Treating; Coating; Stamping; Spin Forming; Titanium; Tooling; Die Fabrication; Rockets, Rocket Propellant; Rocket Engines; Helicopter Wire Strike; Non-Destructive Testing; Instrumentation; Transmissions; Gear Boxes; Data Collection; Laboratory; Gas Turbine Components

Revised: Aug 85

CAD/CAM GRAPHICS Ltd

Code: CGL

Address: 700 Industrial Avenue
Ottawa, Ontario, Canada K1G 0Y9

Contact: Mr. A H Jarvis, General Manager – (613) 526-0620

History: CAD/CAM Graphics Ltd is a small Canadian owned high technology company incorporated in Jan 1984. There is a branch in Toronto and the company is incorporated in the US as CAD/CAM Graphic Systems Inc.

Capability: CAD/CAM Graphics is an engineering design group specializing in computer aided graphics design and artwork generation for printed circuit boards and/or hybrid microcircuits. They also offer consulting services to assist clients in the development of design standards/criteria to suit their special needs. Their product services include: (1) Design from schematic to color-coded layout, (2) Digitizing of color-coded layouts for single, double or multilayered boards (prepared by either the customer or CAD/CAM), (3) Photoplotting of the following artwork masters – component and solder side, drill graphics, solder resist mask, silk screen and assembly, (4) Numerical control drill tapes to suit either Excellon or Digital Systems format, (5) Documentation packages and, (6) Prototype and production quantities of printed circuit boards.

Average Work Force: Total – 20

Gross Sales: 1984 – \$280K
1985 – \$1.1M

Equipment: The equipment presently in use at CAD/CAM is a CALMA GDS I Interactive Graphics System that consists of: (1) Data General Eclipse CPU, (2) Four 48x60 inch digitizing tables with dual 19x11 inch CRTs, (3) Color design/edit station with tablet and CRT, (4) CALCOMP 970 pen plotter (on-line), (5) GERBER 4432 Photoplotter (off-line), (6) Kodak film processing laboratory, and (7) Racal/Redac Color Maxi Auto Tracking equipment.

Plant Size: 5,000 sq ft

Experience: CAD/CAM has contract experience with various departments of the Canadian Government, including the Departments of National Defense and Transportation. Canadian industrial experience includes such companies as Northern Telecom, Bell Northern Research, Litton Systems, and AES Data Ltd. US industrial experience includes ITT Aerospace and IBM.

Keywords: Electronics; Software Services; Circuit Layout; PC Board Design; Thick Film Hybrid Parts; Thick Film Hybrid Design; Thin Film Hybrid Parts; Thin Film Hybrid Design.

Revised: Aug 85

CAE INDUSTRIES Ltd

Code: CAE

Address: Corporate Offices
Suite #3060
P. O. Box 30
Royal Bank Plaza
Toronto, Ontario, Canada M5J 2J1

CAE ELECTRONICS Ltd
8585 Cote de Liesse
P. O. Box 1800
Saint Laurent, Quebec, Canada H4L 4X4

Contact: Dr Murdoch McKinnon, Director, R&D – (514) 341-6780

History: The company was incorporated in 1947 as Canadian Aviation Electronics Ltd to engage principally in the repair and overhaul of electronics and electro-mechanical equipment and devices. The name was changed to CAE Industries Ltd in 1963 to more accurately reflect its expanding interests in many diverse fields of industry. Diversification and acquisition began in 1961 with the formation of CAE Electronics GmbH in West Germany. Other subsidiaries include CAE Electronics Ltd, Northwest Industries Ltd, CAE Fiberglass Products Division, CAE Aircraft Ltd, Canadian Bronze Company Ltd, Welmet Industries Ltd, CAE

Machinery Ltd, CAE Webster Ltd, CAE Accurcast Ltd, CAE-Montupet Diecast Ltd, CAE Lubricators Division, Cleveland-CAE Metal Abrasive Ltd, USP Industries Inc, and CAE Magnesium Products Division. All are Canadian-based except the one subsidiary located in West Germany. This profile will concentrate on CAE Electronics Ltd.

Capability: CAE Electronics Ltd designs and manufactures sophisticated commercial and military aircraft flight simulators and airborne magnetic anomaly detection equipment. They have also become a major producer of computer-based data acquisition and control systems in the areas of electrical power generation and transmission, marine propulsion, air traffic control, and space.

In the simulator area, they are a leading designer and producer of flight simulators. They have produced the first FAA approved phase III commercial aircraft simulator for United Airlines. Their simulators include state-of-the-art technology such as hydrostatic six-degree-of-freedom motion, general purpose computers, and CRT-based instructor's facilities. They reproduce aircraft performance in all flight regimes and, in particular, the critical landing phase. Digital flight simulators have been developed for the A-300, B727, B737, B747, DC-8, DC-9, MD-80, DC-10, L1011, F-28, F-50, F-100, CL-600, and the new generation A-310, B757 and B767. A wide range of simulators has also been supplied to different countries for various types of military aircraft, including tactical jet fighters, jet trainers, antisubmarine patrol aircraft, transports and helicopters.

They selectively pursue the US military flight simulator market. CAE also designs and produces simulators for helicopters such as the Agusta AB-205 and AB-212, Bell UH-1D, Boeing-Vertol CH-47, Sikorsky CH-53, and Westland Sea King MK41. In addition to flight simulators, CAE Electronics produces training simulators for nuclear power plants. They are used to train operators to develop experience in responding to all normal, abnormal and emergency conditions as well as to learn required operating procedures and techniques. In the avionics area, CAE Electronics develops and manufactures magnetic anomaly detection (MAD) systems used in antisubmarine warfare. Their cesium magnetometer system, which has been traditionally mounted in a stinger at the rear of the aircraft, can measure changes in the earth's magnetic field as small as one part in 5 million. The company now offers an integrated MAD system for inboard use on fixed wing aircraft and helicopters.

They have developed a "JETS" joint enroute/terminal data processing and display system for air traffic control. The system is modular and the displayed information is tailorable to user requirements. They are active in the space area as they are part of a Canadian consortium, responsible for developing and manufacturing the complete Manipulator Arm system for the NASA Space Shuttle. They have designed and are manufacturing the display and control panel, plus the rotational and translation hand controls that operate the manipulator itself. They have also designed and developed the simulation subsystem which is used as a design tool to test hardware and software modules of the system.

Average Work Force: Total (CAE Electronics) - 2,000
Technical Staff - 900

Gross Sales: 1984 - \$153M
1985 - \$170M

Plant Size: 420,000 sq ft

Experience: CAE Electronics customers include United Airlines, Air Canada, British Airways, KLM, Lufthansa, Swissair, TWA, FAA, Douglas Aircraft Co, Lockheed California, the Canadian Forces, NASA, US Navy, and other departments of the Canadian Government. Current R&D activities include working with the USAF (AFHRL) on a joint program - Design Project for the development of a Wide Field of View, Helmet-Mounted, Infinity Display System, incorporating Area of Interest high resolution imagery slaved to the pilots eye movements, a recently completed study of the LAMARS Air-to-Surface visual system for the USAF, a study for the CAF for a Turret Interactive Crew Simulator, development

of computer-based training (CBT) and computer-aided learning technique (CAL), and a recently completed NASA study and development of a six-degree-of-freedom hand controller. A modification of this device is being tested as a helicopter side arm control.

Keywords: Aircraft, Avionics, Computers, Electronics, Energy Radar, Security & Safety, Software Services, Space Systems, Flight Simulators, Magnetic Anomaly Detection, Data Acquisition Systems, Data Control Systems, Training Simulators, Air Traffic Control Systems, Control Systems, R&O (Avionics), Video Display Systems, Simulation Programs, Air Traffic Control Simulators, Computer Graphics, Graphics, Hydraulics, Nuclear Simulation, Simulators, Software Development, PC Board Design & Fabrication, Radar Simulation, Real Time Graphics, Real Time, Sonar Training Systems, Tactical Training Systems, Tactical Team Trainers, Real Time Control Systems, Real Time Monitor Systems, Simulation, Training, Sonar Training Systems, Tactical Training Systems, Tactical Team Trainers, Team

Revised: Aug 85

CAMETOID Ltd

Code: COD

Address: 1449 Hopkins Street
Whitby, Ontario, Canada L1N 2C2

Contact: Mr. D G Newman, President & General Manager -
(416) 666-3400

History: Cametoid was incorporated in 1950 and was originally owned by Dowty Equipment of Canada Ltd. In 1968, it was acquired by the Newman family of Whitby, Ontario, and is today a wholly-owned subsidiary of Newman Aerospace Inc., a Canadian company.

Capability: Cametoid has three divisions.

- *The Chemical Coatings Division* - established in 1950, produces specification anodizing (chromic, sulfuric and hard), electroplating (cadmium, copper, nickel, nickel-cadmium, silver, tin and zinc), electroless nickel, chemical films on aluminum and magnesium, phosphates on steel, passivation of stainless steel, dry film lubricants of moly disulfide, and Dupont teflon[®] sprayed coatings.

- *The "Vacuum Coatings Division"* - established in 1981, is one of the few facilities in the world capable of ion vapor deposition of aluminum (Ivadizing[™]) on large parts (narrow parts up to 14 ft long, and flat parts 5 ft x 10 ft), as well as on small parts like aircraft fasteners and round and square connectors.

- *The "Optical Technologies Division"* - established in 1984, this division specializes in the design, production and testing of optical coatings intended primarily for infrared applications. Development is also proceeding on the establishment of facilities for the manufacture of optical components and the production of optical materials.

Average Work Force: 40 to 50 persons with 12 to 15 professionals

Gross Sales: \$2.0 - \$5.0M (Annually)

Plant Size: 30,000 sq ft

Equipment: Cametoid provides complete chemical, electrochemical and vacuum coating facilities, baking ovens, exhaust systems and an in-house water treatment plant. Optical coaters include four-pocket e-beam gun and laser-monitored deposition controller. Two laboratories, one for process control and one for research and development, are also available with suitable test equipment. Strategic production and test facilities are computer-controlled.

Experience: Cametoid has more than 25 years of active subcontract experience in dealing with the aerospace, electronic, nuclear and general defense industries in Canada and the US. It is recognized as a "Special Process" facility by both the Department of National Defense and the Department of Transport Canada. It maintains approvals with its principal customers including Air Canada, Andrew Antennae, Bata Engineering, Bell Aerospace, Bell Helicopter, Boeing, CAE Electronics, Canadair, Canadian General Electric, Cleveland Pneumatic, Computing Devices, de Havilland, Devtek, Dowty, Fleet, Garrett, Grumman, Hawker Siddeley, Indal, ITT Cannon, Kaman Aerospace, Leigh Instruments, Litton, Magna, Martin Marietta, McDonnell Douglas, Menasco, MBB, Pratt and Whitney, Sikorsky, Spar and Sperry.

In addition, the company serves a number of precision machine shops related to the aerospace industry in the Toronto, Ottawa and Montreal regions.

Keywords: Anodizing; Chemical Films; Conductivity Testing; Dry Film Lubricants; Electroplating; Hardness Testing; Hydrogen Embrittlement; Ion Plating; Ion Vapor Deposition; Ivadizing™; Materials Processing; Metal Coatings; Metal Finishing; Multi-layer Coatings; Optical Coatings; Protective Coatings; R&O (Coatings); Salt Spray (Fog) Testing; Stress Relieving; Surface Finishing; Taber Abrasion Testing; Teflon® Coatings; Thickness Testing; Vacuum Coatings; Coatings (Metal); Coatings (Optical).

Revised: Oct 85

CAMPAGNA BROTHERS MACHINE SHOP Ltd

Code: CBM

Address: 2783 Fenton Road
Gloucester, Ontario, Canada K1G 3N3

Contact: Mr. Orlando Campagna, Marketing Director -
(613) 822-1921

History: Campagna Brothers Machine Shop was established in 1966 as a wholly-owned family operation. Campagna presently employs two shifts of production related people on numerically controlled equipment.

Capability: Dedication and commitment has established a steady growth pattern and a wealth of experience which has encouraged an expansion to include supplying the aerospace, defense and communication industries with close tolerance, high precision components and sub-assemblies.

Average Work Force: Manufacturing Engineers - 1
QC Inspectors - 2
Computer Programmers - 2
Others - 30

Gross Sales: 1984 - \$1.8M
1985 - \$2.3M (Est'd)

Plant Size: 15,000 sq ft

Equipment: Complete list of CNC machinery, computerized equipment for inspection, and various machinery involved in the production of high precision components. CNC Machine Center - 4th axis contouring attachment, 4th axis indexing attachment. CNC lathes, CNC Lathe with milling/contouring capabilities Milling machines - 3 digital readout. Lathes; Chucking machine; Cylindrical grinder. Honing machine; Surface grinder. Co-ordinating measure machine/computer - Quality Control, and Profile projector - Quality Control. Various precision drilling and cutting machines and accessories used in high precision production. Future plans include acquiring sophisticated machinery with advanced capabilities, such as 5 axis contouring

Experience: Customers include - Government of Canada (various departments), Atomic Energy of Canada, Boeing of

Canada Ltd, Bata Engineering; Bell Northern Research, Canada Bank Note, Canadian Marconi Co, Canadian Astronautics Ltd, C-Tech Inc (USA), Canadian General Electric; Digital Equipment of Canada, Electrospace Systems Inc (USA), Lumonics Inc, Northern Telecom (Canada & USA), Leigh Instruments Ltd, Pratt & Whitney, Raytheon Co (USA), SED Systems Inc, Spar Aerospace Ltd, and Schweizer Aircraft (USA).

Keywords: Turbine Engine Components; Components (Aerospace); Computer Aided Manufacturing; Precision Assembly; Product Development; Structural Fittings (Helicopters); Electronics (Precision Parts); Machining; Precision Machining; Nuclear Industry (Machining).

Revised: Sep 85

CANADAIR Ltd

Code: CDR

Address: 1800 Laurentien Blvd
St Laurent, Quebec, Canada H4R 1K2

Mailing Address
P. O. Box 6087, Station A
Montreal, Quebec, Canada H3C 3G9

Contact: Mr. Gilbert S Bennett, President & CEO - (514) 744-1511

History: Canadair was originally incorporated in late 1944 and is owned by the Canadian Government. The company has a Government Liaison Office in Ottawa and a fully-owned subsidiary, Canadair Challenger Inc, has a sales office in Westport, CT. A Challenger Service Center is located in Hartford, CT.

Capability: Canadair has a high technology R&D capability specializing in aerodynamics, flutter analysis, composite materials, remotely piloted vehicles, fracture analysis, and computational design techniques. Their product line includes:

- Challenger business jet aircraft
- CL-215 multi-purpose amphibious aircraft
- CL-89, CL-227 and CL-289 unmanned airborne surveillance system

They have active subcontract work on the Boeing 767, Lockheed C-5B, CP-140 and P-3C, McDonnell Douglas F/A-18A, F-15, and Northrop F-5, CF-5, and T-38. They specialize in machining to close tolerances (0.001 inch) with a high degree of repeatability. They have an integrated heat treating and stretch-forming system capable of treating and forming aluminum alloy sheets 40 ft x 8 ft x 0.375 in.

Their CL-89 (AN/USD-501) Airborne Surveillance System (unmanned) was designed for use at the Army Division level. It is fitted with either a photographic or infrared line scanning sensor and is reusable. It is launched from a mobile zero-length launcher and recovered with a two-stage parachute system employing inflatable air bags to absorb landing shocks. This drone is stocked in the arsenals of the UK, West Germany, France, and Italy.

The CL-289 (AN/USD-502) is a longer range updated version being developed jointly with Dornier GmbH of West Germany. This new vehicle will carry both a photographic sensor and an infrared line scan (IRLS) sensor and will cover a 150 kilometer range at speeds in excess of 700 kph. A real-time data transmission link is associated with the IRLS System. Onboard computers carry the flight instructions for both the CL-89 and CL-289.

The third model, CL-227, is an hourglass shaped, remotely piloted vehicle, and is now in the full scale engineering development stage. It is designed as a highly survivable surveillance and target acquisition system for use at medium range. It has VTOL capability and is launched and recovered from a mobile two-meter diameter platform. It can transmit real-time data.

Average Work Force: Engineers - 316
PhDs - 9
Machinists - 363
Others - 3697

Gross Sales: 1983 - \$387.1M
1984 - \$376.4M

Plant Size: - 2,700,000 sq ft (under cover)

Equipment: Their special equipment includes:

- Two Cincinnati profilers; numerically-controlled; 5-axis: Each bed 212 ft long, 13 ft 4 in wide. Each bed has 3 gantries with 3 spindles each.
- One Ingersoll profiler; numerically-controlled; 3 axis: Bed 96 ft long, 17 ft 5 in wide. Single gantry with 3 spindles.
- Nine Wilson profilers; tracer-controlled; 3 axis: Some 6 spindle, some 4 spindle.
- Several Kearney and Trecker 3 and 5 axis profilers; numerically controlled.
- Two Autoclaves; one 15 ft dia, one 12 ft dia, for metal-to-metal, honeycomb and composite bonding.
- Heat-treat, stretch forming system. Electrically-heated furnace takes sheets 40 ft by 8 ft. 1000-ton stretch press takes sheets 50 ft by 8 ft and 1/2 in thick.

Experience: The Canadair experience over the past two years include subcontracts for vertical stabilizers for the EF-111A, components for the Lockheed P-3C and CP-140, rear fuselage sections for Boeing 747SP and 767, components for the McDonnell Douglas F-15 and F/A-18A, and shipsets of components for the Lockheed C-5A and C-5B. Current products include Challenger business jet, CL-215 multipurpose amphibian, three surveillance systems and subcontracts.

Keywords: Aircraft; Machining; Software Services; Testing/Test Equipment; Airframe; Components; Composites; Extended Length; Forging; Heat Treating; Metal Working; Casting; RPV; Drones; Computational Design; Aerodynamics; Fracture Analysis; Flutter Analysis; Coating.

Revised: Sep 85

CANADIAN AIRCRAFT PRODUCTS Ltd

Code: CAP

Address: 2611 Viscount Way
Richmond, British Columbia, Canada V6V 1M9

Contact: Mr. D C Cameron, President - (604) 278-9821

History: Canadian Aircraft Products Ltd was founded in 1955 to design and produce aircraft float. The company is Canadian owned and has no other Canadian locations or US subsidiaries.

Capability: The company designs, engineers and fabricates aircraft components and other allied and support items for the aerospace industry in both aluminum and composites. They maintain a design and engineering office capable of producing products to stated performance specifications and military specifications. They specialize in the design and manufacture of aircraft structures, tools and jigs, support equipment-ground, ancillary equipment-air, cargo handling equipment, aircraft modifications, and aircraft systems.

Modifications to aircraft include the design and installation of additional fuel systems, seats, engine replacement, and structure changes. They have also conducted analyses relative to aircraft/airport compatibility.

Average Work Force: Total - 160

Gross Sales: 1984 - \$7M
1985 - \$9M

Plant Size: 75,000 sq ft

Equipment: Forming capability (3,000 ton rubber bed press), heat treating capability (3x4x18 ft gas-fired oven with water quench) and supporting services. NC milling machines, a composite facility that includes an oven (8x8x10 ft) and an autoclave (5x15 ft).

Experience: Canadian Aircraft Products Ltd has a long background of capability and expertise in repair, overhaul, manufacture and fabrication, as well as design and test of aircraft structures and components. They have designed, manufactured and repaired structures and components of a similar nature such as large aluminum boats, air cushion vehicles, etc. They have produced sheet metal fabricated parts for civil and military application. One such contract was for ammunition boxes for Kaiser Aluminum. They produce wing floats for the Canadair CL-215 water bomber and the floats for the DeHavilland Twin Otter aircraft. The company has built and structurally tested the complete airframe of the Trident Aircraft Ltd Trigull aircraft. Other contracts include the horizontal stabilizer and auxiliary fuel tanks for the Canadair CL-600 aircraft, control surfaces and airstair door for the DeHavilland Dash 7 STOL airliner, the horn assembly for the McDonnell Douglas DC-9, Sabreliner detail parts for N. A. Rockwell, and the design, engineering and production of the horizontal stabilizer, elevators and rudders for the DeHavilland Dash 8 commuter aircraft.

Keywords: Machining; Software Services; Airframe Components; Airframe Structures; Cargo Handling Equipment; Systems; Helicopter Subsystems; R&O (Aircraft Components); Aluminum Components; Composite Components; Modification; Tooling; Jig Fabrication; Rudder Assemblies; Structural Analysis; Structural Design; Flaps.

Revised: Aug 85

CANADIAN ASTRONAUTICS Ltd

Code: CAL

Address: 1050 Morrison Dr
Ottawa, Ontario, Canada K2H 8K7

Contact: Dr Michael A Stott, VP, Business Development - (613) 820-8280

History: Canadian Astronautics is a rapidly growing, wholly owned Canadian company incorporated in 1974. There are no Canadian divisions and no US subsidiaries.

CAL is primarily a systems level contractor with interests in four principal business areas - Space Hardware, Radar and Communications, Computer Systems, and Military Electronics. In addition to these development and manufacturing activities, the company performs engineering design/study work in all four areas.

Capability: As previously mentioned, Canadian Astronautics is divided into four business areas with capabilities as follows.

- **Space Hardware** - CAL has an excellent capability in development and manufacture of spacecraft units and subsystems. Particular examples include antennas, RF subsystems, electro-optical equipment, battery management systems (NiCd and NiH₂), power converters (high voltage and high efficiency), and spaceworthy rad-hardened microcomputers.

- **Radar and Communications** - CAL designs and manufactures airborne SAR and SLAR equipment and has a development capability for radar of all types, particularly those involving complex signal processing. CAL additionally has capabilities in phased arrays, having developed

airborne planar arrays and MLS ground antennas, along with specialized thin film microstrip components, such as precision phase shifters, corporate feeds and radiating elements. Satellite communications station upgrades/retrofits on a turnkey basis and manufacture of custom Satcom equipment is another CAL specialty.

- **Advanced Systems** - EW and ASW are the main activities of this division, but others include processors for LANDSAT-D Thematic Mapper and remote unattended navigation/communications beacons. In EW, the company has developed the Tactical Signal Simulator (TASS), which is a fully programmable dynamic scenario stimulator for ESM receiver evaluation and operator training. Technology developments include fast tuning millimeter wave VCO's for ECM and simulator applications. In ASW, CAL has developed programmable sonobuoy processing systems and advanced processor architecture systems.

- **Commercial Systems** - The main activity of this division is the supply of Search and Rescue Satellite (SARSAT) ground stations. CAL provides a full capability station including processing channels for 121.5, 243, 406 MHz, and it is capable of remote unattended fully automatic operation. Other activities include custom software development, typically for real time signal or data processing applications. Experience is available in many high level languages, including Ada, and CAL has the capability to develop software to MIL SPEC 1679.

Average Work Force: Scientists & Engineers - 180
Others - 50

Gross Sales: 1983/84 - \$14.0M
1984/85 - \$20.0M

Plant Size: 52,000 sq ft Corporate Headquarters includes clean rooms, development laboratories, antenna range, military secure area with TEMPEST shielded room, and CAD facility.

30,000 sq ft Manufacturing facility includes inventory controlled stores, and production equipment.

Experience: CAL has developed an excellent reputation for performing challenging programs, in a professional, reliable manner. The company's record with respect to schedule and budgets is excellent. Their contracts have typically been divided between the Canadian Government (60%), NASA (20%) and others (20%). Canadian Government departments include Communications; National Defense, Environment, Energy, Mines and Resources, and National Research Council. Private customers include Telesat Canada, Atomic Energy of Canada, Marconi Space and Defense Systems (UK), MEL (Phillips, UK), European Space Agency, Intelsat, Bell Canada, and others. Cal has no direct contracts with the USAF, but are directly involved via the SARSAT Program. One of the four SARSAT ground stations provided to NASA is located at Scott AFB, IL. CAL has supplied EW equipment to US Naval Air Test Center. CAL can perform to military specifications.

Keywords: Communications, Computers, Electronic, Image Processing & Optics, Radar, Software Services, Space Systems, Testing/Test Equipment, Antennas, C3 Systems, Computer Parts, Navigation, Solid State Devices, Environmental Testing, Simulators, Phased Array, Synthetic Aperture, Design to Requirement, Structural Analysis, Structural Design, Communications, Data Reduction, Radar, Ground Stations, Satellite Electronics, System Studies, Remote Sensing, Search & Rescue, Design, Microprocessors, Test Rigs, Electromechanical Design, Electronic Warfare, Signal Processing, Spacecraft Units, Spacecraft Subsystems, Antennas, RF Subsystems, Electro-Optical Equipment, Battery Management Systems, Power Converters, Rad-Hardened Microprocessors, Radar, Planar Array, Side-Looking Airborne Radar, Tactical Signal Simulator.

Revised: Aug 85

CANADIAN GENERAL ELECTRIC COMPANY Ltd

Code: CGE

Address: Aerospace Operations
Industrial Benefits Program - Defense Programs
396 Attwell Drive
Rexdale, Ontario, Canada M9W 5C3

Contact: Mr. Brian Noble, Mgr, Industrial Benefits Projects - (416) 674-4210

History: Canadian General Electric Company was incorporated in 1892 and is ninety-two percent owned by General Electric Company.

Capability: The St Andrews (Quebec) Plant - specializes in fiber reinforced epoxy/plastic wound tubes for underground duct and high pressure pipes. They accept custom orders for military projects, such as, launch tubes (pod and hand-held) and rocket motor casings, etc., for the US Army.

Average Work Force: 70 - Total

Gross Sales: 1985 - \$13M

Plant Size: St Andrews Plant - 50,000 sq ft

Experience: Canadian General Electric works with the Canadian Government, US military and many US and Canadian prime contractors (e.g., General Motors, Xerox, etc.).

Keywords: Composite Components; Launch Tubes; Rocket Motor Casings.

Revised: Aug 85

CANADIAN MARCONI CO

Code: CMC

Address: 2442 Trenton Ave
Montreal, Quebec, Canada H3P 1Y9

Contact: Mr. E. J. Spinner, Mgr, Business Development & Programs, Avionics Division - (514) 341-7630, Ext 4335

History: CMC is a public company incorporated in Canada in 1903 as the Marconi Wireless Telegraph Company of Canada. The change to its current name occurred in 1925. The General Electric Company, p.l.c. of London, England, holds 51% of CMC's shares, with the remainder being widely held in Canada and the US.

The Electronics Group consists of, Avionics Division in Montreal, Radar Division in Kanata, DataComm Products Department in Montreal, and Components Division in Montreal.

The Communications Group consists of, Defense Communications Division in Montreal, Commercial Communications Division in Montreal, and Special Services Division in Montreal.

CMC's two wholly-owned, US-based subsidiaries are CMC Electronics Inc., Eatontown, NJ, and Sun World Circuits Inc., Altamonte Springs, FL.

Capability: The Divisional product areas are

- Avionics Division - Navigation systems, landing systems, monitoring and display instruments, and performance management products.

- Radar Division – Ship surveillance, search and rescue, and surface radar systems and related equipment.
- DataComm Products – Telex/data exchange systems.
- Components Division – Multi-layer printed circuit boards, hybrid micro-circuits, illuminated panels, power supplies and precision machined parts.
- Defense Communications Division (DCD) – Tactical communications equipment and related products.
- Commercial Communications Division (CCD) – Point-to-point short range rural radio products, and long-range HF equipment.
- Special Services (SSD) – Repairs and overhaul of communications equipment, and the calibration of electronic test equipment.
- Sun World Circuits Inc – Double-sided, plated through hole circuit boards.
- CMC Electronics Inc – Support for marketing, sales and service for both the Communications and Electronics Groups, and research and development in support of the Defense Communications Division.

The company's military avionics products are used by the defense agencies of more than 20 countries. More than 5,000 Doppler navigation systems and velocity sensors have been supplied for use in rotary wing and fixed wing aircraft as well as drones. Commercial avionics is equally active. Airlines in 45 countries use CMC's navigation, monitoring and display systems aboard more than 100 aircraft types.

The company's digital, color-coded, vertical-scale engine instruments have set a standard for the aerospace industry. Performance of these instruments has led the US military to select them for use in the MOHAWK, APACHE, SEAHAWK, AHIP (OH-58D) and BLACKHAWK programs. Some CMC cockpit instrumentation has been designed to be compatible with specialized night-vision equipment. The reliability and accuracy of these engine instruments provide aircraft operators with precise measurements of all vital engine parameters.

In addition to Doppler navigation and engine instruments, the Avionics Division produces Omega/VLF navigation systems. CMC started designing Omega navigation systems during the early 1970s. The company is now producing its third and fourth generation Omegas, the CMA-734/771 "Alpha" Omega, and the CMA-734 "Arrow", which uses an LCD display.

Finally, the Avionics Division manufactures ground based MLS, and designs and manufactures ILS, DME and VOR equipment, and airborne MLS receivers. The division also designs and produces NAVSTAR/GPS receivers.

CMC's most advanced radar system is the AN/SPS-503 surveillance system. Developed for the Canadian Destroyer Life Extension program (DELEX), it is now being marketed in various configurations to other countries of the world. The surveillance system is intended for fast patrol craft, frigates and destroyers. The company's LN-66 family of radars is used extensively by the US Navy. More than 850 of the AN/SPS-59 (V) configuration are aboard virtually all classes of US Navy vessels.

Few companies in North America possess CMC's high technology ability for the production of printed circuit boards, hybrid microcircuits and power supply systems. CMC's Components Division has built a strong base of competitive technology and superior human resources. In addition to supporting the other CMC divisions, the Division boasts a strong sales base of international aerospace and defense companies.

In data communications, CMC's CMS-755 telex exchange will soon handle all of the UK's telex traffic originating from 10 major cities. The telex system uses new technology in low-speed data

switching. This system is being marketed to other areas of the world with a need for this service.

CMC's military AN/GRC-103 radio, which today numbers over 14,000 units, fill an astounding 70 percent of world requirements for this class of radio. Some 28 countries use CMC's self-contained communications systems, which provide transportable, sheltered-mounted, all-terrain, all-weather communications. The 9th Infantry Division, the US Army's light infantry test division, has ordered the company's newest self-contained system, the AN/TRC-180, for evaluation. This system will double present communications capacity while solving problems of space and weight constraints.

Various countries in the Third World use CMC's commercial radio products based on HF-SSB technology. The RACE (Radio with Automatic Channel Evaluation) automated HF radio system for voice and data communications provides remote locations with automatic telephone service, using a channel-evaluation technique that ensures the best communication link. It is clearly state-of-the-art in HF communications.

Another major communications system is the LINK 8000 private communications system. Used primarily by police forces, this equipment relays information between dispatch posts and field units. The LINK 8000 is used by police organizations to ensure communications over vast geographic areas.

The Special Services Division's expertise includes calibration of precision test equipment, repair and overhaul of electronics systems, and field support of communications and detection installations.

CMC Electronics Inc in the USA provides research and development in conjunction with future US Army requirements in communications. While future plans call for manufacturing expansion at this facility, the Company currently concentrates on support for marketing, sales and service of communications and electronics products to the US military and civil aviation.

US-based, Sun World Circuits (SWC) is a high-volume producer of double-sided printed circuit boards. This subsidiary's sales are concentrated in commercial markets in the US. Recently, SWC's facilities have been substantially upgraded to increase their capability to penetrate the mass lamination printed circuit board market.

Average Work Force: *Engineers – 227
*Technologists – 57
Others – 2447
Total – 2731

*These figures include only those (in Canada) actively engaged in R&D; it excludes management and production personnel

Gross Sales: 1983/84 – \$249M
1984/85 – \$314M

Plant Size: Montreal – 500,000 sq ft
Kanata – 150,000 sq ft

Equipment: CMC has a wide variety of specialized production and test equipment including an Anechoic Antenna Test Range, Automated Test Equipment, EMI/EMC testing to 2GHz, and environmental testing facilities to all major MIL standards. In addition, complete facilities are available for component manufacture of specialized items, and assembly of electronic components and systems to customer design or specifications.

Experience: Canadian Marconi Company has provided systems, equipment, components and services to every branch of the US DOD and the US Coast Guard over the past 25 years, meeting all military specifications satisfactorily. The products of CMC, military and commercial, are exported regularly to 94 countries world-wide. The company has been granted every Mil Spec available.

Keywords: Avionics; Communications; Electronics; Image Processing and Optics; Machining; Radar; Testing/Test Equipment; Doppler Navigation Systems; Omega Navigation Systems; Navstar GPS; Engine Instruments; Intelligent Instruments; Photogrammetry; Data Communications; Tactical Radio Relay; Multiplexer; Tactical Switchboards; Radio Wire Integrator; ECCM Radio; Digital Order Wire; Power Supplies; Radio Ancillaries; Adapters; Line Terminating Unit; Surveillance; PC Boards; Circuit Packaging; Microcircuits; Thin Film Hybrid; Thick Film Hybrid; Magnetic Devices; Transformers; Displays; Illuminated Panels; Injection Molding; Welding; Precision Machining; Radios; R&O (Avionics); Calibration; Components; Photoplotting; Navigation; Radar; ILS; MLS; VOR; DME; Navigation Aids; Landing Aids; Instrument Servicing.

Revised: Aug 85

CANADIAN THERMOSTATS AND CONTROL DEVICES Ltd

Code: CTC

Address: 8415 Mountain Sights Ave
Montreal, Quebec, Canada H4P 2B8

Contact: Mr. Richard Marquis, General Manager -
(514) 739-3274

History: CanTherm was founded in late 1977 to continue the manufacturing and research program previously carried out by the defunct Multi-State Devices Ltd. They are closely associated with Microtherm GmbH of Pforzheim, West Germany, the leading European manufacturer of bimetallic temperature control devices.

Capability: With its acquisition of MSD, CanTherm inherited an active R&D department which has continued to expand in many areas of microelectronics and thermal control. Their first order of priority was to finalize the Moxie from a laboratory prototype to a reproducible chip. They have expertise in the fields of metallurgy, vacuum system depositions (sputtering), and semiconductor production techniques as a result of their initial projects. Early on, they were awarded a two year development grant from the Canadian National Research Council to develop a thin film thermister with tolerances $\pm 1\%$ at 25°C . Other specifications included maximum interchangeability and volume productivity at a market acceptable cost. The project was successfully completed within two years and the product is in the North American and European markets.

Average Work Force: Total - 12

Gross Sales: No Data

Plant Size: 5,000 sq ft (manufacturing)

Experience: CanTherm's product market is world wide. On the North American continent, they work with the Canadian Government, industry, and have an on-going contract with the USAF.

Keywords: Electronics; Environment; Microelectronics; Thermal Control; Chips; Metallurgy; Vacuum Deposition; Sputtering; Semiconductor; Thin Film; Thermister; Environmental Sensor; Solid State Devices

Revised: Sep 85

CARDION ELECTRONICS/ DG INSTRUMENTS (Division of General Signal Ltd)

Code: DGI

Address: Regional Road 5
RR #2
Carp, Ontario, Canada K0A 1L0

Contact: John T Dale, Marketing Manager - (613) 839-5710

History: Formerly operated under the name DG Instruments Ltd, Cardion Electronics/DG Instruments is a Canadian owned company founded by four former employees of Leigh Instruments Ltd and incorporated in Jan 1974. DG Instruments was acquired by General Signal Ltd in February 1982. They report to Cardion Electronics, a unit of General Signal Corp, Woodbury, NY.

Capability: Cardion/DGI specializes in the design, development, test and manufacture of electronic instruments and systems for both military and commercial applications. Customers are primarily in Air Traffic Control, Avionics, Meteorological Marine, and Hydrographic Services. Systems include solid state ATIS recorder, portable ATC trainer, VOR ground check, electronic ice measurement, submersible tide gauge, and ships propeller RPM indicating systems.

Average Work Force: Engineers - 8
Others - 32

Gross Sales: No Data

Plant Size: 18,800 sq ft

Experience: Cardion/DGI has completed a contract with Cubic Corporation to manufacture and test electronic subsystems associated with the ACMR tactical trainer for the CF-18A. They have completed delivery of a contract to supply Canadian DND with 27 Air Control Indicators - total value \$4M, and have now completed delivery of an additional five systems. Major customers in the Canadian Government include Departments of National Defense; Transport; Fisheries & Oceans; Energy, Mines & Resources; Communications; and Environment.

Keywords: Avionics; Electronics; Solid State Devices; Recorders; Air Traffic Control Simulators; VOR Ground Check Systems; Ice Measurement; Tide Gauge; Navigation; Ship Instruments; Tactical Trainer Subsystems; Air Control Indicators; Instrumentation.

Revised: Aug 85

CARR-TECH SERVICES Ltd

Code: CTS

Address: 450 Tapscott Road
Scarborough, Ontario, Canada M1B 1Y4

Contact: Mr. Brian G Glew, President - (416) 293-6400

History: Carr-Tech Services Ltd is a chartered, privately owned Canadian company with roots in the aerospace industry going back to 1947 when its founder, Mr. R J Carriere, first began servicing aircraft at Toronto Island Airport.

Capability: The company is engaged in engineering, manufacturing, repair, overhaul, and field service operations involving military and commercial aircraft electronic, electrical and hydraulic accessory equipment: electrically controlled hot water dispensing systems for aircraft, and diesel, gasoline, or electrically driven ground power equipment. Other capabilities include custom designed power generation equipment for standby and prime source applications together with related electronic control, monitoring and protection equipment for the industrial, commercial transportation and agricultural markets.

Carr-Tech can also undertake subcontract programs (including custom designed or built to specification) for the manufacture of power supplies, regulators, inverters, control and annunciator panels, air and ground rotating beacons, landing lights, portable and emergency lighting equipment.

Carr-Tech Services Ltd implements a well established quality assurance program to ensure that all products and services supplied by the company are controlled to obtain the best possible

quality and reliability, commensurate with economical and competitive cost considerations. The Chief Inspector of their Quality Control Department has over 25 years experience in aerospace and industrial quality control practices and procedures.

Carr-Tech's inspection organization and facilities are approved by the Department of Transport in respect of products supplied for use in civil registered aircraft and their Quality Control operation is recognized by the Department of National Defense as meeting the requirements of DND Specifications 1015 (MIL-Q-9858A), 1016 (MIL-I-45208), 1017, and 1019. In addition, their Quality Program standards meet or exceed CSA Standard 299.2.

Average Work Force: Engineers/Technicians - 6
Production - 18
Others - 16

Gross Sales: 1984 - \$2.5M
1985 - \$3.5M

Plant Size: 35,000 sq ft

Equipment: Carr-Tech's production facilities are suitable for low quantity production runs and the manufacture of experimental and prototype equipment lathes, milling machines, drills, punch presses, shears, welding equipment, riveters, grinders, paint spray booth, ovens, etc.

Test instrumentation includes electrically driven test stands for generators, voltage regulators and control equipment; Bosch fuel injectors and fuel pump testers; hydraulic and fuel test stands for large capacity high pressure equipment; test stands for speed switches, tachometer generators and other instrumentation. Precision electrical and electronic measuring equipment is calibrated regularly to NRC standards.

Experience: Carr-Tech Services Ltd is an approved supplier of services and qualified products to such companies as Aero-spatiale, Air Canada, Boeing Aircraft, Canadair, deHavilland, McDonnell Douglas and Wardair, plus the Canadian Government (DND and DOT), and various provincial government departments.

Keywords: Avionics; Electronics; R&O (Hydraulics); Solid State Devices; Build To Requirements; Standby Power Generating Equipment; Beverage Dispensing Systems; Toilet Hot Water Systems; Lighting Equipment; Prime Power Generating Equipment; Hydraulics; Aircraft Power.

Revised: Aug 85

CASEY COPTER ACCESSORIES Ltd

Code: CCA

Address: P. O. Box 121
Montreal AMF
Dorval, Quebec, Canada H4Y 1A5

Contact: Mr. M J Casey, Vice President - (514) 636-6155

History: Casey Copter Accessories Ltd is a small Canadian owned company founded in 1975 with no other Canadian divisions

Capability: The major products of this company are heating and airconditioning systems for both aircraft and helicopters. Other products are DC motor speed control devices and temperature controls.

The heating system is applicable to aircraft equipped with Allison 250 series of Pratt & Whitney PT6 series engines. The system is designed for maximum reliability with minimal moving parts. This passive heater system is based on the air-to-air heat exchanger principle, requiring minimal maintenance. Use of the heater system does not reduce range, restrict airspeed, nor reduce rate of climb because it does not require bleed air or fuel. The heater system will provide a cabin temperature of 15°C at an outside temperature of -40°C, a 30 pound weight saving over a combustion heater, and a high output

The airconditioning system is of the vapor cycle type with an engine driven compressor. System capacities are available up to 36,000 BTU per hour with current designs. Higher capacities may be developed to customer requirements as will drive systems and installations. The systems are designed to be compatible with Casey heater installations.

Motor speed controls have been designed to provide variable speed control for 28V DC motors in air moving applications and provide increased brush life as well as continuous or step-wise variable control. These units are customized for each application.

Average Work Force: Engineers - 2
Inspection - 1
Others - 6

Gross Sales: 1984 - \$500K
1985 - \$600K

Plant Size: 6,000 sq ft

Experience: The Casey Heater System is currently being used by various departments of the Canadian Federal and Provincial Governments, governments of other countries, US State Governments, and in wide use with Army National Guards and the US Army (Alaska area). The airconditioner is in early commercial introduction. Speed controls have been provided for military land vehicle installation and test stands. It is estimated that 80 - 90% of total sales are to the US (10% to the National Guards). Currently there have never been any sales to the USAF. We are interested in doing business with the USAF.

Keywords: Aircraft Heating; Aircraft Airconditioning; Electronic Controls; Motor Speed Control; Temperature Control; Heating (Aircraft); Airconditioning (Aircraft).

Revised: Aug 85

C. F. H. INDUSTRIES Ltd

Code: CFH

Address: 103 Gun Avenue
Pointe Claire, Quebec, Canada H9R 3X2

Contact: Mr. A J Thomson, VP, Sales & Marketing -
(514) 694-3980

History: C.F.H. Industries Ltd is a Canadian-owned, fire-equipment distributor, and repair and overhaul center. It was originally founded under the name of Canadian Fire Hose Corporation Ltd in 1906. The Aircraft Division was established in 1970

Capability: C.F.H. Industries Ltd is a distributor of fire equipment to a broad spectrum of industries. For the aircraft/aerospace industry, however, they are primarily a repair and overhaul, and parts supply center for engine fire extinguishers, breathing oxygen equipment, air inflation equipment and helicopter floats. They also represent firms involved in total fuselage fire extinguishing systems, emergency breathing equipment, and explosive ordnance devices.

Average Work Force: Technicians - 12
Engineers - 1
Others - 13

Gross Sales: 1983/84 - \$3.0M
1984/85 - \$3.3M

Plant Size: 22,500 sq ft

Equipment: Equipment includes hydrostatic test, sandblast phosphate, Halon 1211, Halon 1301 recharge, nitrogen and oxygen recharge

Experience: C.F.H. has had overhaul contracts with the Department of National Defense for the past 12 years. Other customers include all commercial, corporate and commuter carriers

Keywords: R&O (Fire Extinguishers); R&O (Oxygen Equipment); R&O (Helicopter Floats); Engine Fire Extinguishers; Evacuation Slide; Life Raft Inflation Equipment; Oxygen Equipment; Helicopter Floats; Fire Extinguishing Systems; Emergency Breathing Equipment; Explosive Ordnance Devices.

Revised: Aug 85

CHICOPEE MANUFACTURING LIMITED

Code: CML

Address: 975 Wilson Ave
Kitchener, Ontario, Canada N2C 1J1

Contact: Mr. David Belanger, VP Marketing & Operations - (519) 893-7575

History: Chicopee Manufacturing Limited is a private, wholly owned Canadian company incorporated under the laws of Ontario in 1967.

Capability: The company specializes in precision machining of medium to large complex components to close tolerances from high strength steels, titanium and aluminum alloys for the aerospace and other related industries. Technical knowledge combined with state-of-the-art equipment enables the company to deliver a wide range of such quality products including aircraft structural components, landing gear components, helicopter hubs, helicopter retentions, hydraulic actuators, precision parts for Canada's space arm, and machined components for other space vehicles and equipment.

Chicopee maintains strict quality control and has approvals from most of the major aerospace companies and in addition, complies with the requirements of DND 1015, MIL-Q-9858, and CSA Z 299.3. Procedures call for first-off inspection of every manufacturing operation, as well as 100% final inspection of all critical dimensions. Reverse traceability of materials, parts and processes is guaranteed.

Average Work Force: 225

Gross Sales: No Data

Plant Size: 100,000 sq ft

Equipment: Equipment consists of a full range of CNC and NC profile milling machines including a five-axis CNC gantry profile milling machine; four-axis CNC travelling column machining centers with automatic tool changers; hydraulic trace profile milling machines; vertical, horizontal and universal mills; CNC and conventional lathes; boring mills; drilling and grinding tools and all other necessary support equipment to produce precision custom products.

Experience: Present customers include: The Boeing Co, Boeing Military Airplane Co, Cleveland Pneumatic Co, DAF Indal Ltd, The deHavilland Aircraft of Canada Ltd, Ernst Leitz Canada Ltd, Fairchild Republic Ltd, Fleet Industries, Indal Technologies Inc, Kaman Aerospace Corp, Lockheed Aircraft Corp, McDonnell Douglas Canada Ltd, McDonnell Douglas Corp, Martin Marietta Aerospace, and Spar Aerospace.

Keywords: Machining, Precision Machining, Machining, High Strength Steels, Titanium, Aluminum Alloys, Structural Components, Landing Gear Components, Helicopter Hubs, Helicopter Retentions, Hydraulic Actuators, Precision Parts, CNC Machining

Revised: Sep 85

COM DEV Ltd

Code: CDL

Address: 155 Sheldon Drive
Cambridge, Ontario, Canada N1R 7H6

Contact: Col (Retired) Neil Russell, Dir, Business Dev - (519) 622-2300

History: COM DEV was incorporated federally in 1971 and is a Canadian high technology company.

Capability: Major business areas at which COM DEV's products are aimed include Communications and Remote Sensing Satellites, Earth Terminals, Surveillance Radar, Electronic Warfare and mm-Wave Systems.

Satellite Products - Contiguous and non-contiguous dual mode output multiplexers; group delay and amplitude equalized input multiplexers; high power waveguide and low power coax isolators; low pass harmonic reject filters; telemetry, command and preselect filters; adaptive variable power dividers and combiners; and polarization switches and beam reconfiguring subsystems.

Earth Terminal Products - High power microwave components and subsystems including filters, diplexers, combiners, isolators and terminations; low-loss and high power filters; and antenna feed networks.

Radar Products - Specialized radar antennas, feed networks, phase shifters, high power filters and circulators and SAW enhanced pulse compression subsystems.

Electronic Warfare Products - Microwave and millimeter subsystems and antennas for ESM and ECM applications, such as microwave products, millimetric receivers, high power antennas and combiners for the system designer and manufacturer.

Antenna Products - Design and manufacture of specialized antennas for spacecraft, airborne, shipborne and transportable applications. Items such as SAR, phased arrays, high power beam forming networks, and systolic arrays are available from UHF to EHF frequencies.

Signal Processing and (SAW) Products - Advanced signal processing components and subassemblies for radar and satellite communications, e.g., filters, delay lines, convolvers, SAW oscillators and synthesizers, microscan receivers, code and chirp waveform generators.

Consulting Services - Studies undertaken on trade-offs, optimization and hardware design aspects of subsystems used in related product areas.

Research and Development - Active and passive techniques at frequencies above 20 GHz and 115 GHz. SAW devices as signal processing element in digital communications and radar systems, high power ferrite technology and beam reconfiguring networks.

Average Work Force: Technical Staff - 90
Manufacturing, Management and Support Staff - 123

Gross Sales: 1984 - \$2.0M

Plant Size: 70,000 sq ft

Equipment: Our large computer facility is used extensively for design (CAD), manufacture (CAM) and testing (CAT). There are automatic test facilities to measure product performance, thermal

vacuum chambers to test performance in a simulated space environment, and shock and vibration equipment to simulate conditions in the nose of a rocket, in the Space Shuttle or on military platforms. The MIC-SAW facility includes a specially lighted, class 10,000 clean room, machining of items to 0.0001 inch tolerance and 6 micron finish. The plating facility is equipped to produce very high quality nickel, copper and silver plating, primarily on invar and aluminum parts. The antenna facility has an indoor anechoic chamber, a 500 foot outdoor test range, precision positioners and CAT equipment.

Experience: More than forty communications satellites scheduled for launch by 1986 will carry equipment designed and manufactured by COM DEV, and virtually every major builder of earth stations in the western world used some COM DEV components. Customers include Hughes Aircraft, RCA, Ford Aerospace, Litton, Lockheed, SPAR Aerospace, Marconi (UK), and the Canadian Government.

Keywords: Communications; Radar; Space Systems; Satellite Subsystems; Microwave Subsystems; Surface Acoustic Wave Subsystems; Millimeter Wave Systems.

Revised: Oct 85

COMINCO Ltd (Electronic Materials Division)

Code: COM

Address: Cominco Ltd
Trail, British Columbia, Canada V1R 4L8

Cominco Electronic Materials Inc
E 15128 Euclid Ave
Spokane, Washington 99216

Contact: Mr. A G White, General Manager - (604) 364-4758

History: Cominco Ltd was incorporated in 1906 and is 91% Canadian owned. Head Office is located at 200 Granville St, Vancouver, British Columbia. The operations of Cominco are divided into three industrial segments - Mining and Integrated Metals, Chemicals and Fertilizers, and other Operations. The Electronic Material Division is part of the later segment.

Capability: Cominco is the world's largest producer of zinc and lead with significant output of many by-product metals and chemical fertilizers.

Electronic Materials Division Production:

- **High Purity Metals** - 17 different metals each in several degrees of high purity and shapes
- **High Purity Arsenic** - 49 to 79 grade arsenic in various allotropic crystal forms and shapes. Largest plant of its kind in the world
- **Semiconductors** - single crystal boules and polished wafers of gallium arsenide, indium antimonide, cadmium telluride, cadmium mercury telluride, gallium antimonide, and indium arsenide, germanium and epitaxial cadmium mercury telluride
- **High Purity Metals Fabrication** - alloying, casting, rolling, extrusion, stamping and machinery operations to produce semiconductor processing and packaging materials e.g., evaporation charges, sputtering targets, solder preforms, bonding wires, and ribbons. A well equipped precision tool and die shop serves both Production and Development
- **High Purity Chemicals** - As₂O₃, As₂O₅, Zn As₂S₄, and ZnS

Electronic Materials Division Development:

R&D is directed toward high purity new metal, compound and semiconductor processes, product advancement, and production equipment. Cominco is currently involved in projects to produce Semiconductor Materials in Microgravity.

Average Work Force: Electronic Materials Div - 261

Electronic Materials Div
(Trail, British Columbia)
Engineers - 16
PhDs - 1
Machinists - 5
Others - 90

(Spokane, Washington)
Engineers - 5
PhDs - 3
Machinists - 7
Others - 134

Gross Sales: Electronic Materials Div
1984 - \$55M
1985 - \$63M

Plant Size: Electronic Materials Division
(Trail, BC) - 80,000 sq ft
(Spokane, WA) - 80,000 sq ft

Equipment: Melbourn high pressure Czochralski Crystal Growers; low pressure Czochralski Crystal Growers, Bridgman Crystal Growers, Zone Refiners, custom built metal refining equipment; custom built crystal slicing, fabrication and polishing facilities; and high purity metals fabrication equipment.

Experience: Cominco has been in the electronic materials business since 1949 and has supplied materials to most major US electronic companies.

Keywords: High Purity Metals; Compound Semiconductor Wafers; Semiconductors; Infrared Materials; Bonding Wire & Ribbons; Sputtering Targets; Solder Preforms; Evaporation Charges; Metallurgy; Semiconductor Wafers; Microgravity.

Revised: Sep 85

COMPUTING DEVICES COMPANY

Code: CDC

Address: P. O. Box 8508
Ottawa, Ontario, Canada K1G 3M9

Contact: Mr. H R Irvine, Mgr. Market Develop Support Svcs - (613) 596-7059

History: Computing Devices is a high technology company that has been a division of Control Data Canada Ltd since 1969. The company was established in 1948. It is involved in the manufacture and supply of advanced electronic systems. The company markets through Control Data's Government Systems Division in the US and world-wide.

Capability: Computing Devices' technology areas include acoustic signal processing systems for ASW applications, for airborne, shore and undersea vehicles, digital ballistic computer systems for vehicle & portable installations, air navigation display systems, electronic intrusion detection systems, command & control display systems for ships, and jet engine thrust measurement systems.

Specifically, the company developed, and is manufacturing an acoustic data processor (SBP-1), for the Swedish Air Force and the Canadian Navy. This ASW system is designed for monitoring omnidirectional passive sonobuoys. The company also has

similar acoustic processing ASW equipment in airborne platforms with the Royal Air Force and the Royal Australian Air Force. Another system, the Standard Multi-Sensor Digital Display, is designed for Canadian Navy use under the concept of Shipboard Integrated Processing and Display System. They have also developed and manufactured a Microprocessor Digital Computer System according to a Chrysler specification for the fire control system of the M-1 main battle tank. They have produced approximately 5000 systems at this time. They are also under contract to supply an upgraded version for the M1-A1 and have developed a similar system for the Republic of Korea XK-1. Their Projected Map Display is for use in a variety of aircraft from tactical fighters to transports. This system has been used on the US Navy A-7 aircraft for over 8 years and has been accepted for the USAF Pave Low III Rescue Helicopter Program.

Computing Devices is currently involved in the shared development Ported Coaxial Cable Sensor Program with the BISS SPO at Electronics Systems Division (ESD). The program goal is to develop and test buried cable detection systems for outside security application. The program start date was mid-1976. Initial production deliveries for DOD requirements are scheduled for the 1985-89 time frame. The program has had many spinoffs. GUIDAR is their commercial product. They also developed a system (Thrust Computing System) to compute (from measured pressures) the gross thrust of afterburning turbojet and turbofan engines. The technology has been proven in NASA high altitude test cells on the J85, J79, TF30 and F100 engines, and on the T38/J85-5 system on the Edwards AFB thrust stand. A maintenance application of the technology has been adopted by the USAF for its Air Training Command T-38 fleet for installed engine trimming on the flightline called Thrust Computing Support Equipment (TCSE). NASA was also using the technology in the HIMAT program and is currently using it for the X-29 testing. This was also a shared development program between the USAF and the Canadian Government completed in late 1978.

Computing Devices' design, development and production capabilities have been effectively demonstrated. They perform to military specifications. Contract manufacturing accounts for 20% of their business. This is currently accomplished for Hughes Aircraft Company for the joint Surveillance System.

Average Work Force: Professionals - 300
Total - 800

Gross Sales: 1984 - \$65.0M
1985 - \$74.0M

Plant Size: 295,000 sq ft (three buildings)
400 acres (Stittsville Research Facility)

Experience: As seen under Capability Section, CDC has experience with the US military (approx 50% of their total sales). They have considerable production capability.

Keywords: Avionics; Computers; Electronics; Radar; Security & Safety; Cockpit Displays; Data Handling; Data Analysis; Engine Controls; Instruments; Navigation; Performance Measuring Device; Engine Thrust Measuring Device; Acoustic Sensing; C3 Systems; Computer Systems; Computer Parts; Data Acquisition; Video Display Systems; Projected Map Displays; Intrusion Detection; Signal Processing Systems; Ballistic Computer Systems; ASW System; Fire Control System

Revised: Aug 85

C. P. S. INDUSTRIES Inc (LES)

Code: CPS

Address: 2745 DeMiniac Street
Montreal, Quebec, Canada H4S 1E5

Contact: Mr. Peter Wiedemann, Sales Manager - (514) 336-0568

History: C P S Industries is a Canadian-owned company founded in 1963

Capability: C.P.S. Industries is primarily engaged in the manufacture of aircraft and commercial parts to customer supplied drawings and specifications.

Average Work Force: Production - 43
Engineers - 2
Admin - 5

Gross Sales: 1983/84 - \$1.87M
1984/85 - \$2.64M

Plant Size: 19,000 sq ft

Equipment: Equipment includes CNC lathes and milling centers; surface cylindrical and centerless grinders; computerized machine programming equipment; computerized coordinate measuring machine; plus a full range of conventional machinery and equipment including chemical finishing and painting facilities.

Experience: Present customers include - Dowty Canada Ltd, Menasco Aerospace Ltd, Lucas Industries, Pratt & Whitney Canada Inc, Canadian Arsenals Ltd, Allied-Bendix (US), and Simmonds Precision (US).

Keywords: Aircraft (Components); Landing Gear (Parts); Fuel Control (Parts); Ammunition (Parts); Machining.

Revised: Aug 85

CROVEN CRYSTALS Ltd

Code: CCL

Address: 500 Beech Street
P. O. Box 420
Whitby, Ontario, Canada L1N 5S5

Contact: Mr. Bob McCormick, Sales Manager - (416) 668-3324

History: Croven started as a subsidiary of a US company set up in Whitby in 1954 to manufacture crystals for a NATO contract held by Collins Radio of Toronto. In 1958, the US parent sold the company to the management. In 1967, the company was purchased by a US conglomerate. It is presently owned by another smaller US holding company, but has been managed since 1970 solely by Canadians.

Capability: Croven manufactures quartz crystals and only quartz crystals. Within this product line, Croven has carved out a niche as one of the premier suppliers of high quality, high reliability quartz crystals to the telecommunications, avionics and aerospace industries, as well as directly to the military.

Their crystals are used by companies making telephone equipment, microwave radios, radar for ground and airborne applications, and missile and satellite systems. Some of the better known programs are the fire control radar in the F-16 and F-18 fighter planes, the Navy's Phalanx Weapon System and shipboard radar, the Standard Missile and many of RCA Astro's satellites.

Their ongoing research and development programs combined with their state-of-the-art testing and screening facilities, make them second to none in the industry.

Average Work Force: Engineers - 5
Technicians - 10
Others - 185

Gross Sales: 1984 - \$9.0M
1985 - \$9.0M (Est'd)

Plant Size: 30,000 sq ft

Equipment: Equipment includes all necessary equipment to manufacture and test high quality, high reliability quartz crystals. IBM System 34 is used for production control.

Experience: Present customers include - AvanteK, Bendix, California Microwave, DESC, E-Systems, Equatorial Communications, Frequency West, Frequency Sources, Garrett, General Dynamics, GTE, GE, Harris, Hewlett Packard, Honeywell, Hamilton Standard, Hughes, ITT, JPL, Lockheed, McDonnell Douglas Elect, Magnavox, MCI, MIA Com, Motorola, Martin Marietta, Northern Telecom, Omni Spectra, Plessey, Rockwell, Raytheon, RCA, Spar, Sperry, Scientific Atlanta, Sanders, Texas Instruments, TRW, Varian, Westinghouse, Wilcox, Watkins-Johnson, plus many divisions of the US and Canadian military and Government.

Keywords: Crystals; Quality Crystals.

Revised: Sep 85

DECADE INDUSTRIES Ltd

Code: DIL

Address: 7860 River Road
Richmond, British Columbia, Canada V6X 1X7

Contact: Mr. W Postlethwaite, Dir, Marketing & Product Dev - (604) 278-3561

History: Decade Industries Ltd was founded in 1970 primarily as a manufacturing service company supporting the aero engine maintenance shops of locally based airlines.

In 1975, Decade moved to their present facilities and have since expanded their markets to include principle airframe/engine manufacturers, airlines of the US, the Pacific Rim, and the Far Eastern markets, as well as becoming a major tooling supplier directly to the aero engine manufacturers themselves.

Capability: Decade Industries' machine shop facilities include two numerically computer controlled three-axis machining centers, with capacity for deep milling, precision boring, and facing with close tolerances. Conventional milling and turning equipment, and a well equipped welding and fabrication shop is also maintained by Decade Industries.

A comprehensive quality assurance program in line with DND 1015/16, The Canadian Standards Association, and the specifications of their major customers in the US, ensures a reliable production of high quality, conforming products.

Non-destructive testing and proof load testing is carried out at Decade with certificates furnished for all inspections. Proof loading capability is to 25 tons in their universal tensile loading facility.

Major manufacturing capability is presently directed at production of precision tooling for aero engine maintenance departments of the major airlines, and to supplying bulk contract tooling as subcontractors to the Canadian Forces and specifically to Naval programs (CF-18 Aircraft Acquisition Program, and Canadian Frigate Program - Propulsion Systems). In addition to this, Decade Industries produced precision research equipment for regional nuclear accelerator projects, and Atomic Energy Canada's Radioisotope facilities.

Average Work Force: Consultant Engineers - 2
Resident Engineers - 1
Mechanical Engineering Technologist - 1
Machine Shop Personnel - 24
Administrative - 3

Gross Sales: 1984 - \$2.5M
1985 - \$3.0M

Plant Size: 10,000 sq ft

Experience: Decade Industries customers include:

- Airlines - Air Canada, Canadian Pacific, Pacific Western Airlines, United, Northwest Orient, Philippines, Singapore,

WardAir, Okanagan Helicopters, Emery Air Freight, Flying Tiger Air Freight, Orion, TAA, Pakistan, and DSS.

- Aero Engine Companies - General Electric, Pratt & Whitney, Garrett, and SNECMA/CFMI, Rolls Royce, and Lycoming.

- Aircraft Manufacturing Companies - Boeing, McDonnell Douglas, Lockheed, Canadair, and deHavilland.

- Others - Westcoast Transmission Co, Dome Petroleum, National Research Council, Universities of BC and Alberta, Raytheon, and Litton.

Keywords: Machining; Precision Tooling; Ground Support Equipment; Electrical Test Equipment; R&O (Equipment); Radioactive Waste Containment; Isotope Dispensing Equipment; Pipeline Control Components; Camera Systems Components; Non-Destructive Testing

Revised: Aug 85

THE deHAVILLAND AIRCRAFT OF CANADA Ltd

Code: DHC

Address: Garratt Blvd
Downsview, Ontario, Canada M3K 1Y5

Contact: Mr. J E Hanna, Director, Government Sales - (416) 633-7310

History: The deHavilland Aircraft of Canada Ltd was established in 1928 as a sales outlet, assembly plant, and maintenance facility for aircraft of the British parent company's design and manufacture. The company is owned by the Canadian Government. Its main plant is located in Downsview, Ontario, with other offices located in Ottawa.

Capability: The deHavilland Aircraft of Canada Ltd is a designer and manufacturer of both civilian and military aircraft. It is a leader in short takeoff and landing (STOL) aircraft technology, and is actively engaged in the design and manufacture of these aircraft. During the time period 1939 - 1945, the company built over 3,000 Mosquito bombers, Tiger Moth, and Anson trainers. Following this time, they designed and built the Fox Moth and later the DHC-2 Beaver. More than 1,600 of these latter aircraft were built for use in Canada, the US, and world-wide locations. Their work on the Beaver pioneered the concept of STOL. This aircraft was followed by the DHC-3 Otter and the twin-engine DHC-4 Caribou.

In the 1960s, deHavilland combined turbine technology with STOL experience and began to manufacture the remarkable twin-engined Buffalo and Twin Otter aircraft. Market interest in a larger capacity transport made it possible for de Havilland to develop a quiet four-engined STOL aircraft, the Dash 7. As a strong regional air transport market evolved, de Havilland utilized the advances in turbine technology to design and manufacture the Dash 8. This high performance twin-engined turboprop was introduced to service in late 1984.

deHavilland's R&D activity typically divides into powered lift, propeller refinements and advance composite structures. Powered lift focus has been upon ultraSTOL capability and has been supported by an augmentor-wing flight test program and by extensive wind tunnel testing both in the National Aeronautical Establishment tunnels in Ottawa and the 40 ft x 80 ft tunnel at NASA Ames. This research program has extended progressively to STOL and VTOL research and currently concentrates upon an ejector lift/vectored thrust concept in a program sponsored by NASA and supported by General Dynamics.

Propeller development, motivated by company concentration upon smaller turboprop transports has investigated thin, rear-loaded blade sections. Wind tunnel test modelling techniques have been developed and have led to propeller/nacelle combinations testing in the National Aeronautical Establishment 30 ft x 30 ft tunnel at Ottawa at Reynolds Numbers close to full scale.

Advanced composite structural development has been directed to both Kevlar/Nomex sandwich design and manufacture, and more recently, to carbon structures for primary application.

Average Work Force: Engineers - 245
Machinists - 110
Tool & Die Makers - 70
Technicians - 120
Support Staff - 452
Others - 3100

Gross Sales: 1983 - \$122M
1984 - \$204M

Plant Size: 1,407,000 sq ft (Plant)
271,000 sq ft (Office)

Equipment: For many years the deHavilland plants have been engaged in the production of stressed skin aluminum alloy airframes, and in doing so, utilize equipment normally found in a well-equipped aircraft manufacturing complex. Their present shop equipment includes milling machines; engine, turret, and pre-programmed automatic lathes; drill presses; drop hammers; punch, hydro and stretch presses; magneform; shapers & rolls; jogglers; tube bending and swaging machines; precision grinders; planers; multi-spindle routers; spot and heli-arc welders, vertical and jig borers; and broaches and shears. In addition, heat treat, foundry, plating, painting, sandblasting, and other treatment equipment is available. Hydraulic, instrument, radio, plastic, and upholstery shops also form part of the complete facility. The plastic shop manufactures fiberglass and polycarbonate parts in a temperature and humidity-controlled environment. It is also fully equipped with autoclaves, ovens, bonding and decorative applicator presses for the manufacture of structural kevlar composite parts and aircraft interiors. Numerically controlled equipment consist of drafting and digitizing machine, several multi-spindle profile mills which include a pair of dual gantry 3-spindle 5-axis vertical profiler, wire marking machine and a pipe bender complete with a tube data center.

The company uses the CADAM system of Interactive Computer Graphics in support of both CAD and CAM functions. Availability of this system has permitted an integration of the design/manufacturing function.

deHavilland also maintains an Engineering Library, Metallurgical Laboratory, an Aerodynamics Laboratory, a Structural Testing Department, a Materials Research Laboratory, Environmental Chambers, and an Engineering Computer Center. In addition, an Engineering Development Shop, housed in a separate 11,000 sq ft building, consists of 100 skilled tradesmen experienced in working directly with the Engineering staff. The Data Center is equipped with an IBM 3031AP and an IBM 4341/12. The 4341/12 is dedicated to Engineering and each has a 12 MBytes and N/C of memory. In addition, the Engineering Department has a VAX 11/780 Computer used primarily for structural analysis.

Experience: Contracts for both aircraft purchases, and research & development programs have been negotiated with the USAF, NASA, US Department of Interior, USAF Academy, Alaska National Guard, Canadian Forces, Canadian National Research Council, and the Canadian Department of Transport. In addition to the above, the deHavilland product line is presently being operated in over 70 countries world-wide and on all seven continents. Previous DOD contracts include:

- 981 L20 DHC-2 Mkl Beaver aircraft to the USAF/US Army
- 165 DHC-4 Caribou aircraft to the US Army
- CV7A Buffalo aircraft development.

- SC8A Air Cushion Landing System.
- 6 UV18A DHC-6 Twin Otter aircraft to Alaska Army National Guard.
- 2 UV18B DHC-6 Twin Otter aircraft to USAF.

Keywords: Aircraft; Machining; Aircraft Control; Air Delivery Systems; Airframe Components; Airframe Structures; Cargo Handling Equipment; Cockpit Displays; Composite/Fiberglass Components; Data Handling; Data Analysis; Drones; Engine Components; Engine Systems; Engine Controls; Environmental Controls; Fuel Systems; Fuel Research; Hydraulics; Instruments; Landing Gears; Navigation; Performance Measuring Devices; Personnel Survival/Restraint; R&O (Aircraft); Simulators; Training; STOL Aircraft Manufacture; Wiring; Tubing; Augmentor Wing; Extended length.

Revised: Sep 85

DEVTEK CORPORATION

Code: DEV

Address: 1410 Birchmount Road
Scarborough, Ontario, Canada M1P 2E7

Contact: Mr. H Trevor Pawsor Marketing Manager -
(416) 752-4006

History: Devtek Corp is a wholly owned Canadian company founded in 1980. It was originally the Aerospace/Defense Group owned by Magna International Inc, a Toronto based high technology company. Companies affiliated with Devtek are Diemaco Inc, Hermes Electronics Ltd, Magna Electronics, Verral Metal Fabricators, West Height Manufacturing Inc, General Manufacturing Inc, and Grantech Mfg. Brief descriptions of these companies are included in this report.

Capability: Devtek Corp has seven modern plants, each specializing in various phases of high technology engineering and manufacturing products ranging from undersea detection devices to components for outer space projects. Having pursued markets in the aerospace/defense and commercial goods sectors, Devtek has relied on its people to develop unique, new highly efficient manufacturing techniques. This confidence has resulted in an average annual sales growth of 30% and has made Devtek one of the fastest growing international manufacturing corporations. Devtek's five companies offer a wide range of modern computer controlled machine tools, staffed with highly qualified people with unique experience in fabricating critical components and sub-assemblies. A new technology center has added a unique engineering capability to the corporation's sophisticated, high precision manufacturing activities, including a CAD/CAM system. One of the Devtek companies has assembled extensive engineering and manufacturing skills for the design, development, testing and production of components and systems for military hardware. Another Devtek company holds a leading position in the development, design and manufacture of hydroacoustic sensors and data analysis and transfer systems as well as HF communication equipment to meet exacting military specifications. To complement the technical staffs of the companies in the corporation, Devtek provides the support of a special Corporate Engineering Group which conducts research and development and assists with problems of a highly sophisticated, technical, technological, process or production nature. Devtek's divisions and companies operate to the following Quality Specifications as appropriate DND-1015, MIL-Q-9858A, DND-1016, and MIL-I-45208. The divisions are recognized by the Department of National Defense for having quality programs within their facilities meeting the requirements of DND-1015 (MIL-Q-9858A).

Average Work Force: 15 (All Divisions - 780)

Gross Sales: 1984 - \$38M
1985 - \$57M

Plant Size: 300,500 sq ft (All Divisions)

Experience: Devtek's varied clientele includes - Bell Aerospace Co, Buffalo, NY; Boeing of Canada; Bristol Aerospace Ltd; CAE Electronics Ltd; Canadair Ltd, US Army, Ft Monmouth, NJ; US Navy, Indianapolis, IN; French Navy, Paris, France; Swiss Army Signal Corps, Australian Navy; Canadian General Electric Co; Computing Devices of Canada Ltd; The deHavilland Aircraft of Canada Ltd, Dowty Equipment Ltd, Emerson Electric, St Louis, MO; Fleet Industries; General Electric Co, Winooski, VT; B F Goodrich, Troy, OH; Hughes Aircraft, Los Angeles, CA; Honeywell Inc, St Petersburg, FL; Leigh Instruments; Ernst Leitz Canada Ltd, Litton Guidance & Control Systems, Woodland Hills, CA; Litton Systems (Canada) Ltd; Lumonics Research Ltd; Martin Marietta, Orlando, FL; McDonnell Douglas Corp, St Louis, MO; Motorola Inc, Tempe, AZ; Northern Telecom; Philips Electronics; Raytheon Co, Portsmouth, RI; Sanders Associates, Nashua, NH; Spar Aerospace; Sperry Univac, Salt Lake City, UT; RCA, Moorestown, NJ; Department of National Defense; and others.

Keywords: Landing Gear Components; Alum Dip Brazed Heat Exchangers; Machining; HF Communications; HF Antennas; Sonobuoys; ASW; Beacons; Environmental Laboratory; PC Boards; Weather Stations; Small Arms Components; R&O (Small Arms); Weldments.

Revised: Oct 85

DIEMASTER TOOL Inc

Code: DIE

Address: 160 Watline Avenue East
Mississauga, Ontario, Canada L4Z 1R1

Contact: Mr. Gideon Tankus P.Eng, VP, Sales - (416) 890-1144

History: Diemaster is a Canadian owned company that has been in business for over 12 years.

Capability: Diemaster is a precision engineering/machining firm specializing in machining to aerospace, military and nuclear standards. Jig boring, CNC machining, EDM machining, turning, and milling. They perform stamping operations from 16 to 500 metric tons. Diemaster also designs and fabricates production tooling, special purpose machines, jigs, fixtures, gauges, and dies. Their quality control meets CSA-Z-299.2, DND 1016 and MIL-I-45208A.

Average Work Force: Total - 160

Gross Sales: 1984 - \$7.3M
1985 - \$8.0M

Plant Size: 66,000 sq ft

Equipment: NC & CNC machining centers, and computing centers. Other typical equipment includes mills, grinders, borers, milling machines, drills, lathes, pantograph, presses, cutting, finishing and inspection equipment.

Experience: Diemaster customers include SPAR, AECL, TRW, Avco Lycoming, Sanders Associates, Dupont, Orenda Engines, Bombardier, IBM, McDonnell Douglas, Pratt & Whitney, Xerox, Rockwell International, RCA and many more well known companies. Products to these companies have included aircraft engine parts, fuel tanks, critical components for aircraft navigation systems, components for nuclear industry, dies, gauges, test and production centers, and stampings.

Keywords: Machining; Precision Machining; CNC Machining; Boring; Turning; Milling; Stamping; Fabrication; Die Fabrication; Gauges.

Revised: Aug 85

DIFFRACTO Ltd

Code: DIF

Address: 6360 Hawthorne Drive
Windsor, Ontario, Canada N8T 1J9

Contact: Mr. W J Pastorius, VP, Marketing - (519) 945-6373

History: Diffracto Ltd was incorporated in 1973 as an off-shoot of work done at the University of Windsor. The company is Canadian controlled with a minority interest owned by Otto Wolff AG of Cologne, Germany. An Otto Wolff subsidiary, Hommelwerke, is also the distributor of Diffracto products in Europe. General Motors owns 15% of the company. They also have a US subsidiary, Diffracto Ltd, located at Two Northfield Plaza, Suite #416, 5700 Crooks Road, Troy, Michigan, 48098, (313) 828-7370. Most of the business of the company is conducted in the US through the US subsidiary which largely acts as a sales and service operation.

Capability: Diffracto has been a pioneer in the application of electro-optical inspection equipment to the manufacturing industry, primarily automotive, but also including nuclear, turbine engine, bearings, ordnance, and the like. These electro-optical units were originally developed on a custom basis, but are increasingly becoming more and more standardized. Many are finding their way into robotic applications.

Diffracto currently produces a variety of standard sensor products. In addition are certain special machines, the most predominant example is the Programmable Airfoil Contouring System (PACS) for turbine blade inspection. The PACS was originally developed as a joint Canadian/US Defense Development Sharing project with the USAF (AFWAL/MLTM), General Electric, and Diffracto. This particular project has led to the sales of several such machines to manufacturers of blades in the US and is subject of intense current interest relative to both the inspection of new and rework blades (where additional Diffracto flaw detection equipment can be combined into such machines). An off-shoot of the PACS is the Laser Gear Inspection Machine. It is touted as offering a revolutionary way of quantifying gear dimensions in minimal time.

Diffracto has devoted considerable effort to R&D activities and has received support in this area from the National Research Council of Canada, and the Department of Industry, Trade and Commerce. Current projects exist in the following areas:

- Electro-optical flaw detection
- E/O sorting machine development
- High resolution sensor development (profile image and triangulation)
- Robot guidance sensor development
- Fiber optic dimensional and CMM probe development
- Electro-optical sensors for machine tool feedback

In addition to the above, there are numerous customer sponsored projects and smaller internal projects. It should also be noted that a large percentage of their custom inspection machines delivered have substantial sensor R&D components. The company currently performs over one million dollars of R&D per year directly aimed at laser and electro-optical sensor development for measuring, inspection and robot guidance. Major applications for this type equipment within private industry and possibly within the USAF are as follows:

- Inspection and automatic adaptive control of turbine blade manufacture and rework
- Inspection of turbine assemblies and components. For example, they have projects underway with General Electric for inspection of rotor shaft internal defects. Previous projects were concerned with tip clearance on rotors and for the automatic ultrasonic inspection of disks (laser/optical sensor control portion)

- Air frames and components.

• **DiffRACTO** has participated to a small degree with Boeing in the ICAM sheet metal center development program. Much of the hardware needed to actually implement such a center from the inspection and robot control point of view, already exists at DiffRACTO. They are currently in discussions with Lockheed Georgia on this same subject.

• **Structural Integrity** – DiffRACTO has completed laser-based, miniaturized strain gage for aircraft fatigue strain history monitoring for the Canadian Department of National Defense. This gage can be used for highly stressed air frames and gives real time as well as stored data directly in digital form. It can exist in a fiber optic based version having very low weight and freedom from electrical noise.

• **Manufacturing Technology** – applications include the inspection of parts on flexible machining centers and the inspection of tools in the changers. A line of "RoboGage" vision based inspection machines has been developed, which are being incorporated in flexible lines.

• **Ordnance** – DiffRACTO inspection systems can be used for the inspection of ordnance. These normally high volume, high tolerance items require both dimensional and defect inspection, and are therefore ideally suited for electro-optical inspection. Some DiffRACTO sensing systems operate with fiber optics and can be utilized in remote areas, e.g., loaded munitions areas, etc. Sensors already exist for large caliber barrel straightness determination. Barrel bore dimensions and flaws are other areas for which sensors have been developed. Miniaturization of this technology to small caliber barrels (5.56mm to 40mm) has proved successful.

• **Robot Guidance** – A major project is currently underway to utilize the vision guidance system of the Canadarm used on the Space Shuttle to guide robots in plants. This project, in conjunction with the Government of Canada and a major automobile manufacturer, is expected to result in improved robots capable of much higher accuracy. A principle goal of the project is dynamic, flexible assembly and material handling. A project submission in this area applied to the F-16 has been jointly made with General Dynamics to the USAF.

DiffRACTO standard products include:

- **Standard Laser/Electro-Optical Sensors**
 - 'MAXAN' Matrix Array Computer Vision Units
 - Series S and D High Resolution Outer Diameter Sensors
 - 'LaserProbe' High Resolution Laser Triangulation Sensors
 - LaserSurf In-line Microfinish Sensors
 - Model SF and BF Surface and Bore Flaw Detection Equipment
 - K-Series Microcomputer Based Controller for Optical Sensors and Machines
 - Contact Optical Digital Bore Size Probes
 - LS Light Section Sensors (2/3D Vision Sensors)
- **Standard Machines**
 - PACS – Programmable Laser Airfoil Contour Systems
 - Laser Gear Inspection Machine
 - 'RoboSorter' Computer Vision Bolt Sorting Machine
 - 'RoboGage' Programmable Robotic Inspection Machine (vision-based)

Average Work Force: Total – 175 (5 PhDs)

Gross Sales: No Data

Plant Size: 69,000 sq ft

Experience: DiffRACTO has performed one contract with the USAF (AFWAL – Materials Laboratory) through the Defense Development Sharing Program. They have worked with the US Army

(Picatinny Arsenal) as well as with US industry, e.g., General Electric Co., Boeing Aircraft Co., Union Carbide, Uniroyal, Westinghouse, Bunker-Ramo, Battelle, and others. They also work with the Canadian Department of National Defense and National Research Council of Canada.

Keywords: Measurement & Control Systems; Laser Optics; Optics; Automated Precision Measuring; Precision Measuring; Inspection Equipment; Ordnance Inspection Equipment; Sensors; Turbine Blade Inspection; Gear Inspection; Flaw Detection; Structural Integrity; Robotics; Robot Guidance; Manufacturing Technology; ICAM; Machine Vision; Inspection Systems; Electro-Optic Inspection.

Revised: Aug 85

DIPIX SYSTEMS Ltd

Code: DIP

Address: 120 Colonnade Road
Ottawa, Ontario, Canada K2E 7J5

Contact: Mr. R Cobbold, Dir of Marketing – (613) 224-5175

History: Dipix is a Canadian owned company incorporated in Canada in September of 1978. They are presently represented on a world-wide basis by various companies. US offices are at: DIPIX Inc, Rivers Center, 10220 Old Columbia Rd, Columbia, MD 21046. Contact: Mr. L Robert (301) 596-0505.

Capability: Dipix Systems Ltd has an established capability in the field of digital image processing for remote sensing and digital terrain mapping applications. The company has developed a powerful family of image analysis systems capable of processing imagery from satellite data (e.g., Landsat), digitized imagery (e.g., Photographic), cartographic (Map Digitizer), seismic, and other sources. Dipix engineers, analysts and programmers have designed many unique features into its systems. As a result, the company has been able to establish and maintain a leading market position with export sales around the world.

Central to Dipix's highly regarded position in the image processing field, is its extensive technical and analytical experience in developing applications and utility software to address user operational needs. Dipix has an enviable in-house research and development track record. The company's new ARIES III image analysis system with its proprietary iterative pixel processor offers a programmable high speed processor for improved interactive image processing of large images.

Average Work Force: PhDs – 4
Masters – 6
Bachelors – 30
Others – 55

Gross Sales: 1984 – \$4.2M
1985 – \$9.0M

Plant Size: 30,000 sq ft (new facility) – Nov 82)

Equipment: Dipix has a full range of modern test equipment including DEC VAX and micro VAX computers, as well as a number of Dipix ARIES-II and ARIES III Systems used for program and engineering development

Experience: Dipix personnel have many years of experience in digital image analysis going back to the early 1970s. The six original founders of the company were involved in the design and building of the ground station in Italy, as well as the original Aries image analysis system for the Canadian Forestry Service. Dipix has had a close relationship with the Canada Center for Remote Sensing, where they have been contracted for both hardware and software development. At present, Dipix has in excess of 100 turnkey digital image analysis systems installed world-wide. In the last two years, the company has installed ARIES systems at the Jet Propulsion Laboratory, US Corps of Engineers and various universities and commercial organizations.

Keywords: Electronics; Image Processing; Software Service; Digital Image Analysis; Turnkey Systems; Software Development; Hardware Development; Transmission of Digital Imagery; Storage of Digital Imagery.

Revised: Aug 85

DOCUMENTED CIRCUITS Inc

Code: DCI

Address: P. O. Box 8, Station "A"
Kingston, Ontario, Canada K7M 6P9

Contact: Mr. D J Mercer, General Manager - (613) 389-1032

History: DCI was incorporated in June 1980 and was fully operational January 1981. The company is Canadian owned and operates from three locations in Ottawa, Kingston and Toronto.

Capability: The combination of sophisticated software, state-of-the-art hardware and experienced personnel enable DCI to provide reduced turnaround times, accurate phototools and complete compatible documentation packages at competitive prices. DCI provides a total service to industry including:

- Printed circuit design utilizing a powerful interactive CAD system.
- The color coded layout method of printed circuit board design.
- Digitizing and photoplotting from customer supplied color coded layouts.
- Photoplotting from customer supplied tapes.
- PCB design consultation services.
- Auto insertion reports.
- N/C drill tapes in Excellon, Trudrill and Digital formats.
- Precision phototooling for component and solder sides, silk screen, solder resist and drill graphic plots.
- Magnetic tapes to drive the multiwire process.

DCI will be manufacturing and marketing the DIMACS computer-aided engineering and design systems for the electronics industry. Their main objectives will be to:

- Offer industry state-of-the-art computer assisted printed circuit design and documentation.
- Manufacture and market the DIMACS computer-aided engineering and design software system.

DCI has the capability to work to MIL, IEEE, JIC, IPC, and ANSI standards and specifications or to customer defined parameters.

Average Work Force: Design technicians, training and applications personnel, software development and support engineers, plus an experienced management team for a total staff of 60.

Gross Sales: 1984 - \$1.7M
1985 - \$2.2M

Plant Size: 17,000 sq ft

Equipment: The following equipment is employed by Documented Circuits Inc:

- (4) Digital Equipment "VAX" Mainframes.
- Digital Equipment 2060 Computer with 512K of memory.
- RP06 Disk Packs.

- TU77 Magnetic Tape Drive.
- LA120 Printer Terminal.
- 1055 Calcomp Pen Plotter.
- Digital Equipment: LP20 Line Printer.
- (6) Digital Equipment VT100 Terminals.
- (6) Tektronix 4014 Graphic Terminals.
- (2) 8602 Talos Digitizing Tables.
- (3) Gerber Scientific PC-800 Digitizing Systems.
- 732B Gerber Scientific Photoplotter with a 48"x60" bed.
- Gerber Scientific 4300 Controller.
- (2) Digital Equipment VAX series 730 computers.
- (1) Digital Equipment VAX series 750 computer.
- (18) Orcatech raster graphics terminals.

Phototools are produced, inspected and packaged in a controlled environment.

Experience: DCI has processed designs for companies in the telecommunications, computer, medical, aerospace, and commercial electronics fields. Some of the major accounts include - Rockwell International, Northern Telecom Ltd, Spar Aerospace, and AES Data.

Keywords: Electronics; Software Services; CAD PC Design; CAD/CAE Systems Software.

Revised: Oct 85.

DONLEE PRECISION

Code: DON

Address: 9 Fenmar Drive
Toronto, Ontario, Canada M9L 1L5

Contact: Mr. Rodney Innes, Sales Manager - (416) 743-4410

History: Donlee Precision is a Division of Donlee Manufacturing Industries Ltd, which is a subsidiary of Redpath Industries Ltd. Donlee Precision was founded in 1966.

Capability: Donlee Precision is a manufacturer specializing in precision tubular and shaft type components for the Aerospace, Military and Nuclear industries. Components manufactured include jet engine shafts, landing gear cylinders and pistons, rotor masts, and propeller shafts. Capabilities include complete engineering, manufacturing and quality assurance departments.

Average Work Force: Engineers - 3
Manufacturing - 65
Administrative - 15

Gross Sales: 1984 - \$11.0M
1985 - \$14.0M (Est'd)

Plant Size: 60,000 sq ft

Equipment: Production facility includes CNC turning and milling, gear cutting and grinding, internal honing, deep hole boring, ID grinding, and OD grinding. Quality Insurance includes complete inspection and non-destructive testing facilities.

Experience: Present customers include Canadian Government Crown Corporations and major Aerospace and Military contractors in both Canada and the US.

Keywords: Shafts; Cylinders; Jet Engine (Components); Landing Gear (Components); Machining; Gears; Boring; Grinding; NDI.

Revised: Aug 85

DOUSERV GROUP INC

Code: DOU

Address: 1200 McGill College Ave, Suite #1930
Montreal, Quebec, Canada H3B 4G7

Contact: Mr. G Raymond Doucet, PEng, President -
(514) 866-5836

History: Founded in 1974 by G Raymond Doucet, PEng, as Doucet & Associates Consulting Ltd. Evolved through acquisition and development of other firms leading to the establishment of offices in several Canadian cities and in the US. Incorporated in 1980 as DOUSERV GROUP Inc. The parent company along with its associated firms are well established in the fields of communications, energy, industry, and transportation serving various clients in government, public utilities and the private sector. The headquarters are in Montreal, Canada with field offices in St John's, Newfoundland; Halifax, Nova Scotia; Quebec City, Quebec; Montreal, Quebec; and Dallas, TX.

Capability: The DOUSERV GROUP undertakes large and small projects and is committed to provide clients with quality services for the best value in the shortest possible time. The Group comprises over 140 full-time employees and associates with highly regarded outside specialists. The professional and technical resources have access to the best available work tools, equipment and documentation.

The DOUSERV GROUP organization is characterized by its flexibility to undertake projects requiring multidisciplinary teams. It brings together under common leadership the resources from its associated firms to complete a project in the most effective manner. The individual offices operated by associated firms are also uniquely qualified to pursue a distinct specialization for a specific market area. The DOUSERV GROUP organization is therefore capable of serving all client requirements.

A description of their services is the following:

Studies - feasibility, technology assessment, investment, market, tariff, economic, financial, cost benefit, research and development.

Design - systems design and detail specifications, quantity and cost estimating, contract documents, and bid evaluation.

Construction - inspection, supervision, equipment installation, construction management, start-up operations and commissioning.

Management - project management services, procurement, technical assistance, advisory services, technology management and transfer, operations and maintenance planning and quality control.

Average Work Force: Over 140 employees, including engineers, technicians and support staff.

Gross Sales: 1984 - \$4.0M
1985 - \$6.3M

Plant Size: Offices located in cities named above

Experience: Maritime Telephone & Telegraph Co, New Brunswick Telephone Co, Governments of New Brunswick and Newfoundland, Newfoundland Telephone Co, Bell Canada, Government of Ontario, Rogers Cablesystems, Canadian Broadcasting Corporation, Canadian Pacific, Department of Communications of Canada and of Quebec, Quebec Telephone, Hydro Quebec, James Bay Energy Corp, Inter City Gas, Metropolitan Gas, Montreal Children's Hospital, Teleglobe Canada, Southwestern Bell, International Civil Aviation Organization, among others

Keywords: Satellite, Microwave, Telephone Networks, Switching, Private Telephone Exchange, Computer Communications, Office Communications, Mobile Radio Communications, Cellular Communications, Community Cable Television, Broadcasting, Civil, Electrical, Heating, Air Conditioning, Structural, Fire Alarm, Energy Conservation, Oil Pipelines, Gas Pipelines, Land Surveying, Remote Sensing, Topographic Surveys, Automated Displays, Videotex, Teletex, Telemetry, Audio Visual Facilities, Secondary Surveillance Radar, Navigation Aids, Automation & Control.

Revised: Aug 85

DOWTY CANADA ELECTRONICS Ltd

Code: DCE

Address: 774 Rye Streetway, Unit #1
Peterborough, Ontario, Canada K9J 6W9

Contact: Mr. W Czechowski - Contracts - (705) 743-6903

History: Dowty Canada Electronics Ltd was incorporated in 1976 to design, manufacture and service electronic products for the communications, air, maritime and ground transportation markets. In 1982, Dowty Canada Electronics Ltd (formerly Simtron Ltd) was acquired by Dowty Equipment of Canada Ltd. Dowty specializes in the design, development, manufacturing, certifications testing and overhaul of landing gear, flight control systems and related aerospace and marine equipment.

Capability: Dowty Canada Electronics Ltd's activities are divided into three major areas:

Aerospace - The design and manufacture of aircraft subsystems and black boxes. This is typified by the microprocessor-based "steer-by-wire" equipment presently in production as standard equipment on the Canadair Challenger 601, the deHavilland Dash 8, and Gulfstream IV Aircraft. Dowty Canada Electronics Ltd is approved to AQUAP 4 levels which have direct equivalency to MIL-Q-9858.

Multiplex Systems - Dowty Canada Electronics Ltd has developed a Data Acquisition System (Multiplex 490). Ongoing R&D and development are proceeding on equipment Health Monitor and Control Systems, particularly in the aerospace sector. Custom Systems engineering activity is ongoing.

Build to Print - Dowty Canada Electronics Ltd is engaged in high quality Build-to-Print for a number of customers. Products include printed circuit board assembly, wire harnessing, cabinet assembly, test equipment and testing. The in-house engineering capability enables Dowty Canada Electronics Ltd to offer design, redesign and substitution services on subcontract work.

Average Work Force: R&D - 3
Engineers - 3
Technicians - 3
Production - 65
Others - 10

Gross Sales: 1984 - \$2.0M
1985 - \$3.0M

Plant Size: 10,000 sq ft (capability to expand to 25,000 sq ft)

Equipment: Equipment includes Hollis Wave Soldering Machine, degreasing unit, and various R&D and test equipment.

Experience: See Capability Section.

Keywords: Steer by Wire Systems; Data Acquisition, PCB Fabrication, Test Equipment, Specialized Test Equipment; Wiring Harness Fabrication, Cabinets, Cabinet Testing.

Revised: Sep 85

DOWTY CANADA Ltd

Code: DCL

Address: 574 Monarch Avenue
Ajax, Ontario, Canada L1S 2G8

Contact: Mr. John A Jones, Regional Marketing Manager - (416) 683-3100

History: Dowty Canada is a member of the Dowty North American Aerospace Division, a part of the Dowty Group, based in Cheltenham, England. The Group is an international supplier of aerospace and defense, mining, industrial and electronic equipment.

Dowty Canada Ltd has a longstanding reputation as a supplier of state-of-the-art aircraft landing gear and industrial and marine hydraulic systems. In recent years, the company has developed a total capability in microprocessor-controlled hybrid actuation systems with the acquisition of Dowty Canada Electronics Ltd, a company specializing in the design, development and manufacture of sophisticated electronic control equipment.

Capability: Dowty provides Integrated Systems Management from concept design to product support of - aircraft landing gear systems; microprocessor-controlled ground handling and flight control systems; industrial, marine and military hybrid actuation systems; and equipment health monitoring, information and communication systems.

Computer aided design augments our extensive design and development capability and with CNC manufacturing equipment, ensures the cost effective production of sophisticated products. Ongoing development projects ensure that Dowty Canada is prepared for future hydraulic, electrohydraulic, mechanical, and electronic controlled actuation and control system needs.

Average Work Force: Design & Development Engineering - 50
Sales & Technical Staff - 30
Quality Control - 30
Operations - 200
Financial & Administration - 30
Total- 340

Gross Sales: No Data

Plant Size: 12 Acres (Land) 200,000 sq ft

Equipment: Dowty Canada maintains an extensive design capability, augmented by an integrated CAD/CAM system and specialized analytical modelling software. Development and certification test facilities include a Cyber II computer for test control and data acquisition; strength, fatigue and drop test rigs; and environmental test chambers. A wide range of state-of-the-art manufacturing equipment ensure cost-effective production of the sophisticated components produced by Dowty Canada. In addition to CAD/CAM, Dowty has implemented a Flexible Machining System

Quality assurance and reliability functions are performed in accordance with the standard practices of the aerospace and marine industries. Dowty Canada operates in accordance with Canadian and US military and commercial standards meeting AQAP-1, AQAP-4, AQAP-6, FAA and DOT requirements

Experience: Since its inception in 1940, Dowty Canada has provided landing gear for many successful commercial and military aircraft, ranging from business jets and commuter transports to military fighters, jet trainers and helicopters

Current programs include main landing gear for the Bell-Boeing V-22 Joint Services Vertical Lift Aircraft and the Kaman Aerospace USN SH-2F (LAMPS MK1) Helicopter. Dowty is also providing a wide range of equipment, including main and nose landing gear and steer-by-wire nosewheel steering systems, for the de Havilland Dash 8 Short Haul Transport and the Canadair CL-601 Jet Transport. In addition, Dowty is supplying main and nose landing gear for the Fairchild Republic USAF T-46A Twin Engine Jet Trainer and outrigger landing gear for the McDonnell Douglas USMC AV-8B V/STOL Light Attack Aircraft

Dowty Canada also designs and manufactures a wide range of marine equipment and systems. Currently in production are lightweight capstans for the Bell Aerospace US Navy Air Cushion Landing Craft (LCAC). Dowty also supplies the hydraulic power pack

and constant tension winch for the DAF Indal Helicopter Recovery Assist, Securing and Traversing (RAST) System, which is in service with the US, Japanese and Canadian Navies.

Current flight control programs include the hydromechanical rudder control actuators and dampers for the de Havilland Dash 8 and actuators for the MD-80 and Dash 7 aircraft.

In conjunction with its Electronics Subsidiary, Dowty has developed aircraft ground steering systems which comprise a microprocessor-based electronic control unit which integrates signal inputs from the rudder pedals and/or a pilot's handwheel to control the electrohydraulically actuated nosewheel. Dowty designs and manufactures the electronics, the hybrid actuation and the landing gear, providing complete systems management throughout the project. The steer-by-wire systems have been developed for de Havilland Dash 8, Canadair CL-601 and Gulfstream G-IV aircraft.

Keywords: Helicopter, Aircraft, Landing Gears; Flight Controls; Actuators; Shock Mitigation; Liquid Springs; Hydraulics; Hydromechanical; Electromechanical; Motions Compensation; Microprocessor Central Units; Ground Steering Systems; Machining; Damping; Certification Testing; Integrated Systems Management; Steering (Ground) Systems.

Revised: Sep 85

DSMA ATCON Ltd

Code: DSM

Address: 4195 Dundas Street
West Toronto, Ontario, Canada M8X 1Y4

Contact: Mr. Al Bullock, Mgr, Equipment Division - (416) 239-3011

History: DSMA Atcon Ltd is the advanced engineering affiliate of Dilworth, Secord, Meagher and Associates, which began in 1952 as a high technology engineering organization and was incorporated in 1956 as Dilworth, Secord and Associates Ltd. It is a wholly owned Canadian firm controlled by its senior employees. A computer center, development laboratory, manufacturing facility, and domestic and foreign subsidiaries and affiliates complement the head office engineering resources. The company has the following branch offices:

- DSMA Atcon Ltd - 17704-103rd Ave, Room 202, Edmonton, Alberta T5S 1J9
- Atcon Services Ltd - 3235 Wharton Way, Mississauga, Ontario L4K 2B6
- American Atcon Inc - 1105 N Market St, P.O. Box 1347, Wilmington, DE 19899

Capability: DSMA Atcon Ltd is a firm comprised of engineers and advanced technology consultants. Their services and fields of specialization are shown below

Services - Feasibility and conceptual studies, equipment development, systems engineering, detailed design, manufacture supervision, quality assurance and commissioning, heat transfer, stress and seismic analyses, program management, procurement services, turnkey design and supply through a constructor affiliate

Fields - Machinery design, emergency maintenance and remote handling equipment, controls systems engineering, R&D facilities, aerospace and transportation equipment, environmental studies, air pollution, toxic and hazardous products waste disposal, and nuclear, thermal solar, wind and wave energy projects

Average Work Force: Principal – 1
Associates – 8
Controller – 1
Support Staff – 50 (mechanical, electrical, aeronautical, structural, nuclear, and health physics disciplines)

Gross Sales: 1984 – \$2.5M
1985 – \$2.6M

Plant Size/Equipment: 10,000 sq ft of office space fully equipped for engineering and design. A computing facility is integrated in the design office to provide powerful stress analysis capabilities.

10,000 sq ft of laboratory space equipped to support development, design and manufacturing projects. Specialized equipment such as a small wind tunnel, a shaker table, and dynamometer rig are used to extend the engineering capabilities of the design office.

An engineering office in Edmonton serves clients in western Canada with its associated firm, Alatcon Services Ltd. undertaking design and supply projects. American Alcon Inc of Wilmington, Delaware, serves clients in the US.

Experience: Typical projects include:

- Space shuttle RMS Component Engineering, Test Equipment Design and Supply
- Toxic Gas Dispersion Systems – Requirements, Design, Procurement, Commissioning
- Program Management of Canadian Electric Vehicle Demonstration and Evaluation
- Medical and Physics Accelerator Facilities – Feasibility, Concepts, Design
- Wind, Wave and Solar Energy R&D Programs and Facilities
- Nuclear Industry, Environmental Assessment, Engineering and Decontamination
- Design of Off-Road Transportation Equipment and Transportable Power Supplies
- Data Acquisition and Control System for a Petro-Chemical Extraction Plant
- Stress Analysis of Aircraft Structures & Nuclear Equipment Code Verification
- Design and Development of Heat Transfer Apparatus for Steel Mills
- Design of Nuclear Power Plant Equipment, Apparatus, Systems
- Special Industrial Air Handling and Ventilation Design and Development
- Remote Handling Systems Concepts and Design for Fission and Fusion Facilities
- Remote Maintenance and Repair Equipment Development, Design and Construction
- Test Rigs for Aircraft Components, Satellites and Nuclear Service Equipment
- Test and Research Facilities, Environmental Chambers, Wind-Wave Flumes, Particle Accelerators, Engine Test Stands, Hydrogen Fuel Test Facilities, Astronomical Observatories

Keywords: Consulting; Stress Analysis; Test Rigs; Hydrogen Fuel Cells; Transportable Power Supplies; Particle Accelerators; Radiation Protection; Remote Handling; Ground Support Equipment; Payload Equipment Design; Airframe Analysis & Testing; Shaker Table; Wind Tunnel Systems; Engine Test Beds; Studies; Remote Manipulators; Space Frames; Controls; Instrumentation; Micro-gravity Manufacturing; Space Furnaces.

Revised: Sep 85

DY-4 SYSTEMS Inc

Code: DY4

Address: 888 Lady Ellen Place
Ottawa, Ontario, Canada K1Z 5M1

Contact: Mr. Terry Black, VP Marketing & Sales – (613) 728-3711

History: DY-4 Systems Inc is a Canadian-owned manufacturer of high-performance computer printed circuit board and system level products for commercial, civil and military applications. Formed in 1979, the company has expanded rapidly based on strong engineering design and system integration talent, and a high quality manufacturing process. The company has sales offices located in Ottawa, Campbell, CA, and Aarhus, Denmark.

Capability: The board level products, which the company has developed and manufactures to commercial as well as ruggedized levels, are based on the industry standard VMEbus architecture using 68000/10 (16-bit) and 68020 (32-bit) processor family. The product line includes a wide selection of processor, memory and intelligent disk and tape controllers, as well as intelligent I/O controller and chassis systems, again for commercial and ruggedized applications. A variety of DOS and real time operating systems, as well as high level languages are offered.

In addition to the above products, the company also provides potential customers extensive engineering capabilities ranging from system integration of chassis and board level products, to system software development. DY-4 has related experience in graphics subsystems for Cand Air Traffic management. DY-4's manufacturing has a Quality Assurance Program equivalent to DND Standard 1016 or MIL-I-45208.

Average Work Force: Employees – 100

Gross Sales: 1985 – \$6.6M
1986 – \$9.0M (Est'd)

Plant Size: 27,000 sq ft

Equipment: Extensive LAN-based development systems, CAD, and semi-automatic production facilities.

Experience: The DY-4 present customer base for civil and military programs includes Raytheon (Canadian Radar Modernization Program), Magnavox (Air Traffic Control), Terma Elektronik (C³ Systems and Graphic Display), Picker International (Army Mash Units), Hughes Aircraft, Boeing Aerospace, and CAD Industries (Simulators).

DY-4 has designed a ruggedized shipboard command and control system for the Danish Navy; an airborne management computer was designed for a system integrator to be mounted onboard deHavilland Dash-7 ice reconnaissance aircraft; and the company has also completed extensive work for MOT.

Keywords: Computers; Components (Computers); Operating Systems; Systems Engineering; Graphics Subsystems; Air Traffic Management; C3 Systems.

Revised: Aug 85

EASTERN PRECISION CASTING Inc

Code: EPC

Address: 820 Deslauriers Street
St Laurent, Quebec, Canada H4N 1X1

Contact: Mr. R W McKee, Assistant to President – (514) 337-9600

History: EPC is a Canadian-owned, small business (as prescribed by the SBA) established in 1976. They are a precision investment casting house in both ferrous and non-ferrous alloys utilizing the lost wax process. The company has a US subsidiary, Eastern Precision Casting (NY) Inc, located in Plattsburgh, NY. The US subsidiary company was opened in 1984, but is not yet a complete foundry.

Capability: EPC produces investment castings to the customers drawing and specifications, and their clients are from the following fields of endeavor Aerospace, Aircraft, Missile, Microwave, Engines and Commercial. Ferrous to 20" x 20" x 20" - Non-ferrous to 50" x 30" x 20".

Average Work Force: Engineering - 6
Quality Control - 7
Sales and Marketing - 5
Others - 120

Gross Sales: 1984 - \$6.5M
1985 - \$9.0M (Est'd)

Plant Size: 45,000 sq ft

Equipment: Equipment includes furnaces, robots, wax injection machines up to 100 tons, x-ray, spectrometer, tensile testing M/C, coordinate measuring M/C, hardness testing M/C, zygo, and heat treatment capability for non-ferrous.

Experience: Approximately 80% of our production is for the US market. US clients include - Colt Industries, Lockheed, McDonnell Douglas, Raytheon, Hughes Aircraft, Singer, TRW, Litton Industries, Martin Marietta, Rockwell International, and Bendix. Canadian clients include - Canadair, Pratt & Whitney, Canadian Marconi, Northern Telecom, Garrett Manufacturing, Spar Aerospace, and RCA.

Keywords: Investment Castings; Castings; Ferrous Castings; Non-Ferrous Castings.

Revised: Aug 85

EBCO INDUSTRIES

Code: EBC

Address: P. O. Box 9420
7851 Alderbridge Way
Richmond, British Columbia, Canada V6X 2A4

Contact: Mr. Helmut Eppich, Chairman & Ch Executive Officer
- (604) 278-5578

History: Ebco Industries Ltd is a Canadian owned company formed in 1956 as a small tool and die shop in Vancouver. The company has had a compounded growth rate of 25% per year since that date and now it is a multi-million dollar concern comprising twelve companies. This highly diversified organization, including all subsidiaries and affiliates, has a wide range of expertise that includes all aspects of machining & fabricating, electro-plating, electronic data entry & processing equipment, electronic R&D, data processing, furniture, general & specialty construction, custom wheels & automotive accessories, real estate, upholstery, and stoves. This profile will concentrate only on their machining capability which can vary from a 20 minute grinding or polishing job to an 18 month multi-million dollar custom 50 ft dia atomic cyclotron.

Capability: Ebco Industries is a multi-faceted corporation with a major investment in the machining and fabrication business. Their skills and facilities include:

- Machining of all kinds - milling, grinding, planing, turning, boring, sawing, etc. They also have CNC capability (planer mills and machining center)
- Fabrication and medium and heavy plate work.
- Welding - manual, semi-automatic and automatic in steel, stainless steel, aluminum, T-1, nickel-chrome, titanium, copper, low-temperature steel, etc.
- Thermal stress relieving and heat treating
- Sand blasting and painting.

- Tool and die work, engraving in metals and plastics.
- Mechanical and hydraulic assembly.
- Metal stamping.
- Tube bending and welding.
- Electro-plating - decorative chrome, brass, copper, zinc, bronze. Industrial hard chrome, cadmium, zinc, iron-manganese and zinc phosphating.
- Galvanizing plant - hot dip galvanizing. Centrifugal system for small hardware.

Ebco specializes in close tolerance machining utilizing Brunson optical transit squares and 3-axis digital readouts. Their quality assurance procedures meet CSA standards Z299.2, Z299.3, Z299.4, and ASME Section VIII. Their fabrication facility has the capability to shear, cut, burn, bend, shape and roll plate.

Ebco custom builds large and small assemblies, and machines and boasts the largest repair capability in Western Canada. This latter capability is especially applied to the repair and rebuilding of sawmill and pulpmill machinery, and mining equipment.

Ebco is developing a new Aerospace Division that will contain the largest and most sophisticated machining capability available. The main machines comprise two bed tables, each 90 ft long by 160 inches wide, having two gantries per table each with three spindles capable of five axis machining, that operate simultaneously by CNC control. They will also have available anodizing and ultrasonic immersion inspection systems.

Average Work Force: Total - 675

Gross Sales: 1984 - \$41.0M
1985 - \$46.0M

Plant Size: 211,022 sq ft on 13 Acres (additional 52 acres for future development)

Equipment: Facilities: Crane capacity - maximum lift 150 tons, 40 ft under hook (in shops); maximum lift 70 tons, 36 ft under hook (in yard); Door Size - maximum 24 x 24 ft; and Shipping facilities - road, rail and water loading capacity. Ebco's equipment list is too voluminous to itemize in this profile, however, the following is a brief summary - punch presses ranging from 15 to 250 tons; overhead cranes ranging from 5 to 80 tons; mobile cranes up to 7.5 tons; cutting equipment - Linde 4 & 8 head with tracers, plasma arc machine, ironworker, sheet metal and plate shears; and Stress Relief Furnace 50 ft, 20 ft wide, 16 ft high, maximum temperature 1000°C and maximum load 100 tons.

Other equipment includes welding manipulators, boring mills, planers, lathes, milling machines, drills, forming presses, plate rollers, welding equipment, planer mills, CNC machines with software preparation and programming system, and various inspection and quality control equipment.

Experience: Ebco's clients include - Boeing Co (MX transporter trailer for USAF and CNC - machined components for jetfoil vessel for USN), Hooker Chemical Co (Electrolytic cathode cells for Chlorine plants), DeHavilland Aircraft (CNC - machined aluminum components for Dash 7 and Dash 8 aircraft), University of British Columbia (56 ft vacuum tank and resonators for the Meson Facility - TRIUMF Project), Robbins Co (underground tunnel boring machines to 32 ft dia), Lockheed Petroleum Services Ltd (wellhead cellars for sub-sea oil well drilling and exploration), plus many other companies and a variety of manufactured items.

Keywords: Machining; Extended Length Machining; Metalworking; Heat Treating; Coating Specialized; Precision Machining; Stamping; Tooling Fabrication; Die Fabrication; Titanium; Mechanical Assembly; Hydraulic Assembly; Repair Capability

Revised: Aug 85

ENHEAT Inc (Aircraft Division)

Code: ENH

Address: 1 Lusby St
Amherst, Nova Scotia, Canada B4H 3Y7

Contact: Mr. Roger Hawthornthwaite, General Manager -
(902) 667-3315

History: Enheat Inc is a high-technology aircraft component manufacturing, repair and overhaul facility founded in 1952 by Enamel & Heating Products Ltd of Sackville, New Brunswick, Canada. It was originally owned by Rhodes & Curry Ltd, an Amherst based company, who sold it to Candian Car & Foundry Ltd of Montreal, Quebec. These companies manufactured railway wheels and cars for over 60 years prior to the Second World War.

Canadian Car & Foundry started an aircraft plant in 1940. Until the end of the war in 1945, the Canadian Anson was manufactured as well as many other types and makes of aircraft. Enamel & Heating Products Ltd changed its name to Enheat Ltd in 1972 and Enheat Inc in 1980.

Capability: Enheat Inc, Aircraft Division, is a high technology aircraft component manufacturing and repair & overhaul facility.

Average Work Force: Engineers - 2
Quality Control - 11
Others - 219

Gross Sales: 1984 - \$16.91M

Plant Size: 98,995 sq ft (Manufacturing)
63,378 sq ft (Storage)

Equipment: Enheat Inc employs the following equipment: autoclave, drying ovens, temperature controlled layup room, process room, paint shop, brakes, presses, routers, rolls, shears, drop-hammers, stretch forming machines, lathes, millers, planers, jig borers and grinders, dimplers, miscellaneous small hand tools and processing tanks for phosphoric acid anodizing.

Experience: Enheat has 33 years of experience with major aircraft companies of North America. Present customers include: Canadian Department of National Defense, Boeing Airplane Co, Lockheed California Co, McDonnell Douglas Aircraft Co, Grumman Aerospace Co, Fleet Industries Ltd, The deHavilland Aircraft of Canada Ltd, and Canadair Ltd.

Keywords: Machining; Bonded Components (Metal); Bonded Components (Composite); R&O (Aircraft Components); Components (Aircraft); Aircraft Components.

Revised: Aug 85

ENVIRONMENTAL APPLICATIONS GROUP Ltd

Code: EAG

Address: 114 Avenue Road
Toronto, Ontario, Canada M5R 2H4

Contact: Mr. Richard J Kolomeychuk, Vice President -
(416) 968-3684

History: The Environmental Applications Gp Ltd was incorporated in 1977 to provide multidisciplinary environmental services to industry and government. It is entirely Canadian owned by four principals, with its sole office in Toronto.

Capability: The company was formed as a consulting firm with two major divisions - Atmospheric, and Life Sciences. The Atmos-

pheric Division engages in R&D in pure and applied meteorology, climatology, cloud physics, air quality, and air-sea interaction. Scientific expertise includes numerical modelling of atmospheric phenomena, experimental design and field studies, instrumentation, data analyses, and environmental assessment.

Average Work Force: PhDs - 3
MSs - 4
BSs - 3
Others - 4

Gross Sales: 1984 - \$0.75M
1985 - \$0.70M

Plant Size: 3,250 sq ft (Office Space)
750 sq ft (Laboratory/Workshop)

Equipment: Special equipment and facilities include the following:

- Atmospheric - tethered sonde (Altitude to 1 Km) and airsonde (Altitude to 25 Km) systems utilizing radiotelemetry and optical theodolites for boundary layer and upper air measurements, and remote meteorological base station.
- Air Quality - high-volume particulate samplers, and SO₂ gas analyzers.
- Laboratory - equipped for physical, chemical, microbial, and biological analyses; and includes an atomic absorption spectrophotometer.
- Data Processing - includes a in-house Wang 2200 VP mini computer with access via timesharing to DEC, IBM, and CDC mainframes.

Experience: Environmental Applications Gp Ltd has experience with Canadian Environmental Protection Service, Atmospheric Environment Service, Transport Canada, Ontario Hydro, Onakawana Development Ltd, Potash Company of America, Quebec Hydro, Amoco Minerals Ltd, Polar Gas Project and Ontario Ministry of Environment.

Typical Projects of Environmental Applications Gp Ltd include:

- Runway Site Selection
- Toxic Organic Emissions Study
- Atmospheric Loadings and Emissions Studies
- Upper Atmospheric Experiments
- National and Anthropogenic Emissions Inventories
- Wind Speed and Gust Analyses for Structural Loadings
- Natural Gas Pipeline Associated Studies
- Meteorological Studies using Tethered Balloons
- Air Quality Studies - Remote and Urban
- Ice Accretion on Structures (Ships)

Keywords: Meteorology; Micrometeorology; Satellite Meteorology; Climatology; Air Quality; Pollution Monitoring; Environmental Assessment; Dispersion Modelling; Long Range Transport; Boundary Layer; Upper Air; Cloud Physics; Cloud Dynamics; Weather Modification; Solar Energy; Wind Energy; Acoustics; Icing.

Revised: Oct 85

EPIC DATA Inc

Code: EDI

Address: 7280 River Road
Richmond, British Columbia, Canada V6X 1X5

Contact: Mr. Brian Lowe, Director, Sales & Marketing -
(604) 273-9146

History: Epic Data Sales Ltd is a member of the Canadian owned Ebco group of companies (see Ebco Industries Ltd). Ebco's wide range of products and capabilities caused numerous difficulties in labor and material tracking. Identifying a need for an automated data collection system, they looked at the marketplace and could not find a fully capable system at a reasonable price. Consequently, Ebco developed its own system and incorporated Epic Data in 1974 to manufacture and market it.

Capability: Epic Data designs and manufactures micro-processor-based data collection systems. Terminals and controllers incorporated in modular hardware and software design which ensures both reliability and flexibility while keeping down costs. Terminals users on the factory floor, in the office, and in other environments find the terminals easy and straightforward to operate.

Epic makes five series of data collection terminals. One series, the 100 Series Single Function Terminals, is dedicated to a single type of input media, the barcode. Other series, such as the 050 Series Multi-Function Terminals, the 300 Series Dual-Function Terminals, and the 100 Series Independent Terminals may be configured with new input devices (e.g., magnetic stripe reader, punched badge reader, punched card reader), special interfaces (e.g., weight scales), and peripherals (e.g., CRTs, printers). Epic's modular approach means that system changes or enhancements do not obsolete equipment already purchased. Epic also offers the 200 Series Portable Terminals which, because they are battery operated, sealed, and waterproof, are ideal for use in hostile, harsh and remote environments where other methods of data collection are impractical.

Epic also manufactures the 900 Series of system controllers. Controllers are an intermediary device between the data collection terminals and the system's host computer. The controller's primary functions are polling terminals for collected data; transmitting prompts to the terminals for user guidance; sequencing, editing, and assembling collected data; time of day generation; and data output to host or off-line storage. More sophisticated Epic controllers offer such capabilities as user programmability of controller operating parameters, and data validation (in conjunction with an Epic Winchester disk storage unit). The primary advantages of Epic controllers are maximization of system throughput and redundancy (dual controllers, each with their own communications line, monitor each other and take over in a case of failure of either the other controller or the other line). Redundancy can be built into every level of Epic systems thereby ensuring not only maximum throughput but also continuous data collection, even if the host goes down.

Epic's expertise lies in adapting microprocessor technology to the broad field of data collection. This includes support of both standard and custom hardware and software products, and covers a range of responsibilities from terminal OEM sales to the installation and maintenance of turnkey systems including the host computer the customer prefers.

The capabilities of the assembly group include - PCB component insertion, wave soldering and board cleaning, terminal assembly, cable fabrication, and metallized foil label making. The Manufacturing Test Group performs board and terminal burn-in and test. Self Test Program (STP) prompts are utilized during the terminal burn-in process to check out and monitor terminal functions. Customer orders are fully configured in-house and go through a full systems test prior to shipping. Multi-stage quality monitoring is provided by an independent QA/QC Group. Epic Data's manufacturing facility is augmented by its parent company, Ebco Industries Ltd. Ebco provides capabilities in the areas of metal fabrication, painting, and tool & die making.

Average Work Force: Total - 150

Gross Sales: 1984 - \$12.0M
1985 - \$15.0M

Plant Size: 14,500 sq ft

Equipment: Epic Data's equipment includes - Wave solder machine; aqueous PCB washer and contaminant monitor; PCB bake chamber and PCBA dry chamber; component prep machines; semi-automatic DIP inserter; metallized foil processing equipment; automatic shorts tester; cable tester; PCB burn-in rack; walk-in terminal burn-in chamber; drill presses; flat cable press; crimp terminal machines; STP dedicated testers for PCBAs; and miscellaneous meters, scopes, analysers, and debugging testers.

Experience: Epic Data is a pioneer and leader in the design and manufacture of data collection equipment. Epic has major clients throughout the world and their equipment is frequently recommended for use by such major computer companies as Xerox, Tandem, DEC, and Sperry. Epic's base of over 500 customers include - General Electric, Hughes Aircraft, LTV Aerospace, DEC, General Dynamics, Litton, Lockheed, Martin Marietta, Monsanto, Northrop, Mexican Government, Canadian Government, and Motorola.

Keywords: Data Collection Systems; Terminals; Portable Terminals; Controllers; Microprocessor Technology; Electronics; Modular Design; Standard Products; Custom Hardware; Custom Software; Component/System Testing; Testing/Test Equipment; Solid State Devices; Software Services; Turnkey Vendor.

Revised: Aug 85

ERNST LEITZ CANADA Ltd

Code: ELC

Address: 328 Ellen St
Midland, Ontario, Canada L4R 2H2

Contact: Mr. David G Stephenson, Dir., Marketing & Commercial Operations (705) 526-5401

History: Leitz Canada was established in Midland, Ontario in 1952 as a subsidiary of Ernst Leitz Wetzlar GmbH, West Germany. At that time, the company commenced operations with twelve personnel and since then, the company has expanded through internal growth in three major business areas:

- Photography
- Custom commercial optical assemblies and systems
- Military optical assemblies and instruments

Capability: Ernst Leitz Canada is a well integrated firm specializing in the design and manufacture of complex precision opto-mechanical and electro-optical assemblies and systems for the commercial and government markets built under the Leitz and ELCAN tradenames. From a comprehensive suite of computerized optical design and CAD programs in the engineering departments, to complete opto-mechanical testing capabilities, Leitz is equipped with the most modern equipment to undertake both large volume production and prototype quantities for conventional, state-of-the-art and research programs. Full machining capabilities, surface treatment, optical grinding and polishing of spherical, aspherical and plano optics, in glass, metal and infrared materials, microprocessor controlled thin film coating facilities, and optical measurement and testing apparatus enable Leitz to undertake the fabrication, assembly and test of this complex optical equipment. New developments are underway in optical data storage equipment for harsh environments and military systems, infrared coating, and weight reduction techniques using plastics.

Average Work Force: Professionals - 50
Total - 475

Gross Sales: 1984 - \$18.0M
1985 - \$22.0M

Plant Size: 110,000 sq ft

Equipment: Ernst Leitz' equipment include - In-house HP computing hardware, Eros IV MTF measuring bench, environmental test facilities, CNC machining centers, full set of optical measuring equipment including Tropel digital measuring interferometer, microprocessor controlled coating chambers, and Leitz 3-axis coordinate measuring machine.

Experience: Ernst Leitz' experience is outlined in four different areas:

Photography/Reconnaissance - design and manufacture of the Leica M camera and a family of photographic lenses for the Leica M and R cameras; production of cameras for instrumentation and event recording; design and manufacture of lenses used in underwater applications for military and commercial applications; and design and fabrication of lenses used in aerial reconnaissance, earth resources and space application with focal lengths from 18mm to 900mm.

Custom Commercial Assemblies and Systems - optics for optical data storage, x-ray equipment, image intensifiers and microfilm systems; complex periscope viewing systems for use in high radiation nuclear environments; and industrial electro-optical equipment including laser scanners, non-contact inspection devices and quality control instruments.

Other Military Applications - design and manufacture of visual and infrared assemblies for guidance and fire control applications; binoculars, rifle sights, weapon sights, rangefinders (optical and laser); and HUD and HDD optics.

Research and Development - optical countermeasures, optical data storage for harsh environments, thermal imaging, image intensification, and optics for space.

Keywords: Image Processing & Optics; Optics Visual; Optics Infrared; Electro-optics; Photography; Lenses (Reconnaissance); Lenses (Underwater); Fire Control Optics; Remote Sensing; Sights; Opto-mechanical Precision Assemblies; Optical Research & Development; Optical Coatings; Laser Optics.

Revised: Sep 85

E. S. MANTIS RESEARCH CORP

Code: ESM

Address: 370 East Esplanade
North Vancouver, British Columbia, Canada
V7L 1A4

Contact: Mr. E Sitnam, President - (604) 929-5245

History: A Canadian owned company, incorporated in April 1976.

Capability: E.S. Mantis Research Corp is engaged in the design, development and manufacture of solar collectors. They have developed a relatively small, light-weight collector that is touted as highly efficient. The unit produces working fluids up to 149°C (300°F) in a short time period without tracking the sun. The unit can readily be incorporated into systems for water and space heating, air conditioning, desalination, and generation of electricity. They will be producing a semi-parabolic, high temperature solar collector in early March 1984.

They also have under development an aero-dynamic grenade and a new ATX-05 anti-tank missile.

Average Work Force: Professionals - 5
Labor Force - 14

Gross Sales: No Data

Plant Size: 12,000 sq ft

Experience: Customers include Pakistan, Jamaica, and Mexico

Keywords: Energy; Solar Collectors; Grenade; Anti-Tank Missile.

Revised: Aug 85

EXPLOSAFE AMERICA Inc

Code: EXP

Address: 230 New Toronto St
Toronto, Ontario, Canada M8V 2E8

Contact: Mr. Douglas H Martin, General Manager -
(416) 255-9193

History: Explosafe America Inc was formed in 1973 to handle the design, research & development, manufacture, and sale of the "Explosafe" Engineered Explosion Prevention System. Under the guidance of its engineering and technical staff, the "Explosafe" system underwent all the development, qualification testing, and evaluation cycles attendant to obtaining the USAF Wright Aeronautical Laboratories product approval documented in Report #AFWAL-TR-80-2043, and subsequently supported by specification MIL-B-87162 (USAF) with vendor sourcing as identified in Qualified Products Listing QPL 87162-1 issued in Apr 82.

Capability: "Explosafe" is a practical method of preventing containers of volatile liquids and gases (i.e., gasoline, naphtha, diesel, benzene) from explosion resulting from electrostatic discharge, fire bombing, gunfire, or post crash ignition, etc. The "Explosafe" system is based on a matrix of aluminum foil, slit and expanded to form a mesh of hexagonal openings. When layered, the mesh results in an open-cell batt, cut and shaped into modules for incorporation into any sized container. By installing "Explosafe", the container's interior is transformed into a honeycomb of small cells or compartments. In the event of ignition, the "Explosafe" system acts as a heat dissipator, modifies flame propagation, and prevents explosion. Explosafe salient features include:

- Displaces maximum one percent of fuel capacity for any given volume.
- System is passive therefore offers permanent life time installation capability - low life cycle cost.
- Dissipates static electricity.
- Does not sustain fire and does not emit toxic fumes.
- Designed in modular form, facilitates retrofit in old or new fuel tank installations.
- Provides radical reduction of fuel slosh.
- Facilitates reduction of tank stress and failure.

Average Work Force: Total - 10

Gross Sales: 1984 - \$650K
1985 - \$750K

Plant Size: 30,000 sq ft

Equipment: Explosafe's modern facility is equipped with machinery of proprietary design and laboratory facilities which includes flame tube equipment for combustion over pressure testing.

Experience: Through the past five years, Explosafe has participated with the Canadian Government/USAF evaluation of the aircraft fuel tank ullage explosion prevention system of "Explosafe". This effort has resulted in test/evaluation completion as documented in report #AFWAL-TR-80-2043. This has subsequently substantiated by US Government specification MIL-B-87162 and borne out by Qualified Products Listing QPL-87162-1.

Through prototype and production contracts, Explosafe has been included in the following vehicles - FMC - M113, LVTP-7A1; Cadillac Gage - "Peacekeeper" Bombardier - Canadian Armed

Forces two and one half ton military vehicle; Navy Sea Fox; and numerous others.

Keywords: Explosion Suppression Systems; Explosafe (Fuel Tank Protection); Fuel Tank Protection.

Revised: Oct 85

EXPRO CHEMICAL PRODUCTS Inc

Code: ECP

Address: P. O. Box 5520
Valleyfield, Quebec, Canada J6S 4V9

Contact: Mr. J A MacGregor, VP of Marketing - (514) 371-5520

History: Expro Chemical Products Inc (formerly Valleyfield Chemical Products Corp) was started in 1940 and has been operating continuously ever since. The complex has undergone two multi-million dollar modernization programs - the first in 1950-1952 and the second in 1977-1978. It was incorporated under the former name in 1977. The company changed ownership on 15 March 1982. Because of the new minority share interest held by CIL Inc, the company will have access to Nobel's Explosive Company, Ardeer, Scotland. The latter company has extensive capability for primary research.

Capability: Expro is a fully integrated commercial and military propellant and explosives complex. It has its own capability to produce nitric acid, nitroglycerine, nitrocellulose, propellants, and RDX. Nitrocellulose is produced by the batch process, utilizing wood pulp of high alpha cellulose content and nitric acid. It also has the capability to produce nitrocellulose from cotton linters. Present plant capacity for nitrocellulose production is 15 million pounds per year, with the capability to expand to 40 million pounds annually should the need arise.

Expro uses the in-house produced nitrocellulose in the manufacture of single-base, double-base and triple-base propellants. The former are primarily used in small arms munitions, military or sporting, in medium caliber military ammunition, and large caliber weapons in multi-perforated form. The double-base product is used mainly for small caliber guns. The plant produces its own nitroglycerine, using the Biazzi Process, for the manufacture of the double and triple base propellants. Nitroguanidine for triple-base propellant manufacture is purchased.

Expro produces RDX by the Bachmann Process. It is manufactured to military specifications in various granulations as required. The RDX is mixed with TNT to produce cyclotol. Other products include Composition B, Compositions A-3 & A-4, and Compositions C-4 & A-5. Demolition Block M5-A1 and M112 is also manufactured at the company's facilities.

Average Work Force: Total - 950

Gross Sales: No Data

Plant Size: 1,100 acre site

Experience: Though its prime client continues to be the Canadian Department of National Defense, Expro is one of the two accredited suppliers of propellant for the US Air Force GAU-8/A weapon system. With respect to the GAU-8 system, they supply Honeywell with both propellant and high explosive (Comp A-4) and Aerojet with Comp A-4. Other major clients in the US include Olin Corp (Nitrocellulose for ball propellant), and E. I. DuPont de Nemours (propellant). HE distribution in US is by direct sales. Expro has received orders for its propellants and explosives from the Netherlands, Belgium, Portugal, Italy, France, Greece, Turkey, Brazil and Venezuela.

Keywords: Armament; Chemistry; High Explosives; Explosives; Propellants; Nitrocellulose; RDX; Single Base; Double Base; Triple Base; Composition B; (A-3); (A-4); (A-5); (C-4); Demolition Block

Revised: Sep 85

FAG BEARINGS Ltd

Code: FAG

Address: 801 Ontario St
Stratford, Ontario, Canada N5A 6T2

Contact: Mr John Tsaltas, Customer Service, Sales - (519) 271-3230

History: FAG Bearing Ltd has been in business since 1883 (Germany). The company is incorporated under the laws of the Dominion of Canada. Branch offices are located in Vancouver, Edmonton, Winnipeg, Sudbury, Toronto, Hamilton, Montreal, and Truro. A US affiliate, FAG Bearings Corp, is located in Stamford, Conn.

Capability: FAG Bearings Ltd is involved in the manufacturing of precision ground anti-friction bearings including instrument & miniature bearings, waterpump shaft assemblies, and separate aircraft bearing assemblies.

Average Work Force: Engineering - 18
Production - 519
Admin & others (Stratford) - 177
Total - 714

Gross Sales: No Data

Plant Size: Manufacturing - 200,000 sq ft
Warehouse - 75,000 sq ft
Engineering - 4,000 sq ft
Laboratory - 2,500 sq ft

Equipment: FAG Bearings has complete facilities to manufacture precision ground anti-friction bearings from raw materials (bar stock or tubing). Tolerances to ABEC 9. Aircraft bearing production started in 1981 (heat treating, grinding, assembly, etc.). They have well equipped heat treating facilities, a metallurgical laboratory, bearing testing facilities (life, noise, torque, etc.), complete Clean Room (Class IV), assembly for instrument bearings, and separate aircraft assembly. FAG Bearings also has:

- Material Control Laboratory - Microscope (mag 1250x) Leitz; Vickers Micro Hardness Tester; Rockwell Hardness Tester; and Eddy Current and Ultrasonic Devices.
- Heat Treating Furnaces - Vacuum (computer controlled), Batch with Endo Thermic Generators, continuous type (Nitrogen/Methane), Induction, Salt, and Carburizers (pack & gas).
- Deep Freeze
- Mass Spectrometer - Leak Detector.
- Infrared Analyzers.

Experience: FAG Bearing has experience with many US and Canadian companies Garrett (Airesearch) in Phoenix, AR; Bendix Corp at various locations; GE in Wilmington, MA; Litton Industries at various locations; McDonnell Douglas in Grand Rapids, MI; Sperry at various locations; Varian Assoc in Beverly, MA; Canadian Marconi in Montreal, Que; Spar Aerospace in Toronto, Ont; DISC Defense Ind Supply Center in Philadelphia, PA; Dept of National Defense in Downsview, Ont; and US Army Aviation in Texarkana, TX. Final destinations of some contracts include numerous US Air Force Bases.

Keywords: Bearings; Precision Bearings; Anti-Friction Bearings; Waterpump Shaft Assemblies; Instrument Bearings; Miniature Bearings.

Revised: Oct 85

F. G. BERCHA AND ASSOCIATES Ltd

Code: FGB

Address: 1220 Kensington NW, Suite #301
Calgary, Alberta, Canada T2N 3P5

Contact: Dr Frank G Bercha, President - (403) 270-2221

History: The company was incorporated in 1975 and is Canadian owned. There are branch offices in Ottawa, Ontario; St John's, Newfoundland; and an affiliate corporation, F. G. Bercha and Associates Inc., located in Texas and Arizona. The US offices are wholly owned by Canadian principals.

Capability: The company specializes in research and development, and engineering and environmental consulting, with particular expertise in the areas of ice mechanics, remote sensing, Arctic engineering, special structures development, system simulation and risk analysis. The company provides a totally integrated capability due to its multidisciplinary workforce consisting of engineers, environmental scientists and systems professionals.

Average Work Force: Professionals - 15
Support Staff - 5

Gross Sales: 1984 - \$2.0M
1985 - \$1.5M

Plant Size: 4,000 sq ft (Head Office)

Equipment: Computer terminals and specialized graphic terminals.

Experience: The company is perhaps best known for its capability to generate strategic information in relation to Arctic operations. From remote sensing data, the company is able to generate environmental information on ice and ocean systems applicable to the engineering design of structures. On the basis of this information, company engineers are able to turn the information into specific structural design parameters, and carry out preliminary, as well as detailed engineering designs of structures for service in the Arctic frontier regions. In the area of arctic and ice engineering and consulting, the company has been employed by most of the major US companies, including Exxon, Amoco, ARCO, Sohio, Phillips, Mobile, and Chevron. In addition, principal Canadian clients in the Arctic include Dome, Petro-Canada, and Gulf Resources. Finally, the company is well known for its ability to develop novel structures for service in frontier conditions. Such structures have included portable aircraft shelters made of aerospace materials to military specifications. To date, such aircraft shelters have been developed for the Canadian Department of National Defense for military service in support of Arctic airborne operations.

Keywords: Environment; Software Services; Consulting; Ice Mechanics; Remote Sensing; Arctic Engineering; Special Structures; System Simulation; Risk Analysis; Portable Shelters; Mapping; Geographic Analysis; Geologic Analysis.

Revised: Sep 85

FIELD AVIATION COMPANY Ltd

Code: FAC

Address: Field Aviation Co Ltd
Lester B Pearson International Airport
Box 6023
Toronto AMF, Ontario, Canada L5P 1B9

Field Aviation West Ltd
Calgary International Airport
Box 3186, Station B
Calgary, Alberta, Canada T2M 4L7

*Field Aviation Co Ltd
Standard Life Building
275 Slater St, Suite #320
Ottawa, Ontario, Canada K1P 5H9

Contact: *Mr. C H Wilkinson, Mgr. Gov't/Industry Relations - (613) 236-9577

History: Field Aviation started in Canadian general aviation in 1947 in Oshawa, Ontario. They established a western facility in Calgary, Alberta in 1952 and moved the eastern Canada shops to Toronto in 1960. The company is one of the Hunting Group of Companies, a widely diversified group with headquarters in London, England and operations world-wide in many different segments of the manufacturing and service sectors.

Capability: Field Aviation provides a full range of aircraft sales, modification, repair and overhaul services to general aviation, regional airlines, corporate aviation departments, and governments. They are the exclusive Beechcraft distributor for Canada, and stock a considerable supply of Beechcraft spare parts at both their Toronto and Calgary facilities.

Field West has a top quality aircraft painting facility that will accommodate aircraft up to Boeing 737 size.

Field Aviation also has complete overhaul jigs for the deHavilland Twin Otter and the full line of commercial Bell helicopters. They have completed a major conversion of a number of Gulfstream G1 aircraft to commuter airliners. They have manufactured a wide range of standard and custom aircraft seats with emphasis on the Twin Otter and CASA 212, and have recently expanded their seat production capabilities to meet the needs of seat production for the deHavilland Dash-8. Specific capabilities include magnafluxing, NDT, electrical re-harnessing, hydraulic overhaul, customization/modification, and limited engine overhaul. Work is approved to Canadian Ministry of Transport, FAA and Department of National Defense standards.

Custom design of aerial survey installations and aerial spray or water bombing systems has been a Field Aviation specialty for many years. Both fixed and rotary wing aircraft have been fitted with custom designed systems and are currently flying world-wide.

Field Aviation has often been called to assess crash damage and undertake recovery/salvage operations in remote parts of the world varying from the Canadian Arctic to the mountains of South America or the Far East. A recent task was completed on a Twin Otter in the Antarctic.

Specialized expertise exists for repair, overhaul and modification of: Aero Commander; Beechcraft, BH125; Bell 47, 204B, 205, 206, and 212; Bristol 170; Cessna; PBV-5A; deHavilland DHC-2, DHC-3, DHC-4, DHC-6, and DHC-7; Douglas DC-3, DC-4, and DC-6; Fairchild F27; Gates Learjet; HS748; Hughes 369; Lockheed Electra; MU-2B; Piper; Pilatus PC-6; Scottish Aviation Twin Pioneer; Short SC-7, SD3-30, and SD3-60, and Gulfstream G1.

Average Work Force: Engineers - 2
Technologists/Design Spec - 8
Others - 350

Gross Sales: 1984 - \$31M
1985 - \$34M (Est'd)

Plant Size: 175,000 sq ft (Toronto)
232,000 sq ft (Calgary)
20,000 sq ft (Ft Lauderdale, FL)

Equipment: Toronto - Refueling, ground power and other services for most military, general aviation and corporate aircraft, and in-house or ready access to all associated aviation shop facilities. Calgary - Refueling, etc., as above, major aircraft overhaul shops, assorted overhaul jigs (mainly Twin Otter and Bell helicopters), hydraulic test facility, NDT, specialized aircraft salvage equipment, and B737 size paint shop.

Experience: Field Aviation's current customers include - Canadian Department of National Defense, Canadian Department of Transport, US Navy, British Army, Royal Canadian Mounted Police, numerous regional airlines (world-wide); and numerous other corporations.

Keywords: Aerial Survey Systems; Aerial Spray/Water Bombing; Non-Destructive Testing; Hydraulics; Seat Manufacture; Spares Supply; Survey Systems; R&O (Aircraft); Modification (Aircraft); Water Bombing.

Revised: Aug 85

FLEET INDUSTRIES (A Division of Fleet Aerospace Corporation)

Code: FLT

Address: P. O. Box 400
Fort Erie, Ontario, Canada L2A 5N3

Contact: Mr. H B MacRitchie, VP, Marketing - (416) 366-4435

History: Fleet Industries began operations in Canada in 1930 as Fleet Aircraft of Canada Ltd.

Capability: Fleet Industries manufactures major components for the prime Canadian and US manufacturers of commercial and military aircraft; helicopters; satellites; and radar and sonar systems. Fleet was established in Canada in 1930 to design and manufacture aircraft for the world's civilian, transport, and military markets. Between 1930-1950, almost 4,000 complete aircraft were built at Fleet and flown from the company's 2,400-ft on-property runway.

Today the company concentrates its efforts on the production of major components. Fleet has enclosed facilities of approximately 500,000 sq ft, and about 650 employees. Assembly and test methods meet the latest requirements of both civil and military authorities in Canada and the US. Fleet's ability to produce quality products on schedule and at competitive prices has won a high reputation for the company in both commercial and defense work. In 1982, Fleet's sales were more than \$39M.

AIRCRAFT:

Boeing - 707 fin and rudder; 727 aft engine fairing; 747 SP wing-to-body fairing structure; Boeing E3A TF33 engine nacelles; and 757 APU doors.

Canadair - Challenger CL600 rudder assembly.

deHavilland - DHC-5 bonded components; DHC-6 bonded components; DHC-7 bonded components and engine nacelles; DHC-7 wing leading edges, ailerons; and DHC-8 bonded wing and fuselage panels, inboard and outboard flap assy.

Grumman - A6 inboard and outboard flaps, and bonded honeycomb assemblies.

Lockheed - L-1011 main landing gear doors (aft dorsal structure & aft engine cowlings), and CP140/P3C flight station.

McDonnell-Douglas - A4E speed brakes and flaps; F18A graphite avionics doors; and DC-9 flaps and ailerons (Canada).

Sikorsky Aircraft - Black Hawk UH60A Medevac kits, and blade sub-assemblies.

RADAR:

General Electric - ASR welded antennas.

Lockheed Electronics - Gun fire control system antennas and cabinets.

Raytheon - Phased array antennas "Pave Paws" & "Cobra Judy", AEGIS.

Sperry - Gun fire control system antenna and cabinet.

SATELLITE:

Hughes Aircraft - Solar panel substrates, Anik C, SBS, NASA, Anik D, GOES/GMS, Westar/Palapa B, Leasat, and AT&T.

Spar Aerospace - Bonded panels/structures, Anik C, SBS, Anik D, and Westar, spun/despun assemblies for Brasilsat.

SONAR:

Dept of Supply & Services - Retractable fixed hull mounted, towed bodies, VDS systems and faired tow cables; and repair and overhaul.

EDO Corp - Transducer structure.

General Electric - Heat exchangers.

Westinghouse Canada Ltd - Retractable fixed hull mounted, towed bodies, VDS systems and faired tow cables.

Raytheon - Variable depth sonar (VDS) hoist system.

Average Work Force: Total - 750

Gross Sales: 1983 - \$35.3M
1984 - \$39.0M

Plant Size: 500,000 sq ft

Equipment: Fleet Industries' equipment includes Kearney & Trecker, Sundstrand and Cincinnati numerically controlled equipment, autoclaves, mills, lathes, presses, furnaces and other special equipment associated with aerospace manufacturers. New bonding facility includes 10' x 31' autoclave, water jet cutting, 5-axis NC core cutting and C-scan inspection equipment.

Experience: In 1982, from sales of over \$35M, some 90% was exported to the US. Commercial sales accounted for 53% with 47% military.

Facilities and skills have been developed to produce a diversified list of mechanical structures which include radar, sonar, air cushion vehicles, and other defense and commercial assemblies. In the bonding field, Fleet Industries manufactures a wide range of structural components such as antennas, space satellites, electronic cabinets and other specialized items requiring composite technology.

The list of Fleet's customers reads like a "who's who" of the aerospace industry. Boeing, deHavilland, General Electric, Grumman, Hughes, Lockheed, McDonnell Douglas, Raytheon, Sikorsky, Westinghouse, and many others have placed their confidence in the ability of Fleet Industries to produce quality components.

Fleet Industries' Quality Assurance Program meets the requirements of both Canadian Government specification DND-1015 and US Mil Spec MIL-Q-9858A. The average ratio of inspection to direct labor is 1:10. To insure that production of components meets contractual requirements, the Quality Assurance department reviews and defines product quality with the engineering department; collaborates in the review of specifications; generates quality assurance procedures; reviews quality problems, and effects corrective action and reports on departmental quality performance. Standard mechanical inspection techniques are supplemented by magnaflux, fluorescent penetrant, radiography, destruction testing, chemical analysis, and three-axis co-ordinate measuring equipment.

Keywords: Aircraft Components, Radar Antennas, Satellite Structures, Sonar Equipment, Advanced Composites, Bonding Capabilities.

Revised: Sep 85

FOOTTIT MITCHELL AND ASSOCIATES

Code: FMA

Address: 77 Metcalfe St, Suite #900
Ottawa, Ontario, Canada K1P 5L6

Contact: Mr. J C Bond, Senior Consultant - (613) 563-0236

History: Foottit-Mitchell and Associates is a Canadian owned company founded in 1976 with its office in Ottawa, Ontario. The objectives of the company are two fold:

- To provide an interface between industry and appropriate Canadian Government departments and agencies.
- To provide advice to industry on the establishment of liaison on company-to-company and company-to-government bases.

Capability: Senior members of the firm have had extensive experience in both Canadian Federal Government and industry in the fields of research, development and production. Much of this experience has been in the area of US-Canada defense-industrial cooperation. The combination of industrial and government experience is applied to the facilitation of government-industrial relationships and to company-to-company cooperation in the following areas Aerospace, Electrical and Electronic, Shipbuilding, General Manufacturing, Government Organization, and Systems Planning and Management Evaluation.

Foottit-Mitchell and Associates, in addition to the professional staff of four, has a number of associates with specialized functional knowledge who are called in for specific tasks.

Average Work Force: Professional - 4
Support Staff - As required

Gross Sales: Not Applicable

Plant Size: 1,500 sq ft

Experience: Foottit-Mitchell and Associates currently provides service to twenty manufacturing companies of which several are located in the US. The provision of these services involves contact with most Canadian Federal Government departments and agencies, particularly with the Departments of National Defense and of Supply and Services. The work with these agencies is conducted at all organizational levels and has been concerned with policy, technology, marketing, funding and contracting.

Keywords: Consulting; Government Relations; Systems Planning; International Trade Relations; Marketing.

Revised: Aug 85

FOUNDATION INSTRUMENTS Inc

Code: FI

Address: 24 Colonnade Road
Nepean, Ontario, Canada K2E 7J6

Contact: Mr. Bob Parslow, VP, Marketing - (613) 226-4000

History: Foundation Instruments Inc has been active in the fiber optic market since 1977. The company specializes in complete fiber optic communications products and systems that it has developed, manufactured and installed. To meet customer requirements, they have distributors around the world and a plant in Cleveland, OH.

Capability: Foundation Instruments Inc is a high-technology company dedicated to advancing fiber optic capabilities. The

company performs the design, development and manufacture of all its products. Beginning with a full understanding of a client's communications requirements, Foundation Instruments Inc provides assistance in project management, systems specifications, application engineering, installation supervision, documentation and training. The company provides complete turn-key service from the design to the installation of a fiber optic communications system to fully meet existing and future requirements.

The research capabilities with respect to fiber optic systems are best related by referring to systems that have been designed by Foundation Instruments' R&D Group. These projects include - fiber optic transmission system with high performance 10 MHz baseband analog bandwidth; 250 Mb/s digital link; bi-directional data links; and a special fiber optic system for a shipboard communications simulator. Other systems FI has supplied include secure (TEMPEST) data circuits using fiber optics; subscriber and central office local loop terminals for telephone systems; T1, T2, and 12.98 Mb/s data rate, long haul fiber optic links; and tactical fiber optic communications systems.

Foundation Instruments' capabilities are constantly being expanded to include a five video channels per fiber communications systems, a high data rate multiplexer and a fiber optic data multiplex system.

Average Work Force: Engineers - 27
Production - 15
Admin - 11

Gross Sales: 1984 - \$2.6M
1985 - \$6.2M

Plant Size: 20,000 sq ft (New facility - Jan 84)

Experience: Foundation Instruments Inc has experience with government and commercial corporations, several of which are listed below:

- Department of National Defense
- Atomic Energy Canada Ltd (AECL)
- US Navy
- IBM
- General Electric
- US Army Corps of Engineers
- US Air Force
- Ontario Hydro
- Ford Aerospace Corp
- Quebec Hydro
- National Research Council
- Harris Corporation

Keywords: Communications; Electronics; Radar; Space Systems; C3; Fiber Optics; Optical; Video Systems; Wideband; Telephone; Receivers; Transmitters; Modems; Avalanche Detectors; Laser Diodes; Fusion Splicers; Power Measurement; Moisture Content.

Revised: Oct 85

GARRETT MANUFACTURING Ltd

Code: GML

Address: 255 Attwell Drive
Rexdale, Ontario, Canada M9W 5B8

Contact: Mr. C F Fauquier, Manager of Sales - (416) 675-1411

History: Garrett Manufacturing Ltd (GML) is the Canadian subsidiary of the Garrett Corporation, one of the Signal Companies.

A Garrett office was established in Canada in 1952 to provide sales and services support for Garrett products in Canada. One year later, the company established a repair and overhaul facility near Toronto International Airport and added an engineering department to support this endeavor.

Throughout the 1950s, Garrett expanded its engineering department, added a production department and began the design and manufacture of ground equipment for the Canadian aircraft industry. In 1961, Garrett Manufacturing Ltd assumed a world product mandate for design, development and production of electronic temperature controls.

Capability: Backed up now by a quarter-million square feet of modern design, manufacturing, testing and support facilities, GML markets electronic environmental control systems, communications systems, thick and thin film hybrid microcircuits, illuminated information panels, peripheral vision display systems, advanced systems and subcontract services, and employs approximately 925 people of which 35% are engineering or engineering support staff. With the addition of the illuminated information panels manufacturing facility at 47 Baywood Road, GML now has six facilities in Rexdale, Ontario.

Recent growth has not been limited to the addition of one product line. GML's engineering facilities have expanded significantly and their marketing efforts have yielded important accomplishments in all of the company's product lines. GML:

- Has been contracted to lead a study of the ICECS (Integrated Closed Loop Environmental Control System) concept for the Advanced Tactical Aircraft.
- Has been the first to attain Canadian Government approval to offer a "test house service" within the Canadian Industrial TEMPEST Program.
- Has been certified to Military Standard 1772. Beginning in 1986, certification to this new and more stringent standard will be mandatory for all hybrid microcircuit manufacturers submitting proposals for new military contracts let by the US Department of Defense. Less than 10 of the approximately 400 hybrid manufacturers in North America have been certified at the time of writing.
- Has been selected as the Canadian Contractor for the NATO ASRAAM Program. GML's responsibility includes not only the design and development of the missile fin control actuation system, but other elements of the total weapon system.

GML's marketing efforts are supported in the field by the Garrett Corporation's sales and service organization with offices in most major cities in the world.

GML is actively engaged in the research and development of control systems, RF communications, analog and digital circuit design, and display technology. Twelve percent of annual sales is spent on research.

Environment and EMI qualification testing to military/aerospace standards is performed in their government-approved test facility. A simple standard quality control system than conforms to NATO AQAP-1 and MIL-Q-9858 is employed.

Electronic Environmental Control Systems (EECS): GML EECSs are a major subsystem of the Garrett Environmental Control Systems that fly on more than 70 percent of the commercial and military aircraft in the western world. EECSs are used in cabin, cockpit and compartment air-conditioning systems; wing anti-ice temperature control systems; window heat control systems, and some liquid coolant systems.

In 1984, GML was awarded a contract sponsored by the Flight Dynamics Laboratory, Aeronautical Systems Division at Wright Patterson AFB to study and demonstrate the life cycle costs related to advanced digitally controlled Integrated Closed-Loop Environmental Control Systems (ICECS). Four years of research will involve the analysis, simulation and development of a full scale laboratory system.

GML is internationally known for its expertise in digital control. The ICECS program will further enhance the company's technology base with the implementation of modern control theory

techniques within a fully integrated aircraft system. Several advanced digital technologies will also be studied.

Communications Systems - Emergency Locator Beacons developed by GML are used throughout the world in military, commercial and general aviation applications. These low power transmitters automatically provide an emergency homing signal to assist search aircraft to locate an aircraft in distress.

Personal Locator Beacons and Survival Radio Sets for military users permit two-way voice communication with search aircraft as well as providing an emergency homing signal. These radios are being used by the Canadian Forces and the Swedish Air Force.

VHF/AM Single Channel Transmitters and Receivers are produced for civil and military aviation air traffic control communications. Contracts have been received from the Ministry of Transport to update all Canadian air traffic control towers. This type of equipment offers many performance and maintenance features not previously available.

The ILS (Instrument Landing System) Signal Analyzer is a portable microprocessor controlled radio receiver which precisely measures the radial signal characteristics emitted from Instrument Landing Systems, and provides assurance that the landing system is operating within prescribed tolerances. The Canadian Ministry of Transport employs this equipment to measure the landing systems' accuracy at over 80 airports located across Canada.

Designed and developed by GML under license to British Aerospace PLC, the Survivable Battlefield Antenna (SBA) replaces the commonly used vehicular end-fed whip antenna. The SBA's unique design - reduced height and robust construction - makes it ideal for use in the tactical arena where a reduced visual signature and excellent operational capability are desirable.

Microcircuits (Custom Thick and Thin Film Hybrid Circuits): GML's microcircuits are produced in a fully integrated facility with a dedicated engineering, sales and production staff. The facility, equipped with specialized manufacturing equipment, is considered one of North America's best. Custom thick and thin film hybrids are now being manufactured to the new and more demanding Military Standard 1772. These include power hybrids and assemblies with leadless chip carriers surface mounted on multilayer ceramic motherboards.

Hybrids manufactured by Garrett are used in missile guidance systems, inertial navigation systems, radar systems and other electronic equipment on a variety of military and commercial aircraft, as well as in US Government electronic security systems.

Illuminated Information Panels: GML now produces types IV, V, and VI illuminated information panels and accessories used on ground, airborne, and marine-based equipment for communications, pressure and other environmental control systems, and navigational aids and radar systems. All panels and accessories are manufactured to military standards and NVG (Night Vision Goggle) compatibility requirements.

Peripheral Vision Display: The PVD is a subliminal attitude change indicator for cockpit work-load reduction and pilot disorientation prevention. It operates on the principle that orientation information is sensed primarily by a person's peripheral vision system and is processed subconsciously by dedicated areas of the brain. The system is now in production for military applications.

Advanced Systems and Subcontract Manufacturing Service. GML's 30 years experience in the design, development and manufacture of a wide range of aerospace and aerospace related products provides a sound base for the production of state-of-the-art major defense and communication systems. This experience, supported by a modern up-to-date facility, is also being offered for subcontract manufacturing.

The Advanced Systems capability provided by GML involves the company in a number of collaborative NATO programs. Programs

beginning with R&D and design, through the system integration and development of comprehensive benefits programs, to complete life cycle support and world-wide marketing.

Currently, GML is addressing the feasibility, design and development of control actuation systems, power supplies, weapons computers and specialized test equipment for several NATO requirements.

In addition to GML's participation in the NATO ASRAAM Program, the company is also a member of the multi-national teams conducting the feasibility studies for NATO's LOCPOD (Low Cost Powered Off-Boresight Dispenser) and SRARM (Short Range Anti-Radiation Missile) systems.

The Subcontract Manufacturing services include build-to-print, assembly and testing of sub-assemblies, assembly and testing of electronic systems, and employ GML's highly experienced manufacturing groups, including aerospace standard assurance and computer aided test facilities, to help customers meet demanding delivery schedules. This service backed up by a high-technology team, employing computer aided design and manufacturing techniques provides the best cooperation in major procurement programs.

Average Work Force: Total - 925

Gross Sales: 1984 - \$72M
1985 - \$84M (Est'd)

Plant Size: Administration Building - 64,000 sq ft
Engineering Facility - 33,000 sq ft
Main Production Plant - 75,000 sq ft
Microcircuit Plant - 21,000 sq ft
Customer Support Plant - 34,000 sq ft
Illuminated Panels Facility - 21,000 sq ft

Experience: GML customers are world-wide and include both the commercial and military sectors.

Keywords: Avionics; Communications; Electronics; Software Services; Cockpit Displays; Crash Position Indicator; Environmental Controls; Environmental Instruments; Beacons; R&O (Avionics); Measurement & Control Systems; Power Supplies; PC Board Design & Fabrication; Radio Communication Gear (Fixed, Mobile); Solid State Devices; Hybrid Circuits; Thick Film Hybrid; Thin Film Hybrid; Voltage Transformers, Regulators (Hi/Lo Voltage); Emergency Locator Beacons; Test Equipment & Instrumentation; ATC Communications Systems; Peripheral Vision Display; TEMPEST; RF Communications; Digital Electronics; EMI; Illuminated Information Panels; ILS; Missile Control Systems; Systems Integration; Subcontract Manufacturing.

Revised: Oct 85

GasTOPS Ltd

Code: GAS

Address: 1011 Polytek Street
Gloucester, Ontario, Canada K1J 8Z1

Contact: Mr. B D MacIsaac, President - (613) 744-3530

History: GasTOPS Ltd is a Canadian owned company founded in 1979. Capitalization of the company has been through initial investments and retained earnings, and its growth has been steady since operations began.

Capability: GasTOPS Ltd is primarily involved in the design and development of subsystems and support systems for gas turbine based propulsion systems. The company is organized around projects which emphasize R&D. Projects have been concentrated in the fields of engine health monitoring, engine control systems and engine test data systems. A substantial amount of this development involves computers and software and the company offers

services in these fields to its customers. In the last several years the customer base has been almost exclusively military, both naval and airborne.

Average Work Force: PhDs - 3
Engineers - 11
Others - 6

Gross Sales: 1984 - \$ 780K
1985 - \$1100K

Plant Size: 7,390 sq ft

Equipment: Complete Mechanical Model Ship Electronics test equipment, and in-house computer systems including MICROVAX-II and PDP 11/23.

Experience: Present customers include engine manufacturers, control system manufacturers, and various departments in the Canadian Government including the Navy and the Air Force. GasTOPS Ltd is an R&D company devoted to engineering development of prototypes. Cooperative projects with manufacturers are preferred.

Keywords: Engineering; Gas Turbines; Control Systems; Automatic Data Acquisition Systems; Data Acquisition Systems; Engine Health Monitoring; Inflight Engine Monitoring; Gas Path Analysis; Demonstrator Consoles; Software Design; Expert Systems.

Revised: Jul 85

GENAIRE Ltd

Code: GEN

Address: Niagara District Airport
P. O. Box 84
St Catharines, Ontario, Canada L2R 6R4

Contact: Mr. G R Woolf, President - (416) 684-1165

History: Genaire Ltd is a wholly Canadian-owned and operated corporation, incorporated under Letters Patent issued by the Province of Ontario in August 1951. The company opened its doors for business in October 1951 with a staff of nine persons - six of whom are still active with the business. One hundred percent control remains with the active members of the company.

Capability: Genaire is currently authorized to repair, overhaul, refurbish, test and certify 498 different items of aircraft and aerospace related items for the Canadian Armed Forces through the Department of Supply and Services. The company possesses Canadian Armed Forces approval and Ministry of Transport approval 8-64.

Some of the specialized projects in which Genaire is involved are the repair, overhaul, testing and ranging of radomes; the repair, refurbishing and testing of bladder-tye fuel cells, storage tanks and floats; the world-exclusive manufacture under license of "Airglide" and "Fli-lite" aircraft skis; and the sole Canadian facility for repair and overhaul of cartridge-actuated seat ejection and related gear.

Genaire has the only commercially operated ranging facility for radomes in Canada. Although originally installed to accommodate the Canadian Armed Forces, e.g., Voodoo, Boeing 707, Tracker, Cosmopolitan, etc., the facility has been expanded and now handles civilian radomes from Aztec to the largest facilities available.

The Fuel Cell Department utilizes an advanced urethane process and repairs items as diversified as de Havilland Chipmunk fuel cells to 50,000 gallon storage bladders. The leak-detection process employed is unique and foolproof. Since 1962, the company has produced on a world-wide exclusive basis, Fli-lite and Airglide aircraft skis under license from FliDyne Engineering Corp.

Over the years, Genaire has become a repair facility for aerospace industry for all items except engines and instruments, with certain unique specialization.

Average Work Force: Engineers/Technical - 3
Manufacturing/Others - 82

Gross Sales: 1984 - 3.9M
1985 - 4.2M

Plant Size: 35,000 sq ft (St Catharines, Ontario)
10,000 sq ft (Niagara-on-the-Lake, Ontario)

Experience: Genaire Ltd's primary customer is the Department of National Defense (Canada). They have performed some work for the DOD in the US. They are also listed with several Ski Sales to various customers in Canada, the US, New Zealand and West Germany.

Keywords: R&O (Collapsible Fuel Cells); R&O (Radomes); Cargo Pallets; Platform Side Rails; Towbars; Aircraft Skis; Ground-handling Equipment.

Revised: Aug 85

GENERAL ALUMINUM FORGINGS Inc

Code: GAF

Address: 122 Paquin Road
Winnipeg, Manitoba, Canada R2J 3V4

Contact: Mr. John S Glover, President, Forging Ops -
(204) 661-8601

History: General Aluminum Forgings Inc was established in 1979 by Sterlake Enterprises Ltd (the parent company). An initial plant in Huntington Beach, CA, serving as a pilot company for Winnipeg, began production in Mar 80, and is now at full production. Construction for the Winnipeg plant began in the fall of 1980 and was completed in Jun 81. Production began in Jun 82.

Capability: General Aluminum Forgings manufactures precision, no draft, seamless aluminum forgings as well as conventional forgings ranging in size up to 75 lbs or 175 square inches plan view surface area. The company covers all aspects of the production from die design to final inspection of the finished part. These parts are used primarily in the aerospace industry including both commercial and defense aircraft production, missiles and space vehicles, but because of the characteristics of precision aluminum forgings, which include strength, lightness and greater resistance to corrosion, their application to other industries is on the increase.

Average Work Force: Administration - 30
Production - 55

Gross Sales: No Data

Plant Size: 33,000 sq ft (design capability for additional 56,000 sq ft)

Equipment: General Aluminum Forgings maintains 300 - 3500 ton hydraulic presses.

Experience: General Aluminum Forgings customers include - Boeing Aircraft Corp, AVCO Aerostructures, Northrop Aircraft Corp, McDonnell Douglas, Bendix, Hydraulic Research, National Waterlift, Simular Inc, Garret Pneumatics, Hydraulic Units Inc, Rockwell International, Fairchild Republic, Whittaker Controls, Grumman Aerospace, Mitsubishi Heavy Industries, Heath-Techne, Lockheed California, Lockheed Georgia, E-Systems, Rohr Industries, Parker Hannifin, J E Ramsey Co, Sperry Vickers, Emerson, Hughes Helicopter, and Eldec Inc.

Keywords: Forgings; Aluminum Forgings; Seamless Aluminum Forgings; Die Design; Conventional Forgings

Revised: Oct 85

GENERAL MOTORS OF CANADA Ltd Diesel Division

Code: GMC

Address: P. O. Box 5160
1991 Oxford St East
London, Ontario, Canada N6A 4N5

Contact: Mr. W L Claggett, Sales Manager, Defense Products -
(519) 452-5184

History: Diesel Division, General Motors of Canada Ltd, was established in 1949 for the manufacture of Diesel-electric locomotives. Diesel Division is a division of General Motors of Canada Ltd, which is wholly owned subsidiary of General Motors Corporation.

Capability: Diesel Division is primarily involved in the engineering and manufacture of Diesel-electric locomotives, transit buses and military vehicles. They have advanced skills and techniques in shearing, forming, fabricating and welding of large and complex steel components.

Average Work Force: Engineers - 150
Others - 1850

Gross Sales: 1983 - \$447M
1985 - \$599M

Plant Size: 1,400,000 sq ft (Spread over 4 major plants)

Experience: Diesel Division is under contract with the US Marine Corps to deliver 758 8X8 Wheeled Light Armored Vehicles (LAV). Four hundred and twenty two of these vehicles will carry a 2-man 25 MM turret. The remaining vehicles include Logistics, Recovery, Mortar, Command & Control and Anti-Tank. Under an R&D contract, they are also building 2 prototype Mobile Electronic Warfare Support System (MEWSS) variants of the LAV. An Assault Gun Vehicle and an Air Defense Vehicle are 2 additional variants which the USMC are interested in.

Delivery of the LAV commenced in October, 1983 and as of August, 1985, 294 have been delivered.

In the Fall of 1982, Diesel Division completed the delivery of 491 6x6 Armored Vehicles General Purpose (AVGP) to the Canadian Armed Forces. They were supplied in three variants - a Personnel Carrier, a Fire Support Vehicle and a Maintenance Recovery Vehicle.

Diesel Division is presently under contract to produce 20 Mine Clearance System Kits (MCSK) for interface on to the USMC's LVTP7's. There is an option for 55 additional kits.

In addition, Diesel Division has bid on the Upgunned Weapon System (UGWS) program to design a 1-man 40 MM Grenade Launcher Turret for interface on the USMC's LVTP7's.

Diesel Division has also been under contract with the US Navy for a design study for a hybrid Mobile Protected Weapon System. In addition, they have also participated in the MX Missile Carrier Program through Delco Electronics and bid on the US Army Infantry Fighting Vehicle Second Source Program.

Diesel Division has designed an upgrade kit for the M113 Engineer Dozer Vehicle adding an auger and a hydraulic tool system. They are negotiating with the Canadian Department of National Defense to provide this upgrade as well as an improved cooling and suspension upgrade to their M113 fleet.

More than 3400 locomotives have been delivered to 32 domestic customers and over 1000 locomotives have been exported to 22 countries.

Equipment: GMC has the following kinds of special equipment:

- CAD/CAM
- Flexible Machining Cell – fully automatic, state-of-the-art, used for subassemblies
- Slant Bed Lathe – state-of-the-art in numerical control turning equipment
- Plasma Burner – used for cutting ballistic plate, computer numerically controlled
- Robotic Welding – majority of hull welding is performed by welding robots
- X-Rays – facilities for x-raying weld joints on the vehicle hull
- Machining Centers – state-of-the-art, computer numerically controlled, used for machining entire hulls

Keywords: Locomotives; Armoured Vehicles; GP Armoured Vehicles; Amphibious Vehicles; Personnel Carrier; Fire Support Vehicle; Maintenance Recovery Vehicle; Hybrid Mobile Protected Weapon System; Ground Transportation; Transport System; Light Armoured Vehicles; Logistics Vehicle; Recovery Vehicle; Mortar Vehicle; Command & Control Vehicle; Anti-Tank Vehicle; Assault Gun Vehicle; Air Defense Vehicle; Mobile Electronic Warfare Support System; Mine Clearance System Kit; Upgunned Weapon Station; LVTP7 Upgrades; M113 Upgrades.

Revised: Oct 85

GEOMETRIX Ltd

Code: GEO

Address: 911 Rowntree Dairy Road
Woodbridge, Ontario, Canada L4L 4E4

Contact: Mr. Remo Cigagna, President – (416) 743-8184

History: Geometrix Ltd is a Canadian owned company founded in 1947. The company is located in Toronto, Canada.

Capability: Geometrix Ltd is involved in the design, manufacture and assembly of precision machined components for the aerospace, military, nuclear and commercial industries. The company can produce 4 axis components using machining centers with CAM functions. The company has ultra-precision jig grinding and jib boring equipment that can accurately locate, bore and machine surfaces to less than .0001 inch. The company's engineering section can design systems for remote manipulators, computer analysis, satellite subsystems and components.

Average Work Force: PhD – 1
Engineers – 4
Others – 24

Gross Sales: 1984 – \$1.0M
1985 – \$1.5M (Est'd)

Plant Size: 16,000 sq ft

Equipment: Geometrix Ltd has complete facility for CNC machining using CAM system, ultra precision jig grinding and boring capabilities, and in-house computers for programming.

Experience: Present customers include various departments of the Canadian Government and major aerospace companies in North America, i.e., General Electric, Raytheon, and Pratt & Whitney.

Keywords: Jig Grinding; Jig Boring; Remote Manipulator Systems; Computer Analysis; Satellite Subsystems; Machining; Precision Machining.

Revised: Sep 85

GLOBAL THERMOELECTRIC POWER SYSTEMS Ltd

Code: GTP

Address: P. O. Box 400
Bassano, Alberta, Canada T0J 0B0

Contact: Mr. Wayne Bollmeier, President – (403) 641-3512

History: Global is a privately held Canadian company that was incorporated in 1975. The Global operation, originating employees, equipment, and thermoelectric science & technology, was originally a major part of the Thermoelectric Division of 3M Company of St Paul, Minnesota. All facilities are at the above Canadian location.

Capability: The Global corporate mission is the commercial application of mature, field-proven remote power technology, coupled with an ongoing commitment to research & development of promising remote power technologies. They are regarded as a complete manufacturing and marketing organization, and are engaged in extensive R&D of thermoelectrics, combustion, and electronics. Their Bassano headquarters accommodates both administrative and production facilities, as well as an engineering department, and research & development laboratories.

Global's product is a line of high-reliability thermoelectric power systems for remote unattended stations requiring 10 to 1000 watts continuously. Global power systems have no moving parts and are quiet, pollution-free and reliable. The company's production capacity is about 20 generators per week. Manufacturing of the thermoelectric generators is accomplished through various stages of mechanical and electronic assembly, back-filling, basic machining and thorough testing. The shop capabilities can easily hold tolerances to the required 0.001 inch. The high-technology semiconductor thermoelectric materials and hermetically-sealed power units are manufactured entirely on site. This is predominately for reasons of quality control and due to the highly specialized skills and equipment required. Global is the world's sole commercial source for sintered, doped lead-telluride thermoelectric elements meeting the US Government's standard for 3M-type ES1101 characteristics. It is interesting to note that Global thermoelectric generators have powered telemetric transmissions back to earth during Apollo moon missions. Global's proven systems are performing today in some 40 countries, accumulating a total of well beyond 15,000 years of reliable operations.

While thermoelectrics is a relatively mature technology, the development of remote power in general is still in progress. The company is therefore striving for the development of lower cost, more widely applicable power sources incorporating proven thermoelectric technology with newly developing manufacturing techniques. Their applied research is directed toward the fields of solid state physics, heat transfer and gas & fluid dynamics while development is actively underway in combustion technology, thermoelectric metallurgy, piezoelectric ultrasonic atomization, electronic & electrical engineering, and new burner systems. An additional goal is to improve their attainable weight to power ratio by a factor of 2. Current units range from about one pound per watt for convection cooled units to 0.2 pound per watt for forced convection cooled units. Recent ongoing experiments were in the areas of fuel atomization to allow for efficient and clean combustion of diesel fuel. This R&D has led to the production of 60 units for Nippon Electric Co of Japan delivered to Madagascar. These are convection cooled units burning low grade diesel fuel.

Global has recently been funded by the Alberta Government to a level of approximately \$2M (1982). This level of funding is expected to continue for the next five to six years. The goal is

to lower the production cost of thermoelectric generators, thereby lowering the cost per watt of electrical power produced. The Canadian Government has assisted Global in obtaining \$800,000 in new CNC Automated Machinery and in the \$1.2M development of a light weight portable 120 watt generator for the US military use on the battle field.

Average Work Force: MSc - 2
Engineers - 12
Others - 65

Gross Sales: \$3.5M (Average)

Plant Size: 77,000 sq ft

Equipment: Because of the special requirements associated with the manufacturing of long life, hermetically sealed semiconductor thermopiles, Global has special equipment/instruments such as a helium mass spectrometer, TIG & MIG welding equipment, induction heater (for preparation of special alloys), vacuum & back filling equipment, an extensive line of automated CNC equipment, and two 8'x8'x8' environmental chambers capable of military specification testing.

Experience: Global's power systems markets are in the areas of telecommunications (radio repeater sites); cathodic protection; telemetry; supervisory control & signals; and navigation & positioning. Customers include US EPA, US Army, Exxon Corp (US), Mountain Bell (Boise, Idaho), Continental Telephone of the West (Phoenix, AZ), Texas Instruments, Teledyne Geotech, Amoco Pipeline Co (New Mexico), Nippon Electric Co, ARAMCO/PETROMIN (Saudi Arabia), Algeria Post & Telegraph (Algeria), Abu Dhabi National Oil Co, Shell Canada, Marinav Corp (Canada), Offshore Navigation Canada Ltd, NNPC (Nigeria), and Dome Petroleum (Canada). As can be seen, Global has worldwide experience with major organizations.

Keywords: Remote Power Supplies; Auxiliary Power Units; Thermoelectric Power Units; Unattended Power Supplies; Generators; Thermoelectric Generators; Combustion Technology; Thermoelectric Research; Power Sources; Portable Power Supplies.

Revised: Sep 85

GODFREY DIVISION OF HOWDEN CANADA Inc

Code: GHI

Address: 480 Montreal-Toronto Blvd
Lachine, Quebec, Canada H8S 1B8

Contact: Mr. L C Gillespie, Vice President - (514) 637-1122

History: Godfrey Howden is a member of the Howden Canada Group of companies and is a wholly owned subsidiary of Howden Group Plc which is located in Glasgow, Scotland. It was established initially at the present address in 1947 to provide a sales and service facility for aircraft environmental control equipment manufactured by the then UK parent company, Godfrey Eng Co Ltd. The company became a member of the Howden Group in 1968 and expanded manufacturing and service support capabilities.

Capability: Godfrey Howden is a major source for the design, development and manufacture of aircraft ground support equipment for the Canadian Armed Forces. Special expertise has been acquired in the field of hydraulic, pneumatic and refrigeration ground support equipment. The company also maintains a sophisticated facility providing full repair and overhaul support for a wide range of military and commercial aircraft components associated primarily with pressurization and environmental control systems. All inplant processes are subject to quality control surveillance and defect preventive procedures which meet the requirements of the most stringent Canadian, US and NATO specifications.

Average Work Force: Engineers - 4
Technicians - 8
Others - 68

Gross Sales: 1984 - \$7.3M
1985 - \$8.0M

Plant Size: 33,000 sq ft

Equipment: Equipment and procedures used in the Godfrey Howden production facilities are categorized as follows - Chucking, Lathes, Milling, Drilling Machines, Grinders, Metal Forming, Special Equipment, Variable Speed Rigs, Leakage Test, Vacuum Test, Turbine Test, Altitude Test, High Pressure Air Test Rig, Hydraulic Test Rig, Power Supply Rig, Electrical Power Sources, Balancing, and Speed Measuring. A detailed list can be provided upon request.

Experience: Supplier of specialized equipment and services to the Canadian Government, Beech Aircraft Co, Grumman Aerospace, and major US and Canadian commercial air carriers for over twenty-five years.

Keywords: Machining; Ground Support Equipment; Aircraft Components (R&O); R&O (Aircraft Components).

Revised: Aug 85

HALEY INDUSTRIES Ltd

Code: HAL

Address: Haley, Ontario, Canada
K0J 1Y0

Contact: Mr. H W Murray, Vice President, Marketing - (613) 432-8841

History: Haley Industries Ltd is an aluminum and magnesium aerospace sand casting foundry. The company was originally formed by the Canadian Government in 1952. In 1968, the facility was purchased by private interests. Plant expansions/modernizations took place in 1969 and 1974. In 1981, the company went public in order to finance a further \$7M modernization program. In 1982, a major research and development effort was initiated to produce premium quality sand castings. On 1 April 1984, Haley Industries purchased Presto Casting Company, located in Genie, AZ.

Capability: Haley Industries provides aerospace quality light alloy sand castings to an international customer base. Their castings are used in fixed wing and rotary wing aircraft for both military and civil applications. They specialize in producing complex gearbox and transmission castings in both aluminum and magnesium including constant speed drive housings (CSD), auxiliary power unit housings (APU), airframe mounted auxiliary drive system housings (AMADS), main propulsion engine gearbox housings and main transmission and tail rotor housings for helicopters. In order to supply lubricating oil to the gears in these various housings, Haley developed a sand pipe core process enabling them to cast internal oil passageways in the walls of the casting.

Haley Industries' premium quality casting area permits them to produce castings with superior mechanical properties and excellent radiographic qualities. If required, this also gives them the ability to cast thinner walls with a fine surface finish.

The company is completely self-sufficient for all foundry operations. They have in-house capability for pattern making, heat treat, destructive and non-destructive testing, dimensional inspection, sand testing, spectrographic analysis and tensile testing with high temperature capabilities. The extensive use of computers and microprocessors throughout the foundry has enabled Haley to retain its prominent position in the international aerospace foundry industry.

Average Work Force: Staff - 85
Hourly - 250
Engineers - 17

Gross Sales: 1984 - \$27M
1985 - \$40M

Plant Size: 120,000 sq ft

Equipment: Haley Industries has the most modern foundry equipment available to meet or surpass the exacting aerospace material and design engineering requirements. Specific brochures will be furnished upon request.

Experience: Haley Industries has 31 years in operation serving the following customers - Garrett Turbine Engine Co, Avco Lycoming, Boeing Vertol, Bell Helicopter, Detroit Diesel - Allison, General Electric - Engine Group, Hispano-Suiza (France), Klockner-Humboldt-Deutz (Germany), Kaman Aerospace, Litton Precision, Moteren-Und Turbinen-Union (Germany), Pratt & Whitney Aircraft (Hartford, Conn), Pratt & Whitney Aircraft of Canada Ltd, Sikorsky Aircraft, Spar Aerospace, Sundstrand Aviation, Westinghouse, and Westland Helicopter (England).

Keywords: Light Alloy Sand Castings; Aluminum Sand Castings; Magnesium Sand Castings; Premium Quality Sand Castings; Sand Castings; Castings.

Revised: Aug 85

HAMMOND MANUFACTURING COMPANY Ltd

Code: HMC

Address: Corporate Office
394 Edinburgh Road
Guelph, Ontario, Canada N1H 1E5

Electronic Transformer Division
95 Curtis Drive
Guelph, Ontario, Canada N1K 1E1

Contact: Mrs. Janice Husson, Marketing Services Manager - (519) 822-2960

History: Hammond Manufacturing Company Ltd was formed in 1927. There are presently three divisions - Electrical Transformer Division, Cabinetry Division, and the Electronic Transformer Division. Sales and technical services offices are located in Montreal, Toronto, Winnipeg, Calgary, Vancouver and Buffalo, NY. Hammond Manufacturing is a publically traded subsidiary of Ecomaso Technology Corporation and is listed on the Alberta Stock Exchange.

Capability: The company is involved in the manufacture of a wide range of magnetic devices for the electrical/electronic industry. Specific areas are outlined below:

- High Voltage Design and Fabrication - high voltage transformers are designed, wound, assembled, and tested at the Electronic Transformer Division (Guelph). Fabrication of sheet metal cases and special mechanical mountings are manufactured by the Cabinetry Division (Guelph). The company has been manufacturing custom designed high voltage transformers since 1940 for functions such as radar, dielectric testing, HV power supplies, medical electronics, modulation transformers, electrostatic speakers, and electronic air cleaners. They have design and manufacturing capability for single and three phase units.

- High Voltage Testing - the Electronic Transformer Division has in-house test capabilities up to 50 KV RMS, 60 Hz dielectric testing, Corona testing at 60 Hz to 400 Hz per MIL-T-27 specification. Specification: Available for testing at the Electrical Transformer Division - dielectric up to 80 KV RMS, up to 200 KV DC (high impedance loading),

and up to 175 KV impulse. Test equipment is of commercial and custom manufacture.

- Case design for containing special transformers and fabrication is available to withstand pressure due to liquid expansion. Includes water cooling.

- Leak detection per MIL-T-27.

- Vacuum processing is available for silicone and mineral transformer oils as well as mineral and epoxy varnishes and potting epoxy, or compounds. Oil filling available. At present, there is no gas filling of high voltage transformers.

- Low Voltage Transformers - power, trigger, Audio High Frequency, pulse, and reactors are designed and fabricated at Electrical Transformer Division. Capabilities range from microwatt devices up to kilowatt level in single, two and three phase configurations at frequencies ranging from 10 Hz to 150 KHz. Physical characteristics range from standard EI laminations through "C" core, wound core, toroidal, pot core, etc., in materials of silicone steel, nickel alloy, mu metal, ferrite, powdered iron and air core transformers and reactors.

- Current and Pulse capabilities - Electronic Transformer Division, current to 10A, pulse to 10KV; and Electrical Transformer Division, current up to 50,000A.

- Military requirements - designed to meet MI-T-27 available with certificate of conformance. The company inspection system is established to Department of National Defense specification DND 1016, (equivalent to MIL-I-45208). They are presently in the second stage of applying for recognition of a Quality Program to DND 1015 (equivalent to AQAP-1 NATO Quality Control Systems Requirement for Industry and Military Specification MIL-Q-9858A Quality Program Requirements).

- Source surveillance and government source inspection available by DND Canadian Forces Technical Service Depot 302 (Guelph).

Average Work Force: Corporate (Total) - 1100
Electronic Division - 130

Gross Sales: 1984 - \$57M
1985 - \$68M (Est'd)

Plant Size: Electronic Division - 20,000 sq ft
Electrical/Cabinetry Division - 175,000 sq ft
Other Manufacturing Plants - 50,000 sq ft
Warehouse Facilities - 100,000 sq ft

Equipment: Electronic Transformer Division - (Winding) multiple/gang coil winders, unit coil winders, toroidal coil winders, bobbin coil winders, RF choke winders; Automated stacking/laminating machines, vacuum impregnating/potting encapsulating/casting tanks; (Ovens) Baking and curing ovens. Environmental equipment includes A.G.R.E.E. chamber with dynamic shaker, thermal shock, heat, cold and humidity chambers. Also available on-site are variable AC and DC power sources, machining shop facilities and other standard related electrical testing facilities.

Experience: Hammond Manufacturing has been involved with military projects since 1939. They are presently supplying magnetics to Canadian and US manufacturers of the power supply for the gun turret fire control computer for the M-1 Main Battle Tank. Hammond Manufacturing also supplies magnetics for/to - Canadair Challenger Aircraft; Atomic Energy of Canada Ltd "THERAC" Series of Linear Accelerators; Satcomm Ground Communications Stations for NATO; Garrett Manufacturing; Collins Radio; Varian Canada; Bell Canada; Canadair; deHavilland Aircraft; Canadian General Electric; ITT; Computing Devices Company; National Research Council of Canada; Department of National Defense; Department of Supply & Services; Sperry Univac; Raytheon Canada; Atomic Energy of Canada; Ward Beck Systems; McCurdy Radio; McCurdy Communications; Litton Systems; and universities and research groups.

Keywords: Magnetic Devices; High Voltage Transformers; Sheet Metal Cases; Mechanical Mounts; Dielectric Testing; Corona Testing; Oil Filling; Low Voltage Transformers; Current/Pulse; Audio Transformers.

Revised: Oct 85

HANDS FIREWORKS Inc

Code: HFI

Address: 1785 Woodward Drive
Ottawa, Ontario, Canada K2C 0P9

Contact: Mr. A Davitt, Product Mgr, Military Pyrotechnics - (613) 224-8753

History: Hands Fireworks Inc was established in 1873 for the purpose of making domestic display fireworks. Early in World War II, the company converted completely to the manufacture of military pyrotechnics which have been a major product ever since. Hands Fireworks Inc became the major pyrotechnics and fireworks producer in Canada. During WW II, a wide range of pyrotechnics were manufactured for most of the allied countries and included such items as US BM 8A1 Flare, the 4.5 inch Reconnaissance Flare, 2 inch Parachute Illuminating Flares, Verrey Pistol Cartridges of all types, and smoke signals.

In 1977, the company was purchased by Lorcon Inc and operated as a division, Hand Chemical Industries. Recently, the operations became an independent Canadian company and now operates as Hands Fireworks Inc.

Capability: Hands Fireworks Inc operates from two plants - the main plant at Papineauville, Quebec (between Ottawa and Montreal), and a new plant at Edwardsburgh (50 miles south of Ottawa). The new plant also includes a R&D facility, Environmental Testing Laboratory, Quality Control Laboratory, and the company's central distribution warehouse. The production plants are typical for this industry, being constructed of fire resistant materials and consisting of many individual buildings thereby keeping the amount of explosive, flammable, dangerous or toxic materials and the number of operators involved to a minimum.

Each specific operation or storage area has been carefully analyzed for degree of hazard and is designed to minimize these hazards by steel or reinforced concrete walls, protective steel guards, remote control of operation, special protective devices such as explosive activated fire extinguishing equipment, protective screens between buildings, special electrical wiring, etc. The process, materials, quantities of explosive, type of protection, etc., are licensed yearly by the Federal Department of Energy, Mines and Resources, followed up by frequent plant inspections by this department throughout the year.

The Papineauville facility includes one laboratory/test building, one office building, 50 process buildings, 9 explosive storage magazines, and 32 raw material storage buildings. The fireworks line is completely integrated starting with the basic raw materials, paper, and chemicals, and converting them into spiral wound paper tubes from 1/4 to 3 inch inside diameter, mixing the chemicals, pressing, drying, labelling and packaging. The plastic components which hold the delay charges and bursting charges are purchased from outside sources, but are produced from company molds. The smokeless and black powders used are purchased from outside sources.

Average Work Force: Professionals - 15
Others - 120

Gross Sales: No Data

Plant Size: 100,000 sq ft (Total at all locations - 120 Buildings)

Experience: Hands Fireworks Inc has worked very closely with the Department of National Defense (DND) and various Canadian Design and Development facilities such as the National

Research Council; the Defense Research Establishments in Valcartier, Quebec and Suffield, Alberta; and the Chief Inspector of Explosives of the Department of Energy, Mines and Resources. Development work has been done for the Department of Agriculture. Some major projects have included:

- The design and development of the Grenade, Hand, Smoke (HC), and C1A1.
- The design and development of the Smoke Pot, SC39 and SC390. This long burning (11 to 18 minutes), high volume smoke pot has recently been tested by the DOD at Dugway, Utah.
- The design and development of the Disperser Chemical Groundburst, and Disperser Chemical Airburst, both of which are currently being used by DND.
- Design and development of a complete line of NBC Training Simulators with assorted chemical charges.
- The manufacture of the igniter for the Black Brant Rocket.
- The design, development and production of the Signal, Illumination 1 1/2 inch (plastic case) Red, Yellow, Green, etc., currently in service with the Canadian Forces.
- The design, development and manufacture of the Silver Rainmaker shell which was used successfully to produce rainfall to fill reservoirs for irrigation.
- The design, development and production of the 2 minute Smoke Pot Orange.
- The design and development of self-scuttling Marine Marker (Manual)

Keywords: Armament; Chemical; Chemical Airburst Simulators; Smoke Pots; Markers; Spotting Charges; Grenades Smoke; Hand Grenades Smoke; Signal Cartridges; Illumination Signals; Practice Bomb Signal Cartridges; Orange Smoke; Red Signal; Yellow Signal; Green Signal; Igniters; Rocket Igniters; Chemical Groundburst Simulators; High Volume Smoke Pot; HC Smoke; Pyrotechnics; Flares; Chemical Dispersers; Ammunition Smoke; Ordnance.

Revised: Oct 85

HARBOUR INDUSTRIES (Canada) Ltd

Code: HIL

Address: 460 Normandie Blvd
Farnham, Quebec, Canada J2N 1W4

Contact: Mr. Mark D Beauchamp, Marketing Manager - (514) 293-5304

History: Harbour Industries (Canada) Ltd was incorporated in Canada in 1975 and is a wholly-owned subsidiary of Harbour Industries Inc, Shelburne, Vermont. The Parent company was incorporated in 1964 and both companies manufacture High Temperature Wire and Cable.

Capability: Harbour Industries (Canada) Ltd manufactures high quality standards for Mil Spec, CSA, UL, and individual company specifications. The conductors are solid or stranded bare copper, tin, nickel, silver plated copper and on occasion, thermocouple grade or high strength alloys. They service the Canadian market and the US market where offset credits are involved in Canadian contracts. The insulations are Teflon, Kapton, Tefzel, Fep, Pfa, and Silicone Rubber.

Harbour Industries (Canada) Ltd has a well equipped laboratory approved by the US Department of the Navy for QPL testing. Calibration is to MIL-C-45662 and the Quality Control program meets

the requirements of MIL-I-45208A & MIL-Q-9858A as well as the NATO APAP-4 requirement. The quality program is registered under CSA Quality management registration program and audited regularly by CSA.

Average Work Force: Engineers - 1
Quality Control - 1
Others - 22

Gross Sales: 1984 - \$2.8M
1985 - \$3.5M

Plant Size: 14,500 sq ft

Equipment: Equipment includes - Teflon paste and melt extruders, silicone rubber extruders, tape wrappers, striping/printing towers, cablers and braiders, and complete lab and test equipment.

Experience: Harbour Industries (Canada) Ltd has experience in all areas of design and manufacture of High Quality Wire and Cables.

Keywords: High Temperature Wire; QPL Listed Wire; Aerospace Wire; Radiation Resistant Wire; Thermocouple Wire; Custom Made Cable; Heat Tracer Cable; Coaxial Cable; Communication Cable; Plenum Cable; CSA Wire; UL Wire; Low Hologene Wire; Hologene Free Wire; Flame Proof Wire; Fire Proof Wire; Wire; Cable.

Revised: Sep 85

HAWKER SIDDELEY CANADA Inc (Orenda Division)

Code: HSC

Address: Box 6001
Toronto AMF, Ontario, Canada L5P 1B3

Contact: Mr. M J Clarke, Marketing Manager, Component Manufacturing - (416) 677-3250

History: Hawker Siddeley Canada Inc is a Canadian public company, listed on the Stock Exchanges in Montreal, Toronto and Vancouver. The head office is in Toronto and the company normally employs about 7,000 people in divisions across Canada, in the UK, and in the US. The company is engaged mainly in engineering and manufacture of heavy industrial products for domestic and export markets. The Orenda Division was established in 1946 to design, develop and manufacture jet engines for Canadian fighter aircraft. Orenda has built several thousand gas turbine engines of both its own design and under license for General Electric. They have designed and built the Lance Missile Launcher, conducted nuclear development work, and built parts for the Candu nuclear reactor; and designed and built industrial gas turbines for use in oil pipeline operations and for emergency power units.

Capability: The Hawker Siddeley Orenda Division's capabilities are outlined below:

Manufacturing The Orenda Division is now a sub-contract manufacturer of major components for aircraft and industrial gas turbines. The facility includes a large machine shop, an extensive sheet metal fabricating shop, a heat treating department, quality assurance to MIL-Q-9858, and a comprehensive non-destructive testing department.

Repair & Overhaul Orenda Division has contracts for the repair and overhaul of aircraft gas turbine engines J79, J85-15, J85Can40, and was recently awarded a contract for the repair and overhaul of the F404. Also overhauled and repaired are industrial gas turbine engines. The plant has facilities for testing all these engines.

Publications: The Graphics Department prepares and prints manuals to Department of Defense standards, as well as commercial graphics work.

Laboratory: The laboratory is fully qualified by the Department of National Defense and performs chemical metallurgical and mechanical testing, and analysis in support of other departments and also for other customers.

Average Work Force: Technical Staff - 70
Total - 700/800

Gross Sales: 1984 - \$55M
1985 - \$55M

Plant Size: 440,000 sq ft
117,000 sq ft adjacent space immediately available

Equipment: Machine Shop facilities include: Turning up to 12 ft dia; NC & CNC machining centers; and EDM broaches. NC programming uses access to GE and Sundstrand time-sharing computers. Sheet metal fabricating has mechanical and hydraulic presses to 600 tons; fusion and resistance welding; and facilities for forming, shaping and joining. There is an environmental room with control of temperature, humidity and dust. Heat treating has atmospheric, inert gas and vacuum furnaces, and plating and coating facilities. Non-destructive testing includes fluorescent penetrant, magnetic particle, x-ray and ultrasonic equipment. Assembly has dynamic rotor balancing machines, gas turbine engine test cells, and facilities for testing fuel systems.

Experience: Orenda Division's customers for aeronautical parts and gas turbine repair and overhaul have included Pratt & Whitney, General Electric, Avco Lycoming, McDonnell Douglas, Rolls Royce, Lucas Aerospace, Canadian Department of National Defense, NAMS, and the Air Forces of the Netherlands, Germany, Norway, Belgium, Pakistan, and Italy. Nuclear reactor component design and manufacture was performed for Atomic Energy of Canada.

Keywords: Manuals; R&O (Engines); Plating; Airframe Components; Machining; Engine Components; Metalworking; Heat Treating; Stamping; Forming; Welding; Gas Turbine Components; Nuclear Reactor Components; Laboratories; Engine Testing.

Revised: Aug 85

HERMES ELECTRONICS Ltd

Code: HEL

Address: 40 Atlantic St
Dartmouth, Nova Scotia, Canada B2Y 4A1

Contact: Mr. A S Locan, Sr Exec, Marketing - (902) 466-7491

History: Hermes is the successor of the Canadian branch of EMI Electronics of the UK. It was established in 1949 and has specialized in anti-submarine warfare products, certain areas of HF Communications, and oceans/environmental data systems products.

Capability: The company's products include:

Sonobuoys and Bathythermograph Buoys - production types include AN/SSQ-41A, AN/SSQ-41B, AN/SSQ-36, AN/SSQ-53B, AN/SSQ 525 VLA, and AN/SSQ 527B.

Ionospheric Sounding Equipment - vertical and oblique sounding equipment is manufactured and is in service on a worldwide basis. The AN/FPT-11 transmitters, AN/UPR-2 receivers, and their commercial counterparts represent the last generation of this equipment.

HF Antennas - a unique active broadband aperiodic loop array is produced. Various configurations of this system are in service in twenty-three countries and fifty-four agencies of various governments.

Moored and Drifting Data Buoy Systems - buoy vehicles for the collection, recording and retransmission of oceanographic, meteorological, and environmental data have been developed and systems engineered for government, institutional, and industrial users. Hermes developed the Canadian Ocean Data Systems Buoys for the Canadian Government in 1975.

Environmental Data Systems - ice stations and automatic weather stations have been developed and manufactured for industrial and government users.

Average Work Force: 400 (including 75 engineers, technicians, draftsmen and engineering support staff).

Gross Sales: 1985 - \$20.0M

Plant Size: 137,600 sq ft

Equipment: Hermes has a fully equipped environmental testing laboratory as well as a comprehensive manufacturing facility. Their environmental laboratory is one of the largest in Eastern Canada and contains vibration equipment, humidity and temperature chambers, shock and tensile testers, and high pressure testing tanks. The equipment meets the requirements of MIL-STD-810 for Environmental Test Methods. This is the prime military standard which establishes uniform environmental test methods for determining the resistance of equipment to the effects of natural or induced environments, peculiar to military operations. Hermes cannot conduct testing for fungus and sand & dust, but arrangements can be made to have these carried out at other approved laboratories. The manufacturing facility has a chemical process capability, and can plate, paint, weld, stamp, magnetically form and machine. The plant is equipped to manufacture electronic and mechanical components and equipment as prototypes or in quantity production.

The company's quality control and inspection department has developed and implemented a complete quality assurance program, which ensures quality and compliance to customers specifications, often to military standard. A calibration and standards room is maintained and supervised by quality control and inspection. This facility checks all company instruments to ensure their accuracy by using standards with certified values. These are traced to N.R.C. and N.B.S. and are checked at regular intervals to ensure their accuracy. A quality assurance manual in accordance with DND 1015 and with MIL-G-9858A defines the QA operations of the company.

Experience: Hermes is a large scale producer of sonobuoys for the Canadian and US Governments, as well as other governments. They are presently completing a major order of AN/FPT-11 transmitters for the Government of France and a large order of portable HF Loop Antennas for the US Army.

Keywords: Communications; Electronics; HF Antennas; Weather Stations; Sonobuoys; ASW; Beacons; Environmental Laboratory.

Revised: Sep 85

HEROUX Inc

Code: HER

Address: 755 Thurber
Longueuil, Quebec, Canada J4H 3N1

Contact: Mr. S Richer, President - (514) 679-5450

History: Heroux Inc was founded in 1942.

Capability: Heroux is a fully integrated company involved in the manufacture, assembly and the testing of aircraft landing gears and hydraulic systems for the military and commercial markets. They also operate a landing gear and hydraulic repair and overhaul facility. This latter R&O facility handles such aircraft as the

707, 727, 737, DC8, DC9, DC10, L-1011, C130, KC135, P3 and the DHC-5 & DHC-6. They have complete onsite electroplating facilities.

Average Work Force: Total - 300

Gross Sales: 1984 - \$16M
1985 - \$18M

Plant Size: 250,000 sq ft

Equipment: All necessary equipment for the manufacture, repair and testing of landing gear and hydraulic systems.

Experience: The company is involved in all major markets in North America, England, Europe and South America on both military and commercial basis. Major customers include the US Air Force, Canadian Forces, Air Canada, Canadair, DeHavilland, McDonnell Douglas, Boeing, Lockheed, Grumman and other airlines (British Colodonian, Britannia, Avianca and Aero Peru).

Keywords: Hydraulics; Landing Gears; R&O (Landing Gears); R&O (Hydraulics).

Revised: Aug 85

THE H. I. THOMPSON CO

Code: HIT

Address: 60 Johnston St
Guelph, Ontario, Canada N1H 6M6

Contact: Mr. R E Weltz, President & General Manager -
(610) 359-8900

History: The H I Thompson Company was founded in 1952 as a subsidiary of Hitco of Los Angeles, CA. In 1965, the Canadian operation was purchased from Hitco by three Canadian operating personnel and has since been wholly Canadian owned. Most of the raw materials consumed are purchased from Hitco and after fabrication, are sold to Canadian and US customers permitted by agreement with Hitco.

Capability: The H I Thompson Company is capable of all thermal calculations, design and fabrication of Heat Shields, and Insulation for gas turbine engines, airframe, and commercial applications. The insulation is generally encased in stainless or inconel foils .002" to .008" thick or sheet metal .010" to .032" thick. The foils or casings are spot or seam welded together to prevent the entry of liquids. The company has a sewing capability to produce load carrying equipment, webbing, and kit-bags for the Armed Services and firefighters suits.

Average Work Force: Engineers - 2
Others - 39

Gross Sales: 1984 - \$1.75M
1985 - \$2.50M (Est'd)

Plant Size: 15,000 sq ft

Equipment: Spot welders - 5 to 50 KVA, seam welders - 5 to 100 KVA, form dies to customer part numbers, 50 to 100 ton presses, various sheet metal fabricating equipment, 50 sewing machines and auxiliary equipment, and access to sheet metal spinning and TIG welding.

Experience: Customers include US and Canadian companies such as Pratt & Whitney, de Havilland Aircraft, General Electric, and Canadair. Services are also provided to US and Canadian Governments such as Tinker AFB, OK; Kelly AFB, TX; DISC in Philadelphia; and Department of Supply & Services and Canadian Commercial Corp in Canada.

Keywords: Heat Shields, Foil Heat Shields, Sheet Metal Heat Shields, Forming (Stainless Foils), Forming (Sheet Metal), Welding

(Stainless Foils); Welding (Sheet Metal); Sewing (Insulation); Sewing (Kit-Bags); Sewing (Firefighter Suits); Sewing (Flack Jackets); Insulation (Sewing); Kit-Bags (Sewing); Firefighter Suits (Sewing); Flack Jackets (Sewing).

Revised: Aug 85

HONEYWELL Ltd **Defense & Systems Research Division**

Code: HON

Address: 99 Bank St, Suite #935
Ottawa, Ontario, Canada K1P 6B9

Contact: Mr. A P Stewart, Regional Manager - (613) 238-6628

History: Honeywell Ltd is a Canadian company established in 1930 and is a wholly owned subsidiary of Honeywell Inc of Minneapolis. Currently, Honeywell employs over 3,600 employees in Canada in some 78 locations occupying about 1.4 million square feet. Consolidated in 1984, revenues rose to \$354.2 million with new income rising to \$17.9 million. Major manufacturing facilities are located in Scarborough, Ontario and Candiac, Quebec.

Honeywell Canada's Defense & Systems Research Division (DSRD) is a part of the Honeywell worldwide Aerospace & Defense Group (A&D). Worldwide, A&D enjoyed 1984 sales of approximately \$1.6 billion, employing over 20,000 with 23 R&D and manufacturing facilities.

Capability: The Defense & Systems Research Division is primarily involved in advanced research & development addressing the aerospace & defense markets. Three organizations focus on this mandate.

The Advanced Technology Center (ATC) performs advanced R&D in the areas of Systems & Controls, Signal & Image Processing, Man-Machine Sciences and Microelectronics. The ATC now has a leading Canadian capability in integrated navigation systems.

The Learning Systems Center (LSC) develops turn-key computer-based training systems. The LSC's capabilities include expertise in task analysis through the design, development, and evaluation of training systems and courseware creation.

The Software Development Center (SDC) works in conjunction with Honeywell divisions in the US, France, Italy and the UK to produce software products for international markets.

The DSRD also maintains an avionics repair and overhaul facility. The quality assurance function meets the requirements of AQAP-1, NATO Requirements for an Industrial Quality Control System. This division also markets all Honeywell worldwide aerospace and defense products and services to the Department of National Defense.

Honeywell also has capabilities for design and product engineering including design, process development, process control, engineering support, automation & quality improvement, evaluation & reliability and quality functions.

Average Work Force: ATC Scientists/Professionals - 10
LSC Professionals - 8
SDC Technical/Professionals - 70

There are 36 professionals in the design/product engineering group and an additional 38 engineers/technicians for the production/quality functions.

Gross Sales: 1984 - \$354.2M
1985 - \$334.2M

Plant Size: 260,000 sq ft (Scarborough, Ontario Plant)
110,000 sq ft (Another 5 Plants)
211,000 sq ft (Warehouse Space)

Equipment: Equipment includes - top of the line Honeywell computers, a CAD/CAM facility, a modern mechanical design laboratory, electronic laboratory, and evaluation laboratory. Production facilities include a broad range of equipment including punch presses, automatic screw machines, electro-plating, painting and plastic moulding machines, ultrasonic weld system, zinc plating, conformal coating and epoxy encapsulating facilities, custom sheet metal work, NC controlled tool room equipment, progressive dies, moulds design and build, and assembly and test fixtures.

Experience: Present customers include various departments in the Canadian Government including DND as well as industry in the UK. Some of their current programs include:

- Helicopter Integrated Navigation System (HINS) - development of an integrated multi-sensor navigation system for military helicopters.
- Variable Depth Sonar (VDS) - enhancement of VDS performance by high-rate data transmission on fiber optic cable and by compensation of towbody motion using inertial reference data.
- Space Station - development of a plan for processing of electronic materials in space.
- Voice Interactive Maintenance Aiding Device - development of a portable audio-visual voice interactive system to aid in equipment maintenance for constrained environments.
- Simulator/Trainer - designing a generic microcomputer-based skills simulator/trainer incorporating audio/video disk technology and controlled by a personal computer.

Keywords: R&O (Avionics); Systems & Controls; Man-Machine Sciences; Signal Image Processing; Microelectronics; VLSI; Navigation Systems Integration; Computer-based Training; Training Simulators; Guidance Systems; Software Systems; Manufacturing.

Revised: Sep 85

ICAM TECHNOLOGIES Corp

Code: ITC

Address: 1900 Boul des Sources
Pointe Claire, Quebec, Canada H9R 4Z3

Contact: Mr. John J Nassr, Jr, GL, Applications Analysis - (514) 697-8033

History: ICAM Technologies Corp is a Canadian-owned software development organization specializing in CAD/CAM, NC programming, and production and inventory control. The company was founded in 1971 and is located west of Montreal, Quebec. ICAM has been involved in numerous Canadian commercial and aerospace programs, and has distributed its software products world-wide.

Capability: ICAM Technologies Corp is primarily involved in the development of CAD/CAM software products, custom NC programming, and consulting for all levels of manufacturing. ICAM software products address both industrial and educational needs in the areas of part design and manufacturing, educating and training through Computer Aided Learning (CAL), complete CAM systems that include - APT processing (with sculptured surfaces), postprocessor generation (5 axis capabilities), plotting and tape punching, integrated CAD/CAM systems; as well as Flexible Manufacturing Systems. ICAM is currently a major supplier to Pratt and Whitney of Hartford, CN, and was Boeing's largest supplier of NC programs and fixture designs for their 767 and 757 airframe programs. ICAM software developments are available on mainframe, mini, and micro computer configurations, and

allow all manufacturing institutions to increase their productivity to new levels.

Average Work Force: Engineers and Scientists - 45
Others - 5

Gross Sales: No Data

Equipment: In-house computer system includes - DEC VAX 11/785, VAX 11/730, HP 9000, and various microcomputer configurations. ICAM software is compatible with IBM, DEC, CDC, Data General, Prime Sperry, and Hewlett Packard computer equipment.

Experience: ICAM has 14 years experience in software development, NC programming, and consulting services. ICAM's participation in numerous aerospace projects includes the Canadair Challenger, Mecure II, DHC7, DC9 Super 80, DC10, L1011, 707, 747, 757, 767, F15, and NASA Space Shuttle. ICAM is a current supplier to Pratt and Whitney of Hartford, CN.

Keywords: CAD; CAM; Integrated CAD/CAM Systems; APT Processing; Computer Aided Learning; Flexible Automated Manufacturing System; Consulting (CAD/CAM); Postprocessor (Multi-Axis); CL File; Plotting Package (Postprocessed); Tape Punch System.

Revised: Aug 85

I. M. P. GROUP Ltd Aerospace Division

Code: IMP

Address: Head Office
7037 Mumford Road
Halifax, Nova Scotia, Canada B3L 2J1

(Mailing)
P. O. Box 1014
Dartmouth, Nova Scotia, Canada B2Y 4J3

Contact: Mr. H L Connor, Marketing Director - (902) 861-2250, X277

History: The company, Industrial Marine Products, was formed in 1967 to purchase the assets of a group of Nova Scotia companies which had been manufacturing foundry and steel fabricated products since 1865. During the next few years, they expanded into the commercial fishing gear and marine equipment areas, and expanded operations into other locations in eastern Canada and the US. In the early 1970s, the company acquired the facilities, equipment, operational management and work force of a major aircraft company in the Halifax area, and thus, expanded into aircraft overhaul and repair, and aerospace manufacturing areas. The current operating divisions of IMP Group are

Aerospace Manufacturing	Tool and Plastics
Aerospace Engineering Services	Marine
Aircraft Repair and Overhaul	Offshore Services
General Aviation Services	Hotel
Foundry	Properties and Investments
Steel Fabrication & Machine Shop	Research and Development

Capability: IMP Group's capabilities are described in the eight divisions listed below.

Aerospace Manufacturing Division - manufactures electronic wiring assemblies for various aircraft and elec-

tronics industries. Aerospace metal components are also manufactured.

Aerospace Engineering Services Division - offers integrated services for the other aerospace divisions that include repair schemes, corrosion control, weight and balance, modification development, systems installation design, aeronautical engineering, aircraft maintenance, stress analyses, fatigue studies, structural design, electrical and avionics engineering, systems interface design, electromagnetic compatibility testing, systems ground and flight testing, configuration and modification program control, and maintenance and technical publications for military aircraft.

Aircraft Repair and Overhaul Division - as the major fixed and rotary wing maintenance facility in eastern Canada, it offers repair and overhaul programs for military and commercial aircraft, as well as a full range of equipment modification.

General Aviation Services Division - offers aircraft servicing maintenance, hangarage, crew and passenger lounges for large and small commercial aircraft. This Division supports a fleet of turbo and piston twin engines aircraft for charter anywhere in Canada and the US.

Foundry Division - equipped to produce cast iron, steel and steel alloy castings up to 2-tons with both cupola and electric induction furnaces.

Steel Fabrication and Machine Shop Division - essentially a custom shop, it is serviced by four 5-ton overhead cranes. Typical products include components for fishing trawlers from steel, stainless steel and aluminum, and a whole range of products, repairs and modifications for offshore oil industry.

Tool and Plastics Division - manufactures molded plastic parts using the injection molding technique.

Research and Development Division - the primary function is to identify and develop new products and processes related to the continued expansion of the IMP Group and the technical excellence of its products.

Other Divisions of IMP Group have no apparent relevance to USAF requirements and are therefore, not further defined in this section.

Average Work Force: No Data

Gross Sales: IMP Group Ltd - \$75.0M
Aerospace Manufacturing Div - \$ 6.0M
Aerospace Repair & Overhaul Div - \$24.0M

Plant Size: Aircraft Repair & Overhaul Div - 125,000 sq ft (3 hangars)
Steel Fabrication & Machine Shop - 14,000 sq ft

Experience: IMP Group's aerospace clients include the US Navy (P3 aircraft), Canadian Department of National Defense, Canadair, USAF, and McDonnell Douglas Canada. They are hopeful of participating in the CF-18 Program.

Keywords: Aircraft; Avionics; Machining; Software Services; Airframe Components; Airframe Structures; Wiring & Tubing; Injection Molding; Precision Casting; Structural Analysis; General Testing; Non-Destructive Testing; System Testing; Corrosion Control; Electromagnetic Compatibility; Systems Interface Design; R&O (Aircraft)

Revised: Sep 85

Section III

COMPANY

KEYWORD INDEX

Keyword

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Abradable Seals
Acceptance Testing
Accessories
Accounting
Acoustic Sensing
Acoustic Sensing
Acoustics
Active Filters
Active Sonobuoys
Actuators
Actuators
Adapters
Adaptive Receivers
Advanced Composites
Advisory Services
Aerial Spray/Water
Bombing
Aerial Survey Systems
Aerial Target Tracking
System
Aerodynamics
Aeronautical Engineering
Aerospace Wire
Air Analysis
Air Conditioning
Air Control Indicators

Air Cushion Equipment
Transporters
Air Cushion Systems
Air Cushion Vehicles
Air Defense Vehicle
Air Delivery Systems

Air Delivery Systems
Air Gas Separators
Air Pollution
Air Quality
Air Traffic Control
Air Traffic Management
Airborne Direction
Finders
Airborne Laser
Fluoresensor
Airborne Surveys
Airborne Surveys
Airconditioning (Aircraft)
Aircraft
Aircraft

Aircraft Airconditioning
Aircraft Control

Aircraft Engine Overhaul
Aircraft Floats
Aircraft Heating
Aircraft Inventory
Aircraft Maintenance

Company Name

EXPRO CHEMICAL PRODUCTS
EXPRO CHEMICAL PRODUCTS
EXPRO CHEMICAL PRODUCTS
SHERRITT GORDON MINES Ltd
TELECONSULT Ltd
BENDIX AVELEX Inc
AIRBORNE DATA SYSTEMS Ltd
COMPUTING DEVICES COMPANY
SPARTON OF CANADA Ltd
ENVIRONMENTAL APPLICATIONS
ANATEK MICROCIRCUITS Inc
SPARTON OF CANADA Ltd
AERO MACHINING Ltd
DOWTY CANADA Ltd
CANADIAN MARCONI CO
MILLER COMMUNICATIONS
FLEET INDUSTRIES
TELECONSULT Ltd
FIELD AVIATION COMPANY Ltd

FIELD AVIATION COMPANY Ltd
SED SYSTEMS Inc

CANADAIR Ltd
INNOTECH AVIATION Ltd
HARBOUR INDUSTRIES (Canada)
PHOTOVAC Inc
DOUSERV GROUP INC
CARDION ELECTRONICS/DG
INSTRUMENTS
BELL AEROSPACE CANADA

BELL AEROSPACE CANADA
BELL AEROSPACE CANADA
GENERAL MOTORS OF CANADA
deHAVILLAND AIRCRAFT OF
CANADA Ltd
IRVIN INDUSTRIES CANADA Ltd
3-L FILTERS Ltd
ALBERTA RESEARCH COUNCIL
ENVIRONMENTAL APPLICATIONS
See ATC
DY-4 SYSTEMS Inc
ROCKWELL INTERNATIONAL

BARRINGER RESEARCH Ltd

BARRINGER RESEARCH Ltd
MARS AERIAL REMOTE SENSING
CASEY COPTER ACCESSORIES
CANADAIR Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
CASEY COPTER ACCESSORIES
deHAVILLAND AIRCRAFT OF
CANADA Ltd
STANDARD AERO Ltd
SEI INDUSTRIES Ltd
CASEY COPTER ACCESSORIES
AIRBORNE DATA SYSTEMS Ltd
AIRBORNE DATA SYSTEMS Ltd

Keyword

Aircraft Parts
Aircraft Parts
Aircraft Power
Aircraft Scheduling
Aircraft Skis
Airfoil
Airframe Analysis &
Testing
Airframe Components

Airframe Components
Airframe Components
Airframe Components
Airframe Components

Airframe Components

Airframe Components
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Airframe Components
Airframe Components
Airframe Components
Airframe Components

Airframe Components
(R&O)
Airframe Parts
Airframe Spares
Airframe Structures

Airframe Structures
Airframe Structures
Airframe Structures

Airframe Structures

Airframe Structures
Airframe Structures
Alarm Systems
Alloys
Alternate Fuels
Research
Alternate Fuels
Research
Alternate Fuels
Research
Altimeter
Alum Dip Brazed Heat
Exchangers
Aluminum Alloys
Aluminum Components

Aluminum Components
Aluminum Fabrication
Aluminum Forgings

Aluminum Sand Castings
Ammonia Gas Detection

Company Name

LEAVENS AVIATION Inc
PATLON AIRCRAFT & INDUSTRIES
CARR-TECH SERVICES Ltd
AIRBORNE DATA SYSTEMS Ltd
GENAIRE Ltd
LEIGH INSTRUMENTS Ltd
DSMA ATCON Ltd

BOEING OF CANADA Ltd
(Winnipeg Div)
BRISTOL AEROSPACE Ltd
C. P. S. INDUSTRIES Inc (LES)
CANADAIR Ltd
CANADIAN AIRCRAFT
PRODUCTS Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
ENHEAT Inc
FLEET INDUSTRIES
HAWKER SIDDELEY CANADA Inc
I. M. P. GROUP Ltd
MENASCO AEROSPACE Ltd
NORTHWEST INDUSTRIES Ltd
SPAR AEROSPACE Ltd
SPECIALIZED WELDING &
FABRICATION
GODFREY DIVISION OF
HOWDEN CANADA
AERO MACHINING Ltd
KAYCOM Inc
BOEING OF CANADA Ltd
(Winnipeg Div)
BRISTOL AEROSPACE Ltd
CANADAIR Ltd
CANADIAN AIRCRAFT
PRODUCTS Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
I. M. P. GROUP Ltd
NORTHWEST INDUSTRIES Ltd
BARON COMMUNICATIONS Ltd
SHERRITT GORDON MINES Ltd
INRAD INDUSTRIAL R & D

ONTARIO HYDRO

PRATT & WHITNEY CANADA Ltd

OPTECH Inc
DEVTEK CORPORATION

CHICOPEE MANUFACTURING
CANADIAN AIRCRAFT
PRODUCTS Ltd
ROLLS-ROYCE (CANADA) Ltd
INDAL TECHNOLOGIES Inc
GENERAL ALUMINUM
FORGINGS Inc
HALEY INDUSTRIES Ltd
THE ARMSTRONG MONITORING
CORP

Ammunition
Ammunition (Parts)
Ammunition Smoke
Amphibious Vehicles
Amplifier Subsystems
Amplifiers
Amplifiers
Amplifiers
Analog
Analog/Digital
Analysis (Test Data)

Anechoic Chambers
Animated System
 Trainers
Anodizing
Antenna Support
 Structures
Antennas
Antennas
Antennas
Antennas
Antennas
Antennas
Antennas
Anti-Friction Bearings
Anti-Submarine Warfare
Anti-Tank Missile
Anti-Tank Vehicle
Application Software
APT Processing
Arc Lamps
Arctic Engineering
Armament
Armament
Armament (Cases)
Armoured Vehicles
Artillery Alignment and
 Control Systems
ASME Codes
Assault Gun Vehicle
ASW
ASW
ASW
ASW
ASW
ATC
ATC
ATC
ATC
ATC Communications
 System
ATC Communications
 System
ATC Simulators
ATC Simulators

ATC Simulators
ATC Systems
Atmospheric Optics
Atmospheric Research
Atomic Absorption
 Spectrophotometers
Audio
Audio Transformers
Audio Visual Facilities
Augmentor Wing

Augmentor Wing
Automated Backplane
 Wiring
Automated Displays
Automated Monitoring &
 Control
Automated Precision
 Measuring
Automatic Data
 Acquisition systems

IVI Inc
C. P. S. INDUSTRIES Inc (LES)
HANDS FIREWORKS Inc
GENERAL MOTORS OF CANADA
VARIAN CANADA Inc
ANATEK MICROCIRCUITS Inc
PRESENTLEY ENGINEERING
VARIAN CANADA Inc
PACIFIC MICROCIRCUITS Ltd
PACIFIC MICROCIRCUITS Ltd
ROBERTSON
PHOTOGRAMMETRIC Inc
RAYSHIELD Ltd
ATLANTIS AEROSPACE Corp

CAMETOID Ltd
INDAL TECHNOLOGIES Inc

CANADIAN ASTRONAUTICS Ltd
MPB TECHNOLOGIES Inc
NORTHERN AIRBORNE
PRESENTLEY ENGINEERING
SPAR AEROSPACE Ltd
SPILSBURY COMMUNICATIONS
TIL-TEK Ltd
FAG BEARINGS Ltd
See ASW
E. S. MANTIS RESEARCH CORP
GENERAL MOTORS OF CANADA
AIRBORNE DATA SYSTEMS Ltd
ICAM TECHNOLOGIES Corp
MPB TECHNOLOGIES Inc
F. G. BERCHA AND ASSOCIATES
EXPRO CHEMICAL PRODUCTS
HANDS FIREWORKS Inc
ZARGES AFC CANADA Ltd
GENERAL MOTORS OF CANADA

BENDIX AVELEX Inc
WHITESHELL NUCLEAR
GENERAL MOTORS OF CANADA
COMPUTING DEVICES COMPANY
DEVTEK CORPORATION
HERMES ELECTRONICS Ltd
PRIOR DATA SCIENCES Ltd
SPARTON OF CANADA Ltd
ADGA SYSTEMS INTERNATIONAL
LITTON SYSTEMS CANADA Ltd
PRIOR DATA SCIENCES Ltd
SPERRY Inc (Aerospace & Marine)
GARRETT MANUFACTURING Ltd

JATEL COMMUNICATIONS

CAE INDUSTRIES Ltd
CARDON ELECTRONICS/
DG INSTRUMENTS
LITTON SYSTEMS CANADA Ltd
CAE INDUSTRIES Ltd
OPTECH Inc
ONTARIO HYDRO
SCINTREX Ltd

NORTHERN AIRBORNE
HAMMOND MANUFACTURING
DOUSERV GROUP INC
deHAVILLAND AIRCRAFT OF
CANADA Ltd
ROLLS-ROYCE (CANADA) Ltd
MICROTEL Ltd

DOUSERV GROUP INC
MILLER COMMUNICATIONS

DIFFRACTO Ltd

GasTOPS Ltd

Automatic Number
Identification Systems
Automatic Screw
Machining
Automatic Test
Equipment
Automatic Test
Equipment
Automation
Automation & Control
Auxiliary Power Units
Auxiliary Power Units
Avalanche Detectors
Aviation Consultants
Aviation Management
Aviation Software
Avionics
Avionics
Avionics
Avionics
Avionics
Avionics
Avionics
Avionics
Ballistic Computer
Systems
Based Tone Signalling
Bathymeter
Battery Chargers
Battery Management
Systems
Beacons
Beacons
Beacons
Beacons
Beacons
Bearings
Belts
Beta Ray Monitors
Beverage Dispensing
Systems
Bias Insertion Units
Biological Environment
Biological Research
Biology
Biomass
BK 117 Helicopter
Blister Packaging
BO 105 Helicopter
Bonded Components
Bonded Components
(Composite)
Bonded Components
(Metal)
Bonded Honeycomb
Components
Bonding Capabilities
Bonding Wire & Ribbons
Boring
Boring
Boundary Layer

Brackish Water
Brake Parts
Brazed Aluminum Heat
Sinks
Broadcasting
Broadcasting
Brushless DC Motors
Bubble Memory

A.E.I. TELECOMM. (Canada) Ltd
J.J. CHARLTON COMPANY Ltd
AMTEK MANAGEMENT Inc
NAVAIR Limited
TEKLOGIX Inc
DOUSERV GROUP INC
GLOBAL THERMOELECTRIC
PRATT & WHITNEY CANADA Ltd
FOUNDATION INSTRUMENTS Inc
AIRBORNE DATA SYSTEMS Ltd
AIRBORNE DATA SYSTEMS Ltd
AIRBORNE DATA SYSTEMS Ltd
ATLANTIS AEROSPACE Corp
BENDIX AVELEX Inc
CAE INDUSTRIES Ltd
CANADIAN MARCONI CO
CARDION ELECTRONICS/
DG INSTRUMENTS
CARR-TECH SERVICES Ltd
COMPUTING DEVICES COMPANY
GARRETT MANUFACTURING Ltd
I. M. P. GROUP Ltd
INNOTECH AVIATION Ltd
INTERNAV Ltd
LEIGH INSTRUMENTS Ltd
LITTON SYSTEMS CANADA Ltd
ROCKWELL INTERNATIONAL
TRACKER INDUSTRIES Ltd
COMPUTING DEVICES COMPANY
BARON COMMUNICATIONS Ltd
OPTECH Inc
PYLON ELECTRONIC DEVEL. CO
CANADIAN ASTRONAUTICS Ltd
DEVTEK CORPORATION
GARRETT MANUFACTURING Ltd
HERMES ELECTRONICS Ltd
LEIGH INSTRUMENTS Ltd
SPILSBURY COMMUNICATIONS
FAG BEARINGS Ltd
IRVIN INDUSTRIES CANADA Ltd
SCINTREX Ltd
CARR-TECH SERVICES Ltd
AVTECH ELECTROSYSTEMS Ltd
WHITESHELL NUCLEAR
ONTARIO HYDRO
ALBERTA RESEARCH COUNCIL
ONTARIO HYDRO
MBB HELICOPTER CANADA Ltd
INRAD INDUSTRIAL R & D
MBB HELICOPTER CANADA Ltd
McDONNELL DOUGLAS CANADA
ENHEAT Inc
ENHEAT Inc
McDONNELL DOUGLAS CANADA
FLEET INDUSTRIES
COMINCO Ltd
DIEMASTER TOOL Inc
DONLEE PRECISION
ENVIRONMENTAL
APPLICATIONS GROUP Ltd
SEAGOLD INDUSTRIES Corp
BENDIX AVELEX Inc
VAC-AERO INTERNATIONAL Inc
DOUSERV GROUP INC
TELECONSULT Ltd
PRESENTENY ENGINEERING
TARGA ELECTRONICS SYSTEMS

Keyword

Build-To-Print
 Build-To-Print
 Build-To-Print
 Build-To-Print
 Build-To-Print
 Business & Office
 Communications
 C-4
 C3 Systems
 C3 Systems
 C3 Systems
 C3 Systems
 C3 Systems
 C3 Systems
 Cabinet Testing
 Cabinets
 Cable Assemblies
 Cable Assemblies
 Cable Carrier
 Cables
 Cables
 Cables
 CAD
 CAD PC Design
 CAD/CAE Systems
 Software
 CAD/CAM
 Calibration
 Calibration

 Ltd Calibration
 Calibration

 CAM

 CAM
 Camera Systems
 Components
 Carbon Monoxide Gas
 Detection
 Cargo Handling
 Equipment
 Cargo Handling
 Equipment
 Cargo Pallets
 Cartography Processing
 & Database
 Cartridges
 Cases (Custom)
 Castings
 Castings
 Castings
 Castings
 Castings
 Castings
 Castings
 Catalytic Sensors

 Cathode Ray Tube
 Displays
 Cavity Enclosure
 Cellular Communications
 Center-Loaded Antennas
 Centerless Grinding
 Certification Testing
 Chemical
 Chemical Agent
 Detection
 Chemical Airburst
 Simulators
 Chemical Analysis
 Chemical Dispersers
 Chemical Films
 Chemical Groundburst
 Simulators
 Chemical Processing
 Chemical Processing
 Chemical Processing
 Chemistry

Company Name

CARR-TECH SERVICES Ltd
 GARRETT MANUFACTURING Ltd
 LEIGH INSTRUMENTS Ltd
 LITTON SYSTEMS CANADA Ltd
 MILLER COMMUNICATIONS
 TELECONSULT Ltd

 EXPRO CHEMICAL PRODUCTS
 CANADIAN ASTRONAUTICS Ltd
 COMPUTING DEVICES COMPANY
 DY-4 SYSTEMS Inc
 FOUNDATION INSTRUMENTS Inc
 PERLEY TECHNOLOGIES
 PRIOR DATA SCIENCES Ltd
 SHARP SPECIAL SYSTEMS
 DOWTY CANADA ELECTRONICS
 DOWTY CANADA ELECTRONICS
 BACHAN AEROSPACE
 I. M. P. GROUP Ltd
 TELECONSULT Ltd
 HARBOUR INDUSTRIES (Canada)
 ITT CANNON ELECTRIC CANADA
 NORTHERN AIRBORNE
 ICAM TECHNOLOGIES Corp
 DOCUMENTED CIRCUITS Inc
 DOCUMENTED CIRCUITS Inc

 BATA ENGINEERING
 CANADIAN MARCONI CO
 QUANTUM INSPECTION AND
 TESTING
 ROLLS-ROYCE (CANADA) Ltd
 THE ARMSTRONG MONITORING
 CORP
 CAMPAGNA BROTHERS
 MACHINE SHOP LTD
 ICAM TECHNOLOGIES Corp
 DECADE INDUSTRIES Ltd

 THE ARMSTRONG MONITORING
 CORP
 CANADIAN AIRCRAFT
 PRODUCTS Ltd
 deHAVILLAND AIRCRAFT OF
 CANADA Ltd
 GENAIRE Ltd
 MYRIAS RESEARCH Corp

 3-L FILTERS Ltd
 ZARGES AFC CANADA Ltd
 CANADAIR Ltd
 EASTERN PRECISION CASTING
 HALEY INDUSTRIES Ltd
 SHELLCAST FOUNDRIES Inc
 SHERRITT GORDON MINES Ltd
 SUPRECA Inc
 THE ARMSTRONG MONITORING
 CORP
 LITTON SYSTEMS CANADA Ltd

 ULTRA LASERTECH Inc
 DOUSERV GROUP INC
 SPILSBURY COMMUNICATIONS
 J.J. CHARLTON COMPANY Ltd
 DOWTY CANADA Ltd
 HANDS FIREWORKS Inc
 SCIEX

 HANDS FIREWORKS Inc

 WHITESHELL NUCLEAR
 HANDS FIREWORKS Inc
 CAMETOID Ltd
 HANDS FIREWORKS Inc

 ALBERTA RESEARCH COUNCIL
 RAYLO CHEMICALS
 WHITESHELL NUCLEAR
 ALBERTA RESEARCH COUNCIL

Keyword

Chemistry
 Chemistry
 Chemistry
 Chemistry

 Chemistry
 Chips

 Chips
 Chlorine Gas Detection

 Circuit Layout
 Circuit Packaging
 Civil Reserve Air Fleet
 Simulation
 CL File
 Clandestine
 Communications
 Climatology

 Cloud Dynamics

 Cloud Physics
 Cloud Physics

 Cloud Seeding
 CMOS
 CNC Machining
 CNC Machining
 CNC Machining
 CNC Machining
 CNC Machining
 CO2 Lasers
 CO2 Lasers
 CO2 Lasers
 CO2 Lasers
 CO2 Optoacoustic
 Detector
 Coal Liquefaction
 Coal Pyrolysis
 Coalescer
 Coalescing Filters

 Coated Fabrics
 Coatings
 Coatings
 Coatings
 Coatings
 Coatings
 Coatings
 Coatings
 Coatings
 Coatings (Optical)
 Coaxial Cable
 Cobalt-Samarium
 Magnets
 Cockpit Displays
 Cockpit Displays
 Cockpit Displays

 Cockpit Displays
 Cockpit Displays
 Cockpit Displays
 Cockpit Voice
 Recorders
 Cockpit Voice
 Recorders
 Code Converters &
 Displays
 Coherent Counter-
 measures Systems
 Coherent RF Division
 Coils
 Cold Weather Coated
 Fabrics
 Collapsible Storage
 Containers (Fabric)
 Colloid Chemistry
 Combustible Gas
 Monitoring Equipment
 Combustion Research

Company Name

EXPRO CHEMICAL PRODUCTS
 INRAD INDUSTRIAL R & D
 SCIEX
 THE ARMSTRONG MONITORING
 CORP
 WHITESHELL NUCLEAR
 CANADIAN THERMOSTATS &
 CONTROL DEV.
 PACIFIC MICROCIRCUITS Ltd
 THE ARMSTRONG MONITORING
 CORP
 CAD/CAM GRAPHICS Ltd
 CANADIAN MARCONI CO
 PERLEY TECHNOLOGIES

 ICAM TECHNOLOGIES Corp
 NORTHERN AIRBORNE

 ENVIRONMENTAL
 APPLICATIONS GROUP Ltd
 ENVIRONMENTAL
 APPLICATIONS GROUP Ltd
 ALBERTA RESEARCH COUNCIL
 ENVIRONMENTAL
 APPLICATIONS GROUP Ltd
 ALBERTA RESEARCH COUNCIL
 PACIFIC MICROCIRCUITS Ltd
 BACHAN AEROSPACE
 CHICOPEE MANUFACTURING
 DIEMASTER TOOL Inc
 J.J. CHARLTON COMPANY Ltd
 LEAVENS AVIATION Inc
 LUMONICS Inc
 MPB TECHNOLOGIES Inc
 ULTRA LASERTECH Inc
 ULTRA LASERTECH Inc

 ALBERTA RESEARCH COUNCIL
 ALBERTA RESEARCH COUNCIL
 3-L FILTERS Ltd
 AIRCRAFT APPLIANCES &
 EQUIPMENT Ltd
 MIL-COM TECHNOLOGIES Inc
 BRISTOL AEROSPACE Ltd
 CAMETOID Ltd
 CANADAIR Ltd
 EBCO INDUSTRIES
 McDONNELL DOUGLAS
 SERMATECH CANADA Inc
 UDT INDUSTRIES Inc
 CAMETOID Ltd
 HARBOUR INDUSTRIES (Canada)
 SHERRITT GORDON MINES Ltd

 CANADIAN MARCONI CO
 COMPUTING DEVICES
 deHAVILLAND AIRCRAFT OF
 CANADA Ltd
 GARRETT MANUFACTURING Ltd
 LITTON SYSTEMS CANADA Ltd
 OPTOTEK Ltd
 ATLANTIS AEROSPACE Corp

 LEIGH INSTRUMENTS Ltd

 PYLON ELECTRONIC DEVEL. CO

 TELEMUS ELECTRONIC

 TELEMUS ELECTRONIC
 MICROTOL Ltd
 MIL-COM TECHNOLOGIES Inc

 SEI INDUSTRIES Ltd

 WHITESHELL NUCLEAR
 THE ARMSTRONG MONITORING
 CORP
 GLOBAL THERMOELECTRIC

Combustion Research
Combustion Research
Combustion Research
Combustion Research
Command & Control Vehicle
Command Active Sonobuoys
Command, Control & Communications
Commercial Hardware
Commercial Systems Integration
Communication Cable
Communication Shelters
Communications
Communications
Communications
Communications
Communications
Communications
Communications
Communications
Communications
Communications
Communications
Communications
Communications
Communications
Communications
Communications (Digital)
Communications Analysis
Communications Consultants
Communications Equipment (Castings)
Communications Simulation
Communications Simulators
Communications Systems
Communications Systems
Community Cable Television
Compass Systems
Component/System Testing
Components (Aerospace)
Components (Aircraft)
Components (Airframe)
Components (Airframe)
Components (Avionics)
Components (Computers)
Components (Engines)
Composite Components

Composite Components
Composite Components

Composite Components
Composite Powders
Composite/Fiberglass Components
Composite/Fiberglass Components
Composition B
Compound Semiconductor Wafers
Compressors (GT Engines)
Computational Design

ONTARIO HYDRO
PRATT & WHITNEY CANADA Ltd
ROLLS-ROYCE (CANADA) Ltd
WHITESHELL NUCLEAR
GENERAL MOTORS OF CANADA

SPARTON OF CANADA Ltd

See C3

SUPRECA Inc
SHL SYSTEMHOUSE Ltd

HARBOUR INDUSTRIES (Canada)
ROCKWELL INTERNATIONAL
A.E.I. TELECOMM. (Canada) Ltd
ADGA SYSTEMS
BARON COMMUNICATIONS Ltd
CANADIAN ASTRONAUTICS Ltd
CANADIAN MARCONI CO
COM DEV Ltd
FOUNDATION INSTRUMENTS
GARRETT MANUFACTURING Ltd
HERMES ELECTRONICS Ltd
JATEL COMMUNICATIONS
MILLER COMMUNICATIONS
PRIOR DATA SCIENCES Ltd
ROCKWELL INTERNATIONAL
SPAR AEROSPACE Ltd
SPILSBURY COMMUNICATIONS
ULTRA LASERTECH Inc
EKLOGIX Inc
MPB TECHNOLOGIES Inc

TELECONSULT Ltd

SUPRECA Inc

PERLEY TECHNOLOGIES

MILLER COMMUNICATIONS

NORTHERN AIRBORNE

SED SYSTEMS Inc

DOUSERV GROUP INC

BENDIX AVELEX Inc
EPIC DATA Inc

CAMPAGNA BROTHERS
MACHINE SHOP LTD
ENHEAT Inc
CANADAIR Ltd
McDONNELL DOUGLAS CANADA
NORTHWEST INDUSTRIES Ltd
CANADIAN MARCONI CO
DY-4 SYSTEMS Inc

ROLLS-ROYCE (CANADA) Ltd
BOEING OF CANADA Ltd
(Winnipeg Div)
CANADAIR Ltd
CANADIAN AIRCRAFT
PRODUCTS Ltd
CANADIAN GENERAL ELECTRIC
SHERRITT GORDON MINES Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
McDONNELL DOUGLAS CANADA

EXPRO CHEMICAL PRODUCTS
COMINCO Ltd

PRATT & WHITNEY CANADA Ltd

CANADAIR Ltd

Computer Aided Design
Computer Aided Learning
Computer Aided Learning
Computer Aided Manufacture
Computer Analysis
Computer Based Training
Computer Code Development
Computer Communications
Computer Graphics
Computer Graphics
Computer Graphics
Computer Mass Memory
Computer Produced Maps
Computer Security
Computer Simulation
Computers
Computers
Computers
Computers
Computers
Computers
Computers
Computers
Computers
Computers
Computers
Computers
Computers
Computers
Computers
Computers (Parallel)
Concrete Technology
Conductivity Sensors
Conductivity Testing
Connectors
Consulting
Consulting
Consulting

Consulting
Consulting

Consulting
Consulting (CAD/CAM)
Consulting (Communications)
Consulting (Communications)
Consulting (Nav/Comm)
Continuous Casting
Continuous Wave CO₂
Continuous Wave CO₂
Continuous Wave Lasers
Continuous Wave Light Sources
Contract Management
Contract Research
Control Cables (Aircraft)
Control Cables (Aircraft)
Control Circuitry
Control Systems
Control Systems
Control Systems
Control Systems
Control Systems
Control Systems
Control Systems
Control Systems
Control Systems
Control Systems (Process)
Controllers
Controls (Systems)
Convective Storms
Conventional Forgings

See CAD
ICAM TECHNOLOGIES Corp

PERLEY TECHNOLOGIES

See CAM

GEOMETRIX Ltd
HONEYWELL Ltd

WHITESHELL NUCLEAR

DOUSERV GROUP INC

ALBERTA RESEARCH COUNCIL
CAE INDUSTRIES Ltd
PRIOR DATA SCIENCES Ltd
TARGA ELECTRONICS SYSTEMS
SPAR AEROSPACE Ltd

SHARP SPECIAL SYSTEMS
PRIOR DATA SCIENCES Ltd
AIRBORNE DATA SYSTEMS Ltd
ATLANTIS AEROSPACE Corp
BARON COMMUNICATIONS Ltd
CAE INDUSTRIES Ltd
CANADIAN ASTRONAUTICS Ltd
COMPUTING DEVICES COMPANY
DY-4 SYSTEMS Inc
MYRIAS RESEARCH Corp
NORTHERN AIRBORNE
PRIOR DATA SCIENCES Ltd
SED SYSTEMS Inc
SPERRY Inc (Defense Products)
TRIDEX SYSTEMS Inc
MYRIAS RESEARCH Corp
ONTARIO HYDRO
APPLIED MICROSYSTEMS Ltd
CAMETOID Ltd
ITT CANNON ELECTRIC CANADA
DSMA ATCON Ltd
F. G. BERCHA AND ASSOCIATES
FOOTIT MITCHELL AND
ASSOCIATES
PRIOR DATA SCIENCES Ltd
ROBERTSON
PHOTOGRAMMETRIC Inc
TRACKER INDUSTRIES Ltd
ICAM TECHNOLOGIES Corp
JATEL COMMUNICATIONS

TELECONSULT Ltd

ADGA SYSTEMS INTERNATIONAL
SHERRITT GORDON MINES Ltd
MPB TECHNOLOGIES Inc
ULTRA LASERTECH Inc
MPB TECHNOLOGIES Inc
PRA INTERNATIONAL Inc

AMTEK MANAGEMENT Inc
RAYLO CHEMICALS
LEAVENS AVIATION Inc
NORTHWEST INDUSTRIES Ltd
VARIAN CANADA Inc
CAE INDUSTRIES Ltd
DSMA ATCON Ltd
GasTOPS Ltd
INDAL TECHNOLOGIES Inc
MENASCO AEROSPACE Ltd
NORTHERN AIRBORNE
SPAR AEROSPACE Ltd
TRACKER INDUSTRIES Ltd
TEKLOGIX Inc

EPIC DATA Inc
HONEYWELL Ltd
ALBERTA RESEARCH COUNCIL
GENERAL ALUMINUM
FORGINGS Inc

Converter/Recorders
Systems
Converters
Core Memory Arrays
Core Wound Products
Corona Testing
Corrosion Control
Corrosion Control
Corrosion Control
Corrosion Science
Corrosion Science
Cost Estimating
Crash Position Indicator
Crash Position Indicator
Crew Scheduling
Cryptography
Crystals
Crystals (Quartz)
CSA Wire
Current Meter Systems
Current/Pulse
Custom Chips
Custom Chips
Custom Hardware
Custom Made Cable
Custom Packaging
Custom Packaging
Custom Software
Custom Software
Custom Software
Custom Software (ATE)
Custom Synthesis
CW Agent Detection
Cylinders
DAMA
Damping
Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition
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Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition
Data Acquisition

Data Acquisition
Data Analysis
Data Analysis
Data Analysis

Data Analysis
Data Analysis
Data Annotation
Displays
Data Communications
Data Communications
Data Communications
Data Control Systems
Data Conversion
Data Handling
Data Handling

Data Handling

Data Links
Data Loggers
Data Logging
Data Management
Data Processing
Data Processing
Data Processing

PRESENT EY ENGINEERING

PYLON ELECTRONIC DEVEL. CO
SPERRY Inc (Defense Products)
SPERRY Inc (Defense Products)
HAMMOND MANUFACTURING
I. M. P. GROUP Ltd
INNOTECH AVIATION Ltd
ROLLS-ROYCE (CANADA) Ltd
ONTARIO HYDRO
WHITESHELL NUCLEAR
TELECONSULT Ltd
GARRETT MANUFACTURING Ltd
LEIGH INSTRUMENTS Ltd
AIRBORNE DATA SYSTEMS Ltd
MYRIAS RESEARCH Corp
CROVEN CRYSTALS Ltd
PHILIPS ELECTRONICS Ltd
HARBOUR INDUSTRIES (Canada)
APPLIED MICROSYSTEMS Ltd
HAMMOND MANUFACTURING
MICROTEL Ltd
PACIFIC MICROCIRCUITS Ltd
EPIC DATA Inc
HARBOUR INDUSTRIES (Canada)
INRAD INDUSTRIAL R & D
ZARGES AFC CANADA Ltd
EPIC DATA Inc
SHL SYSTEMHOUSE Ltd
TELEMUS ELECTRONIC
NAVAIR Limited
RAYLO CHEMICALS
SCIEX
DONLEE PRECISION
MILLER COMMUNICATIONS
DOWTY CANADA Ltd
AIRBORNE DATA SYSTEMS Ltd
APPLIED MICROSYSTEMS Ltd
BRISTOL AEROSPACE Ltd
CAE INDUSTRIES Ltd
COMPUTING DEVICES COMPANY
DOWTY CANADA ELECTRONICS
EPIC DATA Inc
GasTOPS Ltd
LEIGH INSTRUMENTS Ltd
LITTON SYSTEMS CANADA Ltd
MILLER COMMUNICATIONS
PRIOR DATA SCIENCES Ltd
QUESTOR SURVEYS Ltd
SCI-TEC INSTRUMENTS Inc
SHARP SPECIAL SYSTEMS
THE ARMSTRONG MONITORING
CORP
TRACKER INDUSTRIES Ltd
BARRINGER RESEARCH Ltd
COMPUTING DEVICES COMPANY
deHAVILLAND AIRCRAFT OF
CANADA Ltd
LITTON SYSTEMS CANADA Ltd
QUESTOR SURVEYS Ltd
OPTOTEK Ltd

CANADIAN MARCONI CO
RE: ACTION MARKETING
TRACKER INDUSTRIES Ltd
CAE INDUSTRIES Ltd
RE: ACTION MARKETING
COMPUTING DEVICES COMPANY
deHAVILLAND AIRCRAFT OF
CANADA Ltd
MACDONALD DETTWILER &
ASSOCIATES Ltd
OPTO-ELECTRONICS Inc
TARGA ELECTRONICS SYSTEMS
APPLIED MICROSYSTEMS Ltd
MUIRHEAD SYSTEMS Ltd
AIRBORNE DATA SYSTEMS Ltd
LEIGH INSTRUMENTS Ltd
MILLER COMMUNICATIONS

Data Processing
 Data Recorder Systems
 Data Recorders
 Data Reduction
 Data Reduction
 Data Terminals
 DC Powered Modules
 Deceleration Systems
 Defense Simulation
 Demolition Block
 Demonstrator Consoles
 Depth Systems
 Derived Release Limits
 Desalination
 Detectors
 Detonation
 Die Design

 Die Fabrication
 Die Fabrication
 Die Fabrication
 Die Fabrication
 Die Fabrication
 Dielectric Testing
 Diffusion Coatings
 (Simplex or Duplex)
 Digital Communications
 Digital Data Processing
 Digital Electronics
 Digital Image Analysis
 Digital Mapping
 Digital Modems
 Digital Order Wire
 Digital Signal Processor
 Digital Switches
 Dispersion Modelling

 Dispersion Strengthened
 Alloys
 Display Technologies
 Displays
 Displays
 Displays
 Displays
 Displays
 Disposal (Nuclear
 Waste)
 Distributed Processing
 Distributed Processing
 Distribution (Aircraft
 Parts)
 Distributors (Fasteners)
 DME
 Documentation
 Doppler Navigation
 Systems
 Dosimeters
 Double Base
 Drone Alignment
 Systems
 Drone Recovery
 Systems
 Drones
 Drones

 Drugs Detection
 Dry Film Lubricants
 Dye Lasers
 ECCM Radio
 ECM Jamming Products
 Economic Studies
 Editing
 Effectiveness Evaluation
 EHF Antennas
 Electrical Engineering
 Electrical Engineering
 Electrical System Solid
 State Systems
 Electrical Test
 Equipment

SHARP SPECIAL SYSTEMS
 PRESENTEY ENGINEERING
 TARGA ELECTRONICS SYSTEMS
 CANADIAN ASTRONAUTICS Ltd
 QUESTOR SURVEYS Ltd
 TRACKER INDUSTRIES Ltd
 AVTECH ELECTROSYSTEMS Ltd
 IRVIN INDUSTRIES CANADA Ltd
 PERLEY TECHNOLOGIES
 EXPRO CHEMICAL PRODUCTS
 GasTOPS Ltd
 APPLIED MICROSYSTEMS Ltd
 WHITESHELL NUCLEAR
 SEAGOLD INDUSTRIES
 OPTO-ELECTRONICS Inc
 WHITESHELL NUCLEAR
 GENERAL ALUMINUM
 FORGINGS Inc
 AERO MACHINING Ltd
 BRISTOL AEROSPACE Ltd
 DIEMASTER TOOL Inc
 EBCO INDUSTRIES
 NORTHWEST INDUSTRIES Ltd
 HAMMOND MANUFACTURING
 SERMATECH CANADA Inc

 MILLER COMMUNICATIONS
 ALBERTA RESEARCH COUNCIL
 GARRETT MANUFACTURING Ltd
 DPIX SYSTEMS Ltd
 SPAR AEROSPACE Ltd
 MILLER COMMUNICATIONS
 CANADIAN MARCONI CO
 TRIDEX SYSTEMS Inc
 SED SYSTEMS Inc
 ENVIRONMENTAL
 APPLICATIONS GROUP Ltd
 SHERRITT GORDON MINES Ltd

 OPTOTEK Ltd
 CANADIAN MARCONI CO
 LITTON SYSTEMS CANADA Ltd
 MPB TECHNOLOGIES Inc
 SHARP SPECIAL SYSTEMS
 WHITESHELL NUCLEAR

 MYRIAS RESEARCH Corp
 SPERRY Inc (Defense Products)
 AIRCRAFT APPLIANCES &
 EQUIPMENT Ltd
 INTERNATIONAL FASTENERS Ltd
 CANADIAN MARCONI CO
 RE: ACTION MARKETING
 CANADIAN MARCONI CO

 SCINTREX Ltd
 EXPRO CHEMICAL PRODUCTS
 BENDIX AVELEX Inc

 IRVIN INDUSTRIES CANADA Ltd

 CANADAIR Ltd
 deHAVILLAND AIRCRAFT OF
 CANADA Ltd
 SCIEX
 CAMETOLD Ltd
 PRA INTERNATIONAL Inc
 CANADIAN MARCONI CO
 TELEMUS ELECTRONIC
 SPIECE ASSOCIATES
 RE: ACTION MARKETING
 THOMSON-CSF SYSTEMS
 TIL-TEK Ltd
 DOUSERV GROUP INC
 INNOTECH AVIATION Ltd
 NORTHERN AIRBORNE
 TECHNOLOGY Ltd
 DECADE INDUSTRIES Ltd

Keyword

Electrical/Electronic
Modification
Electro-Optic Inspection
Electro-Optical
Instrumentation
Electro-Optics
Electro-Optics
Electro-optics
Electro-Optics
Electro-Optics
Electro-Optics
Electrochemical
Devices
Electrochemistry
Electrochromic
Technology
Electrodes
Electromagnetic
Compatibility
Electromagnetic Surveys
Electromagnetics
Electromagnetics
Electromagnetics
Electromechanical
Design
Electromechanical
Design
Electron Beam Welding
Electron Transfer
Electronic Controls
Electronic Counter-
Measures
Electronic Counter-
Measures
Electronic Gas Detectors

Electronic Support
Measures
Electronic Systems
Design
Electronic Telephone
Switching Equip.
Electronic Test
Equipment
Electronic Warfare
Electronic Warfare
Electronic Warfare
Electronic Warfare
Electronic Warfare
Electronics (Precision
Parts)
Electronics Nuclear
Electronics Research
Electroplating
Emergency Breathing
Equipment
Emergency Locator
Beacons
Emergency Locator
Beacons
Emergency Reporting
Systems
EMI
EMI Hardened
Equipment
EMP Shielding
Enclosures (Electronic)
Energy Conservation
Energy Conversion
Energy Recovery Pumps
Engine Component
Simulator
Engine Components
Engine Components

Engine Components
Engine Components
Engine Components
Engine Components

Company Name

BOEING OF CANADA Ltd
(Arnprior Div)
DIFFRACTO Ltd
PRA INTERNATIONAL Inc

BARRINGER RESEARCH Ltd
CANADIAN ASTRONAUTICS Ltd
ERNST LEITZ CANADA Ltd
OPTTECH Inc
OPTO-ELECTRONICS Inc
SPAR AEROSPACE Ltd
THE ARMSTRONG MONITORING
CORP
WHITESHELL NUCLEAR
OPTOTEK Ltd

VORTEK INDUSTRIES Ltd
I. M. P. GROUP Ltd

QUESTOR SURVEYS Ltd
MPB TECHNOLOGIES Inc
SCINTREX Ltd
TIL-TEK Ltd
CANADIAN ASTRONAUTICS Ltd

DOWTY CANADA Ltd

VAC-AERO INTERNATIONAL Inc
SERMATECH CANADA Inc
CASEY COPTER ACCESSORIES
CANADIAN ASTRONAUTICS Ltd

M.E.L. DEFENSE SYSTEMS Ltd

THE ARMSTRONG MONITORING
CORP
M.E.L. DEFENSE SYSTEMS Ltd

PARAMAX ELECTRONICS Inc

PYLON ELECTRONIC DEVEL. CO

OPTOTEK Ltd

CANADIAN ASTRONAUTICS Ltd
M.E.L. DEFENSE SYSTEMS Ltd
MILLER COMMUNICATIONS
PRIOR DATA SCIENCES Ltd
TELEMUS ELECTRONIC
CAMPAGNA BROTHERS
MACHINE SHOP LTD
WHITESHELL NUCLEAR
ONTARIO HYDRO
CAMETOID Ltd
C. F. H. INDUSTRIES Ltd

GARRETT MANUFACTURING Ltd

LEIGH INSTRUMENTS Ltd

A.E.I. TELECOMM. (Canada) Ltd

GARRETT MANUFACTURING Ltd
PYLON ELECTRONIC DEVEL. CO

RAYSHIELD Ltd
SHELLCAST FOUNDRIES Inc
DOUSERV GROUP INC
ONTARIO HYDRO
SEAGOLD INDUSTRIES Corp
ATLANTIS AEROSPACE Corp

BRISTOL AEROSPACE Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
HAWKER SIDDELEY CANADA Inc
PRATT & WHITNEY CANADA Ltd
ROLLS-ROYCE (CANADA) Ltd
SHERRITT GORDON MINES Ltd

Keyword

Engine Components
Engine Components

Engine Controls
Engine Controls

Engine Emission
Research
Engine Fire
Extinguishers
Engine Fuel Control
Systems
Engine Health Monitoring
Engine Instruments
Engine Research
Engine Research
Engine Systems
Engine Systems

Engine Systems
Engine Systems
Engine Systems
Engine Systems
Engine Test Beds
Engine Testing
Engine Thrust Measuring
Device
Engineering Services

Engineering Services
Engineering Services
Engines
Engines
Engraving
Environment
Environment

Environment
Environment
Environment
Environment
Environmental Analysis
Environmental Analysis
Environmental Analysis
Environmental
Assessment
Environmental
Assessment
Environmental Controls

Environmental Controls
Environmental
Instruments
Environmental
Laboratory
Environmental
Laboratory
Environmental
Programming
Environmental Sensors

Environmental Sensors
Environmental Sensors
Environmental Testing
ESM Products
Evacuation Slide
Evaporation Charges
Excimer Lasers
Expediting

Expert Systems
Explosafe (Fuel Tank
Protection)
Explosion Suppression
Systems
Explosions
Explosive Ordnance
Devices

Company Name

SPAR AEROSPACE Ltd
SPECIALIZED WELDING &
FABRICATION
COMPUTING DEVICES COMPANY
deHAVILLAND AIRCRAFT OF
CANADA Ltd
PRATT & WHITNEY CANADA Ltd

C. F. H. INDUSTRIES Ltd

BENDIX AVELEX Inc

GasTOPS Ltd
CANADIAN MARCONI CO
PRATT & WHITNEY CANADA Ltd
ROLLS-ROYCE (CANADA) Ltd
BRISTOL AEROSPACE Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
PRATT & WHITNEY CANADA Ltd
ROLLS-ROYCE (CANADA) Ltd
SHERRITT GORDON MINES Ltd
DSMA ATCON Ltd
HAWKER SIDDELEY CANADA Inc
COMPUTING DEVICES COMPANY

BOEING OF CANADA Ltd
(Arnprior Div)
GasTOPS Ltd
ONTARIO HYDRO
PRATT & WHITNEY CANADA Ltd
ROLLS-ROYCE (CANADA) Ltd
NORTHERN AIRBORNE
ALBERTA RESEARCH COUNCIL
CANADIAN THERMOSTATS &
CONTROL DEV.
F. G. BERCHA AND ASSOCIATES
SCI-TEC INSTRUMENTS Inc
SCIEX
THE ARMSTRONG MONITORING
CORP
WHITESHELL NUCLEAR
BARRINGER RESEARCH Ltd
MARS AERIAL REMOTE SENSING
PRESENTENY ENGINEERING
ENVIRONMENTAL
APPLICATIONS GROUP Ltd
ONTARIO HYDRO

deHAVILLAND AIRCRAFT OF
CANADA Ltd
GARRETT MANUFACTURING Ltd
GARRETT MANUFACTURING Ltd

DEVTEK CORPORATION

HERMES ELECTRONICS Ltd

TRACKER INDUSTRIES Ltd

CANADIAN THERMOSTATS &
CONTROL DEV.
INRAD INDUSTRIAL R & D
SPARTON OF CANADA Ltd
CANADIAN ASTRONAUTICS Ltd
TELEMUS ELECTRONIC
C. F. H. INDUSTRIES Ltd
COMINCO Ltd
LUMONICS Inc
QUANTUM INSPECTION AND
TESTING Ltd
GasTOPS Ltd
EXPLOSAFE AMERICA Inc

EXPLOSAFE AMERICA Inc

WHITESHELL NUCLEAR
C. F. H. INDUSTRIES Ltd

Keyword

Explosives
Explosives
Explosives Detection
Extended Interaction
Klystrons
Extended Length
Machining
Extended length
Machining
Extended Length
Machining
Extended Length
Machining
Fabric Structures
Fabrication Procedures
Fabrication/Assembly/
Test
Facility Management
Failure Investigations
Failure Mechanics
Far Infrared
Fast Optical Detection
Fast Optical Sources
Fasteners
Fault Diagnosis
Fault-Tolerant Software
Feasibility Studies
Feasibility Studies
Feasibility Studies
Ferrous Castings
Ferrous Castings
FETs
Fiber Optics
Fiber Optics
Fiber Optics Illumination
Fiberglass Components
Fiberglass/Composite
Components
Film Annotation Systems
Filters
Filters
Filters
Finishing
Fire Alarm
Fire Control
Fire Control
Fire Control Optics
Fire Extinguishing
Systems
Fire Fighting Equipment
Fire Proof Wire
Fire Support Vehicle
Firefighter Suits (Sewing)
Fixed Radios
Flack Jackets (Sewing)
Flame Proof Wire
Flaps
Flares
Flat Panel Displays
Flat Panel Displays
Flaw Detection
Flexible Automated
Manufacturing System
Flight Control Systems
Flight Controls
Flight Data Recorders
Flight Data Recorders
Flight Data Recorders
Flight Data Recorders
Flight Operations
Flight Planning
Flight Simulators

Company Name

EXPRO CHEMICAL PRODUCTS
HANDS FIREWORKS Ltd
SCIEX
VARIAN CANADA Inc
CANADAIR Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
EBCO INDUSTRIES
McDONNELL DOUGLAS CANADA
SEI INDUSTRIES Ltd
QUANTUM INSPECTION AND
TESTING Ltd
MICROTEL Ltd
SHARP SPECIAL SYSTEMS
QUANTUM INSPECTION AND
TESTING Ltd
ONTARIO HYDRO
MPB TECHNOLOGIES Inc
OPTO-ELECTRONICS Inc
OPTO-ELECTRONICS Inc
INTERNATIONAL FASTENERS Ltd
SIMMONDS PRECISION CANADA
TRIDEX SYSTEMS Inc
PRIOR DATA SCIENCES Ltd
SHARP SPECIAL SYSTEMS
TELECONSULT Ltd
EASTERN PRECISION CASTING
SUPRECA Inc
OPTOTEK Ltd
FOUNDATION INSTRUMENTS Inc
OPTO-ELECTRONICS Inc
NORTHERN AIRBORNE
BOEING OF CANADA Ltd
(Winnipeg Div)
NORTHWEST INDUSTRIES Ltd
PRESENTY ENGINEERING
3-L FILTERS Ltd
AIRCRAFT APPLIANCES &
EQUIPMENT Ltd
ANATEK MICROCIRCUITS Inc
PACIFIC MICROCIRCUITS Ltd
TIL-TEK Ltd
PRECI-TECH Ltd
DOUSERV GROUP INC
ADGA SYSTEMS INTERNATIONAL
COMPUTING DEVICES COMPANY
ERNST LEITZ CANADA Ltd
C. F. H. INDUSTRIES Ltd
SEI INDUSTRIES Ltd
HARBOUR INDUSTRIES (Canada)
GENERAL MOTORS OF CANADA
THE H I THOMPSON CO
SPILSBURY COMMUNICATIONS
THE H I THOMPSON CO
HARBOUR INDUSTRIES (Canada)
CANADIAN AIRCRAFT
PRODUCTS Ltd
HANDS FIREWORKS Inc
LITTON SYSTEMS CANADA Ltd
OPTOTEK Ltd
DIFFRACTO Ltd
ICAM TECHNOLOGIES Corp
MENASCO AEROSPACE Ltd
DOWTY CANADA Ltd
ATLANTIS AEROSPACE Corp
LEIGH INSTRUMENTS Ltd
NORTHERN AIRBORNE
PRESENTY ENGINEERING
AIRBORNE DATA SYSTEMS Ltd
AIRBORNE DATA SYSTEMS Ltd
CAE INDUSTRIES Ltd

Keyword

Flight Surface
Manufacture
Flight Test Equipment
Flood Forecasting
Floppy Disk Emulators
Fluid Dynamics
Fluid Dynamics
Fluorescent Penetrant
Inspection
Flutter Analysis
Foil Heat Shields
Forgings
Forgings
Forgings
Forming
Forming (Sheet Metal)
Forming (Stainless Foils)
Foundry
Fracture Analysis
Fracture Mechanics
Frequency "Halver"
Frequency Control
(Crystals)
Frequency Counters
Frequency Stabilizers
Freshwater
Fuel Control (Parts)
Fuel Filters
Fuel Monitors
Fuel Research
Fuel Research
Fuel Storage
Fuel Systems
Fuel Systems
Fuel Systems
Fuel Systems Research
Fuel Tank Protection
Fuses
Fusion Splicers
Galvanically Active
Gamma Ray Monitors
Gas Analysis
Gas Chromatography
Gas Detectors
Gas Lasers
Gas Path Analysis
Gas Pipelines
Gas Turbine
Components
Gas Turbine
Components
Gas Turbine Engines
Gas Turbine Engines
Gas Turbine Engines
(R&D)
Gauges
Gear Boxes
Gear Boxes
Gear Boxes
Gear Inspection
Gears
Gears
General Testing
Generators
Geochemical Equipment
Geographic Analysis
Geographic/Geologic
Analysis
Geologic Analysis
Geology
Geophysical Equipment
Geophysics
Geophysics

Company Name

NORTHWEST INDUSTRIES Ltd
BOEING OF CANADA Ltd
(Arnprior Div)
ALBERTA RESEARCH COUNCIL
TARGA ELECTRONICS SYSTEMS
SCIEX
WHITESHELL NUCLEAR
SPECIALIZED WELDING &
FABRICATION
CANADAIR Ltd
THE H I THOMPSON CO
CANADAIR Ltd
GENERAL ALUMINUM
FORGINGS Inc
McDONNELL DOUGLAS CANADA
HAWKER SIDDELEY CANADA Inc
THE H I THOMPSON CO
THE H I THOMPSON CO
SHELLCAST FOUNDRIES Inc
CANADAIR Ltd
WHITESHELL NUCLEAR
TELEMUS ELECTRONIC
PHILIPS ELECTRONICS Ltd
TELEMUS ELECTRONIC
ULTRA LASERTECH Inc
SEAGOLD INDUSTRIES Corp
C. P. S. INDUSTRIES Inc (LES)
AIRCRAFT APPLIANCES &
EQUIPMENT Ltd
3-L FILTERS Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
PRATT & WHITNEY CANADA Ltd
SEI INDUSTRIES Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
McDONNELL DOUGLAS CANADA
SEI INDUSTRIES Ltd
PRATT & WHITNEY CANADA Ltd
EXPLOSAFE AMERICA Inc
3-L FILTERS Ltd
FOUNDATION INSTRUMENTS Inc
SERMATECH CANADA Inc
SCINTREX Ltd
PHOTOVAC Inc
PHOTOVAC Inc
THE ARMSTRONG MONITORING
CORP
LUMONICS Inc
GastOPS Ltd
DOUSERV GROUP INC
BRISTOL AEROSPACE Ltd
HAWKER SIDDELEY CANADA
PRATT & WHITNEY CANADA Ltd
ROLLS-ROYCE (CANADA) Ltd
GastOPS Ltd
DIEMASTER TOOL Inc
BACHAN AEROSPACE
BRISTOL AEROSPACE Ltd
SPAR AEROSPACE Ltd
DIFFRACTO Ltd
BACHAN AEROSPACE
DONLEE PRECISION
I. M. P. GROUP Ltd
GLOBAL THERMOELECTRIC
SCINTREX Ltd
F. G. BERCHA AND ASSOCIATES
BARRINGER RESEARCH Ltd
F. G. BERCHA AND ASSOCIATES
ALBERTA RESEARCH COUNCIL
SCINTREX Ltd
INRAD INDUSTRIAL R & D
SPARTON OF CANADA Ltd

Keyword

Geotechnical
Engineering
Government Relations
GP Armoured Vehicles
Graphical Data
Distribution Systems
Graphics
Graphics
Graphics
Graphics
Graphics Subsystems
Graphite Epoxy
Components
Gravity Sensors
Green Signal
Grenade (Aero-dynamic)
Grenades Smoke
Grinding
Ground Based
Reproducers
Ground Control
Equipment
Ground Handling
Equipment
Ground Station Antennas
Ground Stations
Ground Stations
Ground Stations
Ground Steering
Systems
Ground Steering
Systems
Ground Support
Equipment
Ground Support
Equipment
Ground Support
Equipment
Ground Support
Equipment
Ground Support
Equipment
Ground Transportation
Ground Water
Guidance Systems
Hand Grenades Smoke
Hangars
Hardness Testing
Hardware Evaluation
Harnesses
Harnesses
Harnesses
Harnesses
Harsh Environment
Equipment
Hazardous Gas Alarm
System
Hazardous Gas
Detection
Hazardous Gas
Detection
Hazardous Gas
Detection
Hazardous Gas
Detection
Hazardous Gas
Detection
HC Smoke
Health Physics
Heat Shields
Heat Tracer Cable
Heat Treating
Heat Treating

Company Name

ONTARIO HYDRO
FOOTTIT MITCHELL AND
ASSOCIATES
GENERAL MOTORS OF CANADA
MUIRHEAD SYSTEMS Ltd
CAE INDUSTRIES Ltd
MPB TECHNOLOGIES Inc
PRIOR DATA SCIENCES Ltd
RE: ACTION MARKETING
SHARP SPECIAL SYSTEMS
DY-4 SYSTEMS Inc
BOEING OF CANADA Ltd
(Winnipeg Div)
SCINTREX Ltd
HANDS FIREWORKS Inc
E. S. MANTIS RESEARCH CORP
HANDS FIREWORKS Inc
DONLEE PRECISION
PRESENTY ENGINEERING
SED SYSTEMS Inc
GENAIRE Ltd
VICTRIX Ltd
CANADIAN ASTRONAUTICS Ltd
MACDONALD DETTWILER &
ASSOCIATES Ltd
MILLER COMMUNICATIONS
SED SYSTEMS Inc
SPAR AEROSPACE Ltd
DOWTY CANADA Ltd
MENASCO AEROSPACE Ltd
BOEING OF CANADA Ltd
(Arnprior Div)
DECADE INDUSTRIES Ltd
DSMA ATCON Ltd
GODFREY DIVISION OF
HOWDEN CANADA
GENERAL MOTORS OF CANADA
ALBERTA RESEARCH COUNCIL
HONEYWELL Ltd
HANDS FIREWORKS Inc
INDAL TECHNOLOGIES Inc
CAMETOID Ltd
SHARP SPECIAL SYSTEMS
IRVIN INDUSTRIES CANADA Ltd
ITT CANNON ELECTRIC CANADA
NORTHERN AIRBORNE
SPERRY Inc (Defense Products)
TARGA ELECTRONICS SYSTEMS
INRAD INDUSTRIAL R & D
BARRINGER RESEARCH Ltd
INRAD INDUSTRIAL R & D
MPB TECHNOLOGIES Inc
SCINTREX Ltd
THE ARMSTRONG MONITORING
CORP
ULTRA LASERTECH Inc
HANDS FIREWORKS Inc
WHITESHELL NUCLEAR
THE H I THOMPSON CO
HARBOUR INDUSTRIES (Canada)
BOEING OF CANADA Ltd
(Arnprior Div)
BRISTOL AEROSPACE Ltd

Keyword

Heat Treating
Heat Treating
Heat Treating
Heat Treating
Heat Treating
Heat Treating
Heating
Heating
Heating (Aircraft)
Helicopter External Load
Equipment
Helicopter Floats
Helicopter Hubs
Helicopter Magnetic
Gradiometer
Helicopter Recovery
Assist
Helicopter Retentions
Helicopter Subsystems
Helicopter Subsystems
Helicopter Systems
Helicopter Systems
Helicopter Systems
Helicopter Wire Strike
Helicopters
Helicopters
Helicopters
Helicopters
HF Adaptive Antenna
Arrays
HF Airborne
Communication
Systems
HF Antennas
HF Antennas
HF Antennas
HF Antennas
HF Communications
HF Communications
HF High Power
Transformers
HF Modems
HF Packet
HF Radios
HF Receivers
HF Transceivers
HF Transmitters
HF Whip Antennas
High Explosives
High Intensity Light
Source
High Intensity Light
Source
High Pressure
(Connectors)
High Purity Metals
High Q Crystals
High Q Crystals
High Speed Pulsers
High Strength Steels
High Temperature
(Connectors)
High Temperature Wire
High Voltage Engineering
High Voltage Pulse
Techniques
High Voltage Science
High Voltage
Transformers
High Volume Smoke Pot
Hologene Free Wire
Honing
Horizon Reference
Systems
Hybrid Circuits
Hybrid Circuits
Hybrid Mobile Protected
Weapon System

Company Name

CANADAIR Ltd
EBCO INDUSTRIES
HAWKER SIDDELEY CANADA Inc
McDONNELL DOUGLAS CANADA
ROLLS-ROYCE (CANADA) Ltd
UDT INDUSTRIES Inc
DOUSERV GROUP INC
VORTEK INDUSTRIES Ltd
CASEY COPTER ACCESSORIES
SEI INDUSTRIES Ltd
C. F. H. INDUSTRIES Ltd
CHICOPEE MANUFACTURING
QUESTOR SURVEYS Ltd
INDAL TECHNOLOGIES Inc
CHICOPEE MANUFACTURING
CANADIAN AIRCRAFT
PRODUCTS Ltd
SPAR AEROSPACE Ltd
BRISTOL AEROSPACE Ltd
MENASCO AEROSPACE Ltd
PRATT & WHITNEY CANADA Ltd
BRISTOL AEROSPACE Ltd
BOEING OF CANADA Ltd
(Arnprior Div)
DOWTY CANADA Ltd
MBB HELICOPTER CANADA Ltd
NORTHERN AIRBORNE
MILLER COMMUNICATIONS
ROCKWELL INTERNATIONAL
DEVTEK CORPORATION
HERMES ELECTRONICS Ltd
SPILSBURY COMMUNICATIONS
TIL-TEK Ltd
DEVTEK CORPORATION
MILLER COMMUNICATIONS
TIL-TEK Ltd
MILLER COMMUNICATIONS
ROCKWELL INTERNATIONAL
SPILSBURY COMMUNICATIONS
ROCKWELL INTERNATIONAL
ATLANTIS AEROSPACE Corp
ROCKWELL INTERNATIONAL
SPILSBURY COMMUNICATIONS
EXPRO CHEMICAL PRODUCTS
MPB TECHNOLOGIES Inc
VORTEK INDUSTRIES Ltd
ITT CANNON ELECTRIC CANADA
COMINCO Ltd
CROVEN CRYSTALS Ltd
PHILIPS ELECTRONICS Ltd
AVTECH ELECTROSYSTEMS Ltd
CHICOPEE MANUFACTURING
ITT CANNON ELECTRIC CANADA
HARBOUR INDUSTRIES (Canada)
ONTARIO HYDRO
OPTO-ELECTRONICS Inc
ONTARIO HYDRO
HAMMOND MANUFACTURING
HANDS FIREWORKS Inc
HARBOUR INDUSTRIES (Canada)
J. J. CHARLTON COMPANY Ltd
SPERRY Inc (Aerospace &
Marine)
GARRETT MANUFACTURING Ltd
MICROTEL Ltd
GENERAL MOTORS OF CANADA

Keyword

Hydraulic Actuators
 Hydraulic Hose
 Hydraulic Servos
 Hydraulics
 Hydraulics
 Hydraulics
 Hydraulics
 Hydraulics
 Hydraulics
 Hydrogen
 Hydrogen Embrittlement
 Hydrogen Fuel Cells
 Hydrogen Gas Detection
 Hydrogen Production
 Hydrogen Sulfide
 Sensors
 Hydromechanical
 Hydrometeorology
 Hydrophones
 IC Design
 ICAM
 Ice Detector
 Ice Measurement

 Ice Mechanics
 Icing

 Igniters
 Illuminated Panels
 Illuminated Panels
 Illuminated Panels
 Illumination Signals
 ILS
 ILS
 ILS
 ILS Structures
 Image Processing
 Image Processing
 Image Processing
 Image Processing
 Image Processing
 Image Processing

 Image Processing
 Image Processing
 Image Recorder

 Impedance
 Transformers
 Impulse Generators
 Induction Hardening
 Industrial Control
 Instrumentation
 Industrial Engineering
 Inertial Navigation
 Inflatable Floats
 Inflatable Hanger
 Inflatable Life Support
 Systems
 Inflatable Products
 Inflatable Rescue
 Equipment
 Inflight Engine
 Monitoring
 Information Displays
 Information Handling
 Products
 Information Management
 Infrared Diode Lasers
 Infrared Instrumentation
 Infrared Instrumentation
 Infrared Instrumentation

Company Name

CHICOPEE MANUFACTURING
 LEAVENS AVIATION Inc
 AERO MACHINING Ltd
 BRISTOL AEROSPACE Ltd
 CAE INDUSTRIES Ltd
 CARR-TECH SERVICES Ltd
 deHAVILLAND AIRCRAFT OF
 CANADA Ltd
 DOWTY CANADA Ltd
 EBCO INDUSTRIES
 FIELD AVIATION COMPANY Ltd
 HEROUX Inc
 McDONNELL DOUGLAS CANADA
 MENASCO AEROSPACE Ltd
 NORTHWEST INDUSTRIES Ltd
 WHITESHELL NUCLEAR
 INRAD INDUSTRIAL R & D
 CAMETOID Ltd
 DSMA ATCON Ltd
 INRAD INDUSTRIAL R & D
 INRAD INDUSTRIAL R & D
 THE ARMSTRONG MONITORING
 CORP
 DOWTY CANADA Ltd
 ALBERTA RESEARCH COUNCIL
 SPARTON OF CANADA Ltd
 PACIFIC MICROCIRCUITS Ltd
 DIFFRACTO Ltd
 LEIGH INSTRUMENTS Ltd
 CARDION ELECTRONICS/DG
 INSTRUMENTS
 F. G. BERCHA AND ASSOCIATES
 ENVIRONMENTAL
 APPLICATIONS GROUP Ltd
 HANDS FIREWORKS Inc
 CANADIAN MARCONI CO
 GARRETT MANUFACTURING Ltd
 NORTHERN AIRBORNE
 HANDS FIREWORKS Inc
 AMTEK MANAGEMENT Inc
 CANADIAN MARCONI CO
 GARRETT MANUFACTURING Ltd
 INDAL TECHNOLOGIES Inc
 CANADIAN ASTRONAUTICS Ltd
 CANADIAN MARCONI CO
 DIPIX SYSTEMS Ltd
 ERNST LEITZ CANADA Ltd
 MACDONALD DETTWILER &
 ASSOCIATES Ltd
 MUIRHEAD SYSTEMS Ltd
 SCI-TEC INSTRUMENTS Inc
 MACDONALD DETTWILER &
 ASSOCIATES Ltd
 AVTECH ELECTROSYSTEMS Ltd

 AVTECH ELECTROSYSTEMS Ltd
 J.J. CHARLTON COMPANY Ltd
 OPTO-ELECTRONICS Inc

 ALBERTA RESEARCH COUNCIL
 LITTON SYSTEMS CANADA Ltd
 SEI INDUSTRIES Ltd
 MIL-COM TECHNOLOGIES Inc
 IRVIN INDUSTRIES CANADA Ltd

 MIL-COM TECHNOLOGIES Inc
 SEI INDUSTRIES Ltd

 GasTOPS Ltd

 SHARP SPECIAL SYSTEMS
 SPERRY Inc (Defense Products)

 SHL SYSTEMHOUSE Ltd
 OPTO-ELECTRONICS Inc
 BARRINGER RESEARCH Ltd
 OPTO-ELECTRONICS Inc
 OPTOTEK Ltd
 SPAR AEROSPACE Ltd

Keyword

Infrared Materials
 Injection Molding
 Injection Molding
 Injection Molding
 Injection Molding Tools
 Inspection

 Inspection

 Inspection Equipment
 Inspection Systems
 Installations & Servicing
 Installations (Avionics)
 Instructional Services
 Instrument Bearings
 Instrument Manufacture
 Instrument Repair
 Instrument Repair
 Instrument Repair
 Instrumentation
 Instrumentation
 Instrumentation
 Instrumentation
 Instrumentation
 Instrumentation (Air/Gas)
 Instrumented Landing
 Systems
 Instruments
 Instruments
 Instruments

 Instruments
 Instruments
 Instruments
 Instruments
 Instruments
 Instruments
 Instruments-Nuclear
 Insulation (Sewing)
 Integrated CAD/CAM
 Systems
 Integrated Circuits
 Integrated High Density
 LED Displays
 Integrated Logistic
 Support
 Integrated Logistics
 Support
 Integrated Processing &
 Display Systems
 Integrated Systems
 Management
 Intelligent Instruments
 Interactive Analysis

 Intercommunication
 Systems
 Intercommunication
 Systems
 Interface Systems
 Interfacing
 International Trade
 Relations
 Intrusion Detection
 Intrusion Detection
 Inverters
 Inverting Transformers
 Investment Castings
 Investment Castings
 Investment Castings
 Iodine Lasers
 Ion Molecule Chemistry
 Ion Physics
 Ion Plating
 Ion Vapor Deposition
 IR Detectors Liquid
 Sensors

Company Name

COMINCO Ltd
 CANADIAN MARCONI CO
 I. M. P. GROUP Ltd
 INRAD INDUSTRIAL R & D
 KOSS MACHINE & TOOL CO
 QUANTUM INSPECTION AND
 TESTING Ltd
 SPECIALIZED WELDING &
 FABRICATION
 DIFFRACTO Ltd
 DIFFRACTO Ltd
 NORTHWEST INDUSTRIES Ltd
 NAVAIR Limited
 TELECONSULT Ltd
 FAG BEARINGS Ltd
 BARRINGER RESEARCH Ltd
 CANADIAN MARCONI CO
 NORTHWEST INDUSTRIES Ltd
 SIMMONDS PRECISION CANADA
 BRISTOL AEROSPACE Ltd
 CARDION ELECTRONICS/DG
 INSTRUMENTS
 DSMA ATCON Ltd
 MPB TECHNOLOGIES Inc
 ONTARIO HYDRO
 OPTO-ELECTRONICS Inc
 SCI-TEC INSTRUMENTS Inc
 SED SYSTEMS Inc
 PHOTOVAC Inc
 See ILS

 BENDIX AVELEX Inc
 COMPUTING DEVICES COMPANY
 deHAVILLAND AIRCRAFT OF
 CANADA Ltd
 LITTON SYSTEMS CANADA Ltd
 NORTHERN AIRBORNE
 PRESENTEY ENGINEERING
 PYLON ELECTRONIC DEVEL. CO
 SCIEX
 WHITESHELL NUCLEAR
 THE H I THOMPSON CO
 ICAM TECHNOLOGIES Corp

 PACIFIC MICROCIRCUITS Ltd
 OPTOTEK Ltd

 AMTEK MANAGEMENT Inc

 SPERRY Inc (Aerospace &
 Marine)
 SPERRY Inc (Defense Products)

 DOWTY CANADA Ltd

 CANADIAN MARCONI CO
 MACDONALD DETTWILER &
 ASSOCIATES Ltd
 LEIGH INSTRUMENTS Ltd

 NORTHERN AIRBORNE

 SHARP SPECIAL SYSTEMS
 TRACKER INDUSTRIES Ltd
 FOOTIT MITCHELL AND
 ASSOCIATES
 COMPUTING DEVICES COMPANY
 LITTON SYSTEMS CANADA Ltd
 PYLON ELECTRONIC DEVEL. CO
 AVTECH ELECTROSYSTEMS Ltd
 EASTERN PRECISION CASTING
 SHELLCAST FOUNDRIES Inc
 SUPRECA Inc
 MPB TECHNOLOGIES Inc
 SCIEX
 SCIEX
 CAMETOID Ltd
 CAMETOID Ltd
 OPTO-ELECTRONICS Inc

IR Sources
Irradiations
ISO-CMOS(tm)
Isotope Dispensing
Equipment
Isotopes
Isotopic CO2
Ivadizing(tm)
Jamming
Jet Engine (Components)
Jig Boring
Jig Fabrication

**Jig Grinding
Kit-Bags (Sewing)
Klystrons
Laboratory
Laboratory
Ladder Scaffold Systems
Laminates**

[illegible]

Landing Gears
Landing Gears
Landing Gears
Landsat

- Laser Altimeter
- Laser Communications
- Laser Controllers
- Laser Diodes
- Laser Diodes
- Laser Film Image Recorder
- Laser Light Sources
- Laser Marking Systems
- Laser Optics
- Laser Optics
- Laser Radar
- Laser Radar
- Laser Rangefinders
- Laser Simulation
- Lasers
- Lasers
- Lasers
- Launch Tubes
- LED Arrays
- LED Displays
- LED Lighting
- LED Materials
- Lenses
- (Reconnaissance)
- Lenses (Underwater)
- Level of Repair Analysis
- Library (Aircraft Parts)

**Lidar Systems
Life Cycle Support
Life Cycle Support
Life Raft Inflation
Equipment**

OPTO-ELECTRONICS Inc
WHITESHELL NUCLEAR
PACIFIC MICROCIRCUITS Ltd
DECADE INDUSTRIES Ltd

**WHITESHELL NUCLEAR
ULTRA LASERTECH Inc
CAMETOID Ltd
MILLER COMMUNICATIONS
DONLEE PRECISION
GEOMETRIX Ltd
CANADIAN AIRCRAFT
PRODUCTS Ltd
GEOMETRIX Ltd
THE H I THOMPSON CO
VARIAN CANADA Inc
BRISTOL AEROSPACE Ltd
HAWKER SIDDELEY CANADA Inc
ZARGES AFC CANADA Ltd
BOEING OF CANADA Ltd
(Winnipeg Div)**

VORTEK INDUSTRIES Ltd
DOUSERV GROUP INC
CANADIAN MARCONI CO
AERO MACHINING Ltd

BACHAN AEROSPACE

C. P. S. INDUSTRIES Inc (LES)

CHICOPEE MANUFACTURING

DEVTEK CORPORATION

DONLEE PRECISION

MENASCO AEROSPACE Ltd

deHAVILLAND AIRCRAFT OF
CANADA Ltd
DOWTY CANADA Ltd
HEROUX Inc
MENASCO AEROSPACE Ltd
MACDONALD DETTWILER &
ASSOCIATES Ltd

OPTOTECH Inc
 MPB TECHNOLOGIES Inc
 ULTRA LASERTECH Inc
 FOUNDATION INSTRUMENTS Inc
 OPTO-ELECTRONICS Inc
 MACDONALD DETTWILER &
 ASSOCIATES Ltd
 OPTO-ELECTRONICS Inc
 LUMONICS Inc
 DIFFRACTO Ltd
 ERNST LEITZ CANADA Ltd
 OPTTECH Inc
 ULTRA LASERTECH Inc
 OPTTECH Inc
 VORTEK INDUSTRIES Ltd
 LUMONICS Inc
 MPB TECHNOLOGIES Inc
 ULTRA LASERTECH Inc
 CANADIAN GENERAL ELECTRIC
 OPTOTEK Ltd
 LITTON SYSTEMS CANADA Ltd
 NORTHERN AIRBORNE
 OPTOTEK Ltd
 ERNST LEITZ CANADA Ltd

ERNST LEITZ CANADA Ltd
AMTEK MANAGEMENT Inc
PATLON AIRCRAFT &
INDUSTRIES Ltd
OPTECH Inc
PRIOR DATA SCIENCES Ltd
ROLLS-ROYCE (CANADA) Ltd
C. F. H. INDUSTRIES Ltd

Life-Saving Equipment
Light Alloy Sand Castings
Light Analysis
Light Armoured Vehicles
Light Assembly
Light Detection
Light Generation
Lighted Panels
Lighted Panels
Lighted Panels
Lighting (High Power)
Lighting Equipment
Line Terminating Unit
Linear Pulse Amplifiers
Liquid Crystal Displays
Liquid Crystals
Liquid Springs
Local Area Networking
Locomotives
Logistic Support

- Logistic Support
- Logistic Support Analysis
- Logistics Engineering
- Logistics Vehicle
- Long Range Systems Planning
- Long Range Transport

Loop Back Units
 Loopless Memories
 Loran C Navigation
 Receivers
 Low Frequency Beacon
 Systems
 Low Hologene Wire
 Low Voltage
 Transformers
 Luminescence Decay
 Systems

LVTP7 Upgrades
 M113 Upgrades
 Machine Control
 Machine Vision
 Machining
 Machining
 Machining
 Machining
 Machining

**Machining
Machining
Machining**

Machining
Machining

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SEI INDUSTRIES Ltd
HALEY INDUSTRIES Ltd
PRA INTERNATIONAL Inc
GENERAL MOTORS OF CANADA
J.J. CHARLTON COMPANY Ltd
PRA INTERNATIONAL Inc
PRA INTERNATIONAL Inc
CANADIAN MARCONI CO
GARRETT MANUFACTURING Ltd
NORTHERN AIRBORNE
VORTEK INDUSTRIES Ltd
CARR-TECH SERVICES Ltd
CANADIAN MARCONI CO
AVTECH ELECTROSYSTEMS Ltd
LITTON SYSTEMS CANADA Ltd
OPTOTEK Ltd
DOWTY CANADA Ltd
SPERRY Inc (Defense Products)
GENERAL MOTORS OF CANADA
BOEING OF CANADA Ltd
(Arnprior Div)
KAYCOM Inc
AMTEK MANAGEMENT Inc
THOMSON-CSF SYSTEMS
GENERAL MOTORS OF CANADA
SHL SYSTEMHOUSE Ltd

ENVIRONMENTAL
APPLICATIONS GROUP Ltd
PYLON ELECTRONIC DEVEL. CO
TELEMUS ELECTRONIC
INTERNAV Ltd

SPILSBURY COMMUNICATIONS

HARBOUR INDUSTRIES (Canada)
HAMMOND MANUFACTURING

PRA INTERNATIONAL Inc

GENERAL MOTORS OF CANADA
GENERAL MOTORS OF CANADA
TEKLOGIX Inc
DIFFRACTO Ltd
AERO MACHINING Ltd
BACHAN AEROSPACE
BATA ENGINEERING
BENDIX AVELEX Inc
BOEING OF CANADA Ltd
(Armiprior Div)

BRISTOL AEROSPACE Ltd
C. P. S. INDUSTRIES Inc (LES)
CAMPAGNA BROTHERS
MACHINE SHOP LTD
CANADAIR Ltd
CANADIAN AIRCRAFT
PRODUCTS Ltd
CANADIAN MARCONI CO
CHICOPEE MANUFACTURING
DECADE INDUSTRIES Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
DEVTEK CORPORATION
DIEMASTER TOOL Inc
DONLEE PRECISION
DOWTY CANADA Ltd
EBCO INDUSTRIES
ENHEAT Inc
GEOMETRIX Ltd
GODFREY DIVISION OF
HOWDEN CANADA
HAWKER SIDDELEY CANADA Inc
I. M. P. GROUP Ltd
INDAL TECHNOLOGIES Inc
INRAD INDUSTRIAL R & D
J.J. CHARLTON COMPANY Ltd
KOSS MACHINE & TOOL CO
LEAVENS AVIATION Inc
McDONNELL DOUGLAS

Keyword

Machining
Machining

Machining
Machining
Machining
Machining
Magnesium
Magnesium Sand
Castings
Magnetic Anomaly
Detection
Magnetic Anomaly
Detection
Magnetic Devices
Magnetic Devices
Magnetic Gradiometer
Magnetic Sensors
Magnetic Tape
Transports
Magnetometers
Magnetometers
Magnetometers
Magnets
Maintenance
Maintenance Consoles
Maintenance Planning
Maintenance Recovery
Vehicle
Man-Machine Sciences
Management Consulting
Manuals
Manufacturing
Technology
Mapping
Mapping
Mapping
Mapping
Marine Diesel
Simulators
Marine Simulators

Markers
Market Research
Marketing

Marketing
Mass Spectrometry
Mass Storage Systems
Materials
Characterization
Materials Processing
Materials R&D
(Connectors)
Materials Testing
Materials Testing
Materials Testing &
Development
Mathematics
Measurement & Control
Systems
Measurement & Control
Systems
Measurement & Control
Systems
Measurement & Control
Systems
Measurement Systems
Measurement Systems

Mechanical Arms
Mechanical Assembly
Mechanical Mounts
Mechanical Testing
Medical Biophysics
Memory
Memory
Metal Coatings
Metal Detection

Company Name

MICROTEL Ltd
MONTREAL PRECISION
CRAFTING Ltd
PRECI-TECH Ltd
SCI-TEC INSTRUMENTS Inc
UDT INDUSTRIES Inc
VAC-AERO INTERNATIONAL Inc
ROLLS-ROYCE (CANADA) Ltd
HALEY INDUSTRIES Ltd

CAE INDUSTRIES Ltd

PRESENTY ENGINEERING

CANADIAN MARCONI CO
HAMMOND MANUFACTURING
QUESTOR SURVEYS Ltd
SCINTREX Ltd
SPERRY Inc (Defense Products)

CAE INDUSTRIES Ltd
PRESENTY ENGINEERING
QUESTOR SURVEYS Ltd
SHERRITT GORDON MINES Ltd
See R&O
SPERRY Inc (Defense Products)
TELECONSULT Ltd
GENERAL MOTORS OF CANADA

HONEYWELL Ltd
SPIECE ASSOCIATES
HAWKER SIDDELEY CANADA Inc
DIFFRACTO Ltd

F. G. BERCHA AND ASSOCIATES
MARS AERIAL REMOTE SENSING
QUESTOR SURVEYS Ltd
SPAR AEROSPACE Ltd
SPERRY Inc (Aerospace &
Marine)
SPERRY Inc (Aerospace &
Marine)
HANDS FIREWORKS Inc
SPIECE ASSOCIATES
FOOTIT MITCHELL AND
ASSOCIATES
RE: ACTION MARKETING
SCIEX
TARGA ELECTRONICS SYSTEMS
WHITESHELL NUCLEAR

CAMETOID Ltd
ITT CANNON ELECTRIC CANADA

ALBERTA RESEARCH COUNCIL
ONTARIO HYDRO
WHITESHELL NUCLEAR

WHITESHELL NUCLEAR
DIFFRACTO Ltd

GARRETT MANUFACTURING Ltd

SHARP SPECIAL SYSTEMS

SPERRY Inc (Defense Products)

OPTO-ELECTRONICS Inc
ROBERTSON
PHOTOGRAMMETRIC Inc
SPAR AEROSPACE Ltd
EBCO INDUSTRIES
HAMMOND MANUFACTURING
WHITESHELL NUCLEAR
WHITESHELL NUCLEAR
PACIFIC MICROCIRCUITS Ltd
TARGA ELECTRONICS SYSTEMS
CAMETOID Ltd
BARRINGER RESEARCH Ltd

Keyword

Metal Finishing
Metal Plating
Metal Powders
Metallography
Metallurgy

Metallurgy
Metallurgy
Metalworking
Metalworking
Metalworking
Metalworking
Metalworking
Meteorological
Instruments
Meteorological Satellite
Processing
Meteorological
Stations/Equipment
Meteorology
Meteorology

Meteorology
Metrology

MIC Design &
Production
Microbiology
Microcircuits
Microcomputer
Programming
Microelectronics

Microelectronics
Microgravity
Microgravity
Manufacturing
Micrometeorology

Microprocessors
Microprocessors
Microprocessors
Microprocessors
Microprocessors
Microprocessors
Microprocessors
Microwave
Microwave Landing
Systems
Microwave Prescalers
Microwave Subsystems
Microwave Systems
Millimeter Wave
Subsystems
Millimeter Wave
Systems
Milling
Mine Clearance System
Kit
Miniature Bearings
Mirror Mounts
Missile Components
Missile Control Systems
Missile Parts
MLS
MLS Structures
Mobile & Laboratory
Analytical Services
Mobile Control Heads
Mobile Data Design
Mobile Electronic
Warfare Support
System
Mobile Radio
Communications
Mobile Radios
Mobile Terminals
Modeling
Modems

Company Name

CAMETOID Ltd
ROLLS-ROYCE (CANADA) Ltd
SHERRITT GORDON MINES Ltd
WHITESHELL NUCLEAR
CANADIAN THERMOSTATS &
CONTROL DEV.
COMINCO Ltd
WHITESHELL NUCLEAR
BRISTOL AEROSPACE Ltd
CANADAIR Ltd
EBCO INDUSTRIES
HAWKER SIDDELEY CANADA Inc
McDONNELL DOUGLAS CANADA
APPLIED MICROSYSTEMS Ltd

MACDONALD DETTWILER &
ASSOCIATES Ltd
BRISTOL AEROSPACE Ltd

ALBERTA RESEARCH COUNCIL
ENVIRONMENTAL
APPLICATIONS GROUP Ltd
MYRIAS RESEARCH Corp
QUANTUM INSPECTION AND
TESTING Ltd
TELEMUS ELECTRONIC

ALBERTA RESEARCH COUNCIL
CANADIAN MARCONI CO
RE: ACTION MARKETING

CANADIAN THERMOSTATS &
CONTROL DEV.
HONEYWELL Ltd
COMINCO Ltd
DSMA ATCON Ltd

ENVIRONMENTAL
APPLICATIONS GROUP Ltd
BARON COMMUNICATIONS Ltd
CANADIAN ASTRONAUTICS Ltd
DOWTY CANADA Ltd
EPIC DATA Inc
SCI-TEC INSTRUMENTS Inc
SPERRY Inc (Defense Products)
TRACKER INDUSTRIES Ltd
DOUSERV GROUP INC
See MLS

TELEMUS ELECTRONIC
COM DEV Ltd
BARON COMMUNICATIONS Ltd
VARIAN CANADA Inc

COM DEV Ltd

DIEMASTER TOOL Inc
GENERAL MOTORS OF CANADA

FAG BEARINGS Ltd
ULTRA LASERTECH Inc
BACHAN AEROSPACE
GARRETT MANUFACTURING Ltd
AERO MACHINING Ltd
CANADIAN MARCONI CO
INDAL TECHNOLOGIES Inc
SCIEX

BARON COMMUNICATIONS Ltd
TEKLOGIX Inc
GENERAL MOTORS OF CANADA

DOUSERV GROUP INC

SPILSBURY COMMUNICATIONS
TEKLOGIX Inc
ULTRA LASERTECH Inc
FOUNDATION INSTRUMENTS

Keyword

Modems
Modification (Aircraft)

Modification (Aircraft)
Modification (Aircraft)
Modification (Helicopters)
Modular Design
Modular Practice Bomb
Module Design
Moisture Content
Monitoring (Microprocessors-Based)
Monitoring Systems
Monocycle Generators
Monomers
Mortar Vehicle
Motions Compensation
Motor Speed Control
Motors
Multi-Layer Coatings
Multi-Layered Board Assemblies
Multicolor LED Displays
Multiplexer
Multiplexers

Nanosecond
Naval Combat Systems
Navigation
Navigation
Navigation
Navigation

Navigation

Navigation
Navigation
Navigation
Navigation
Navigation
Navigation
Navigation Aids
Navigation Aids
Navigation Aids
Navigation Receivers
Navigation Systems
Navigation Systems Integration
Navstar GPS
NC/CNC Equipment
Needs Analysis
Network Systems
Networking
Neutron Activation
Nickel
Nickel Coinage
Nickel Powders
Nickel Strip
Night Vision
Nitrocellulose
Nitrogen Lasers
Noise
Non-Destructive Testing
Non-Destructive Testing
Non-Destructive Testing
Non-Destructive Testing
Non-Destructive Testing
Non-Destructive Testing
Non-Destructive Testing
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Non-Destructive Testing
Non-Destructive Testing

Non-Destructive Testing

Company Name

MILLER COMMUNICATIONS
CANADIAN AIRCRAFT PRODUCTS Ltd
FIELD AVIATION COMPANY Ltd
I. M. P. GROUP Ltd
INNOTECH AVIATION Ltd
BOEING OF CANADA Ltd (Arnprior Div)
EPIC DATA Inc
VICTRIX Ltd
PRIOR DATA SCIENCES Ltd
FOUNDATION INSTRUMENTS
PYLON ELECTRONIC DEVEL. CO

TRACKER INDUSTRIES Ltd
AVTECH ELECTROSYSTEMS Ltd
RAYLO CHEMICALS
GENERAL MOTORS OF CANADA
DOWTY CANADA Ltd
CASEY COPTER ACCESSORIES
PRESENTLEY ENGINEERING
CAMETOID Ltd
SPERRY Inc (Defense Products)

OPTOTEK Ltd
CANADIAN MARCONI CO
SPERRY Inc (Aerospace & Marine)
AVTECH ELECTROSYSTEMS Ltd
PARAMAX ELECTRONICS Inc
BENDIX AVELEX Inc
CANADIAN ASTRONAUTICS Ltd
CANADIAN MARCONI CO
CARDION ELECTRONICS/DG INSTRUMENTS
COMPUTING DEVICES COMPANY
deHAVILLAND AIRCRAFT OF CANADA Ltd
DOUSERV GROUP INC
INTERNAV Ltd
LITTON SYSTEMS CANADA Ltd
MILLER COMMUNICATIONS
PRESENTLEY ENGINEERING
SPERRY Inc (Defense Products)
SPILSBURY COMMUNICATIONS
CANADIAN MARCONI CO
DOUSERV GROUP INC
SPILSBURY COMMUNICATIONS
INTERNAV Ltd
BENDIX AVELEX Inc
HONEYWELL Ltd

CANADIAN MARCONI CO
BATA ENGINEERING
TELECONSULT Ltd
TRACKER INDUSTRIES Ltd
JATEL COMMUNICATIONS
WHITESHELL NUCLEAR
SHERRITT GORDON MINES Ltd
SHERRITT GORDON MINES Ltd
SHERRITT GORDON MINES Ltd
SHERRITT GORDON MINES Ltd
NORTHERN AIRBORNE
EXPRO CHEMICAL PRODUCTS
PRA INTERNATIONAL Inc
NORTHERN AIRBORNE
BRISTOL AEROSPACE Ltd
DECADE INDUSTRIES Ltd
DONLEE PRECISION
FIELD AVIATION COMPANY Ltd
I. M. P. GROUP Ltd
INNOTECH AVIATION Ltd
NORTHWEST INDUSTRIES Ltd
ONTARIO HYDRO
QUANTUM INSPECTION AND TESTING Ltd
ROLLS-ROYCE (CANADA) Ltd

Keyword

Non-Destructive Testing
Non-Directional Beacon Systems
Non-Ferrous Castings
Non-Ferrous Castings
Non-Routine Analysis
Nozzles
Nuclear Engineering
Nuclear Engineering
Nuclear Industry (Machining)
Nuclear Instrumentation

Nuclear Reactor Components
Nuclear Reactor Components
Nuclear Simulation
Nuclear Valves
Nuclear Waste Management
Nuclear Waste Management
Numerical Modelling
Oceanographic Instrumentation
Office Communications
Oil Filling
Oil Pipelines
Oil Sands
Oil Vacuum Processing
Omega Navigation Systems
Operating Systems
Operational Analysis
Operational Simulation
Operations Manuals
Optical Building Blocks
Optical Coatings
Optical Coatings
Optical Communications
Optical Communications
Optical Research & Development
Optical Switches
Optics
Optics
Optics Infrared
Optics Visual
Opto-Mechanical Precision Assemblies
Optoacoustic Trace Gas Analyzer
Optogalvanic Effects
Orange Smoke
Ordnance
Ordnance
Ordnance Detectors
Ordnance Inspection Equipment
Organic Materials Research
Oscillators
Oxygen Equipment
PABX Systems
Packaging (Custom)
Painting (Aircraft)

Painting (Aircraft)
Painting (Aircraft)
Panels
Parachutes
Parallel Processing
Particle Accelerators
Parts (Machining)
Passive Sonobuoys
Pathways Analysis
Payload Design
Payload Equipment Design

Company Name

WHITESHELL NUCLEAR
SPILSBURY COMMUNICATIONS

EASTERN PRECISION CASTING
SUPRECA Inc
RAYLO CHEMICALS
3-L FILTERS Ltd
ONTARIO HYDRO
WHITESHELL NUCLEAR
CAMPAGNA BROTHERS MACHINE SHOP LTD
PYLON ELECTRONIC DEVEL. CO Ltd
BRISTOL AEROSPACE Ltd

HAWKER SIDDELEY CANADA

CAE INDUSTRIES Ltd
SUPRECA Inc
ONTARIO HYDRO

WHITESHELL NUCLEAR

ALBERTA RESEARCH COUNCIL
APPLIED MICROSYSTEMS Ltd

DOUSERV GROUP INC
HAMMOND MANUFACTURING
DOUSERV GROUP INC
ALBERTA RESEARCH COUNCIL
HAMMOND MANUFACTURING
CANADIAN MARCONI CO

DY-4 SYSTEMS Inc
THOMSON-CSF SYSTEMS
PERLEY TECHNOLOGIES
RE: ACTION MARKETING
PRA INTERNATIONAL Inc
CAMETOID Ltd
ERNST LEITZ CANADA Ltd
FOUNDATION INSTRUMENTS
OPTO-ELECTRONICS Inc
ERNST LEITZ CANADA Ltd

OPTO-ELECTRONICS Inc
DIFFRACTO Ltd
VORTEK INDUSTRIES Ltd
ERNST LEITZ CANADA Ltd
ERNST LEITZ CANADA Ltd
ERNST LEITZ CANADA Ltd

ULTRA LASERTECH Inc

ULTRA LASERTECH Inc
HANDS FIREWORKS Inc
HANDS FIREWORKS Inc
IVI Inc
SCINTREX Ltd
DIFFRACTO Ltd

ONTARIO HYDRO

ANATEK MICROCIRCUITS Inc
C. F. H. INDUSTRIES Ltd
A.E.I. TELECOMM. (Canada) Ltd
ZARGES AFC CANADA Ltd
BOEING OF CANADA Ltd (Arnprior Div)
I. M. P. GROUP Ltd
INNOTECH AVIATION Ltd
NORTHERN AIRBORNE
IRVIN INDUSTRIES CANADA Ltd
MYRIAS RESEARCH Corp
DSMA ATCON Ltd
UDT INDUSTRIES Inc
SPARTON OF CANADA Ltd
WHITESHELL NUCLEAR
SED SYSTEMS Inc
DSMA ATCON Ltd

Payload Test Services
 PC Board Design & Fabrication
 PC Board Design & Fabrication
 PC Board Design & Fabrication
 PC Board Design & Fabrication
 PC Board Design & Fabrication
 PC Board Design & Fabrication
 PC Board Design & Fabrication
 PC Board Design & Fabrication
 PCM Filters
 Performance Measuring Devices
 Performance Measuring Devices
 Peripheral Equipment
 Peripheral Mass Storage
 Peripheral Vision Display
 Personnel Carrier
 Personnel Restraint Equipment
 Personnel Survival Equipment
 Personnel Survival/Restraint
 Phased Array
 Photo-Fabrication
 Photoacoustics
 Photocatalyst
 Photodetectors
 Photogrammetry
 Photogrammetry
 Photogrammetry
 Photography
 Photon Counting Systems
 Photoplating
 Physical Chemistry
 Physics
 Pipeline Control Components
 Planar Array
 Plasma Spray Coating
 Plastic Molding
 Plastic Fabrication
 Plastic Fabrication
 Platform Side Rails
 Plating
 Plenum Cable
 Plotting Package (Postprocessed)
 Pollution
 Pollution Control
 Pollution Detection
 Pollution Monitoring
 Pollution Monitoring Equipment
 Pollution Sensing
 Pollution Sensing & Analysis
 Polymer Chemistry
 Porous Titania Glass
 Portable Antenna Masts (Surface)
 Portable Power Supplies
 Portable Shelters

SED SYSTEMS Inc
CAD/CAM GRAPHICS Ltd
CAE INDUSTRIES Ltd
CANADIAN MARCONI CO
DEVTEK CORPORATION
DOWTY CANADA ELECTRONICS
GARRETT MANUFACTURING Ltd
MICROTEL Ltd
SPERRY Inc (Defense Products)
ANATEK MICROCIRCUITS Inc
COMPUTING DEVICES CO
deHAVILLAND AIRCRAFT OF
CANADA Ltd
A.E.I. TELECOMM. (Canada) Ltd
TARGA ELECTRONICS SYSTEMS
GARRETT MANUFACTURING Ltd
GENERAL MOTORS OF CANADA
IRVIN INDUSTRIES CANADA Ltd
IRVIN INDUSTRIES CANADA Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
CANADIAN ASTRONAUTICS Ltd
NORTHERN AIRBORNE
ULTRA LASERTECH Inc
INRAD INDUSTRIAL R & D
OPTO-ELECTRONICS Inc
CANADIAN MARCONI CO
PRESENTHEY ENGINEERING
ROBERTSON
PHOTOGRAMMETRIC Inc
ERNST LEITZ CANADA Ltd
PRA INTERNATIONAL Inc
CANADIAN MARCONI CO
RAYLO CHEMICALS
WHITESHELL NUCLEAR
DECADE INDUSTRIES Ltd
CANADIAN ASTRONAUTICS Ltd
VAC-AERO INTERNATIONAL Inc
MICROTEL Ltd
NORTHERN AIRBORNE
VICTRIX Ltd
GENAIRE Ltd
HAWKER SIDDELEY CANADA
HARBOUR INDUSTRIES (Canada)
ICAM TECHNOLOGIES Corp
QUESTOR SURVEYS Ltd
ONTARIO HYDRO
ULTRA LASERTECH Inc
ENVIRONMENTAL
APPLICATIONS GROUP Ltd
THE ARMSTRONG MONITORING
CORP
PRESENTHEY ENGINEERING
MPB TECHNOLOGIES Inc
RAYLO CHEMICALS
INRAD INDUSTRIAL R & D
VICTRIX Ltd
GLOBAL THERMOELECTRIC
POWER SYSTEMS
F. G. BERCHA AND
ASSOCIATES Ltd

Portable Terminals
Positive and Negative Ions
Postprocessor (Multi-Axis)
Potable Water
Potential Difference
Powder Metallurgy
Power Sources
Power Amplifiers
Power Converters
Power Klystrons
Power Measurement
Power Splitters
Power Supplies
Power Supplies
Power Supplies
Power Supplies
Power Supplies
Power Supplies
Power Systems
Practice Bomb
Practice Bomb Signal Cartridges
Pre-Wired Board Assemblies
Precipitation Measurement
Precision Assembly

Precision Bearings
Precision Engraving
Precision Investment Castings
Precision Machining
Precision Machining
Precision Machining
Precision Machining

Precision Machining

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Precision Machining
Precision Machining

Precision Machining
Precision Machining
Precision Machining
Precision Measurement
Precision Measurement

Precision Opening Release Systems
Precision Parts
Precision Tooling
Premium Quality Sand Castings
Pressure Vessel Filters
Prime Power Generating Equipment
Printed Circuit Board Printing
Private Telephone Exchange
Process Control
Process Development Product Characterization
Product Characterization
Product Development

EPIC DATA Inc
 SERMATECH CANADA Inc
 ICAM TECHNOLOGIES Corp
 SEAGOLD INDUSTRIES Corp
 SERMATECH CANADA Inc
 SHERRITT GORDON MINES Ltd
 GLOBAL THERMOELECTRIC
 VARIAN CANADA Inc
 CANADIAN ASTRONAUTICS Ltd
 VARIAN CANADA Inc
 FOUNDATION INSTRUMENTS
 AVTECH ELECTROSYSTEMS Ltd
 CANADIAN MARCONI CO
 GARRETT MANUFACTURING Ltd
 PRESENTEY ENGINEERING
 SPARTON OF CANADA Ltd
 SPERRY Inc (Defense Products)
 ULTRA LASERTECH Inc
 VARIAN CANADA Inc
 ONTARIO HYDRO
 VICTRIX Ltd
 HANDS FIREWORKS Inc
 SPERRY Inc (Defense Products)
 ALBERTA RESEARCH COUNCIL
 CAMPAGNA BROTHERS
 MACHINE SHOP LTD
 FAG BEARINGS Ltd
 INRAD INDUSTRIAL R & D
 SUPRECA Inc
 BACHAN AEROSPACE
 BATA ENGINEERING
 BENDIX AVELEX Inc
 BOEING OF CANADA Ltd
 (Arnprior Div)
 CAMPAGNA BROTHERS
 MACHINE SHOP LTD
 CANADIAN MARCONI CO
 CHICOPEE MANUFACTURING
 DIEMASTER TOOL Inc
 EBCO INDUSTRIES
 GEOMETRIX Ltd
 INRAD INDUSTRIAL R & D
 J.J. CHARLTON COMPANY Ltd
 KOSS MACHINE & TOOL CO
 MONTREAL PRECISION
 CRAFTING Ltd
 PRECI-TECH Ltd
 ROLLS-ROYCE (CANADA) Ltd
 UDT INDUSTRIES Inc
 DIFFRACTO Ltd
 QUANTUM INSPECTION AND
 TESTING Ltd
 IRVIN INDUSTRIES CANADA Ltd
 CHICOPEE MANUFACTURING
 DECADE INDUSTRIES Ltd
 HALEY INDUSTRIES Ltd
 3-L FILTERS Ltd
 CARR-TECH SERVICES Ltd
 See PC Board
 RE: ACTION MARKETING
 DOUSERV GROUP INC
 TEKLOGIX Inc
 RAYLO CHEMICALS
 RAYLO CHEMICALS
 SCIEX
 CAMPAGNA BROTHERS
 MACHINE SHOP LTD

Keyword

Product Surveillance

Products Testing
Professional Services
Professional Services
Program Management
Program Management
Program Management
Program Management
Program Management
Program Management
Program Management
Program Management
Programming
Programming
Projected Map Displays
Propellants
Protective Clothing
Protective Clothing
Protective Coatings
Protective Equipment
Proton Magnetometers
Publication Service

Pulse Amplifiers
Pulse Generators
Pulsed Gas Lasers
Pulsed Light Sources
Pulsers
Pyrotechnics
Pyrotechnics
QPL Listed Wire
Quality Assurance

Quality Assurance
Quality Assurance
Quantum Chemical
Modelling
Quartz Crystals
Quartz Crystals
R&O (Accessories)
R&O (Aircraft
Components)
R&O (Aircraft
Components)
R&O (Aircraft
Components)
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R&O (Avionics)
R&O (Avionics)
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R&O (Avionics)
R&O (Avionics)
R&O (Avionics)

R&O (Coatings)
R&O (Collapsible Fuel
Cells)

Company Name

QUANTUM INSPECTION AND
TESTING Ltd
ALBERTA RESEARCH COUNCIL
SCIEX
WHITESHELL NUCLEAR
AMTEK MANAGEMENT Inc
M.E.L. DEFENSE SYSTEMS Ltd
PARAMAX ELECTRONICS Inc
PRIOR DATA SCIENCES Ltd
SED SYSTEMS Inc
SHARP SPECIAL SYSTEMS
SHL SYSTEMHOUSE Ltd
SPIECE ASSOCIATES
TELECONSULT Ltd
THOMSON-CSF SYSTEMS
AIRBORNE DATA SYSTEMS Ltd
TRACKER INDUSTRIES Ltd
COMPUTING DEVICES
EXPRO CHEMICAL PRODUCTS
IRVIN INDUSTRIES CANADA Ltd
MIL-COM TECHNOLOGIES Inc
CAMETOID Ltd
IRVIN INDUSTRIES CANADA Ltd
PRESENTY ENGINEERING
BOEING OF CANADA Ltd
(Arnprior Div)
AVTECH ELECTROSYSTEMS Ltd
AVTECH ELECTROSYSTEMS Ltd
LUMONICS Inc
PRA INTERNATIONAL Inc
VARIAN CANADA Inc
HANDS FIREWORKS Inc
VICTRIX Ltd
HARBOUR INDUSTRIES (Canada)
QUANTUM INSPECTION AND
TESTING Ltd
SCIEX
WHITESHELL NUCLEAR
MYRIAS RESEARCH Corp
CROVEN CRYSTALS Ltd
PHILIPS ELECTRONICS Ltd
LEAVENS AVIATION Inc
CANADIAN AIRCRAFT
PRODUCTS Ltd
AIRCRAFT APPLIANCES &
EQUIPMENT Ltd
ENHEAT Inc
GODFREY DIVISION OF
HOWDEN CANADA
BOEING OF CANADA Ltd
(Arnprior Div)
BRISTOL AEROSPACE Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
FIELD AVIATION COMPANY Ltd
I. M. P. GROUP Ltd
INNOTECH AVIATION Ltd
NORTHWEST INDUSTRIES Ltd
SPAR AEROSPACE Ltd
AIRCRAFT APPLIANCES &
EQUIPMENT Ltd
BENDIX AVELEX Inc
CAE INDUSTRIES Ltd
CANADIAN MARCONI CO
GARRETT MANUFACTURING Ltd
HONEYWELL Ltd
INTERNAV Ltd
LEIGH INSTRUMENTS Ltd
LITTON SYSTEMS CANADA Ltd
NAVAIR Limited
NORTHERN AIRBORNE
NORTHWEST INDUSTRIES Ltd
SPAR AEROSPACE Ltd
SPERRY Inc (Aerospace &
Marine)
CAMETOID Ltd
GENAIRE Ltd

KeywordR&O (Components)
R&O (Components)

R&O (Components)

R&O (Electronics)
R&O (Engine
Components)
R&O (Engines)
R&O (Engines)
R&O (Engines)
R&O (Engines)
R&O (Engines)
R&O (Envionics)

R&O (Equipment)
R&O (Fire Extinguishers)
R&O (Ground Power)

R&O (Helicopter Floats)
R&O (Helicopters)

R&O (Helicopters)
R&O (Helicopters)
R&O (Hydraulics)
R&O (Hydraulics)
R&O (Instruments)
R&O (Landing Gears)
R&O (Oxygen
Equipment)
R&O (Propellers)
R&O (Radar)

R&O (Radomes)
R&O (Refueling
Systems)
R&O (Small Arms)
Rad-Hardened
Microprocessors

Radar
Radar
Radar
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Radar
Radar
Radar
Radar (Laser)
Radar (Laser)
Radar Antennas
Radar Control Systems
Radar Drives
Radar Processing
Radar Rain Forecasting
Radar Reflectors
Radar Signature
Analysis
Radar Simulation
Radiation
Radiation Monitoring
Systems
Radiation Protection
Radiation Resistant Wire
Radiation Shielding
Radio Ancillaries
Radio Communication
Gear (Fixed, Mobile)
Radio Communications
Radio Communications
Radio Communications

Company Name

BENDIX AVELEX Inc
BOEING OF CANADA Ltd
(Arnprior Div)
SPECIALIZED WELDING &
FABRICATION
MILLER COMMUNICATIONS
VAC-AERO INTERNATIONAL Inc

BRISTOL AEROSPACE Ltd
HAWKER SIDDELEY CANADA
LEAVENS AVIATION Inc
PRATT & WHITNEY CANADA Ltd
ROLLS-ROYCE (CANADA) Ltd
STANDARD AERO Ltd
THE ARMSTRONG MONITORING
CORP
DECADE INDUSTRIES Ltd
C. F. H. INDUSTRIES Ltd
AIRCRAFT APPLIANCES &
EQUIPMENT Ltd
C. F. H. INDUSTRIES Ltd
BOEING OF CANADA Ltd
(Arnprior Div)
I. M. P. GROUP Ltd
INNOTECH AVIATION Ltd
CARR-TECH SERVICES Ltd
HEROUX Inc
SIMMONDS PRECISION CANADA
HEROUX Inc
C. F. H. INDUSTRIES Ltd

LEAVENS AVIATION Inc
SPERRY Inc (Aerospace &
Marine)
GENAIRE Ltd
3-L FILTERS Ltd

DEVTEK CORPORATION
CANADIAN ASTRONAUTICS Ltd

ADGA SYSTEMS
ALBERTA RESEARCH COUNCIL
BENDIX AVELEX Inc
CAE INDUSTRIES Ltd
CANADIAN ASTRONAUTICS Ltd
CANADIAN MARCONI CO
COM DEV Ltd
COMPUTING DEVICES
FOUNDATION INSTRUMENTS
INDAL TECHNOLOGIES Inc
LEIGH INSTRUMENTS Ltd
LITTON SYSTEMS CANADA Ltd
MILLER COMMUNICATIONS
MPB TECHNOLOGIES Inc
PRIOR DATA SCIENCES Ltd
OPTTECH Inc
ULTRA LASERTECH Inc
FLEET INDUSTRIES
SHARP SPECIAL SYSTEMS
BACHAN AEROSPACE
TRIDEX SYSTEMS Inc
MUIRHEAD SYSTEMS Ltd
INDAL TECHNOLOGIES Inc
TELEMUS ELECTRONIC

CAE INDUSTRIES Ltd
WHITESHELL NUCLEAR
SCINTREX Ltd

DSMA ATCON Ltd
HARBOUR INDUSTRIES (Canada)
WHITESHELL NUCLEAR
CANADIAN MARCONI CO
GARRETT MANUFACTURING Ltd

ADGA SYSTEMS
INTERNATIONAL Ltd
CANADIAN MARCONI CO
JATEL COMMUNICATIONS

Keyword

Radio Communications
Radio Wire Integrator
Radio/Radar Altimeters
Radioactive Gas
Generators
Radioactive Waste
Containment
Radioactive Wastes
Radiographic Penetrant
Inspection
Radiotelephone
Equipment
Radomes
Rail Transport
Range Finder
Rare Earth Magnets
Rare Earth Magnets
Rational Drug Design
RDX
Reactor Components
Reactors
Real Time
Real Time Control
Systems
Real Time Control
Systems
Real Time Graphics
Real Time Monitor
Systems
Real Time Monitor
Systems
Receivers
Recorders

Recovery Systems
Recovery Vehicle
Red Signal
Reference Library
(Aircraft Parts)
Reference Manuals
Reflex Klystrons
Refueling Hose
Refueling Systems
Regional Resource
Databases
Regulators (Hi/Lo
Voltage)
Relays
Remote Sensing
Remote Control
Systems
Remote Gas Detection
Remote Handling
Remote Inspection
Systems
Remote Manipulator
Systems
Remote Manipulator
Systems
Remote Manipulator
Systems
Remote Power Supplies
Remote Sensing
Remote Sensing
Remote Sensing
Remote Sensing
Remote Sensing

Remote Sensing

Remote Sensing
Remote Sensing
Remote Sensing
Remote Sensing
Remote Sensing
Remote Sensing
Removable Media Mass
Storage Systems

Company Name

MILLER COMMUNICATIONS
CANADIAN MARCONI CO
ATLANTIS AEROSPACE Corp
PYLON ELECTRONIC DEVEL. CO

DECADE INDUSTRIES Ltd

WHITESHELL NUCLEAR
SPECIALIZED WELDING &
FABRICATION
SPILSBURY COMMUNICATIONS

INDAL TECHNOLOGIES Inc
WHITESHELL NUCLEAR
OPTECH Inc
INRAD INDUSTRIAL R & D
SHERRITT GORDON MINES Ltd
MYRIAS RESEARCH Corp
EXPRO CHEMICAL PRODUCTS
SUPRECA Inc
WHITESHELL NUCLEAR
CAE INDUSTRIES Ltd
CAE INDUSTRIES Ltd

SHARP SPECIAL SYSTEMS

CAE INDUSTRIES Ltd
CAE INDUSTRIES Ltd

SHARP SPECIAL SYSTEMS

FOUNDATION INSTRUMENTS
CARDION ELECTRONICS/DG
INSTRUMENTS
IRVIN INDUSTRIES CANADA Ltd
GENERAL MOTORS OF CANADA
HANDS FIREWORKS Inc
PATLON AIRCRAFT &
INDUSTRIES Ltd
RE: ACTION MARKETING
VARIAN CANADA Inc
3-L FILTERS Ltd
3-L FILTERS Ltd
PERLEY TECHNOLOGIES

GARRETT MANUFACTURING Ltd

MICROTEL Ltd
QUESTOR SURVEYS Ltd
SCI-TEC INSTRUMENTS Inc

BARRINGER RESEARCH Ltd
DSMA ATCON Ltd
BRISTOL AEROSPACE Ltd

DSMA ATCON Ltd

GEOMETRIX Ltd

SPAR AEROSPACE Ltd

GLOBAL THERMOELECTRIC
BARRINGER RESEARCH Ltd
CANADIAN ASTRONAUTICS Ltd
DOUSERV GROUP INC
ERNST LEITZ CANADA Ltd
F. G. BERCHA AND
ASSOCIATES Ltd
MACDONALD DETTWILER &
ASSOCIATES Ltd
MARS AERIAL REMOTE
SENSING Ltd
OPTECH Inc
SCI-TEC INSTRUMENTS Inc
SCINTREX Ltd
SPAR AEROSPACE Ltd
ULTRA LASERTECH Inc
TARGA ELECTRONICS SYSTEMS

Keyword

Repair & Overhaul
Repair Capability
Machining
Reports
Requirements Analysis
Rescue Equipment
Reservoir Modelling
Resistor Networks
Reverse Osmosis
RF Amplifiers
RF Communications
RF Components
RF Memory (Digital)
RF Shielding
RF Subsystems
RF Subsystems
RFP Response
Ringing (Telephone
Circuits)
Risk Analysis

Risk Analysis
Risk Analysis
Robot Guidance
Robotics
Rocket Propellant
Rocket Engines
Rocket Igniters
Rocket Motor Casings
Rocket Subcommutators
Rockets
Roller Bearings
RPV
RPV Antennas
Rudder Assemblies

Ruggedized Mass
Storage Systems
Salt Spray (Fog) Testing
Sand Castings
Sandwich Components

SAR
SAR

Satellite Comm. Ground
Stations
Satellite
Communications
Satellite
Communications
Satellite
Communications
Satellite
Communications
Satellite
Communications
Power Amp.
Satellite Electronics
Satellite Ground Stat.
Alarm Equip.
Satellite Meteorology

Satellite Structures
Satellite Subsystems
Satellite Subsystems
Satellite Subsystems
Satellite Telemetry
Tracking Stations
Satellites
Satellites
Scope Probes
SCPC
Screen Rooms
Sealed CO2
Sealed-Off Lasers
Seamless Aluminum
Forgings
Search & Rescue
Equipment

Company Name

See R&O
EBCO INDUSTRIES

RE: ACTION MARKETING
PRIOR DATA SCIENCES Ltd
SEI INDUSTRIES Ltd
MYRIAS RESEARCH Corp
ANATEK MICROCIRCUITS Inc
SEAGOLD INDUSTRIES Corp
ANATEK MICROCIRCUITS Inc
GARRETT MANUFACTURING Ltd
ANATEK MICROCIRCUITS Inc
TELEMUS ELECTRONIC
RAYSHIELD Ltd
CANADIAN ASTRONAUTICS Ltd
TIL-TEK Ltd
RE: ACTION MARKETING
PYLON ELECTRONIC DEVEL. CO

F. G. BERCHA AND
ASSOCIATES Ltd
SPIECE ASSOCIATES
WHITESHELL NUCLEAR
DIFFRACTO Ltd
DIFFRACTO Ltd
BRISTOL AEROSPACE Ltd
BRISTOL AEROSPACE Ltd
HANDS FIREWORKS Inc
CANADIAN GENERAL ELECTRIC
PRESENTY ENGINEERING
BRISTOL AEROSPACE Ltd
PRATT & WHITNEY CANADA Ltd
CANADAIR Ltd
TIL-TEK Ltd
CANADIAN AIRCRAFT
PRODUCTS Ltd
TARGA ELECTRONICS SYSTEMS

CAMETOID Ltd
HALEY INDUSTRIES Ltd
BOEING OF CANADA Ltd
(Winnipeg Div)
CANADIAN ASTRONAUTICS Ltd
MACDONALD DETTWILER &
ASSOCIATES Ltd
SED SYSTEMS Inc

ADGA SYSTEMS

MILLER COMMUNICATIONS

MPB TECHNOLOGIES Inc

TELECONSULT Ltd

VARIAN CANADA Inc

CANADIAN ASTRONAUTICS Ltd
PYLON ELECTRONIC DEVEL. CO

ENVIRONMENTAL
APPLICATIONS GROUP Ltd
FLEET INDUSTRIES
COM DEV Ltd
GEOMETRIX Ltd
SPAR AEROSPACE Ltd
SED SYSTEMS Inc

DOUSERV GROUP INC
SPAR AEROSPACE Ltd
AVTECH ELECTROSYSTEMS Ltd
MILLER COMMUNICATIONS
RAYSHIELD Ltd
ULTRA LASERTECH Inc
MPB TECHNOLOGIES Inc
GENERAL ALUMINUM
FORGINGS Inc
CANADIAN ASTRONAUTICS Ltd

Search & Rescue
Equipment
Search Radar
Seat Manufacture
Seawater
Secondary Surveillance
Radar
Secure Communications
Semiconductor
Processing
Semiconductor Wafers
Semiconductors

Semiconductors
Semiconductors
Sensors
Sensors
Sensors
Sensors

SEI INDUSTRIES Ltd

LITTON SYSTEMS CANADA Ltd
FIELD AVIATION COMPANY Ltd
SEAGOLD INDUSTRIES Corp
DOUSERV GROUP INC

ADGA SYSTEMS
VORTEK INDUSTRIES Ltd

COMINCO Ltd
CANADIAN THERMOSTATS &
CONTROL DEV.
COMINCO Ltd
OPTOTEK Ltd
DIFFRACTO Ltd
OPTO-ELECTRONICS Inc
QUESTOR SURVEYS Ltd
THE ARMSTRONG MONITORING
CORP
WHITESHELL NUCLEAR
3-L FILTERS Ltd
3-L FILTERS Ltd
AIRCRAFT APPLIANCES &
EQUIPMENT Ltd
THE H I THOMPSON CO

THE H I THOMPSON CO
THE H I THOMPSON CO
THE H I THOMPSON CO
BACHAN AEROSPACE
DONLEE PRECISION
DSMA ATCON Ltd
MICROTEL Ltd
HAMMOND MANUFACTURING
BOEING OF CANADA Ltd
(Arnprior Div)
NORTHWEST INDUSTRIES Ltd
THE H I THOMPSON CO

INNOTECH AVIATION Ltd
SHELLCAST FOUNDRIES Inc
RAYSHIELD Ltd

RAYSHIELD Ltd
CARDION ELECTRONICS/DG
INSTRUMENTS
INDAL TECHNOLOGIES Inc

DOWTY CANADA Ltd
CANADIAN ASTRONAUTICS Ltd

ERNST LEITZ CANADA Ltd
HANDS FIREWORKS Inc
MILLER COMMUNICATIONS

HONEYWELL Ltd

BARRINGER RESEARCH Ltd
CANADIAN ASTRONAUTICS Ltd
COMPUTING DEVICES
MILLER COMMUNICATIONS
SHARP SPECIAL SYSTEMS
CAE INDUSTRIES Ltd
PERLEY TECHNOLOGIES
PRIOR DATA SCIENCES Ltd
SPERRY Inc (Aerospace &
Marine)
CAE INDUSTRIES Ltd
SED SYSTEMS Inc
ATLANTIS AEROSPACE Corp
CAE INDUSTRIES Ltd
CANADIAN ASTRONAUTICS Ltd
deHAVILLAND AIRCRAFT OF
CANADA Ltd
LITTON SYSTEMS CANADA Ltd
PRESENTHEY ENGINEERING
EXPRO CHEMICAL PRODUCTS
SPILSBURY COMMUNICATIONS

Site or Regional
Resource Databases
Small Arm Caliber
Ammunition
Small Arms Components
Small Gas Turbine
Engines
Smoke Markers
Smoke Pots
Software Development
Software Development
Software Development
Software Development
Software Development
Software Development
Software Development
Software Development
Software Documentation
Software Engineering
Software Maintenance
Software Package
Customization
Software Package
Search & Evaluation
Software Services
Software Services
Software Services
Software Services
Software Services
Software Services
Software Services

Software Services
Software Services
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Software Services
Software Services

Software Services
Software Services
Software Services
Software Services
Software Services
Software Services
Software Services
Software Systems
Software Systems
Software Systems

Software Training

Soils
Solar Collectors
Solar Energy

Solar Simulation
Solder Preforms
Solid Mould Castings
Solid State Devices
Solid State Devices
Solid State Devices

Solid State Devices

Solid State Devices
Solid State Devices
Solid State Devices
Solid State Devices
Solid State Devices
Solid State Devices
Solid State Devices

Solid State Devices
Solid State Devices
Solid State Memory
Solid State Systems

PERLEY TECHNOLOGIES
 IVI Inc
 DEVTEK CORPORATION
 PRATT & WHITNEY CANADA Ltd
 VICTRIX Ltd
 HANDS FIREWORKS Inc
 AIRBORNE DATA SYSTEMS Ltd
 ATLANTIS AEROSPACE Corp
 CAE INDUSTRIES Ltd
 DIPIX SYSTEMS Ltd
 GasTOPS Ltd
 M.E.L. DEFENSE SYSTEMS Ltd
 MICRO-FUTURES RESEARCH
 PRIOR DATA SCIENCES Ltd
 SCI-TEC INSTRUMENTS Inc
 MICRO-FUTURES RESEARCH
 MICRO-FUTURES RESEARCH
 MICRO-FUTURES RESEARCH
 SHL SYSTEMHOUSE Ltd
 SHL SYSTEMHOUSE Ltd
 ADGA SYSTEMS
 AIRBORNE DATA SYSTEMS Ltd
 ALBERTA RESEARCH COUNCIL
 ATLANTIS AEROSPACE Corp
 CAD/CAM GRAPHICSLtd
 CAE INDUSTRIES Ltd
 CANADAIR Ltd
 CANADIAN AIRCRAFT
 PRODUCTS Ltd
 CANADIAN ASTRONAUTICS Ltd
 DIPIX SYSTEMS Ltd
 DOCUMENTED CIRCUITS Inc
 EPIC DATA Inc
 F. G. BERCHA AND
 ASSOCIATES Ltd
 GARRETT MANUFACTURING Ltd
 I. M. P. GROUP Ltd
 PRIOR DATA SCIENCES Ltd
 SCI-TEC INSTRUMENTS Inc
 SHL SYSTEMHOUSE Ltd
 SPERRY Inc (Defense Products)
 TEKLOGIX Inc
 TRACKER INDUSTRIES Ltd
 AIRBORNE DATA SYSTEMS Ltd
 HONEYWELL Ltd
 MACDONALD DETTWILER &
 ASSOCIATES Ltd
 ROBERTSON
 PHOTOGRAMMETRIC Inc
 ALBERTA RESEARCH COUNCIL
 E. S. MANTIS RESEARCH CORP
 ENVIRONMENTAL
 APPLICATIONS GROUP Ltd
 VORTEK INDUSTRIES Ltd
 COMINCO Ltd
 SHELLCAST FOUNDRIES Inc
 AVTECH ELECTROSYSTEMS Ltd
 CANADIAN ASTRONAUTICS Ltd
 CANADIAN THERMOSTATS &
 CONTROL DEV
 CARDION ELECTRONICS/DG
 INSTRUMENTS
 CARR-TECH SERVICES Ltd
 EPIC DATA Inc
 GARRETT MANUFACTURING Ltd
 JATEL COMMUNICATIONS
 LITTON SYSTEMS CANADA Ltd
 OPTOTEK Ltd
 THE ARMSTRONG MONITORING
 CORP
 TRACKER INDUSTRIES Ltd
 VARIAN CANADA Inc
 TARGA ELECTRONICS SYSTEMS
 OPTO-ELECTRONICS Inc

Keyword

Sonar Equipment
 Sonar Training Systems
 Sonobuoys
 Sonobuoys
 Sound Velocity Systems
 Space Frames
 Space Furnaces
 Space Systems
 Space Systems

Space Systems
 Space Systems
 Space Systems
 Space Systems
 Space Systems
 Space Systems
 Spare Parts (Aircraft)
 Spare Parts (Engines)
 Spares Supply
 Special Purpose
 Parachutes
 Special Structures

Specialized Fabrication
 Specialized Test
 Equipment
 Specialty Alloys
 Specifications
 Spectroscopy
 Spectroscopy
 Spectroscopy
 Spectrum Analysis
 Speech
 Spin Forming
 Spotting Changes
 Spread Spectrum
 Modems
 Sputtering

Sputtering Targets
 SSMA
 Stamping
 Stamping
 Stamping
 Stamping
 Stand Alone Lab
 Instrumentation
 Standard Products
 Standby Power
 Generating Equipment
 Statistical Analysis
 Status Systems
 Steer by Wire Systems
 Steering (Ground)
 Systems
 STOL Aircraft
 Manufacture
 Storage of Digital
 Imagery
 Stress Analysis
 Stress Analyzer
 Stress Relieving
 Structural
 Structural Analysis

Structural Analysis
 Structural Analysis
 Structural Components
 Structural Components
 Manufacture
 Structural Design

Structural Design
 Structural Design
 Structural Fasteners
 Structural Fittings
 (Helicopters)
 Structural Integrity

Company Name

FLEET INDUSTRIES
 CAE INDUSTRIES Ltd
 DEVTEK CORPORATION
 HERMES ELECTRONICS Ltd
 SPARTON OF CANADA Ltd
 APPLIED MICROSYSTEMS Ltd
 DSMA ATCON Ltd
 DSMA ATCON Ltd
 ALBERTA RESEARCH COUNCIL
 BOEING OF CANADA Ltd
 (Winnipeg Div)
 CAE INDUSTRIES Ltd
 CANADIAN ASTRONAUTICS Ltd
 COM DEV Ltd
 FOUNDATION INSTRUMENTS
 SCI-TEC INSTRUMENTS Inc
 SPAR AEROSPACE Ltd
 KAYCOM Inc
 KAYCOM Inc
 FIELD AVIATION COMPANY Ltd
 IRVIN INDUSTRIES CANADA Ltd

F. G. BERCHA AND
 ASSOCIATES Ltd
 INDAL TECHNOLOGIES Inc
 DOWTY CANADA ELECTRONICS

SHERITT GORDON MINES Ltd
 RE: ACTION MARKETING
 PRA INTERNATIONAL Inc
 BARRINGER RESEARCH Ltd
 ULTRA LASERTECH Inc
 MILLER COMMUNICATIONS
 NORTHERN AIRBORNE
 BRISTOL AEROSPACE Ltd
 HANDS FIREWORKS Inc
 MILLER COMMUNICATIONS

CANADIAN THERMOSTATS &
 CONTROL DEV.
 COMINCO Ltd
 MILLER COMMUNICATIONS
 BRISTOL AEROSPACE Ltd
 DIEMASTER TOOL Inc
 EBCO INDUSTRIES
 HAWKER SIDDELEY CANADA
 AVTECH ELECTROSYSTEMS Ltd

EPIC DATA Inc
 CARR-TECH SERVICES Ltd
 ALBERTA RESEARCH COUNCIL
 BARON COMMUNICATIONS Ltd
 DOWTY CANADA ELECTRONICS
 DOWTY CANADA Ltd

deHAVILLAND AIRCRAFT OF
 CANADA Ltd
 DIPIX SYSTEMS Ltd

DSMA ATCON Ltd
 NORTHERN AIRBORNE
 CAMETOID Ltd
 DOUSERV GROUP INC
 CANADIAN AIRCRAFT
 PRODUCTS Ltd
 CANADIAN ASTRONAUTICS Ltd
 I. M. P. GROUP Ltd
 CHICOPEE MANUFACTURING
 NORTHWEST INDUSTRIES Ltd

CANADIAN AIRCRAFT
 PRODUCTS Ltd
 CANADIAN ASTRONAUTICS Ltd
 INNOTECH AVIATION Ltd
 INTERNATIONAL FASTENERS
 CAMPAGNA BROTHERS
 MACHINE SHOP LTD
 DIFFRACTO Ltd

Keyword

Structural Modification
 Structural Testing
 Structures
 Structures
 Studies
 Studies
 Subcontract
 Management
 Subcontract
 Manufacturing
 Subcontract
 Manufacturing
 Subcontract
 Manufacturing
 Supercritical Gas
 Technology
 Supervisory & Control
 Systems
 Support Activities
 Surface Acoustic Wave
 Subsystems
 Surface Chemistry
 Surface Finishing
 Surface Water
 Surveillance
 Surveillance
 Surveillance/Navigation
 Survey Systems
 Survival Kits
 Swiss Type Screw
 Machining
 Switching
 Switching
 Switching
 Switching
 Synthesizers
 Synthesizers
 Synthetic Aperture
 Radar
 Synthetic Aperture
 Radar
 Synthetic Pulsed Radar
 Systems (Controls)
 Systems Analysis
 Systems Design
 Systems Design
 Systems Design
 Systems Design
 Systems Design
 Systems Design
 Systems Engineering
 Systems Engineering
 Systems Engineering
 Systems Engineering
 Systems Engineering
 Systems Engineering
 Systems Engineering
 Systems Engineering
 Systems Engineering
 (Nav/Comm)
 Systems Facility
 Management
 Systems Facility
 Services
 Systems Flight Testing
 Systems Ground Testing
 Systems Installation
 Design
 Systems Integration
 Systems Integration
 Systems Integration
 Systems Integration
 Systems Integration
 Systems Management
 Systems Planning
 Systems Simulation
 Systems Simulation
 Systems Studies

Company Name

NORTHWEST INDUSTRIES Ltd
 ROBERTSON
 PHOTOGRAMMETRIC Inc
 McDONNELL DOUGLAS
 SPAR AEROSPACE Ltd
 DSMA ATCON Ltd
 TELECONSULT Ltd
 QUANTUM INSPECTION AND
 TESTING Ltd
 GARRETT MANUFACTURING Ltd

LEIGH INSTRUMENTS Ltd

LITTON SYSTEMS CANADA Ltd

RAYLO CHEMICALS

TELECONSULT Ltd

ROCKWELL INTERNATIONAL
 COM DEV Ltd

WHITESHELL NUCLEAR
 CAMETOID Ltd
 ALBERTA RESEARCH COUNCIL
 CANADIAN MARCONI CO
 PRIOR DATA SCIENCES Ltd
 SPERRY Inc (Defense Products)
 FIELD AVIATION COMPANY Ltd
 IRVIN INDUSTRIES CANADA Ltd
 J.J. CHARLTON COMPANY Ltd

A.E.I. TELECOMM. (Canada) Ltd
 DOUSERV GROUP INC
 JATEL COMMUNICATIONS
 SPERRY Inc (Defense Products)
 MILLER COMMUNICATIONS
 TELEMUS ELECTRONIC
 CANADIAN ASTRONAUTICS Ltd

MACDONALD DETTWILER &
 ASSOCIATES Ltd
 MPB TECHNOLOGIES Inc
 HONEYWELL Ltd
 PRIOR DATA SCIENCES Ltd
 MILLER COMMUNICATIONS
 ROCKWELL INTERNATIONAL
 SCI-TEC INSTRUMENTS Inc
 SHL SYSTEMHOUSE Ltd
 TELECONSULT Ltd
 TRACKER INDUSTRIES Ltd
 DY-4 SYSTEMS Inc
 SCI-TEC INSTRUMENTS Inc
 SED SYSTEMS Inc
 TELECONSULT Ltd
 THOMSON-CSF SYSTEMS
 TRIDEX SYSTEMS Inc
 ADGA SYSTEMS

RE: ACTION MARKETING

RE: ACTION MARKETING

INNOTECH AVIATION Ltd
 INNOTECH AVIATION Ltd
 INNOTECH AVIATION Ltd

GARRETT MANUFACTURING Ltd
 I. M. P. GROUP Ltd
 INNOTECH AVIATION Ltd
 M.E.L. DEFENSE SYSTEMS Ltd
 PARAMAX ELECTRONICS Inc
 THOMSON-CSF SYSTEMS
 FOOTIT MITCHELL AND
 ASSOCIATES
 ATLANTIS AEROSPACE Corp
 F. G. BERCHA AND
 ASSOCIATES Ltd
 CANADIAN ASTRONAUTICS Ltd

Systems Studies
Systems Studies
Systems Testing
Taber Abrasion Testing
Tactical Radio Relay
Tactical Signal Simulator
Tactical Switchboards
Tactical Team Trainers
Tactical Trainer Subsystems
Tactical Training Systems
Tailings
Talk and Signal Supplies
Tape Punch System
Tape Recorders
Target Simulators
Tatical Team Trainers
TDMA
TEA Lasers
Technical Illustration
Technical Investigations

Technical Manuals
Technical Publications Production
Technical Writing
Technology Consulting
Teflon(tm) Coatings
Telecommunications
Telecommunications
Telecommunications Test Equipment
Telegraphy
Telemetry Systems
Telemetry Systems
Telephone Communications
Telephone Communications
Telephone Communications
Telephone Communications
Telephone Communications
Telephone Communications
Telephone Communications
Telephone Interconnect Terminals
Telephone Networks
Telephone Rectifiers
Teletex
Temperature Control
Temperature Sensors
TEMPEST
TEMPEST
Terminals
Terminals
Terrain Profiler
Terrestrial Communications
Test Equipment (Cases)
Test Equipment (Digital 1553)
Test Equipment (Environmental)
Test Instrumentation
Test Instrumentation
Test Instrumentation
Test Instrumentation
Test Rigs
Test Rigs

SED SYSTEMS Inc
THOMSON-CSF SYSTEMS
I. M. P. GROUP Ltd
CAMETOID Ltd
CANADIAN MARCONI CO
CANADIAN ASTRONAUTICS Ltd

CANADIAN MARCONI CO
CAE INDUSTRIES Ltd
CARDION ELECTRONICS/DG
INSTRUMENTS
CAE INDUSTRIES Ltd

WHITESHELL NUCLEAR
PYLON ELECTRONIC DEVEL. CO
ICAM TECHNOLOGIES Corp
PRESENTHEY ENGINEERING
PRESENTHEY ENGINEERING
CAE INDUSTRIES Ltd
MILLER COMMUNICATIONS
LUMONICS Inc
NORTHWEST INDUSTRIES Ltd
BOEING OF CANADA Ltd
(Arnprior Div)
RE: ACTION MARKETING
NORTHWEST INDUSTRIES Ltd

NORTHWEST INDUSTRIES Ltd
SHL SYSTEMHOUSE Ltd
CAMETOID Ltd
A.E.I. TELECOMM. (Canada) Ltd
MILLER COMMUNICATIONS
RE: ACTION MARKETING
NAVAIR Limited

TELECONSULT Ltd
DOUSERV GROUP INC
SCI-TEC INSTRUMENTS Inc
A.E.I. TELECOMM. (Canada) Ltd

BARON COMMUNICATIONS Ltd

FOUNDATION INSTRUMENTS

JATEL COMMUNICATIONS

PYLON ELECTRONIC DEVEL. CO

SED SYSTEMS Inc

TELECONSULT Ltd

TRACKER INDUSTRIES Ltd

BARON COMMUNICATIONS Ltd

DOUSERV GROUP INC
PYLON ELECTRONIC DEVEL. CO
DOUSERV GROUP INC
CASEY COPTER ACCESSORIES
APPLIED MICROSYSTEMS Ltd
GARRETT MANUFACTURING Ltd
M.E.L. DEFENSE SYSTEMS Ltd
EPIC DATA Inc
MILLER COMMUNICATIONS
OPTECH Inc
TELECONSULT Ltd

ZARGES AFC CANADA Ltd
ATLANTIS AEROSPACE Corp

PHOTOVAC Inc

GARRETT MANUFACTURING Ltd
MILLER COMMUNICATIONS
PRATT & WHITNEY CANADA Ltd
PRESENTHEY ENGINEERING
CANADIAN ASTRONAUTICS Ltd
DSMA ATCON Ltd

Testing (High Pressure)
Testing/Test Equipment
Testing/Test Equipment
Testing/Test Equipment
Testing/Test Equipment
Testing/Test Equipment
Testing/Test Equipment
Testing/Test Equipment
Testing/Test Equipment
Testing/Test Equipment
Testing/Test Equipment
Testing/Test Equipment
Text Management
Thermal Analysis
Thermal Conductivity Devices
Thermal Control

Thermal Spraying
Thermister

Thermocouple Wire
Thermoelectric Generators
Thermoelectric Power Units
Thermoelectric Research
Thick Film Hybrid Microcircuits
Thick Film Hybrid Microcircuits
Thick Film Hybrid Microcircuits
Thick Film Hybrid Microcircuits
Thickness Testing
Thin Film Hybrid Microcircuits
Thin Film Hybrid Microcircuits
Thin Film Hybrid Microcircuits
Thin Film Hybrid Microcircuits
Thin Wall Castings
Thruster Motors (Electric)
Ticketing
Tide Gauge

Time Code Generators
Time Division Multiplexers
Timesharing Service
Titania Glass
Titanium
Titanium
Titanium
Titanium
Toilet Hot Water Systems
Tone Signalling
Tooling
Tooling

Tooling
Tooling
Tooling
Tooling
Tooling
Topographic Surveys
Towbars

ITT CANNON ELECTRIC CANADA
CANADAIR Ltd
ALBERTA RESEARCH COUNCIL
ATLANTIS AEROSPACE Corp
CANADIAN ASTRONAUTICS Ltd
CANADIAN MARCONI CO
DOWTY CANADA ELECTRONICS
EPIC DATA Inc
GARRETT MANUFACTURING Ltd
MILLER COMMUNICATIONS
PRATT & WHITNEY CANADA Ltd
PRESENTAY ENGINEERING
SCI-TEC INSTRUMENTS Inc
SIMMONDS PRECISION CANADA
RE: ACTION MARKETING
WHITESHELL NUCLEAR
THE ARMSTRONG MONITORING
CORP
CANADIAN THERMOSTATS &
CONTROL DEV.
SHERITT GORDON MINES Ltd
CANADIAN THERMOSTATS &
CONTROL DEV.
HARBOUR INDUSTRIES (Canada)
GLOBAL THERMOELECTRIC

GLOBAL THERMOELECTRIC

GLOBAL THERMOELECTRIC

ANATEK MICROCIRCUITS Inc

CAD/CAM GRAPHICSLtd

CANADIAN MARCONI CO

GARRETT MANUFACTURING Ltd

CAMETOID Ltd
CAD/CAM GRAPHICSLtd

CANADIAN MARCONI CO

CANADIAN THERMOSTATS &
CONTROL DEV.
GARRETT MANUFACTURING Ltd

SHELLCAST FOUNDRIES Inc
SEI INDUSTRIES Ltd

AIRBORNE DATA SYSTEMS Ltd
CARDION ELECTRONICS/DG
INSTRUMENTS
PYLON ELECTRONIC DEVEL. CO
SPERRY Inc (Aerospace &
Marine)
SHARP SPECIAL SYSTEMS
INRAD INDUSTRIAL R & D
AERO MACHINING Ltd
BRISTOL AEROSPACE Ltd
CHICOPEE MANUFACTURING
EBCO INDUSTRIES
ROLLS-ROYCE (CANADA) Ltd
CARR-TECH SERVICES Ltd

BARON COMMUNICATIONS Ltd
AERO MACHINING Ltd
BOEING OF CANADA Ltd
(Arnprior Div)
BRISTOL AEROSPACE Ltd
CANADIAN AIRCRAFT
PRODUCTS Ltd
EBCO INDUSTRIES
KOSS MACHINE & TOOL CO
McDONNELL DOUGLAS
NORTHWEST INDUSTRIES Ltd
ROLLS-ROYCE (CANADA) Ltd
DOUSERY GROUP INC
GENAIRE Ltd

Keyword

Toxic Agent Detection
Toxic Chemicals
Toxic Gas Detectors
Toxic Gas Detectors

Toxic Gas Detectors
Trace Analysis
Trace Gas Detection
Trace Gas Detection
Trace Gas Detection
Trace Gas Detection
Trace Gas Detection
Traffic Management
Training
Training
Training

Training
Training
Training
Training
Training

Training & Education
Training (Audio-Visual)
Training (Computer Systems)
Training Aids
Training Aids
Training Manuals
Training Simulators
Training Simulators
Training Simulators
Training Simulators
Training Systems
Training Systems
Training Systems
Training Systems

Transducers
Transformers
Transformers
Transmission of Digital Imagery
Transmission Systems
Transmissions
Transmissions
Transmissometers
Transmitter
Teletypewriter Controls
Transmitters
Transport System
Transportable Power Supplies
Transportation
Transportation Control Systems
Transportation Simulation
Travelling Wave Tubes
Triple Base
Tritium Monitors
Tubing

Tubing
Tubing
Tubing Assembly Fabrication
Tuneable CO2
Turbine Blade Inspection
Turbine Blade Inspection
Turbine Engine Components
Turbine Engines

Company Name

SCIEX
WHITESHELL NUCLEAR
SCINTREX Ltd
THE ARMSTRONG MONITORING CORP

ULTRA LASERTECH Inc
WHITESHELL NUCLEAR
BARRINGER RESEARCH Ltd
INRAD INDUSTRIAL R & D
MPB TECHNOLOGIES Inc
SCIEX
SCINTREX Ltd
ULTRA LASERTECH Inc
LEIGH INSTRUMENTS Ltd
AMTEK MANAGEMENT Inc
CAE INDUSTRIES Ltd
deHAVILLAND AIRCRAFT OF CANADA Ltd
LITTON SYSTEMS CANADA Ltd
MICRO-FUTURES RESEARCH
NAVAIR Limited
PARAMAX ELECTRONICS Inc
PERLEY TECHNOLOGIES
QUANTUM INSPECTION AND TESTING Ltd
SHL SYSTEMHOUSE Ltd
NAVAIR Limited
TRIDEX SYSTEMS Inc

ATLANTIS AEROSPACE Corp
MICRO-FUTURES RESEARCH
RE: ACTION MARKETING
ATLANTIS AEROSPACE Corp
CAE INDUSTRIES Ltd
HONEYWELL Ltd
MICRO-FUTURES RESEARCH
MICRO-FUTURES RESEARCH
MPB TECHNOLOGIES Inc
NAVAIR Limited
SPERRY Inc (Aerospace & Marine)
OPTO-ELECTRONICS Inc
AVTECH ELECTROSYSTEMS Ltd
CANADIAN MARCONI CO
DIPIX SYSTEMS Ltd
TELECONSULT Ltd
BRISTOL AEROSPACE Ltd
SPAR AEROSPACE Ltd
PRESENTHEY ENGINEERING
PRESENTHEY ENGINEERING

FOUNDATION INSTRUMENTS
GENERAL MOTORS OF CANADA
DSMA ATCON Ltd

ALBERTA RESEARCH COUNCIL
TRACKER INDUSTRIES Ltd

PERLEY TECHNOLOGIES

VARIAN CANADA Inc
EXPRO CHEMICAL PRODUCTS
SCINTREX Ltd
deHAVILLAND AIRCRAFT OF CANADA Ltd
ITT CANNON ELECTRIC CANADA
McDONNELL DOUGLAS
NORTHWEST INDUSTRIES Ltd

ULTRA LASERTECH Inc
DIFFRACTO Ltd

ROLLS-ROYCE (CANADA) Ltd

CAMPAGNA BROTHERS
MACHINE SHOP LTD
PRATT & WHITNEY CANADA Ltd

Keyword

Turbine Engines
Turning
Turnkey Computer Systems
Turnkey Computer Systems
Turnkey Data Collection Systems
Turnkey Image Processing Systems
UHF & S-Band Telemetry Trans.
UHF Antennas
UL Wire
Ultra Fine Metal Powders
Ultra High Power Design
Ultra High Power Modeling
Ultra-Trace Analysis
Ultraviolet Fluorescence Systems
Unattended Power Supplies
Underwater Acoustics
Underwater Instrumentation
Underwater Ring Shell Sound Projectors
Underwater Salvage Equipment
Uninterruptable Power Supplies
Upgunned Weapon Station
Upper Air

Vacuum Brazing
Vacuum Coatings
Vacuum Deposition

Vacuum Furnaces
Vacuum Heat Treating
Vacuum Technology
Value Added Reseller
Variable Tuned Antennas
Vehicular Mobile Systems
Vendor Surveillance

Vertical Axis Wind Turbines

VHF Antennas
VHF Navigation Systems

VHF/FM
Vibration/Acoustic Intensity Measurement

Video Disks
Video Display Systems
Video Display Systems
Video Display Systems
Video Display Systems
Video Systems
Video Systems
Videotex
Videotex (Telidon)
Visual Information Devices
Vitrification
VLSI
VLSI Simulation
Voice
Voice Advisory Systems
Voice Privacy Communications

Company Name

ROLLS-ROYCE (CANADA) Ltd
DIEMASTER TOOL Inc
PRIOR DATA SCIENCES Ltd

SHARP SPECIAL SYSTEMS

EPIC DATA Inc

DIPIX SYSTEMS Ltd

MILLER COMMUNICATIONS

TIL-TEK Ltd
HARBOUR INDUSTRIES (Canada)
SHERRITT GORDON MINES Ltd

ULTRA LASERTECH Inc

ULTRA LASERTECH Inc

SCIEX
SCINTREX Ltd

GLOBAL THERMOELECTRIC

APPLIED MICROSYSTEMS Ltd
APPLIED MICROSYSTEMS Ltd

SPARTON OF CANADA Ltd

SEI INDUSTRIES Ltd

PYLON ELECTRONIC DEVEL. CO

GENERAL MOTORS OF CANADA

ENVIRONMENTAL APPLICATIONS GROUP Ltd
VAC-AERO INTERNATIONAL Inc
CAMETOID Ltd
CANADIAN THERMOSTATS & CONTROL DEV.
VAC-AERO INTERNATIONAL Inc
VAC-AERO INTERNATIONAL Inc
SCIEX
SHL SYSTEMHOUSE Ltd
SPILSBURY COMMUNICATIONS

TELECONSULT Ltd

QUANTUM INSPECTION AND TESTING Ltd
INDAL TECHNOLOGIES Inc

TIL-TEK Ltd
ATLANTIS AEROSPACE Corp

SPILSBURY COMMUNICATIONS
SPERRY Inc (Defense Products)

MICRO-FUTURES RESEARCH
CAE INDUSTRIES Ltd
COMPUTING DEVICES
MUIRHEAD SYSTEMS Ltd
SPERRY Inc (Defense Products)
FOUNDATION INSTRUMENTS
MICRO-FUTURES RESEARCH
DOUSERV GROUP INC
MICRO-FUTURES RESEARCH
NORTHERN AIRBORNE

WHITESHELL NUCLEAR
HONEYWELL Ltd
MYRIAS RESEARCH Corp
NORTHERN AIRBORNE
NORTHERN AIRBORNE
MILLER COMMUNICATIONS

Keyword

Voice Recorders
 Voice Recorders
 Voice Reproducers
 Voltage Transformers
 VOR
 VOR Ground Check
 Systems
 Warning System
 Definition & Design
 Waste Management
 Water
 Water Bombing
 Water Makers
 Water Purification
 Systems
 Water Storage
 Water Transport
 Water/Hydrogen
 Conversion
 Waterpump Shaft
 Assemblies
 Waveform Generators
 Waveform
 Instrumentation
 Waveguide Lasers
 Waveguide Lasers
 Waveguides
 Weapon System
 Controls
 Wear Resistant
 Materials
 Weather Forecasting
 Weather Forecasting
 Systems
 Weather Forecasting
 Systems
 Weather Image
 Processor
 Weather Modification
 Weather Modification

Company Name

LEIGH INSTRUMENTS Ltd
 PRESENTEY ENGINEERING
 PRESENTEY ENGINEERING
 GARRETT MANUFACTURING Ltd
 CANADIAN MARCONI CO
 CARDION ELECTRONICS/DG
 INSTRUMENTS
 PERLEY TECHNOLOGIES
 WHITESHELL NUCLEAR
 ALBERTA RESEARCH COUNCIL
 FIELD AVIATION COMPANY Ltd
 SEAGOLD INDUSTRIES Corp
 3-L FILTERS Ltd
 SEI INDUSTRIES Ltd
 SEI INDUSTRIES Ltd
 INRAD INDUSTRIAL R & D
 FAG BEARINGS Ltd
 AVTECH ELECTROSYSTEMS Ltd
 AVTECH ELECTROSYSTEMS Ltd
 MPB TECHNOLOGIES Inc
 ULTRA LASERTECH Inc
 VARIAN CANADA Inc
 VICTRIX Ltd
 SHERRITT GORDON MINES Ltd
 ALBERTA RESEARCH COUNCIL
 MACDONALD DETTWILER &
 ASSOCIATES Ltd
 MUIRHEAD SYSTEMS Ltd
 MACDONALD DETTWILER &
 ASSOCIATES Ltd
 ALBERTA RESEARCH COUNCIL
 ENVIRONMENTAL
 APPLICATIONS GROUP Ltd

Keyword

Weather Stations
 Weather Stations
 Weight & Balance
 Welding
 Welding
 Welding
 Welding
 Welding
 Welding
 Welding
 Welding
 Welding (Sheet Metal)
 Welding (Stainless Foils)
 Welding Procedures
 Wheel Parts
 Wide Area Alarm Units
 Wideband
 Wind Energy
 Wing Actuation Systems
 Wing Tunnel Systems
 Wire
 Wiring
 Wiring
 Wiring
 Wiring
 Wiring & Tubing
 Wiring Harness
 Fabrication
 Wiring Harness
 Fabrication
 Word Processing
 Writing
 X-Ray Inspection
 X-Ray Inspection
 Yellow Signal

Company Name

DEVTEK CORPORATION
 HERMES ELECTRONICS Ltd
 INNOTECH AVIATION Ltd
 CANADIAN MARCONI CO
 DEVTEK CORPORATION
 HAWKER SIDDELEY CANADA
 INNOTECH AVIATION Ltd
 ROLLS-ROYCE (CANADA) Ltd
 SPECIALIZED WELDING &
 FABRICATION
 THE H I THOMPSON CO
 THE H I THOMPSON CO
 QUANTUM INSPECTION AND
 TESTING Ltd
 BENDIX AVELEX Inc
 PYLON ELECTRONIC DEVEL. CO
 FOUNDATION INSTRUMENTS
 ENVIRONMENTAL
 APPLICATIONS GROUP Ltd
 MENASCO AEROSPACE Ltd
 DSMA ATCON Ltd
 HARBOUR INDUSTRIES (Canada)
 deHAVILLAND AIRCRAFT OF
 CANADA Ltd
 ITT CANNON ELECTRIC CANADA
 McDONNELL DOUGLAS
 NORTHERN AIRBORNE
 I. M. P. GROUP Ltd
 DOWTY CANADA ELECTRONICS
 NORTHWEST INDUSTRIES Ltd
 RE: ACTION MARKETING
 RE: ACTION MARKETING
 NORTHWEST INDUSTRIES Ltd
 SPECIALIZED WELDING &
 FABRICATION
 HANDS FIREWORKS Inc

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Section II COMPANY PROFILES

(Continued)

INDAL TECHNOLOGIES Inc

Code: IND

Address: 3570 Hawkestone Road
Mississauga, Ontario, Canada L5C 2V8

Contact: Mr. Frank Davenport, Director of Marketing -
(416) 275-5300

History: Indal Technologies was originally incorporated under the name Dominion Aluminum Fabricating Ltd in 1951. The company became a member of the Toronto based Indal Group of companies in 1968 and changed its name to DAF Indal Ltd in 1977, then to Indal Technologies Inc in 1985. Indal is a diversified industrial holding company with 23 operating subsidiaries and divisions in Canada and 17 in the US.

Capability: Since its incorporation, Indal Technologies has grown steadily through the development of facilities which provide a speciality range of engineered products. Indal Technologies maintains a large engineering department staffed by professional engineers of many disciplines, including mechanical, electrical, structural, aerodynamics and hydraulic engineering. The company is engaged in many activities involving one or more of these disciplines, and those related to the aerospace industry area as listed below:

- **Specialty Fabrication Work** - Indal Technologies has the reputation of being an acknowledged expert in the field of specialized aluminum structural fabrication work, and has been certified by the Canadian Welding Bureau as meeting the requirements of CSA Standard W47.2 "Aluminum Welding Qualification Code". Typical of the specialized structural design and fabrication work undertaken by Indal Technologies is a frangible ILS localizer support structure designed to break away on impact, now a designated fit where certain conditions prevail at Canadian airports. More recently, Indal Technologies was awarded a contract to build a prototype enclosure for the new MLS antenna systems scheduled to replace ILS antennae across Canada by the year 2,000. Other work for Transport Canada has included the design and fabrication of a 100 ft telescopic mobile monitoring tower, design of a frangible glide path monitoring antenna mast and range towers for coastal navigation. Other work performed by Indal Technologies in this field includes the design and fabrication of other antenna support towers, the fabrication of radar reflectors, radomes and space frame hangar systems.

- **Shipboard Helicopter Support Systems** - Indal Technologies is a world leader in the development and supply of shipboard helicopter support systems as employed on helicopter carrying ships operated by navies and coast guards world-wide. The helicopter recovery assist systems built by Indal Technologies were originally developed in conjunction with the Department of National Defense for use on board Canadian Navy vessels. Variants of the systems are now employed on vessels operated by the Navies of the US, Japan, India, and Argentina - being a directed fit in many cases. These systems include any or all of the

following - visual landing aids (including horizon reference system), firefighting systems, fueling systems, helicopter recovery assist and transversing systems, and telescopic hangars and hangar doors. The Indal Technologies RAST (Recovery Assist, Securing and Traversing) system was selected as a key element of the US Navy's LAMPS III program; it is intended to equip over 100 ships with this system to operate in conjunction with the new Sikorsky SH-60B Sea Hawk helicopter. Indal Technologies is the originator of the unique telescopic helicopter hangar that is employed on many navy and coast guard vessels that have flight deck space limitations. Over 160 such hangars have been built and are in service with numerous agencies, principally the US Navy, US Coast Guard and Canadian Coast Guard.

- **Vertical Axis Wind Turbines** - Indal Technologies has been a world leader in the design and manufacture of Vertical Axis Wind Turbines for over 10 years. The Indal Technologies 50 kW unit is the most technically advanced and proven VAWT in the world today. A 500 kW machine modeled on a previous design of 230 kW VAWT built by Indal Technologies is now in production and is gaining acceptance as a very viable source of alternate energy. The company has also pioneered the development of a hybrid wind turbine/diesel power generation system for use in remote areas.

- **Program Management and Quality Control** - Indal Technologies has developed the appropriate project management control systems to administer large military contracts and is fully familiar with all aspects of government contracting. In fact, it is the first company outside the US to have received validation from the US Navy for its advanced total program management system. Quality assurance procedures are maintained in accordance with CSA Standard Z.299.2 and AQAP1 requirements (equivalent to MIL-Q-9858A) are also met. There is a resident DND inspector staff based at the Indal Technologies plant and the Department of Supply and Services Canada maintains an office adjacent to the Indal Technologies facility to monitor ongoing domestic and international contracts. Production scheduling, material requirements and financial analyses are all controlled by a computer based system which is capable of handling all work in progress at any one time.

Average Work Force: Engineering - 50
Production - 160
Administration - 130

Gross Sales: 1984 - \$51M

Export sales represent more than 90% of Indal Technologies' annual sales of which a large percentage is for the US military, principally the US Navy.

Plant Size: 120,000 sq ft (Manufacturing Plant)
42,000 sq ft (Office Complex)

The bays in the manufacturing plant have a headroom of 35' plus and are served by overhead gantry cranes.

Experience: Indal Technologies serves many industries and their customers are invariably the leaders of those industries. The majority of their sales are made to government customers, either directly or through a third party subcontract. Principal customers include Navies and Coast Guards of Canada, the US, Japan, India, other NATO countries in Europe, Latin America, and Australia.

Keywords: Machining; Radar, Shipboard Support Systems; Hangars; Helicopter Recovery Assist; Antenna Support Structures; Radar Reflectors; Control Systems; Specialized Fabrication; Radomes; Aluminum Fabrication; Vertical Axis Wind Turbines; ILS Structures; MLS Structures.

Revised: Aug 85

INNOTECH AVIATION Ltd

Code: INA

Address: Head Office
455 Michel Jasmin
Dorval, Quebec, Canada H9P 1C2

Contact: Mr. Douglas M McGregor, VP Marketing & Sales - (514) 636-4155

History: Innotech Aviation Ltd was incorporated in 1955 as Timmins Aviation Ltd. In 1967, the latter was acquired by Atlantic Aviation Corp of Wilmington, Delaware, resulting in a further name change to Atlantic Aviation of Canada Ltd. The present name came into being in 1974 when a group of the company's Canadian executives together with Innocan Investments Ltd purchased the shares held by Atlantic Aviation Corp. The company has offices and aircraft service facilities in 3 Canadian cities, Vancouver, Toronto and Montreal.

Capability: The current operating divisions of Innotech Aviation Ltd include Aircraft Sales and Brokerage; Aircraft Management Services and Charter Operations; and Technical Services. This profile describes only the Technical Services Division which consists of:

Engineering & Design - A full range of aerospace related engineering services are offered which include repair schemes; corrosion control; weight and balance; systems installation design; aeronautical engineering; aircraft maintenance; modification development; structural design; electrical and avionics engineering; systems interface design; systems ground and flight testing; and custom designed aircraft interiors for commercial and military aircraft including executive transport, air evacuation, and hospital interiors; plus maintenance and technical publications for a wide range of commercial and military aircraft.

Aircraft Repair & Overhaul - This department's maintenance and service capabilities cover light single and twin engine aircraft, multi-engine turbo-props, turbo jets, and helicopters for civilian and military customers, as well as a full range of equipment modifications and non-destructive testing.

Modification - This department specializes in sheet metal work, aircraft welding, aircraft painting, cabinet making and upholstery of aircraft interiors and furnishings.

Quality Assurance - Innotech's quality assurance personnel hold Canadian Department of Transport (DOT) and the Department of National Defense Shop approvals (DND). All aircraft inspectors are licensed by DOT and, thence, through agreements between Canada and other countries, can approve work done for customers from outside Canada.

Average Work Force: Total - 420 (all locations)

Gross Sales: 1984 - \$50M
1985 - \$50M

Plant Size: 500,000 sq ft (all locations)

Experience: Innotech Aviation Ltd customers include the US Coast Guard (Falcon Aircraft), Canadian Department of National Defense (and other departments of the Canadian Government), Canadair, de Havilland Aircraft of Canada, Government of Malaysia and many other corporate operators.

Keywords: Corrosion Control; R&O (Aircraft); Weight & Balance; Systems Installation Design; Aeronautical Engineering; Maintenance; Modification Design; Structural Design; Electrical Engineering; Avionics Engineering; Systems Interface Design; Systems Ground Testing; Systems Flight Testing; R&O (Helicopter); Non-Destructive Testing; Sheet Metal Work; Welding; Painting.

Revised: Sep 85

INRAD INDUSTRIAL RESEARCH & DEVELOPMENT Ltd

Code: INR

Address: 128 Adelaide Street
Winnipeg, Manitoba, Canada R3A 0W5

Contact: Mr. Edward A Speers, P.Eng, President - (204) 943-6870

History: Inrad is a wholly owned Canadian company incorporated in 1975. There are no other Canadian locations. An affiliate company, Speers McGonigal (1980) Ltd, custom packager and plastic fabrication, is located at the same site.

Capability: The Inrad group is interested in new product development, particularly in the plastics, petroleum, chemical engineering, agricultural and energy spheres. They are also in the commercial packaging business. Some of their products include - a study of rare earth magneto-strictive materials for underwater transducers; photocatalytic conversion of water to hydrogen; the development of a high voltage fluorescent light switch; a farm fertilizer generator; and work on a high temperature solar collector suitable for a national grid system and for central heating.

A new material, porous titania glass, is available in research quantities. This acts as a photocatalyst when exposed to sunlight in the production of hydrogen from water at NTP. This material can be doped as required. Based on this technology, a portable hydrogen "sniffer" has been developed. The resistance of the detector changes on exposure to as little as 0.05% hydrogen in air. This instrument serves as an alarm for use near hydrogen producers such as batteries, hydrogen furnaces, and fuel cells. Slicodizing of aluminum is available wherein a layer of glass is joined directly to the aluminum, making it corrosion resistant and insulated. Different coatings are available. Air "undercoat" causes paint to adhere firmly. A smooth hardcoat is available.

Other capabilities include precision machining and engraving, plastic fabrication (vacuum forming), custom packaging, and skin and blister packaging.

Average Work Force: PhDs - 4
Engineer - 2
Physicist - 1
Chemist - 1
Others - 12/16

Gross Sales: Annual - \$1.0M

Plant Size: 25,000 sq ft

Experience: Inrad has worked with the Canadian Department of National Defense, the National Research Council, Atomic Energy of Canada Ltd, universities, and with private industry. They have low sales to the US. They have been in contact with USAF primarily in the area of rare earth magnets.

Keywords: Chemistry; Machining; Rare Earth Magnets; Photocatalyst; Alternate Fuels Research; Geophysics; Environmental Sensors; Trace Gas Detection; Titania Glass; Porous Titania Glass; Hydrogen Production; Water/Hydrogen Conversion; Hydrogen; Hazardous Gas Detection; Hazardous Gas Alarm System; Hydrogen Gas Detection; Injection Molding; Precision Machining; Precision Engraving; Custom Packaging; Blister Packaging.

Revised: Oct 85

INTERNATIONAL FASTENERS Ltd

Code: IFL

Address: 21 Constellation Court
Rexdale, Ontario, Canada M9W 1K4

Contact: Mr. S D Woolings, General Manager - (416) 674-0770

History: International Fasteners Ltd is a Canadian-owned distributor and representative organization serving the aerospace and hi-tech electronics industries.

Capability: Traceable inventories are maintained in support of transport, fighter and commercial aircraft and subsystems. Over 30,000 items of NAS, MS and VENDOR numbers. Authorized distributor of Hi-Lok, Taper Lok, NAS - MS - structural fasteners. An extensive inventory of F18, KC10, CP140 oversize fasteners are maintained. IFL is a representative of Rexnord, Hi-Shear, Deutsch, Dzus, TA Manufacturing, and Transport Dynamics.

Average Work Force: 60 employees

Gross Sales: 1983 - \$6M
1984 - \$7M

Plant Size: 20,000 sq ft (Warehouse)
7,500 sq ft (Office)

Experience: IFL customers include Government of Canada (DND), McDonnell Douglas, Boeing Aircraft, Pratt & Whitney, deHavilland, Dowty, British Hovercraft, Swiss Air Force, and Fleet Industries.

Keywords: Fasteners; Structural Fasteners; Distributors (Fasteners).

Revised: Sep 85

INTERNAV Ltd

Code: INL

Address: Sydport Industrial Park
P. O. Box 1261
Sydney, Nova Scotia, Canada B1P 6J9

Contact: Mr. Robert Janes, Engineering Manager -
(902) 564-2043

History: Internav Ltd is a Canadian owned high-technology electronics company founded in 1976.

Capability: Internav is primarily involved in the design and manufacture of Loran C radio navigation receivers and accessories. Other projects include design, development and manufacture of navigation computers, and antenna preamplifiers. Internav has also taken on build-to-print work from foreign companies seeking to fulfill Canadian Industrial Benefit commitments. Internav marine navigation Loran receivers are in wide use in commercial vessels in the Coast Guards of Canada, the US, Iceland, and the US and Canadian navies. Survey Loran receivers are in use in offshore exploration and mapping all over North America. An airborne receiver is just being brought into production.

Human resources include Electronic Design engineers, programmers, and technicians providing a broad design base. Technicians, assemblers, and QC inspectors provide a complimentary manufacturing capability.

Average Work Force: Engineering - 5
Technicians - 10
Others - 15

Gross Sales: 1983 - \$1.8M
1984 - \$2.2M

Plant Size: 13,000 sq ft

Equipment: Specialized equipment includes - A wave solder machine, electronic test equipment, a burn-in chamber, 3 Intel Microprocessor Development Systems, and a Loran C Simulator.

Experience: Customers include - the US Navy, Canadian Navy, Canadian Air Force, US Coast Guard, Canadian Coast Guard, Icelandic Coast Guard, and a variety of commercial customers.

Keywords: Avionics; Loran C Navigation Receivers; Navigation Receivers; R&O (Avionics).

Revised: Aug 85

IRVIN INDUSTRIES CANADA Ltd

Code: IIC

Address: P. O. Box 280
Fort Erie, Ontario, Canada L2A 5M9

Contact: Mr. John Swanigan, President - (416) 871-6510

History: Irvin Industries was incorporated in Canada in 1925 and is a subsidiary of Irvin Industries Inc of New York. The parent company not only operates many facilities in the US and one in Canada, but also in the UK, Italy, and Sweden.

Capability: Irvin Industries produces personnel parachutes (back & seat-type for ejection seats, military search and rescue units, paratroopers & military freefall), precision opening release systems, aerial delivery systems, inflatable life support systems, and aircraft, automobile & industrial restraint systems. Irvin has also designed and manufactured special purpose parachutes including sophisticated recovery systems for supersonic jet transports; and multi-use high-reliability & patented deceleration systems for fighter aircraft.

Irvin's Production Department is equipped with more than 350 sewing machines capable of efficiently stitching the latest natural and man-made fabrics, tapes and webbings. Added to this are quality control test machines, cloth laying and cutting tables, grommet and eyelet machines, and jigs and fixtures to enable the company to produce highly dependable and durable life support equipment.

Additionally, an environmentally-controlled facility equipped with modern environmental test chambers, jigs, fixtures and inspection equipment accommodates the assembly, inspection and customer servicing of the FF-2 "Hitefinder" automatic parachute opening device.

A further enhancement to Irvin's capabilities in the inflatable products line has been realized through the firm's recent acquisition of the latest in frequency stabilized electronic heat sealing equipment. This advanced state-of-the-art production equipment now permits both prototype development and large scale manufacture of an extended range of inflatable products including - life rafts; inflatable boats; life vests and jackets; impact attenuation bags; air mattresses; anti-g suits; cooling suits; and partial pressure vests. Heat sealing techniques are likewise being applied to make product improvements upon Irvin's existing line of inflatables produced previously by conventional means.

Irvin's Quality Control Program has been designed to conform with the requirements of the Canadian Armed Forces standards as defined in DND Spec 1015, whose equivalent US Department of Defense standards are MIL-Q-9858 and MIL-I-45208. The quality audits conducted by independently assigned specialists, as well as full-time in-house quality assurance representatives assigned by the Department of National Defense, provides for the surveillance of Irvin's quality control program. Irvin Industries Canada Ltd has been listed by the military as an "approved" company since Dec 1938.

Irvin's Engineering Department is responsible for all projects from the proposal stage to production. This encompasses design, development, static testing, aerial & dynamic testing, drawing approval, preparation of procedures & specifications, and approval of the first-off specimen. Preliminary design work is facilitated

by an in-house computer which is capable of simulating tests, thereby avoiding extensive trial & error testing. They also maintain Drafting and Customer Service/Product Support Departments.

Irvin's products include space vehicle recovery, drone recovery, missile recovery, deceleration (for high performance aircraft) systems, personnel parachute systems, special purpose parachutes - precision opening & release systems, air cargo delivery systems, and other miscellaneous items such as harnesses, belts, protective clothing, special suits/clothing, life rafts, and survival kits.

Average Work Force: Total - 125

Gross Sales: 1984 - \$8.6M
1985 - \$7.6M

Plant Size: 39,000 sq ft

Experience: Irvin's customers include the USAF (AIM Parachute Program - joint USAF/Canadian program and the deceleration parachute for the F-105), US Army (FF-2 Hitefinder Automatic Parachute Release Mechanism), the Canadian DND, Canadair, Fleet Industries, MBB Helicopter Canada Ltd, and many other off-shore customers (primarily military).

Keywords: Protective Equipment; Air Delivery Systems; Personnel Survival Equipment; Personnel Restraint Equipment; Parachutes; Precision Opening Release Systems; Inflatable Life Support Systems; Special Purpose Parachutes; Recovery Systems; Deceleration Systems; Drone Recovery Systems; Harnesses; Belts; Protective Clothing; Survival Kits.

Revised: Aug 85

ITT CANNON ELECTRIC CANADA (A Division of ITT Industries of Canada Ltd)

Code: ITT

Address: 4 Cannon Court
Whitby, Ontario, Canada L1N 5V8

Contact: Mr. Bruce D Vallillee, Manager of Marketing and Sales - (416) 668-8881

History: The company commenced operation in Canada in 1942 as Cannon Electric Company Ltd. The parent company, Cannon Electric Company (Los Angeles), was eventually purchased by ITT Corporation and the Canadian company became a wholly owned ITT subsidiary. In 1956, the company name was changed to its present name, and in 1967 the company began operation as a Division of ITT Canada Ltd. The company maintains Sales Offices in Montreal and Vancouver.

Capability: ITT Cannon Electric Canada is engaged in R&D, manufacture, and sales of electrical & electric connectors, cable harnesses, and interconnect devices for the hostile environment market. Cannon connectors are in virtually every passenger jet aircraft in the free world, deep in the earth & ocean, in space, in nuclear reactors, and in oil & gas drilling rigs - in other words, in the hostile environment.

Their manufacturing capability features both manufacturing & industrial engineering, tool design (plastic & metallic components), machining fabrication & assembly operations, machine & model shops, molding facilities, and electroplating. They have world-wide market responsibility and engineering design cognizance over, a) battery power connectors, b) firewall connectors, c) waterproof connectors, d) high temperature connectors, e) buffet series, f) aircraft firewall connectors, g) circular nuclear series, h) weatherproof series, i) Canadian design specials, j) environmental rack & panel DRA series, k) geophysical-seismic, l) cryogenic connector series, and m) sonar-underwater tow connectors.

Product development has led to a variety of new and/or improved connectors. These include, a) a new series with proven results at elevated temperatures for nuclear applications; b) a connector to meet MIL-C28840 for seaboard applications (QPL); c) a connector (MS5015/3400D series) being used by the US Navy on new equipment as well as for retrofit, replacement & all power applications; d) the MIL-C-83723 series III connector designed for high performance aero applications; e) the "Downhole" connector designed for high pressure usage (hermetically sealed); f) the MR series connector - rugged, heavy duty & waterproof (designed to withstand severe environmental conditions); g) a geophysical hermaphroditic connector designed for the seismic exploration industry; and h) a connector to meet MIL-C-38999, III K.

Average Work Force: Not Specified.

Gross Sales: 1984 - \$18M
1985 - \$20M

Plant Size: Production - 55,000 sq ft
Office - 15,000 sq ft

Experience: It suffices to say that Cannon connectors are designed to the specification of the electronic industry, and meet the requirements of the Canadian Department of National Defense, the US DOD, Canadian Ministry of Transport, and the Canadian Standards Association. Cannon plugs are used world-wide.

Keywords: Connectors; Tubing; Wiring; Cable; Harnesses; High Temperature (Connectors); High Pressure (Connectors); Testing (High Pressure); Materials R&D (Connectors).

Revised: Aug 85

IVI Inc

Code: IVI

Address: Marketing Office
1010 Sherbrooke West, #608
Montreal, Quebec, Canada H3A 2R7

Contact: Lt Gen J J Paradis, Dir, International Marketing - (514) 282-1396

History: IVI Inc carries on a tradition in the manufacture of small arms ammunition that dates back to 1880 when the Quebec Arsenals were established in Quebec City. It was incorporated as Valcartier Industries Inc in 1966, later changed to IVI Inc, and the plant is located on a 500 acre site at Val Belair, Quebec, 15 miles outside of Quebec City. IVI Inc, a wholly owned subsidiary of the SNC Group, is Canadian owned.

Capability: IVI Inc is a manufacturer of high quality, small arms ammunition, both military and commercial. It is the sole small arms ammunition manufacturer in Canada. It supplies the Canadian Forces for all their needs in small caliber ammunition. From the early 1950s on, it has from time to time been a major supplier to the US Army. Its military ammunition conforms to NATO specification.

IVI Inc operates its own foundry and produces brass, lead and gilding metals required for the production of ammunition. All dies, punches, tool holders and other tools are produced in-house. The precision tooling is used for both commercial and military ammunition.

IVI maintains very high quality control standards through rigid and numerous destructive and non-destructive inspection checks following the various stages in the manufacturing process. They have a functioning Proof House and ranges for proof firing of all products.

IVI Inc's R&D capability is considerable. In the late 1960s, it co-operated with the Canadian Army Research and Development

establishment in the development of heavy core Tungsten Carbide Anti-Armour ammunition and in the middle 1970s, it developed in cooperation with US industry, aluminum cast technology for 30mm canon ammunition. More recently, the R&D department was involved in the development of bullets for caseless ammunition, of plastic blanks and of a 9mm sub-sonic cartridge. The R&D department is equipped with a manufacturing capability, testing facilities, most modern measuring devices, and indoor and outdoor ranges.

IVI Inc's military products include 5.56mm, 7.62mm, .50 cal., 9mm, and 20mm ammunition. Commercial ammunition includes a large assortment of shotshells, .22 caliber rimfire, as well as popular calibers of centerfire cartridges.

Average Work Force: 800

Gross Sales: Annual - \$45M

Plant Size: Manufacturing - 500,000 sq ft
Warehouse - 84,000 sq ft
Total Acreage - 500

Experience: IVI is the sole supplier of small arms ammunition to the Canadian Forces. They export small arms ammunition to more than 20 countries, including the US, Norway, Belgium, Kenya, Indonesia and Australia.

Keywords: Ordnance; Ammunition; Small Arm Caliber Ammunition; R&D (Ammunition).

Revised: Aug 85

JATEL COMMUNICATIONS SYSTEMS LTD

Code: JAT

Address: 39 Leacock Way
Kanata, Ontario, Canada K2K 1T1

Contact: Mr. J Ebrahimi, President - (613) 592-4331

History: Jatel Communications Systems Ltd was founded in 1976 and is 100% Canadian owned.

Capability: Jatel activities include consulting, systems studies, and applied research associated with telecommunications techniques. As a result of successful endeavors in the aforementioned, they initiated and brought to fruition, a research and development program that resulted in the development and production of their RX-32 Communication Switching System. This system has completed field trials with the Canadian Department of National Defense for air traffic control applications. The RX-32 system is a solid state, time division multiplex switching network. It has a stored program and is microprocessor controlled.

Jatel areas of scientific specialization include design and manufacture of customized telecommunications systems for both civilian and military applications. Typical applications include air traffic control communications, Coast Guard Ship-to-Shore communications and police radio dispatch communication systems.

Average Work Force: Professionals - 8

Gross Sales: 1985 - \$600K

Plant Size: 1,500 sq ft

Experience: Jatel customers include the Canadian Departments of National Defense and Transport.

Keywords: Communications; Switching; Telephone; Radio; Solid State Devices; ATC Communications System; Consulting (Communications); Networking.

Revised: Oct 85

J.J. CHARLTON COMPANY Ltd

Code: JJC

Address: 115 Milvan Drive
Weston, Ontario, Canada M9L 1Z8

Contact: Mr. John A Charlton, President - (416) 741-9030

History: J.J. Charlton Company Ltd is a wholly owned Canadian company founded in 1947 with a sole affiliate - C.F.N. Precision Machining Inc. J.J. Charlton initially did work for a A.V. Roe (Aircraft Division) during the 1950s. Over the years, J.J. Charlton has concentrated its efforts on supplying precision machined parts to the aerospace, defense, atomic energy, telecommunications and business systems industries.

Capability: J.J. Charlton specializes in precision machining of all alloys and plastics, using single spindle screw machines, Swiss Type Sliding Head Screw machines, and CNC turning and milling machines. They also have a unique Diamond Centerless Grinding capability for fragile material, i.e., ceramic, glass and ferrite tubes. J.J. Charlton also incorporates a modern QC department using a computerized statistical QC system for process capability along with a digital co-ordinate measuring machine. Our QC manual meets the requirements of DND-1016, AQAP-1, AQAP-9, MIL-I-45208 and CSA Z299-2.

Average Work Force: Machinists - 25
Quality Control - 3
Production Control - 3
Administrative - 6

Gross Sales: No Data

Plant Size: 21,000 sq ft

Experience: J.J. Charlton's customers include Devtek (Diemaco), Murata Erie North America Ltd, Kyocera International, Garrett Manufacturing Ltd, Ernst Leitz Canada Ltd, Varian Canada Inc, Leigh Instruments Ltd, Santa Barbara Research Center, Donlee Nuclear, T.R.W., I.B.M., Xerox, N.C.R., Vac-Aero International Inc., Amphenol-Bendix, AMP of Canada Ltd, and many more aerospace related customers.

Keywords: Machining; Precision Machining; Automatic Screw Machining; Swiss Type Screw Machining; CNC Turning & Milling; Centerless Grinding; Induction Hardening; Honing; Light Assembly.

Revised: Sep 85

KAYCOM Inc

Code: KCI

Address: 250 Richmond St
Ville St Pierre, Quebec, Canada H8R 3Y8

Contact: Mr. Brian March, General Manager - (514) 367-0585

History: Kaycom Inc is primarily involved in the supply and manufacturing of military replacement parts and equipment. Since its inception, Kaycom has specialized in the logistic support of a wide variety of North American designed military transport and fighter aircraft.

Capabilities: Kaycom possesses an extensive product list for which they have developed excellent sources of supply for current and out-of-production aircraft. The company products range from electronic to mechanical, and include airframe and engine spares, to totally support all military type equipment.

Average Work Force: Engineers - 1
Management - 3
QA - 2
Sales - 5
Others - 10

Gross Sales: 1984 - \$4.2M
1985 - \$6.0M (Est'd)

Plant Size: 15,000 sq ft (including warehouse)

Experience: Present customers include DND; commercial and research agencies (i.e., Canadian Coast Guard and National Research Councils); foreign military based establishments (i.e., Namsa and Ministry of Transport, Britain); and Canadian aerospace manufacturers (i.e., Spar Aerospace, Heroux, IMP Aerospace, and many others).

Keywords: Logistic Support; Spare Parts (Aircraft); Spare Parts (Engines); Aircraft (Spare).

Revised: Aug 85

KOSS MACHINE & TOOL CO

Code: KOS

Address: 1765 Shawson Dr, Units 7 & 8
Mississauga, Ontario, Canada L4W 1N8

Contact: Mr. Dragomir Cajic, President - (416) 678-7236

History: Koss Machine & Tool Co was started in 1975 as a general machine shop and incorporated in 1976. The company ventured into defense and aircraft industry associated work in 1978 which today comprises 80% of their work. The company is a division of 333 111 Ontario Ltd.

Capability: Koss Machine is involved in milling and lathe operations primarily involved with defense and aerospace related work. The CNC milling operation has a working travel of up to 20x40 inches and a vertical space up to 29.75 inches. Tolerances can be held to 0.0003 inch. A new Makino machine center is operational. It exhibits X, Y, Z axis lengths of 75.5, 27.5, and 23.6 inches, respectively.

Lathe operations are carried out with both CNC and conventional machines with maximum swing of 24 inches, maximum cross travel of 9.75 inches, and a maximum machining length of 21.5 inches. A quality assurance manual (quality level to DND 1016/MIL-I-45208) has been prepared.

Average Work Force: Machinists - 12
Quality Control - 1
Production Control - 1
Administrative - 2

Gross Sales: 1984 - \$550K
1985 - \$780K

Plant Size: 6,000 sq ft

Equipment: Koss' equipment includes CNC machines, vertical milling machines, engine lathes, turret lathes, and other assorted equipment associated with machining operations.

Experience: Contractor approvals have been afforded by Canadair Ltd, the deHavilland Aircraft of Canada Ltd, and McDonnell Douglas.

Keywords: Machining; Precision Machining; Tooling; Injection Molding Tools.

Revised: Aug 85

LEAVENS AVIATION Inc

Code: LAI

Address: 2555 Derry Road East
Mississauga, Ontario, Canada L4T 1A1

Contact: Mr. E Baumgartner, Production Manager -
(416) 678-1234

History: Leavens Aviation Inc is a Canadian-owned company founded in 1927. In its early days, it was primarily engaged in air transportation and flight training. During the second World War, in addition to operating a flight training school for Commonwealth pilots, it enlarged its engine, propeller and accessories overhaul capabilities, and engaged in manufacturing parts and assemblies for aircraft.

In 1972, the operation was relocated to its present facility, concentrating on manufacturing of aircraft parts and assemblies, distribution of aircraft supplies, as well as the overhaul of engines, propellers and accessories for small-to-medium sized aircraft.

Capability: Leavens Aviation Inc specializes in the manufacturing of parts, sub-assemblies and assemblies for military and civilian aircraft, and the overhaul of piston engines, propellers and accessories.

Average Work Force: 60

Gross Sales: 1984 - \$5.0M
1985 - \$5.5M

Plant Size: 30,000 sq ft

Equipment: Equipment includes CNC milling and turning, full machining capabilities, and assembly and test facilities.

Experience: Leavens Aviation Inc has manufactured parts and assemblies for Canadian and US manufacturers. They provide their customers with hydraulic hose and aircraft control cable assembly and test facilities, and overhaul of aircraft engines, propellers and accessories. They are interested in doing business for the USAF.

Keywords: Aircraft Parts; Machining; CNC Milling; Hydraulic Hose; Control Cable (Aircraft); R&O (Engines); R&O (Propellers); R&O (Accessories).

Revised: Aug 85

LEIGH INSTRUMENTS Ltd

Code: LEI

Address: 2680 Queensview Drive
Ottawa, Ontario, Canada K2B 8J9

Contact: Mr. Michael A Rowlands, Director of Marketing -
(613) 820-9720

History: Leigh Instruments is a high technology electronics company engaged in the systems engineering, development and manufacture of equipment, products and systems principally for the aerospace, government and military markets. Leigh was founded in 1961 and is a publicly held, Canadian owned company. Approximately 50% of sales are for the export market. Leigh's engineering and aerospace operations, described further under capabilities, has engineering facilities in Ottawa together with the company's marketing and executive offices, and has a production facility in Carleton Place, Ontario; thirty miles west. Other facilities include the Frequency Control Division in Toronto, which manufactures crystals, crystal filters, and high environment glass-to-metal seals; and a plant in the UK near Heathrow Airport which supplies some products as well as support and repair and overhaul services to Leigh's European customers.

Capability: Leigh's aerospace and engineering systems operations supplies a range of products, systems and services to the aerospace, military and government sector. The company is organized into three product groups, two of which (Aerospace and Marine & Land) do business in this area.

The company developed initially as a flight recorder/crash locator systems company, building on a patent for a unique deployable crash position indicator.

The aerospace product group has developed its business base to include products and expertise in other areas such as helicopter CPIs, mechanical strain recorder systems and helicopter icing detection systems. In the latter instance, for example, Leigh won a US Army AISLIS (Advanced Icing Severity Level Indicating System) R&D contract on a competitive basis, as a result of its experience.

The company has, over 25 years, developed its capability also in the areas of data processing and display systems applications, communication switching systems, and radar-based surveillance and display systems as both a prime contractor and system integrator.

Average Work Force: 450 (Ottawa & Carleton Place, approx)

Gross Sales: 1984 - \$35.5M (Year ending Jun 30)
1985 - \$35.0M (Year ending Jun 30)

Plant Size: 122,000 sq ft (Ottawa & Carleton Place, Ontario)

Equipment: Leigh's production facility is qualified to DND 1015, which incorporates MIL-Q-9858B, and has a resident DND inspection detachment. The plant has a fully integrated production facility including machine shop with both NC and CNC equipment; mechanical and electrical inspection facilities; electrical and electromechanical assembly; and specialized foam/fiberglass production facilities. Electrical assembly facilities include component preparation, semiautomatic insertion, PCB flow soldering, conformal coating, semiautomatic wirewrap and harness shop. Test facilities include production ATE, cable and harness test facilities, various production test stations, test equipment calibration facilities, and a large RF anechoic chamber.

The plant also has a well equipped environmental test lab and a number of different types of AGREE production environmental test chambers. Engineering facilities include well equipped laboratories including a number of microprocessor development stations and a VAX 11-750 engineering computer facility.

Experience: Leigh Instruments Ltd's major customers include - US Navy, US Army, US Air Force, US Coast Guard, Canadian Forces, Canadian Coast Guard, Transport Canada, McDonnell Douglas, Lockheed, Boeing, RAF, FRG DOD, and Panavia. Source qualified by all of the foregoing.

Leigh's major projects in the aerospace government and defense areas include:

System Prime Contractor - Vessel Traffic Management Systems (radar surveillance, display, data processing, microwave backhaul) for Transport Canada for Vancouver, Tofino and Les Escoumins (1976-1982).

System Integrator - TRACS, Terminal Radar and Control System, for Department of National Defense. System engineering, integration, installation and test of seven modern ATC radar, processing, display and communication control facilities across Canada (1979-1982).

Systems Engineer - System definition contractor for VTM System for Port of Hong Kong (1982-present). Interior Communication System integrator for Canadian Patrol Frigate CD phase finalist (1981-1982).

Ships Interior Communications - Supply STM SHINCOM (integrated system) to DND (1982-present). Contracted to supply system for new frigate program (1983).

TACAN Navigation Equipment - Contracted by DND to supply 30 TACAN ground beacons across Canada as well as naval versions for Canadian Patrol Frigate (1984-present).

Voice Recorders - Cockpit Voice Recorder to Panavia Tornado (1975-present).

Flight Recorder/Locator Systems - USN, Canadian, USAF and European programs (1970 to date). Aircraft include P3, C130, 707, F104G, Tornado (Joint program with Dornier), others. Contained Crash Survivable PDR/Maintenance Recorder: RAF Hawk.

Mechanical Strain Recorder - (present) - USAF F-16, others.

Helicopter Icing Detection Units - Various commercial North Sea, others. AISLIS R&D contractor for US Army. Helicopter CPI - Various military, North Sea commercial.

Other CPI - Military and civil applications; Canada, the US and Europe.

Avionics Production - Subcontract manufacture of advanced avionics subsystems for CF18 (SMS and CSCS for LSI: 1982-present).

Keywords: Avionics; Radar; Airfoil; Beacon; Data Acquisition; Data Processing; Traffic Management; Ice Detector; Crash Position Indicator; Intercom; R&O (Avionics); Flight Data Recorder; Voice Recorders; Cockpit Voice Recorders; Build-to-Print.

Revised: Aug 85

LITTON SYSTEMS CANADA Ltd

Code: LSL

Address: 25 Cityview Drive
Rexdale, Ontario, Canada M9W 5A7

Contact: Mr. B A Bisley, Dir of Marketing, ATE - (416) 249-1231

History: Litton Systems Canada Ltd (LSL), a major operating division of Litton Industries, has a long and successful history of designing and manufacturing highly sophisticated electronics equipment for military and commercial use in a world-wide market. LSL was launched nearly 25 years ago with a contract to assemble and test the guidance and control systems in the LN3 Inertial Navigation System (INS) for the Canadian Forces CF-104 Starfighter. LSL's facilities were rapidly expanded and improved, and super-clean assembly and test facilities were established to support the manufacture of gyroscopes, accelerometers and inertial platforms. The original INS has subsequently been modified and improved, and at LSL, a whole family of guidance systems has evolved to support the European Starfighter program and for use in aircraft manufactured by Grumman, Lockheed, McDonnell and General Dynamics. A Litton guidance system, the LN35, was the one chosen for the US Cruise Missile.

Capability: LSL has become a dominant force in the commercial INS marketplace. The LTN-72 system has achieved phenomenal success and is the most widely used INS throughout the world. The LTN-72 is a reliable, self-contained, all-weather, world-wide navigation system that is totally independent of ground-based navigation aids. In 1982, LSL underwent a major expansion and upgrading of its INS capabilities to allow the manufacture of the next generation of inertial systems, employing ring laser gyros in a strap-down configuration. These systems, the LTN-90, LTN-90-100 and the LTN-92 are now on board aircraft such as the A310, A300-600, E-6A and The Challenger 601.

Utilizing the wealth of experience acquired in LN3 INS design and production testing, in 1962 LSL developed a punched-tape programmer controlled Mobile Automated Test Set for first level maintenance support of the INS. These systems were used to support the F-104 and P-3 Aircraft. LSL developed its first computer-controlled Automatic Test Equipment (ATE) in the late 1960s. This system, the Litton Automated Test Set (LATS), evolved

into a highly capable, general purpose analog and digital level two and level three test set utilized by LSL as factory test equipment, as well as by a number of commercial and military customers as depot test stations. The LATS has been expanded to accommodate the testing requirements of the F-18. The expanded Litton Automated Test Set (ELATS) is used for their depot test stations to support their new fighter programs. ELATS has been purchased by the Canadian Air Force, the Royal Australian Air Force and one European NATO Air Force.

In June 1967, the company began broadening the scope of the projects it pursued and competed for and won the contract for the supply of CCS-280 Command and Control System for the Canadian DDH-280 class destroyers. This program established the in-house capability for advanced systems engineering, software development, and display manufacture. A key part of this program was the creation of a Program Generation Center which led to the development of simulation programs and the subsequent marketing by the company of its line of ISIS Civilian Air Traffic Control Simulators and RIS Ground Control Intercept Military Simulators. Other systems engineering capabilities have been exploited on a variety of programs such as the DOT Regional Air Traffic Simulators, the Air Navigator Procedures Trainer for DND, and the Sea King Helicopter Tactical Simulator.

LSL's expertise in the development of specialized systems supported the award of the contract for the Automatic Data Link Plotting System (ADLIPS). ADLIPS is designed to meet the performance specification issued by the Canadian Navy as a retrofit system for a number of differing interface and installation requirements. ADLIPS is a complex, low-cost, shipborne computer-assisted, real-time command, control and tactical data communications system which can be fully integrated with existing ships' systems.

LSL has headed up a team of Canadian Industrial firms, working in concert with the Government Project Office, to conceive, design, develop, and integrate and reconstruct Canada's four Tribal Class Destroyers. The Update and Modernization Project (TRUMP) has seen LSL chosen as the Single Prime Contractor for the contract definition phase of the project.

The expertise acquired in Systems Engineering was also responsible for the design and development of Litton Integrated Security Systems. These computer-based systems combine complete perimeter detection, surveillance, access control and radio communication to provide the necessary level of protection. The company has obtained contracts for the system for implementation at a Middle East Air Force Base. Systems have already been installed in Maximum Security Penitentiaries and Nuclear Power Generating Stations.

Previous indepth experience in the development of software in both the inertial and systems engineering fields made LSL the logical choice for the contract to develop the Data interpretation and Analysis Center for the Maritime Command of the Canadian Forces. The DIAC correlates current and historical data enhancing mission planning and control.

In order to ensure that its products and areas of expertise stay abreast of the current technology, LSL is committed to a high investment in research and development. Recently, this effort, combined with assistance from a joint Canadian/US development contract, resulted in the next-generation aircraft cockpit displays. LSL has developed a solid-state, modular, flat panel display system using light emitting diode technology for use in the military environment. This system has recently been selected by General Dynamics for implementation in the F-16 aircraft.

The company also produces programmable display modules (PDMs), cathode ray tube cockpit displays, and liquid crystal displays (LCDs). An Ottawa subsidiary, Data Images Inc., designs and manufactures liquid crystal displays.

Another successful R&D program that has also progressed to production is the Inertial Referenced Flight Inspection System (IRFIS). IRFIS is a self-contained enroute and terminal navaid calibration system. It performs calibration of Category I, II and III Instrument Landing Systems with higher accuracy and lower

operating costs than other systems currently in use. Another example of the successful implementation of R&D and systems engineering is the Litton family of Airborne Search Radar Systems. LSL entered the field in 1972 when, in conjunction with the AIL Division of Cutler-Hammer, it designed and developed radar systems for fleet fitment in the Canadian Forces CH-124 Sea King Helicopters. Since that time, a number of different systems have emerged with varying capabilities. The Litton radar is currently flying in 11 different types of aircraft in 15 countries around the world. LSL is continuing to evolve this product line and is presently working on a system with ASW capabilities.

LSL has recognized that an electronic system management capability is a national priority, and has taken the necessary steps to equip the company with the organizational structure, skilled management, technical personnel and specialized computer facilities to undertake the management of large, complex electronic and avionic programs.

Average Work Force: Engineers - 650
Mfg/Admin/Techs - 2,350

Gross Sales: 1984 - \$198M
1985 - \$240M

Plant Size: 725,000 sq ft

Keywords: Radar; Cockpit Displays; Data Analysis; Instruments; Inertial Navigation; Simulators; Training; C3 Systems; Data Acquisition; LED Displays; Solid State Devices; Intrusion Detection; ATC; ATC Simulators; Navigation; Displays; R&O (Avionics); Liquid Crystal Displays; Cathode Ray Tube Displays; Search Radar.

Revised: Aug 85

LUMONICS Inc

Code: LUM

Address: 105 Schneider Road
Kanata, Ontario, Canada K2K 1Y3

Contact: Mr Tom Znotins, Marketing Manager - (613) 592-1460

History: Lumonics Inc is a Canadian owned high technology company incorporated in 1970 with one subsidiary in the US. The company also has a subsidiary in the UK - JK Lasers - that specializes in a range of Nd:YAG and Ruby Lasers for general purpose research applications including holography. The company was formed to manufacture and sell the pulsed CO₂ lasers developed at the Defense Research Establishment Valcartier.

Capability: Lumonics specializes in pulsed gas lasers including excimer, CO₂ and HF/DF types. It is the third largest North American laser manufacturer serving both the scientific and industrial markets. They have twelve series of lasers available with various models within each series. A significant portion of their business is contract R&D, but it is carried out only when Lumonics anticipates and retains rights for commercial exploitation. Their scientific market includes university, government and corporate researchers. The two primary fields in which their customers are active are chemistry/isotope separation, material processing and plasma research. Lumonics has been manufacturing their excimer lasers for scientific application since 1978, and has received government funding to develop an industrial series over the next 4-5 years.

Lumonics' key functions of material procurement and control, electrical and mechanical assembly, and final preference testing are carried out in-house. Machined and sheet metal components are sub-contracted.

Average Work Force: Scientists & Engineers - 40
(In Canada)
Others - 120 (In Canada)
Others - 75 (In the US)
Others - 100 (In the UK)

Gross Sales: 1984 - \$40M
1985 - \$50M

Plant Size: 75,000 sq ft (In Canada)
50,000 sq ft (In the US)
50,000 sq ft (In the UK)

Experience: Lumonics is interested in working with the USAF and has done so in the past in the form of providing standard lasers. They have not undertaken any USAF-sponsored R&D. They carry out extensive in-house R&D for the Canadian Government.

Keywords: Pulsed Gas Lasers; Excimer Lasers; Gas Lasers; Lasers; CO₂ Lasers; TEA Lasers; Laser Marking Systems.

Revised: Aug 85

MA ELECTRONICS CANADA Ltd

Code: MAE

Address: 3135 Universal Drive
Mississauga, Ontario, Canada L4X 2E7

Contact: Mr. Paul Mercer, Sales & Marketing Mgr -
(416) 625-4605

History: MA Electronics Ltd was established in January 1977 to support the Canadian communications industry's expanding needs for advanced technology components and subsystems. Over the last years, a hybrid microwave integrated circuit (HMIC) production facility has been established. The company is part of the M/A Com Inc operating companies.

Capability: MA Electronics is a major supplier of GaAs FET amplifiers and related microwave components for consumer, military, and telecom markets. Their Mississauga facility houses microwave design and test laboratories, an extensive machine shop, and plating and finishing facilities, complemented by engineering, administrative and sales offices. They have the capability to provide standard components from a diversified product line, design active and passive devices to customer specifications, and interface requirements and combine technologies into subsystems, thus maximizing overall performance and cost effectiveness. In general, they offer a comprehensive in-house product capability spanning DC to 26 GHz.

MA Electronics has three product groups:

- *Passive Microwave Components* - coaxial and waveguide devices including ferrites, evanescent mode filters, multiplexers, and precision electroformed components.
- *Commercial Satellite Electronics* - low noise communication band amplifiers, power amplifiers, and integrated subsystems containing up and down conversion, filters, multipliers, and sources.
- *Hybrid Microwave Integrated Circuit (HMIC) Components* - multioctave wideband amplifiers over .5 to 26 GHz. Small signal to 1 watt. Built in facility under 9858 Quality Program.

Average Work Force: 105 (Total)

Gross Sales: 1985 - \$11.5M

Plant Size: 22,000 sq ft

Equipment: Equipment includes Class 10,000 clean room manufacturing area for HMIC products, laser welder for hermetic packages, and electroforming capability.

Experience: MA Electronics' product market is world-wide

Keywords: Microwave Components; Waveguides; Switches; Pin Diode Switches; Waveguide Attenuators; Couplers; Attenuators;

Waveguide Transducers; Amplifiers; Microwave Amplifiers; Low Noise Amplifiers; Medium Power Amplifiers; High Power Amplifiers; Multiplexers; Electroforming; GaAs FET Amplifiers; Filters; Microwave Filters; Ferrite Devices; Isolators; Circulators; Coaxial Ferrite Devices; Microwave Subassemblies.

Revised: Aug 85

MACDONALD DETTWILER & ASSOCIATES Ltd

Code: MDA

Address: 3751 Shell Road
Richmond, British Columbia, Canada V6X 2Z9

Contact: Dr Marshall N Prentice, Sales Manager -
(604) 278-3411

History: MDA is a privately owned Canadian company formed in 1969 with a single plant in Vancouver, BC.

Capability: MDA is a leading supplier of digital systems in the fields of remote sensing from air and space, image data processing, and digital graphics. It is a high technology firm whose main areas of business are: (1) remote sensing satellite processing systems (especially for the NASA Landsat series), (2) meteorological satellite processing systems for all the major satellites, (3) synthetic aperture radar (SAR) digital processors for airborne and spaceborne sensors, and (4) high speed film image recorders.

MDA is a leading supplier of Earth Resource Satellite Stations. The company has played a role ranging from that of prime contractor providing a fully integrated receiving and processing facility, to that of subcontractor supplying system design and subsystem components. The basic design of these satellite data systems is modular. Data can be processed at high speed from a variety of sources including the MSS and TM sensors of the current Landsat satellite and the sensors on the French SPOT Satellite. In addition to radiometric and geometric corrections, the processing permits accurate resampling to map projections so that various data fields can be overlaid and thematic imagery in map-format produced.

MDA supplies complete ground stations for the reception and processing of data from polar orbiting and geostationary meteorological satellites. Their systems include an analysis capability which permits extended interactive analysis of the meteorological satellite data, and provides for the overlay of conventional measured and forecast meteorological parameters on imagery to enhance its usefulness in forecasting.

MDA designs and manufactures digital processors for both airborne and spaceborne SARs. Their developmental designs are based on computer software and on high speed electronic hardware. This allows them to supply small fast units for aircraft use and larger ground based units for the processing of satellite generated radar data. Their IRIS product is a complete airborne SAR system with dual frequency transmit and the capability of image storage, downlink, or real-time hard copy on the aircraft.

The MDA FIRE 240 laser film image recorder exhibits high resolution, high geometric accuracy and high throughput. It is rugged, light weight, and allows for unattended operation. A color version has been produced with similar high resolution and high speed for use in the graphic arts and seismic processing industries. A larger version is available for the plotting of printed circuit board (PCB) artwork.

Average Work Force: Elect Eng - 60
Data Processing - 140
Systems Engs - 30
Scientists - 20
Admin - 200
TOTAL - 450

Gross Sales: 1984 - \$32M
1985 - \$38M

Plant Size: 120,7000 sq ft

Equipment: MDA's equipment includes Digital Electronic Assembly & Test Facility; General Purpose Computer Facility; and Systems Integration Rooms.

Experience: MDA had served as prime contractor on large scale systems for the US Air Force, Swedish Space Corp, Australia, National Research Council (Thailand), Indonesian Space Agency, German Space Agency, European Space Agency, Swissair Transport Co Ltd, Canada Center for Remote Sensing, and Atmospheric Environment Service Canada. They have served as subcontractor to Bendix, TRW Systems, General Electric Co, Jet Propulsion Laboratories, NASA, Messerschmitt-Bolkow-Blohm (W Germany), National Space Development Agency of Japan, and Hitachi.

Keywords: Landsat; Image Processing; SAR; Remote Sensing; Image Recorder; Ground Stations; Software Systems; Data Handling; Meteorological Satellite Processing Systems; Weather Forecasting Systems; Synthetic Aperture Radar; Weather Image Processor; Interactive Analysis; Laser Film Image Recorder.

Revised: Aug 85.

MARS AERIAL REMOTE SENSING Ltd

Code: MAR

Address: 1220 Kensington, Suite #301
NW Calgary, Alberta, Canada T2N 3P5

Contact: Dr Frank G Bercha, President - (403) 270-3006

History: The company was incorporated in 1980 in Calgary, Alberta, and currently has a branch office in Ottawa, Ontario, and St Johns, Newfoundland. The company is 100% Canadian owned. It is affiliated with F G Bercha and Associates Ltd, a Canadian consulting company.

Capability: The company specializes in providing an integrated remote-sensing service. It owns and operates a Gulfstream G-1 aircraft equipped with a side-looking airborne radar of the APS-94D type, as well as, an assortment of other sensors including RC-8 cameras, multispectral camera, thermal scanner, and magnetometer. The side-looking radar is of aerospace technology caliber, and includes both analog and digital output. It is capable of storing the digital output for subsequent digital interpretation. The hardware system is the only one of its type in the world, as such, MARS possesses a unique capability in terms of hardware. In addition, the MARS approach to integrated remote sensing, providing a useful information product, has made it well known for its capability in solving information related remote-sensing problems through judicious design, execution, interpretation, and analysis of remote-sensing program images. The company has over five years real time airborne operational support experience in ice populated waters, both in the Beaufort Sea and Hibernia/Grand Banks area.

Average Work Force: Total - 20 (including executive, engineering staff, aircrew, mechanics, radar engineers, sensor technicians and support staff).

Gross Sales: 1984 - \$2.0M
1985 - \$2.0M

Plant Size: Office Space - 2,500 sq ft
Industrial Space - 3,000 sq ft
Additional space is leased for aircraft maintenance, electronic shops and general operations.

Equipment: Grumman G-1 aircraft with APS/94D SLAR; RC-8 and I²S MS cameras; and TIR scanner constitute a unique commercial multi-sensor package.

Experience: The company has carried out work for most of the major US oil companies, including Exxon, ARCO, Amoco, Mobil, Chevron, Sohio, and Phillips, as well as selected projects for Burlington Northern and a number of mining companies. Its principal clients in Canada constitute the Federal Government, Dome Petroleum, Petro-Canada, Gulf Canada Resources, Husky-Bow Valley, and Mobil Canada. Internationally, the company has completed data acquisition in Australia, Fiji, Papua New Guinea, and Indonesia.

Keywords: Remote Sensing; Airborne Surveys; Environmental Analysis; Mapping.

Revised: Sep 85

MBB HELICOPTER CANADA Ltd

Code: MBB

Address: 130 Albert St, Suite #910
Ottawa, Ontario, Canada K1P 5G4

Contact: Mr. E James Grant, VP, Marketing - (613) 232-1557

History: MBB Helicopter Canada Ltd is a subsidiary of Messerschmitt-Bolkow-Blohm GmbH, the largest aerospace company in West Germany. MBB of Germany is no stranger to international programs; in addition to programs such as Airbus, Tornado, satellites, space labs and high-speed ground transportation, MBB is also involved in cooperative production programs in Canada, Spain, India, Indonesia and Japan.

Since incorporation in April 1984, MBB Helicopter Canada Ltd has been leasing space from Fleet Aerospace, a 5% shareholder in this Canadian joint venture. On 15 July 1985, MBB Helicopter Canada Ltd broke ground for their manufacturing facility in Fort Erie, Ontario. MBB Helicopter Canada Ltd has the world product mandate for manufacturing the BO 105 LS, a multi-purpose, lightweight, twin-engine helicopter, the latest in the MBB family of helicopters, designed especially for hot-temperature and high-altitude operations.

Capability: MBB Helicopter Canada Ltd is primarily responsible for all activities essential to the establishment of a modern helicopter facility, including research and development, assembly and flight testing.

Its capacities and capabilities will be expanded to meet the requirements of Canadian and world markets. The new facility will be scaled to satisfy initial production requirements, but will be designed so that it can be expanded readily. The helicopter manufacturing plant will facilitate approximately 30 helicopters in various stages of completion.

MBB Helicopter Canada Ltd has established a marketing office in Ottawa, Ontario, responsible for the domestic marketing of not only the BO 105 LS, but all MBB products, including the BO 105 CBS and the larger BK 117.

Average Work Force: Senior Management - 3
Engineers - 23
Quality Control - 4
Production Planning - 28
Others - 12

Gross Sales: 1985 - \$7.0M

Plant Size: 85,000 sq ft

Equipment: Complete helicopter manufacturing facility.

Experience: Projects include Airbus, Tornado, Satellites, Space Labs, and High-speed Ground Transportation. Cooperative Production Programs with Canada, Japan, India, Indonesia and Spain. Customers include Canadian Coast Guard, ALC Airlift Corporation, EXPO '86, Dome Petroleum, and Okanagan Helicopters.

Keywords: Helicopters; BO 105 Helicopter; BK 117 Helicopter.

Revised: Aug 85

McDONNELL DOUGLAS CANADA Ltd

Code: MDC

Address: Box 6013 Toronto AMF, Ontario, Canada L5P 1B7

Contact: Mr. Garret G Ackerson, VP & General Manager - (416) 677-4341

History: McDonnell Douglas Canada Ltd (MDCAN), a wholly owned subsidiary of McDonnell Douglas Corp, St Louis, MO, was federally chartered in Jul 64 to manufacture aircraft and other aerospace products. The plant and head offices are located adjoining the Toronto International Airport.

Capability: MDCAN is a fully-integrated high technology manufacturer of major airframe structural components for both commercial and military jet aircraft. Capabilities include design assist for major components and full management and implementation of tooling concepts, and design and manufacture for McDonnell Douglas DC-8, DC-9/MD-80 and DC-10/KC-10 aircraft. On these programs, MDCAN has total project management responsibility, including material and subcontract management. MDCAN has been a pioneer in manufacturing methods and equipment development, including substantial application of numerically controlled machines. Extensive work also has been done in the area of bonded metal components, automated machine controlled drilling and riveting and milling of spars of extended length components.

MDCAN is a leader in the design and implementation of integrated computer-assisted Management Systems in the ongoing development of Information Resource Management.

Average Work Force: Engineers - 66
Machinists - 827
Tool Makers - 215
Others - 2992

Gross Sales: 1981 - \$226.5M
1982 - \$150.5M

Plant Size: 1,780,000 sq ft

Equipment: MDCAN's equipment is progressively updated to state-of-the-art with the result that MDCAN is a leader in computer aided manufacturing in the Canadian aircraft industry. The equipment used at MDCAN is that of a well-equipped airframe manufacturing facility producing large sophisticated airframe components such as MD-80 and KC-10 wings. Special equipment includes:

Automated Hydraulic Powered Riveters - five 100' long machines; two 50' long machines.

Numerical Control Equipment - 51 mills and profilers; 2 lathes; 1 coordinate measuring machine; 1 digitizer plotter, and 2 tube benders.

Computing Equipment - 2 IBM 4341/(2); 2 DEC PDP11/70; 1 DEC VAX; and 2 Perkin Elmer 3250.

Hydraulic Presses - 6 vertical and stretch form, up to 300 tons.

Other facilities include the Engineering Laboratory, heat treat, paint and process, and mechanized penetrant inspection units up to 100 feet in length.

Experience: Since 1965, MDCAN has produced major fuselage structures for the DC-8 and major wing and fuselage structures for all commercial and military versions of the DC-9/MD-80 family. MDCAN was also active in the design and development of the DC-10, leading to design and manufacture beginning in 1968 of detail and assembly tooling for the DC-10 wing. Production deliveries of DC-10/KC-10 components have continued uninterrupted since 1970, including several versions, both commercial and military. Tooling and production of FA-18 structural components was begun in 1982.

Keywords: Aircraft; Machining; Components; Structures; Composite/Fiberglass Components; Fuel Systems; Hydraulics; Wiring; Tubing; Bonded Components; Bonded Honeycomb Components; Extended Length; Forging; Heat Treat; Metalworking; Coating; Tooling Design & Fabrication.

Revised: Dec 83

M.E.L. DEFENSE SYSTEMS Ltd

Code: MEL

Address: 1 Iber Road, P. O. Box 90
Stittsville, Ontario, Canada K0A 3G0

Contact: Mr. William R Dawes, Dir, Marketing - (613) 836-6860

History: M.E.L. Defense Systems Ltd is a wholly-owned subsidiary of Philips Canada Ltd, established in 1982 as a Canadian electronic warfare systems company.

Capability: M.E.L. Defense Systems specializes in the design, engineering, development, manufacture and integration of sophisticated electronic warfare products and systems, and also provide engineering consulting and program management services. Capabilities include research and development, software design and development, and program generation activities. The M.E.L. Defense Systems' plant and laboratory facilities are security cleared to SECRET level, as are all personnel associated with our military EW products. As a member of the Philips Defense Control Systems Main Industry Group, M.E.L. Defense Systems has full access to the substantial research, engineering, production and marketing resources of the Philips Group of companies world-wide.

Average Work Force: PhD - 1
Engineers - 45
Others - 90

Gross Sales: 1984 - \$12.0M
1985 - \$23.5M

Plant Size: 45,000 sq ft

Equipment: Secure electronics assembly, integration and testing facility, 600 sq ft of TEMPEST shielded environment for support of EW research and development, software development and program generation activities, and in-house computer systems including DEC, VAX and micros.

Experience: M.E.L. Defense Systems' principal customer is Canadian Department of National Defense.

Keywords: Electronic Warfare; Electronic Support Measures; Electronic Counter-Measures; Program Management; System Integration; Secure; TEMPEST; Software Design & Development.

Revised: Aug 85

MENASCO AEROSPACE Ltd

Code: MAL

Address: 1400 South Service Road West
Oakville, Ontario, Canada L6L 5Y7

Contact: Mr. Eric Eriksmoen, VP, Marketing - (416) 827-7777

History: Menasco is a wholly owned subsidiary of Colt Inc (US) and was organized in 1971.

Capability: Menasco designs, develops, test, and manufactures fixed-wing aircraft and helicopter landing gear systems. Also included in this capability are electro-hydraulic and hydro-mechanical systems related to primary and secondary flight controls; fly-by-wire electro-hydraulic flight controls; ground steering, including steer-by-wire; aircraft hydraulic systems; variable wing and wing sweep actuation and machining of aircraft and helicopter components. They meet contractor and quality control standards as specified by FAA, DOT, MIL-Q-9858A, NPC-200, and DND 1015. Physical and environmental testing is accomplished with, among other facilities, two drop test towers which can also measure landing gear shimmy and steering characteristics. Brochures available upon request.

Average Work Force: Engineers - 53
Manufacturing - 197
Others - 188

Gross Sales: 1984 - \$40M
1985 - \$60M

Plant Size: 200,000 sq ft

Equipment: Complete physical and environmental testing laboratory for landing gear, flight controls and actuating devices, including facilities for vibration, structural, stress survey, fatigue testing, and full complement of NC equipment and a computerized production control system.

Experience: Menasco Canada has produced equipment for the following manufacturers and aircraft - Boeing (727, 737, 757, CH-47); Bell (YAH-63, XV-15); Canadair (CL-41, CL-84); deHavilland (DHC-4, DHC-5, DHC-7); Fairchild Republic (A-10); Fokker (F-28); General Dynamics (F-111); Lockheed (C-141, C-5A,B); McDonnell Douglas (DC-10); Short Bros (SD3-30); and Sikorsky (CH-53). Program and facilities have been approved by major military prime contractors and government agencies in the US and Canada.

Keywords: Landing Gear Components; Landing Gears; Helicopter Systems; Flight Control Systems; Control Systems; Hydraulics; Ground Steering Systems; Wing Actuation Systems; Aircraft Components.

Revised: Oct 85

MICRO-FUTURES RESEARCH GROUP

Code: MFR

Address: 308, 902 - 11th Avenue, SW
Calgary, Alberta, Canada T2R 0E7

Contact: Mr. Jack Campbell, Mgr, Interactive Projects - (403) 229-0424

History: Micro-Futures was created to meet the rapidly growing demand for interactive videodisc products. The company was incorporated in 1983 in the Province of Alberta, and has offices in Ottawa and Toronto.

Capability: Micro-Futures is a high-technology company engaged in the research and development of interactive laserdisc technology. They are primarily involved in the design of interactive videodisc training programs which incorporate the ability to utilize sophisticated aircraft and military simulations.

Average Work Force: Total - 12

Gross Sales: \$1.5M

Plant Size: 4,000 sq ft

Equipment: The equipment presently in use at Micro-Futures consists of the MicroMax II and IBM compatibles with programming capabilities in "c" language, UNIX and MS-DOS. A Sony Frame Creator-FCS1000 is used to create videotex screens.

Keywords: Software; Software Design; Software Development; Software Documentation; Software Engineering; Software Maintenance; Training; Training Aids; Training Simulators; Training Systems; Video Disks; Video Systems; Videotex (Telidon).

Revised: Sep 85

MICROTEL Ltd Manutronics Division

Code: MAN

Address: 100 Strowger Blvd
Brockville, Ontario, Canada K6V 5W8

Contact: Mr. B W Tekamp, Marketing & Sales Manager - (613) 342-6621

History: In 1980, the Manutronics Division of Microtel Ltd, a Canadian owned company, was established to market custom electronic manufacturing services. A percentage of the total resources currently available to Manutronics will be expanded to meet future needs. Microtel, Canada's second largest manufacturer of telecommunications equipment is a wholly owned subsidiary of British Columbia Telephone Company.

Capability: Microtel's resources are available in the areas of PCB blank designs, layout & fabrication, PWC assembly & test, automatic backplane wiring, computerized wire verification, hybrid circuit assembly & test, and complete product development and assembly, etc. Manutronics offers Microtel's production expertise and facilities on a contract basis to industry to meet specialized needs such as military standards P-55110 and MIL I-45208.

Average Work Force: Total - 3000

Gross Sales: 1984 - \$14M
1985 - \$32M

Plant Size: (3 Locations)

Brockville, Ontario - 500,000 sq ft
Burnaby, British Columbia - 154,000 sq ft
Saskatoon, Sask - 47,000 sq ft

Equipment: Equipment includes - surface mount component technology, Gardner Denver horizontal wiring, Hughes high voltage fact test, Diacro computerized sheet metal fabricator, and state-of-the-art electronic testing equipment (GenRad, ATS-960, DAR).

Keywords: Electronics; Machining; Fabrication/Assembly/Test; PC Boards; Automated Backplane Wiring; Printed Wiring Card; Sheet Metal; Hybrid Assembly; Plastic Molding; Relays; Coils; Custom Design & Development.

Revised: Aug 85

MIL-COM TECHNOLOGIES Inc

Code: MTI

Address: 480 Dutton Drive
Waterloo, Ontario, Canada N2L 4C6

Contact: Mr W Doug Byam, President - (519) 885-3123

History: Incorporated in 1982, Mil-Com was formed as a result of a decision by Uniroyal Ltd to cease production of its military-related products at its Kitchener textile plant. A renewed demand for these products prompted W Douglas Byam, formerly of Uniroyal, to resume production under Mil-Com, with the guidance of Board Chairman, Maj Gen Richard H Rohmer (Ret).

Capability: Mil-Com Technologies Inc have expertise in coating fabrics (Nylon, Dacron, Cotton, etc) with rubber, polyurethane, etc, to exacting military specifications. From the coated fabrics, Mil-Com produce inflatable products from military air mattresses to positive pressure chemical protective surgery rooms for military field hospitals. All products are quality assured and inspected to NATO AQAP-4.

Average Work Force: Management - 2
Production - 10

Gross Sales: 1984 - \$687K
1985 - \$725K (Est'd)

Plant Size: 8,800 sq ft

Equipment: Equipment includes Doubler, Duster, Molding Press, Scott Tensile Tester, Eyelet and Dome Insertion Machines, various submersion tanks, and two knife-over-roll Spread Coaters with a double side immersion tank for each.

Experience: Present customers include the Canadian Defense Department, NATO Supply Center, the Federal Republic of Germany, Dornier GMBH, Canadair Ltd, deHavilland Aircraft, and the Canadian Ministry of Environment.

Keywords: Coated Fabrics; Inflatable Products; Cold Weather Coated Fabrics; Inflatable Hanger.

Revised: Nov 85

MILLER COMMUNICATIONS SYSTEMS Ltd

Code: MCS

Address: 300 Legget Drive
Kanata, Ontario, Canada K2K 1Y5

Contact: Mr. Allan Miller, President - (613) 592-3020

History: Miller Communications is a wholly Canadian-owned company founded in 1974 with no US subsidiaries. It is primarily a systems engineering company specializing in the planning, design, and implementation of a wide range of communication systems.

Capability: MCS designs and manufactures advanced communications systems and equipment for both military and commercial applications. The company is structured into three complementary divisions as follows:

- The Advanced Systems Division performs design studies, analyses and simulations, principally in the fields of communications, and electronic warfare. Custom software and hardware is also developed to the level of full-scale prototype to prove concepts and demonstrate performance. Particular expertise exists in digital modulation and coding, spread spectrum techniques, channel modelling and propagation analysis, emitter location and identification, spectrum analyzing receivers, fixed/mobile satellite system design, satellite navigation and positioning, and interference effects analysis.

- The Monitoring Systems Division produces computer-controlled instrumentation for communications monitoring, research, and simulation. Defense-related products include a Communications ECM Simulator, which allows the evaluation of communications systems performance under

jamming conditions, and an Adaptive Antenna Array Processor, which automatically synthesizes appropriate antenna patterns to reject interference and jamming. Products with both commercial and military applications include systems for spectrum surveillance, satellite monitoring, and satellite-mobile propagation simulation.

- The Telemetry Systems Division produces data downlink systems designed to transmit high speed information such as digitized SLAR radar video in real time from an aircraft to a ship or ground station. Radar images from the aircraft can be received, stored and reproduced in hard-copy form on board the ship. Applications for the system include coastal surveillance and ice reconnaissance. Related data downlink system products include a high resolution airborne data acquisition system which permits video information such as SLAR and SAR to be stored on a 9 track tape recorder for offline processing and an aircraft motion compensation system which corrects aircraft imagery for yaw and drift angle motion.

Average Work Force: Engineers/Computer Scientists - 25 +
Total - 35 +

Gross Sales: 1984 - \$2.4M
1985 - \$2.8M

Plant Size: MCS is housed in a modern 15,000 sq ft plant (expandable to 40,000 sq ft on current site). The plant is well equipped with a variety of computers, test equipment and production equipment.

Keywords: Communications; Radar; Ground Stations; Navigation; Radio Communications; HF Communications; Data Acquisition; Data Processing; Communications; Test Equipment; Test Instrumentation; Signal Processing; Satellite Communications; Adaptive Receivers; Modems; Digital Modems; Signal Identification Systems; Electronic Warfare; Telecommunications; Terminals; Synthesizers; HF Modems; HF Adaptive Antenna Arrays; Spread Spectrum Modems; Communications Simulators; R&O (Electronics); Automated Monitoring & Control Systems; Digital Communications; SCPC; DAMA; TDMA; SSMA; Voice Privacy Communications; Jamming; Build To Print; System Design; Spectrum Analysis; UHF & S-Band Telemetry Transmitters.

Revised: Oct 85

MONTREAL PRECISION CRAFTING Ltd

Code: MPC

Address: 797 Lajoie
Dorval, Quebec, Canada H9P 1G7

Contact: Mr. Neville Carter, Controller - (514) 636-0823

History: Montreal Precision Crafting Ltd is a Canadian-owned machine shop that performs both industrial and aircraft machine work. It has been in existence since 1969.

Capability: Montreal Precision Crafting Ltd performs highly technical work and designing for all types of commercial and aircraft work. MPC is engaged in all types of manufacturing and designing.

Average Work Force: Management - 3
Others - 15

Gross Sales: 1984 - \$360K
1985 - \$420K

Plant Size: 5,000 sq ft

Equipment: \$100K and more of standard machine shop equipment including lathes, milling machines, and drill presses

Experience: Montreal Precision Crafting Ltd's customers include Pratt & Whitney (United Aircraft), Noranda Research, Bell Canada, Canadian Explosives, Canadian Industries, Proctor & Gamble, Noram Quality Controls, Avon Products, Beloit Canada, McGill University and Northern Telecom.

Keywords: Machining; Precision Machining.

Revised: Sep 85

MPB TECHNOLOGIES Inc

Code: MPB

Address: 1725 N Service Road, Trans Canada Highway
Dorval, Quebec, Canada H9P 1J1

Contact: Dr M P Bachynski, President - (514) 683-1490

History: MPB is a Canadian owned high technology company that was incorporated in 1976. It is a spin-off from RCA Ltd. There are no other locations in Canada and no US subsidiaries.

Capability: MPB occupies a modern 18,000 sq ft facility which includes a library, central computer room, machine shop, laboratories and production area. They are fully facilitated to conduct experimental, theoretical, and developmental work in a variety of fields. These include lasers, electromagnetics and radars, digital electronics, and instrumentation.

Laser work includes the design and development of CO₂ continuous wave lasers (1-20 watt range, > 10,000 hours lifetime, sealed off) and CO₂ waveguide lasers with wide band width and good tunability (sealed off, 10,000 hours lifetime). They have a capability with iodine lasers in conjunction with mode locking experiments, and have conducted laser spectroscopic studies. They have also been involved with heterodyne detection techniques in conjunction with optical fiber hydrophones that can measure 1/500 of a fringe (phase shift: 360/500°). A program is in place for the development of far infrared lasers, a FIR heterodyne receiver breadboard, and the construction of advanced FIR detector packages including reflector mounts. They are involved in a program on the application of lasers to satellite communications (MILSATCOM) and have developed a laser communications test bed and propagation measurement facility for a Canadian Government laboratory. Current work involves development of a 1GHz bandwidth communications system based on solid state lasers, and waveguide lasers with ceramic envelopes.

In the area of electromagnetics and radar technology, MPB has carried out research with synthetic pulse radar for airborne measurement of sea-ice thickness at VHF and UHF, and in the area of radar/chaff interaction from 8 to 80 GHz, target RCS enhancement and reduction at 6 to 18 GHz. They have been involved with communications analysis (cross polarization effects, earth and satellite communications), and mine detection using electromagnetic techniques and antenna research (wide-band VHF antennas). The company recently delivered an airborne C-band scatterometer for measurements of ice surface roughness and a 6 channel millimeter wave radiometer (from 20 to 60 GHz) for remote sensing of the atmosphere. The company is involved in projects related to target augmentation and to deployment of chaff including the NATO MACE Trials. In the digital electronics area, MPB has expertise in electronic graphics, displays, training systems, and graphic composition. They have also been involved with special purpose communication terminals (transcontinental telex operator communications) and special purpose data recorders (based on microprocessor technology).

In the area of instrumentation, MPB is involved with a Space Shuttle experiment (wave injection facility), where their main responsibility is the software for the control electronics, the system test equipment, the plasma preionization, diagnostic instrumentation - probes, lasers, microwave interferometry, and software development (controls and on-line data analysis).

MPB products include the VISTA 80 Graphics System, a versatile character generating system which utilizes a standard keyboard for message composition, and a magnetic diskette system for bulk storage of messages. The system is based on microprocessor technology. Primary use is for presenting alphanumeric information in news, weather, sports & election programs, and for titling & credits. The company recently introduced their VISTA 90 electronic graphics and composition system for applications to business and science. The system permits the composition of picture quality graphics by various input devices and hard copy through a choice of 35mm slides, printer, or video tape. Their laser communications system is capable of video, multiple voice channel, or high bit rate digital transmission. The system has a video signal to voice ratio greater than 60 dB and is immune to RF interference. They have made major sales to the US of their sealed-off CO₂ lasers that are long lived (greater than 38,000 hours) and have power ranges from 3 to 12 watts TEM⁰⁰ and 1 to 18 watts multimode. Suggested uses are optical communications, atmospheric research, spectroscopy, far infrared laser excitation, materials processing, surgery, etc. MPB has recently introduced a number of new laser products which include a 100 watt cw CO₂ laser, a low voltage mirror translator with control electronics and a low-cost closed-looped cooler for use with the family of CO₂ lasers. Their final product is a High Intensity Light Source. It is a long (450mm) self-starting vortex stabilized arc discharge. It has a continuous radiation spectrum, can be started instantaneously and can deliver a hundred times more light output than a high power mercury arc lamp light-head of comparable dimensions.

Average Work Force: PhDs - 20
Engs - 20
Others - 20

Gross Sales: 1984 - \$4.0M
1985 - \$5.0M

Plant Size: 18,000 sq ft

Equipment: Equipment includes hydrogen oven for high temperature ceramic band seals; Tempest secure computer room; and millimeter wave instrumentation to 140 GHz.

Experience: MPB's typical clients include the Canadian Government (Dept of National Defense, Communications Research Center, National Research Council), AFOSR, CBC, SPAR Aerospace Ltd, Telesat Corp, Teleglobe Canada, plus others. Recent US customers have included the Department of Energy (Nevada Div), Hughes Aircraft, RCA Astroelectronics, and National Oceans & Atmospheric Administration.

Keywords: Electronics; Lasers; Radar; Instrumentation; Continuous Wave Lasers; Waveguide Lasers; Iodine Lasers; Far Infrared; Synthetic Pulsed Radar; Communications Analysis; Antennas; Pollution Sensing & Analysis; Graphics; Displays; Training Systems; Satellite Communications; Laser Communications; CO₂ Lasers; Sealed-Off Lasers; High Intensity Light Source; Arc Lamps; Trace Gas Detection; Hazardous Gas Detection; Electromagnetics; Continuous Wave CO₂.

Revised: Sep 85

MUIRHEAD SYSTEMS Ltd

Code: MSL

Address: 50 Galaxy Blvd, Unit #4
Rexdale, Ontario, Canada M9W 4Y5

Contact: Mr. J B Crampton, General Manager - (416) 675-7450

History: Muirhead Systems is a wholly owned subsidiary of the UK based company, Muirhead plc. The Canadian subsidiary was founded in Canada in 1954. The company has a sister subsidiary located in Mountainside, NJ.

Capability: Muirhead Systems has a world product mandate to design and manufacture computer based image processing systems for applications primarily in meteorological satellite imagery, newspaper wirephoto and law enforcement finger print transmission. Additionally, the company designs and manufactures computer interfaces and graphical data distribution systems for meteorological applications such as satellite imagery, weather charts and precipitation radar.

Muirhead has developmental and design expertise in both software and hardware for image processing, data management, video display and graphical data distribution. These systems are currently in service with the Atmospheric Environment Service Canada, the Canadian Coast Guard and the Department of National Defense for their weather forecasting facilities.

Average Work Force: Graduate Engineers - 5
Technologists - 5
Others - 10

Gross Sales: 1984 - \$2.3M
1985 - \$2.5M (Est'd)

Plant Size: 7,000 sq ft

Equipment: Muirhead employs digital electronics design and assembly facilities, microcomputer software development systems, and in-house DEC computer systems.

Experience: Muirhead's customer base includes the Atmospheric Environment Service and several other meteorological agencies around the world. Their military customer base includes the USAF - who has taken delivery of a computer interface for processing of GOES Satellite Imagery. Customers for relevant products include - Atmospheric Environment Service, Department of National Defense, Canadian Coast Guard, Ministry of Defense (UK) Meteorological, Danish Meteorological Institute, USAF (Vandenberg AFB, CA), World Meteorological Agency, Italian Air Force, Israeli Air Force, and Federal Aviation Authority.

Keywords: Image Processing Systems; Graphical Data Distribution Systems; Data Management; Video Display; Weather Forecasting Systems; Radar Rain Forecasting.

Revised: Aug 85

MYRIAS RESEARCH Corp

Code: MRC

Address: 10328 - 81st Ave, #200
Edmonton, Alberta, Canada T6E 1X2

Contact: Dr Martin Walker, Dir of Applications Research -
(403) 432-1616

History: Myrias Research Corp is a Canadian owned corporation established in 1982 to design, manufacture and sell computer hardware and software for high-speed parallel computing.

Capability: Myrias Research Corp is developing a very high speed parallel computing system. The minimal configuration has over 4000 microprocessors (Motorola 68000's) and 2 GBytes of memory. It is from 2 to well over 10 times faster than a Cray 1. For many defense applications such as transonic shock and multidimensional flows, and scalar problems such as ray tracing (for sonar analysis), the higher speed range is applicable. For problems which can be done in fixed point arithmetic, such as signal processing and flight simulation, the Myrias 4000 is up to 50 times faster than a Cray 1. The Myrias 4000 has the first truly expandable computer architecture. Up to 16 times the minimal configuration can be configured to meet much higher speed and larger memory requirements.

Component failures within the Myrias system are handled by high-level recovery strategies. The failure recovery mechanism ensures the system will not go down.

Myrias parallel Fortran makes the Myrias 4000 very easy to program. Existing Fortran 77 programs can be run with little or no modification. The Myrias 4000 is physically small and consumes little power, so no elaborate cooling system or other expensive support is required. The architecture of the Myrias 4000 enables system performance to be improved as the microprocessors on which it is based become faster and more capable.

Average Work Force: PhD - 5
MSc - 6
Engineers - 2
Others - 23

Gross Sales: No Data

Plant Size: 10,000 sq ft (under construction)

Equipment: Complete digital electronics laboratory and facility. In-house tandem VAX 11/750s.

Keywords: Computers; Reservoir Modelling; Meteorology; Cryptography; Cartography Processing & Database; VLSI Simulation; Distributed Processing; Rational Drug Design; Quantum Chemical Modelling; Parallel Processing; Computers (Parallel).

Revised: Aug 85

NAVAIR Limited

Code: NAV

Address: 2450 Derry Rd East, Hangar #2
Mississauga, Ontario, Canada L4T 3B6

Contact: Mr. Terry Malone, Marketing Manager - (416) 676-4150

History: Navair Limited is a Canadian-owned manufacturer and distributor of avionics oriented electronics equipment. Formally incorporated as NAVAIR LIMITED in 1971, the company was originally established as the Field Aviation Avionics Division in 1959, and has a long history of service to both the North American and overseas aircraft industry from its base at the Lester B Pearson International Airport in Canada. A subsidiary company, IRIS AEROSPACE PRODUCTS Limited, is also based at the Mississauga facility.

Capability: Navair Limited has four distinct spheres of operation:

- Avionics sales, installations, repairs and overhaul. Avionics installations are performed in all types of aircraft, including survey and reconnaissance aircraft; piston-engined, turbine and jet aircraft; military and government aircraft such as the Lockheed C-130 and Electra L-188; de Havilland DHC-5D Buffalo and DHC-6 Twin Otter; Conquest 540; and Grumman GI (Commercial). The repair and overhaul section has a full range of facilities and fully qualified personnel for servicing the most sophisticated avionics systems.

- Test equipment sales, repair, overhaul and re-calibration for the Avionics and telecommunications industry are performed at the Navair facility.

- Design, manufacture and sales of Automatic Test Equipment (ATE) for the aviation industry. This includes custom software design for specific customer requirements.

- Preparation and instructing of training programs in avionics and aircraft systems to all levels. This includes the design and supply of "turnkey" workshop facilities for customers in various parts of the world.

Navair Limited operates under strict quality control procedures and is a designated approved company by the Canadian Ministry of Transport (MOT Approval No. 13-74). It is also authorized to certify avionics installations and modifications (including structural modification) up to and including BOEING 727 and 737.

Average Work Force: 42 (with additional contract personnel as required)

Gross Sales: 1984 - \$5.5M
1985 - \$6.6M

Plant Size: 7,500 sq ft (Office and service facilities)
6,000 sq ft (Hangar space)

Equipment: Full complement of test equipment for full-range avionics repair and overhaul; complete design and manufacturing facilities for ATE; in-house custom software design; hangaring and aircraft storage facilities for most aircraft; engineering and drafting departments; and class rooms and equipment (including audio-visual) for training programs.

Experience: Present customers include various departments in the Canadian Government such as Transport Canada, National Defense, Coast Guard, and The de Havilland Aircraft Company Ltd. Navair Limited is interested in doing business with the USAF.

Keywords: Installations (Avionics); Automatic Test Equipment (ATE); R&O (Avionics); Custom Software (ATE); Telecommunications Test Equipment; Training; Training Systems; Training (Audio-Visual).

Revised: Oct 18

NORTHERN AIRBORNE TECHNOLOGY Ltd

Code: NAT

Address: 1839 1st Ave
Prince George, British Columbia, Canada V2L 2Y8

Contact: Mr. W Shawlee, President - (604) 562-2232

History: NAT was formed at the end of 1979 to design helicopter targeted, low-noise audio systems. The company's activities expanded into avionics service and installation, and eventually led to an extensive field service activity that covers aircraft worldwide. Manufacturing has expanded to cover a wide range of avionics products, and computer-based acquisition and monitoring systems.

An affiliated company, Arctic Data Corp (ADC), was formed in 1982 to address the complex computer activities NAT was beginning. This eventually led to a complete computerization of all company activities, installation of a CAD system, and extensive software development. ADC now markets its business software packages across Canada. Revenue is shown for NAT and combined NAT/ADC operations.

NAT currently markets its standard avionics products through a multi-national distribution network consisting of standard Aero International, Hawkins Avionics and EDMO. Custom products and other services are handled directly.

Capability: Northern Airborne Technology Ltd has R&D expertise in avionics, flight recorders, computer systems (airborne), lighted panels (LED/fiber optics), and visual information devices. Their avionics products include external/internal airborne sound systems, communication systems (intercomm, audio cont), and custom avionics control & interface systems, and airborne computer and data collection systems. NAT is qualified to MIL-I-45208A QA level.

Average Work Force: Management - 3
Engineering - 4
Production - 6
Field Support Staff - 2

Gross Sales:

	NAT	TOTAL
1984 -	\$ 56M	\$ 83M
1985 -	\$ 77M	\$ 90M

Plant Size: 7,100 sq ft

Equipment: Northern Airborne Technology Ltd's equipment include machine shop (metal and plastic), engraving shop, artwork studio, photo lab/photo fabrication lab, ship/size wiring harness production area (life size jigs for Bell 206, Aerospatiale, Astar, Twinstar), and assembly & testing equipment for avionics products for in-house or vendor produced equipment. Assembly includes wave soldering and vapor degreasing equipment, and the final avionics test lab is an MOT approved facility.

Experience: Listed below are clients of Northern Airborne Technology Ltd and status of their projects:

Client: Raytheon Co. **Target:** Design and build two eight-station status display systems for the PAVE PAWS Radar Installations in the US. **Completion:** Systems designed, built and delivered ahead of schedule and within budget. Acceptance tests passed for all components.

Client: Wulfsberg Electronics, Quebec Provincial Police, Ontario Provincial Police, Department of National Defense. **Target:** Design a portable clandestine wideband VHF FM communications system based on the RT7200/RT9600 transceiver core. **Completion:** Complete system designed and built incorporating a unique planar radiator antenna and all voltage switching power supply. The unit was indistinguishable from an ordinary briefcase in all aspects excluding weight, and was tremendously successful in extensive security agency field trials. On proof of concept, Wulfsberg has now offered the TC1 transit case as a standard product.

Client: Department of National Defense. **Target:** Redesign internal illumination of the C722/C962 FM control head to insure consistent performance with other cockpit lighting. **Completion:** Two step LED dimming circuit was modified to provide linear dimming while retaining correct daylight operation. Circuit redesign was simple and easily carried out by Department of National Defense as a field modification without major expense or rework. Adopted into all units in service.

Client: Canadian Coast Guard. **Target:** Provide a high capability audio inter-communication system for the SRN6/Search & Rescue Hovercraft that would interface fundamentally incompatible radios to standard headsets. Reliable multiple station intercom operation was required under extreme noise conditions. **Completion:** A modular, ultra-flexible audio system and interface were designed and installed in the SRN6. The resulting new performance levels and concepts now form the basic craft standards.

Client: National Research Council. **Target:** First hardware phase of the HSA70 Helicopter stress analyzer. The HSA70 is a self-adaptive micro-processor system that provides spoken advisory to helicopter pilots for accident avoidance. Flight date recorder capability via non-volatile storage is also scheduled. **Progress:** Initial hardware/software interaction underway, airframe interface circuitry designed.

Client: R&D. **Target:** Develop an all-attitude crashworthy ELT antenna system for helicopters. **Progress:** Planar antenna feasibility demonstrated, production techniques under consideration.

Client: Hughes Helicopters. **Target:** Design a technically improved, but harness compatible, audio controller to replace the C6533 Military Controller. **Progress:** Working prototypes of all functional blocks produced. Mechanical model demonstrated. Preproduction status at this time. Further research underway to demonstrate feasibility of all solid state 560 nM panel illumination to reduce interference with night vision systems.

Client: Ministry of Transport. **Target:** Flight test phase of HSA70 Stress Analyzer Aystem. **Progress:** Project underway and expected to be completed the first Quarter of 1986.

Northern Airborne Technology Ltd has also acted as technical advisor in the following projects and assignments:

- Feasibility of low cost computer interface for photogram-metric digitizer.
- Design of solid state control system for Vinten airborne camera.
- Theory proposal for remote real estate monitoring system.
- Theory proposal for computer monitored home and business security system.
- Design of new electrical system for the Canadian Coast Guard SAR Hovercraft.

Keywords: Audio; Cables; Clandestine Communications; Communications Systems; Computer Systems; Controls; Fiber Optics Illumination; Intercommunication Systems; Lighted Panels; LEDs; Noise; Night Vision; Panels; Photo-Fabrication; Speech; Stress Analyzer; Voice; Wiring; Helicopters; Instruments; Flight Recorder; Visual Information Devices; Voice Advisory Systems; Electrical System Solid State Systems; Antennas; Plastic Fabrication; Engraving; Harnesses; R&O (Avionics).

Revised: Aug 85

NORTHWEST INDUSTRIES Ltd

Code: NWI

Address: P. O. Box 9864
Edmonton International Airport Edmonton, Alberta,
Canada T5J 2T2

Contact: Mr. F A (Floyd) Maybee, Operations VP - (403) 955-6300

History: Northwest Industries Ltd, incorporated in 1943, is a subsidiary of CAE Industries Ltd, Toronto, Ontario, Canada.

Capability: Northwest Industries Ltd (NWI) is one of Canada's principal aircraft maintenance contractors experienced in the overhaul and modification of military and commercial aircraft, including CF-104 Starfighter, T-33 and CL-41 jet trainers and C-130 Hercules transports. The company provides a comprehensive aircraft maintenance service from minor inspection to major overhaul including nondestructive testing, airframe life extension and corrosion control, airframe parts and components manufacture, hydraulic, mechanical and electrical systems overhaul, lines and cable manufacture, electrical wiring fabrication, instrumentation repair and calibration, and avionic systems installation and integration.

NWI's Technical Publications group produces military and commercial manuals, technical orders and monification leaflets in direct support of the Company's aircraft modification programs or as separate publication contracts. Utilizing photography, typesetting, word processing and computer techniques, the group undertakes the technical writing and illustration of documents from raw data through to final text, artwork and printing.

NWI's manufacturing shops produce structural, mechanical and electronic components for its aircraft overhaul and modification programs and for supply, under subcontract, to North America's principal aerospace manufacturers. Components manufactured range from the floor assemblies and bulkheads of the wide body Lockheed L-1011 Tristar, the complete empennage of the Scottish Aviation Jetstream, and the center wings and aft fuselage of the Boeing 707 to composite fiberglass epoxy conditioned air ducts for the Lockheed L-1011 electronic component racks and miniaturized circuitry for Hughes Aircraft company and sophisticated mechanical cable assemblies incorporated in the Spar Aerospace remote manipulator arm of the NASA Space Shuttle

Average Work Force: Engineering - 15
P Eng (2)
Quality Control - 20
Production - 150
Admin & Other - 70

Gross Sales: 1984 - \$14.0M
1985 - \$13.0M

Plant Size: Edmonton Municipal Airport - 250,000 sq ft
Edmonton International Airport - 150,000 sq ft
(Modern hangars at the Edmonton International Airport accommodate aircraft to the size of the Boeing 747)

Equipment: Test and Inspection Equipment - avionics electronics; electrical hydraulics and mechanical test equipment; NDT radiographic; and ultrasonic and X-ray equipment.

Production Equipment - three axis, three spindle NC milling machines (25 ft x 8 ft); precision jig boring machine (98 in x 48 in table); drop hammer table (63' x 36"); rubber pad hydraulic forming press table (76 in x 76 in); hydraulic stretch wrap forming machine (20 tons); precision tube bender up to 3 1/2" OD capacity; cable swaging, splicing and proof loading; and heat treatment, cadmium plating, and anodizing.

Experience: Northwest Industries Ltd customers include, Government of Canada Department of National Defense, United States Air Force, Spar Aerospace, Lockheed California Co, Hughes Aircraft Co and other major aircraft manufacturers and operators. The company holds Canadian Department of National Defense Approval No. 686-1/44, Canadian Ministry of Transport Approval No. 3/57 and US Federal Manufacturers Code No. 35598.

Keywords: Structural Modification; Non Destructive Testing; X-Ray; Installations & Servicing; Instrument Repair; Instrument Servicing; Structural Components Manufacture; Flight Surface Manufacture; Tooling; Die Fabrication; Sheet Metal Fabrication; Fiberglass Composite Component Manufacture; Wiring Harness Fabrication; Control Cables Fabrication; Component Fabrication; Tubing Assembly Fabrication; Technical Publications Production; Technical Writing; Hydraulics; Technical Illustration; R&O (Aircraft); R&O (Avionics); Aircraft Components; Aircraft Structures.

Revised: Sep 85

ONTARIO HYDRO (Research Division)

Code: OHR

Address: 800 Kipling Avenue
Toronto, Ontario, Canada M8Z 5S4

Contact: Dr G R Floyd, Research Proposal Officer -
(416) 231-4111, X6322

History: Ontario Hydro was established by Provincial Legislation in 1906 and has the authority to generate, buy and distribute electricity throughout Ontario. The Research Division, which occupies the Dobson Research Laboratory was founded in 1912, and is one of the oldest and largest utility research laboratories on this Continent. Ontario Hydro is a financially self-sustaining Crown Corporation that derives no revenue from taxes.

Capability: The Research Division of Ontario Hydro is a fully integrated facility with a broad range of capabilities in research, development and testing. Extensive experience with solving utility-related problems has produced a staff with expertise in such areas as materials science, high voltage science and engineering, concrete technology, organic and inorganic chemistry, biology and geotechnical engineering to name a few. The keyword list gives a more detailed account of the Division's areas

OPTO-ELECTRONICS Inc

Code: OEI

Address: 2538 Speers Road, Units 8, 9, & 10
Oakville, Ontario, Canada L6L 5K9

Contact: Dr B K Garside, President - (416) 827-6214

History: Opto-Electronics is a high technology company incorporated in late 1976 with a newly opened subsidiary in the US (775 Main St, Unit #202, Buffalo, NY 14202, Telephone 216-856-1322). The company was formed with the primary goal of carrying out research, development, manufacturing, and marketing of high technology electro-optical components, devices, and instruments.

Capability: Opto-Electronics fields of expertise lie in the areas of industrial control instrumentation, fiber optic systems, optical communications, electro-optics & instrumentation, fast optical sources & detectors, high voltage pulse techniques, solid state electronics, laser devices, and sensors & transducers. Past year activities include new product development and manufacturing as well as contract research on special ultra-high speed photodetectors, ultra-high speed diode laser light sources, tunable infrared diode lasers, and a line of industrial electro-optical process monitors, controllers and sensors. The company has introduced an average of at least four products per year. Current research projects include ultra-fast photodetectors, ultra-fast laser diode sources, industrial monitors & controllers, fiber optic data and video links, passive waveguide splitters and combiners, an electronic streak camera, high-speed optical switches, fiber-based liquid sensors and infrared sources, and detectors based on lead salt materials.

Average Work Force: Scientists, Engs, & Techs - 16
Others - 8

Gross Sales: 1984 - \$1.56M
1985 - \$1.85M (Est'd)

Plant Size: 12,000 sq ft

Equipment: OEI's capability consists of a machine shop, assembly room, dark room, & circuit etching, electronics test & optics test areas, stock room, and shipping & receiving rooms. Five persons are currently assigned to manufacturing. Their R&D facility consists of lasers, optics, electronics & optics design, electronic assembly areas, a chemistry laboratory, materials processing room, areas of microscope & spectral analysis, vacuum work & measurement, and a high voltage shielded room. Also included are special rooms for furnace work, machining and modeling, and a library. The research staff consists of 5 PhDs; 3 MEngs; 2 MSc; and 2 BSc.

Major equipment includes high vacuum evaporator, electron microscope, cryogenic, electrical and optical facilities, spectrophotometer, ellipsometer, diffusion furnace, vacuum furnace, optical microscopes, multiple beam interferometer, electrometers, oscilloscopes, and other associated instruments.

Experience: OEI's experience has for the most part been with the Canadian Government. Most products are exported. They have expressed interest in doing business with the USAF, and have currently completed Phase I of contract work on liquid leak fiber optic sensors with NASA.

Keywords: Infrared Instrumentation; Industrial Control Instrumentation; Fiber Optic Systems; Optical Communications; Electro-Optics; Instrumentation; Fast Optical Sources; Fast Optical Detection; Detectors; High Voltage Pulse Techniques; Solid State Systems; Sensors; Transducers; Photodetectors; Laser Light Sources; Laser Diode Sources; Measurement Systems; Data Links; Infrared Diode Lasers; Optical Switches; IR Sources; IR Detectors Liquid Sensors.

Revised: Aug 85

OPTOTEK Ltd

Code: OPT

Address: 1283 Algoma Road
Ottawa, Ontario, Canada K1B 3W7

Contact: Dr David I Kennedy, President - (613) 746-3100

History: Optotek Ltd is a high technology company with no other divisions in Canada or the US. Optotek was incorporated in Oct 77 as a spin-off from Bowmar Canada Ltd, a Canadian subsidiary of Bowmar Instrument Corp.

Capability: Active - (1) Development and manufacture of LED materials and devices based on Group III-V and II-VI compounds, (2) design and manufacture of custom LED arrays for military and industrial applications, (3) design and manufacture of display-related electronic subsystems and test equipment, (4) design and manufacture of Gallium Arsenide field-effect transistors, and (5) design and manufacture of infrared photodetectors (Cadmium Mercury Telluride).

Development - Current LED displays, both monochromatic and multicolor, range in resolution from 25 to 1000 lines-per-inch. Diversification activities will encompass gallium arsenide field effect transistor and high-speed integrated circuit technology, as well as infrared photodetector technology based on cadmium mercury telluride.

Average Work Force: PhDs - 2
Engineers - 8

Gross Sales: No Data

Plant Size: 30,000 sq ft

Equipment: Optotek has a full complement of semiconductor processing equipment.

Experience: Optotek has experience with the USAF, USN and NASA. They are interested in continuing their business with the DOD and NASA. Past contracts have been in the LED materials, devices, and displays areas. Principal programs with the USAF have been the Multimode Matrix LED Display, the Video Flat-Panel LED Display, and the development of Multicolor LED Displays. The USN programs include manufacturing technology for advanced solid-state data annotation displays and a production program involving the RF-4 and P3 reconnaissance systems.

Keywords: Cockpit Displays; Infrared Instrumentation; Integrated High Density LED Displays; Solid State Devices; LED Materials; LED Arrays; FETs; Semiconductors; Display Technologies; Liquid Crystals; Electrochromic Technology; Flat Panel Displays; Multicolor LED Displays; Data Annotation Displays; Electronic Test Equipment.

Revised: Aug 85

PACIFIC MICROCIRCUITS Ltd

Code: PML

Address: 1645-140 St
White Rock, British Columbia, Canada V4A 4H1

Contact: Mr Philip D Stern, President - (604) 536-1886

History: Pacific Microcircuits is a new company incorporated in Apr 1982. It was set up as an affiliate of Mitel Corp for the sole purpose of integrated circuit design.

Capability: Pacific Microcircuits is a custom integrated circuit design group specializing in the design of CMOS circuitry. The company has the expertise and facilities to design digital and

analog CMOS circuits. Typical design activities include the development of integrated circuits from customer schematics or the development of new circuits to meet customer specifications. Pacific Microcircuits has experience in all aspects of design, testing, packaging, and manufacturing to ensure the success of the customer's circuits.

Average Work Force: Engineers - 4
Layout Designer - 1
Technologist - 1

Gross Sales: 1985 - \$1.0M

Plant Size: 4,400 sq ft

Equipment: Pacific Microcircuits employs a VAX 11/780 for circuit simulation, logic simulation, rules checks, schematic verification, and switched capacitor filter design; and a CALMA GSDII Color Graphics System for IC layout, design, digitizing, & editing, plotting, and schematic entry. Testing is done on a Hewlett-Packard 50 MHz system and automatic wafer probe equipment.

Experience: Pacific's clients include Mitel Corp and several small companies from British Columbia and California. Specific IC design experience of the company's engineers include telephony components, switched capacitor filters, DTMF receivers, modem design, CCD devices, and DSP devices.

Keywords: IC Design; Integrated Circuits; CMOS; Memory; ISO-CMOS(tm); Filters; Chips; Custom Chips; Analog; Analog/Digital.

Revised: Sep 85

PARAMAX ELECTRONICS Inc

Code: PEI

Address: 6111 Royalmount Avenue
Montreal, Quebec, Canada H4P 1K6

Contact: Mr. Jack Henry, Marketing Manager - (514) 340-8310

History: Paramax Electronics Inc is a wholly-owned subsidiary of Sperry Inc in Canada. The company was created following the granting by the Canadian Government of a \$2.6 billion contract to the St John Shipbuilding/Sperry Corp team for the building of six Canadian Patrol Frigates. Paramax's contract for designing, integrating, testing and installing the frigates's combat systems and other electronics is for \$1.25 billion. The company maintains a sales office in Ottawa at 141 Laurier Ave West, Suite #901. The point of contact there is Mr. William G Brown, Marketing Manager.

Capability: Systems management is the business of Paramax. It is a disciplined systematic process which begins with the analysis of a complex requirement, examines alternatives, selects candidate approaches, synthesizes the best answer and then implements the proper solution.

As the frigate project matures, Paramax engineers will develop independent expertise in systems integration and management. By the time the first frigate is delivered, in 1989, Paramax will be in a position to pursue new large-scale program management business on its own. This new business could include work on other naval vessels or systems integration work for commercial ships or oil and gas platforms, or other civilian uses, both in Canada and abroad, under a 25-year world mandate from Sperry Corporation.

Training is also one of Paramax's immediate duties. The realistic physical environment created at the Combat System Test and Support Facility will permit naval personnel to test and use the system over an extended period of time.

The significant advantage of the test concept is that the entire frigate system, including the computer software, can be tested

to its operational limits through simulation prior to its installation aboard ships. Similar testing is not feasible at sea, except in wartime, because of costs.

Average Work Force: 500 specialists in electrical, electronic and mechanical engineering and computer sciences.

Gross Sales: No Data

Plant Size: 150,000 sq ft

Keywords: Naval Combat Systems; Systems Integration; Training; Electronic Systems Design; Program Management.

Revised: Aug 85

PATLON AIRCRAFT & INDUSTRIES Ltd

Code: PAI

Address: 5502 Timberlea Blvd
Mississauga, Ontario, Canada L4W 2T7

Contact: Mr. P B Mann, President - (416) 624-5572

History: Patlon Aircraft & Industries Ltd has been in business for 30 years and is 100% Canadian owned. It was originally located at 74 Six Point Road, but moved to a much larger facility at its present address. It has a wholly owned subsidiary located in Miami, FL.

Capability: Patlon is an engineering sales, servicing and warehousing distributor servicing the total aircraft industry which includes the Canadian Government, Canadian Forces, airlines, private aircraft users and electronic and communication companies. Over its 30-year history, it has built up and currently maintains excellent business and personal relationships at all levels of the aforementioned areas.

Patlon maintains one of the largest master reference libraries in Canada which includes most of the military vehicles and equipment purchased in the free world. This capability enables us to cross reference products replacing specified materials and equipment with qualified products from multiple sources, usually at a lower cost. Patlon has been particularly successful in this area with the Canadian military, airframe and engine repair and overhaul depots.

Its selling procedure includes meeting with management, procurement, engineering, sales, service and manufacturing personnel, depending upon the product and customer requirements. With its knowledge of the industry and personnel involved, it has the opportunity of discussing projects at the drawing board stage, and in many cases, has been successful in having its equipment specified.

To summarize, Patlon provides both spare support service as well as product support at the original equipment manufacturer level.

Average Work Force: Management - 4
Support Staff - 6
Sales - 11

Gross Sales: No Data

Plant Size: 6,000 sq ft (Toronto, Canada)
2,500 sq ft (Miami, FL)

Equipment: Patlon is equipped with all the required communications equipment to conduct business around the world.

Experience: Patlon provides the services mentioned above to several other countries. The list of foreign countries which it has

sold to includes Germany, Turkey, Australia, Denmark, Indonesia, the US, and many South and Central American countries. The Miami office of Patton, which was opened in January 1980, has vastly improved Patton's ability to service both the South and Central American countries.

Keywords: Aircraft Parts; Parts; Library (Aircraft Parts); Reference Library (Aircraft Parts).

Revised: Aug 85

PERLEY TECHNOLOGIES CORPORATION

Code: PTC

Address: 35 Holiday Drive
Constance Bay, Ontario, Canada K0A 3M0

Contact: Mr. Daniel R Perley, President - (613) 832-3500

History: Perley Technologies Corp (PTC) is a highly specialized systems firm active in turnkey projects, consulting, and research in three areas - workplace technology, computer simulation, and emergency planning. Located in Ottawa-Carleton, the locus of Canada's high-technology industry, the firm possesses excellent working relationships with governmental agencies, hardware and software producers, and with other high technology firms. Original research and development activities undertaken allow PTC to extend the concept of 'office automation' to a much wider one which they identify as 'workplace technology'. PTC specializes in workplace decentralization and sells packaged systems for small multi-facility organizations. These systems include Mitel Kontakt workstations, and single and multi-user Digital microcomputers. PTC has implemented decentralized comprehensive consulting, planning, orientation and implementation support. Clients include small and medium-size business, government, and non-profit organizations.

In addition to proprietary workplace technology planning simulations, PTC designs and implements advanced computer simulations in such fields as transportation, communications and defense. PTC also offers an extensive range of capabilities in the application of computer systems technology to emergency planning/civil defense based on a proven record of project success. Specific products include the Emergency Information System (EIS) microcomputer software package for emergency planners and other emergency planning software which is sold on a turnkey basis with Digital microcomputers.

Capability: The simulation experience of Perley Technologies Corp principal consultants and associate consultants spans more than 25 years and the widest variety of civilian and military applications. Since the mid-1970s, a substantial number of professional papers and tutorials have been presented at simulation conferences and symposia throughout North America. It is thus possible for PTC to offer an extensive range of theoretical and practical experience in the application of simulation technology to a variety of fields. During the past five years, the use of computer simulation as a tool for training, planning and research has been extended to a large number of new application areas. In addition to providing proprietary and customized simulations for workplace technology projects, PTC conceptualizes, defines, designs and implements advanced computer simulations in the following areas:

- Air transport management and policy
- Air transport operations
- Surface transport management and policy
- Surface transport operations
- Inter-modal transport/energy modelling
- Military air-air and air-ground operational environments
- Communications system operations
- Emergency planning and civil defense
- Industrial emergency/security planning

In various other application areas, PTC consultants can quickly assess the feasibility and desirability of constructing simulations for training, research, strategic planning or other purposes. Such assessments include not only an estimation of the cost and quantitative benefits of the construction and use of a specific simulation, but also detail qualitative information as well.

The company is also the sole Canadian firm offering an extensive range of capabilities in the application of computer systems technology to emergency planning/civil defense based on a proven record of project success. Specific capabilities include:

- Feasibility and implementation studies of training, database, command and control, warning and other emergency planning systems.
- Critique of existing plans and procedures.
- Public participation coordination for emergency plan creation or revision.
- Creation or revision of computer systems and emergency procedures for use on industrial or military sites.
- Base warning system definition, design and implementation supervision.

Average Work Force: Consultant Level Personnel - 5/10
Associate & Staff Support - As required

Gross Sales: No Data

Equipment: PTC employs in-house computing resources including Digital and Mitel computer systems and executive workstations.

Experience: PTC's clients include various Canadian and foreign government agencies in the transportation, communications and defense fields, as well as emergency planning.

Keywords: Operational Simulation; Civil Reserve Air Fleet Simulation; Transportation Simulation; Communications Simulation; Defense Simulation; Simulation; Training; Computer Aided Learning; Site Or Regional Resource Databases; Regional Resource Databases; C3 System Definition; Warning System Definition & Design.

Revised: Sep 85

PHILIPS ELECTRONICS Ltd. (Quartz Crystal Department)

Code: PEL

Address: 601 Milner Avenue
Scarborough, Ontario, Canada M1B 1M8

Contact: Mr. Jack F Gehrels, Mgr, Crystal Department - (416) 292-5161

History: Philips Electronics Ltd is a Canadian member of the world-wide Philips federation of industries which started in 1891, and today employs more than 330,000 people in 65 countries. Philips Electronics has been manufacturing quartz crystals since 1949 for specific individual customer requirements.

In the early 1950s, it was realized that by removing the air or gas from the crystal housing the probability of contamination is greatly reduced and crystals with exceptional long term stability could be manufactured. A special process has been developed for sealing crystals in small glass holders.

Over the years, the stability requirements have increased and the processes have been improved and perfected. Glass enclosed crystals have been manufactured for military and commercial applications.

Philips also is a recognized supplier of metal enclosed crystals. These crystals are manufactured with the same rigid standards as the glass encapsulated devices. The crystal manufacturing facility is part of the large, 380,000 sq ft Philips complex in Toronto.

Capability: Our Glass enclosed crystals are ideally suited for Hi-Reliability Aerospace frequency control applications and have many advantages over cold welded metal encapsulated crystals:

- Frequency range 1.5 to 175 MHz.
- Hi-Rel – glass enclosed units.
- Mil approved in-plant test laboratory to MIL-C-45662.
- QPL approved types to MIL-C-3098.
- Fast delivery for prototypes and production quantities.
- Free application consulting services.
- Uncomprising quality standards.
- Automatic computerized test data available with each crystal.

Average Work Force: Engineers – 2
Others – 35

Gross Sales: \$2.0M

Plant Size: 8,000 sq ft (In company owned 360,000 sq ft Modern Bldg)

Equipment: Specialized computerized automatic equipment for manufacturing and testing of quartz crystals.

Experience: Our customer base includes the aerospace, marine, broadcast, navigation, communications and instrumentation industries. We are suppliers to commercial and military OEM's as well as the oscillator manufacturers. Major customers include Hughes Aircraft, Collins Rockwell, L M Ericsson, and Northern Telecom.

Keywords: Crystals (Quartz); Quartz Crystals; High Q Crystals; Frequency Control (Crystals).

Revised: Sep 85

PHOTOVAC Inc

Code: PHV

Address: 134 Doncaster Ave
Unit 2
Thornhill, Ontario, Canada L3T 1L3

Contact: Dr Richard C Leveson, President – (416) 881-8225

History: Incorporated in 1975; Canadian owned. Their US subsidiary, Photovac International Inc, is located in Long Island, NY.

Capability: Photovac's distinctive competence is in the ability to, (a) design and manufacture instrumentation for the detection and analysis of gaseous and vaporous contaminants in air, and in other gases, at extremely low concentration levels (parts per billion); and (b) to apply this instrumentation, together with technical knowledge, to specific R&D projects. This competence is broadly based in research, product development, systems engineering, and computer design (from scratch); and software development capabilities as these relate separately or in combination to photoionization gas chromatography technology. Photovac's particular technology strength is based on a newly-developed, ultra-sensitive photoionization system which overcomes problems previously experienced with this technique.

Average Work Force: PhDs – 3
Engineers – 5
Research Scientists – 10
Technicians – 8

Gross Sales: 1984 – \$2.0M
1985 – \$4.0M

Plant Size: 7,000 sq ft (Plus 1,000 sq ft in Long Island, NY)

Equipment: Photovac Inc's equipment capability is described below:

- Instrumentation for air and gas analysis of contaminants with sub part-per-billion detection capability.
- Available in field portable format including computer interpretation.
- Available for system installation to carry out multi-point, continuous, high-speed surveillance of air quality.
- Specialty equipment for investigating short wave-length, ultra-violet phenomena, specially related to gas analysis applications – vacuum UV monochromator system and mass spectrometer.
- Machine shop capability.

Experience: Photovac Inc has had experience with:

- Development of ultra-sensitive (sub ppb) detector for military applications (AGARD Proceedings #309 "Toxic Hazards in Aviation", B15-1, Sep 80).
- General Electric – continuous surveillance of arsine and phosphine in new Research Triangle Park facility.
- Research on preconcentration for ion mobility spectrometry relating to detection of explosive vapors in air at trace levels (Canadian Department of National Defense).
- Anticipated contract (sole source) from NASA for development of specialized breath analysis system for future Space Shuttle flight.
- Miscellaneous semi-formal projects and special assignments for EPA (US), Cal OSHA, USDA, US Gas Research Institute.

Keywords: Test Equipment (Environmental); Gas Chromatography; Air Analysis; Gas Analysis; Instrumentation (Air/Gas).

Revised: Oct 85

PRA INTERNATIONAL Inc

Code: PRA

Address: 45 Meg Drive
London, Ontario, Canada N6E 2V2

Contact: Dr R C Miller, Director of Marketing – (519) 686-2950

History: Photochemical Research was incorporated in mid-1976. It is a Canadian owned high technology company with a US sales office located in Oak Ridge, Tennessee.

Capability: PRA is involved in the design, development and manufacture of electro-optical instrumentation systems, specifically in light generation, detection and analysis. Their present product lines consist of luminescence decay systems for the reliable measurement of short lived fluorescence life times, pulsed light sources with pulse widths from picoseconds to seconds and spectral ranges from the VUV to the IR, CW light sources and a line of optical building blocks; Photon Counting Systems for low light level detection, and Nitrogen and Dye lasers. PRA is currently developing third generation spectroscopic analysis instrumentation. The latter is nearing market readiness.

In addition to manufacturing standard products, they possess research and laboratory facilities for custom manufacturing, contract research, and consulting. PRA operates on a worldwide basis through offices in Canada and the United States, and through distributor networks in Europe and the Far East.

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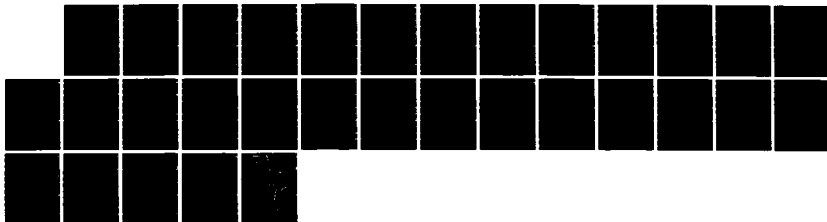
GUIDE TO CANADIAN AEROSPACE RELATED INDUSTRIES(U) AIR
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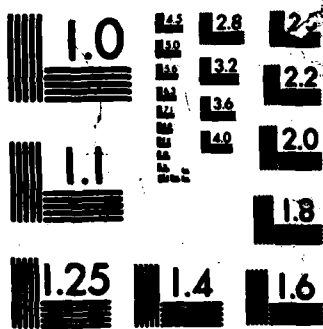
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MICROCOPY

CHART

Average Work Force: Scientists/Engineers - 15
Others - 40

Gross Sales: 1984 - \$3.0M
1985 - \$4.0M

Plant Size: 22,500 sq ft

Equipment: PRA Nitromite Lasers have set the standard for compact, reliable UV lasers. PRA Fluorescence Systems characterize short-lived transients in a variety of chemical/biological systems.

Experience: PRA has sold their off-the-shelf products to a variety of academic, industrial, and government research facilities including - Lawrence Livermore Laboratories, Oak Ridge National Laboratories, Los Alamos Scientific Laboratories, Solar Energy Research Institute, Exxon Research, Bell Laboratories, Western Electric, Eastman Kodak, and Wright-Patterson AFB, OH.

Keywords: Electro-Optical Instrumentation; Light Generation; Light Detection; Light Analysis; Luminescence Decay Systems; Pulsed Light Sources; Continuous Wave Light Sources; Optical Building Blocks; Photon Counting Systems; Spectroscopic Analysis Instrumentation; Nitrogen Lasers; Dye Lasers.

Revised: Aug 85

PRATT & WHITNEY CANADA Ltd

Code: PWC

Address: P. O. Box 10
Longueuil, Quebec, Canada J4K 4X9

Contact: Mr. S Monaghan, Chief R&D Support - (514) 647-7557

History: Established in 1928 as a Canadian center for the overhaul of Pratt & Whitney Aircraft radial piston engines, Pratt & Whitney Canada Ltd (P&WC) took over full responsibility for this function prior to moving into small gas turbine development and production. They are a wholly owned subsidiary of the Pratt & Whitney Aircraft Group, a division of United Technologies Corporation.

Capability: P&WC has the mandate to develop and produce all small gas turbine engines typically for general aviation, commuter and paramilitary use. Their primary business areas are:

- Small gas turbine engine development
- Small gas turbine engine production
- Small gas turbine engine oriented research

The development of gas turbine engines at P&WC started in the late 1950s with the early PT6. This turboprop engine was introduced to the commercial market in 1963. The military designation for this engine is the T74-CP-701. In 1979, the development started on the PW100 turboprop engine. This fuel efficient engine is used primarily in commuter and short-haul aircraft.

The JT15D turbofan engine was introduced in 1967. It is the power plant of the Cessna Citation corporate jet, as well as the Aero-spatiale Corvette and the Mitsubishi Diamond 1 aircraft. P&WC has also developed a twin turboshaft engine for helicopter use. These are designated the PT6T-3 and -6 series (military designation is T400-CP-400, -WV-402).

By 1984, the company had delivered 26,700 engines for the world market.

Average Work Force: Company Total - 7,932
R&D Center - 2,200

Gross Sales: 1984 - \$644M
1985 - \$730M (Est'd)

Plant Size: 1,809,640 sq ft (Total area)

Equipment: Equipment includes extensive manufacturing and R&D equipment and facilities for all aspects of small aviation gas turbines - test cells, spin pits, fatigue test facilities, metallurgical test facilities, gear test facilities, strain gauging/thermocouple applications, photoelasticity, acoustics, etc.

Experience: P&WC has had experience with the following organizations:

United States Air Force - (1) Research on High DN Value Roller Bearings - a program to determine the influence of geometric variable etc., on small high speed roller bearings (carried out as a shared development program); and (2) Alternate Fuels Combustion Research - an experimental study of the effects of alternate jet fuels on small gas turbine combustion systems (carried out as a shared development program).

United States Army - (1) Subcontractor in Cooled Radial Turbine Program to Pratt & Whitney, Government Products Division (GPD) (1969-1971). Pratt & Whitney Canada Ltd was responsible for the Aerodynamic design and participated in the structural analysis and mechanical design of the turbine; (2) Consultant to P&W, GPD, on ST9 1500 horsepower demonstrator program for new US Army helicopter engine - first stage was scaled P&WC research rotor and second stage was centrifugal compressor (1966-1969); (3) Consultant to P&W, GPD, for the demonstration of a 10:1 Pressure Ratio single centrifugal compressor - P&WC provided data from previous in-house demonstrations of 10:1 Pressure Ratio Compressors carried in 1967 & 1970 (1970-1972); and (4) P&WC is currently contracted with the US Army at Ft Eustis for a advanced 15:1 Pressure Ratio Single Centrifugal Compressor.

United States Navy - (1) P&WC was a subcontractor to P&W, Commercial Products Division (CPD), on a demonstration of a regenerative, small turboprop engine based on the PT6 - P&W designed the regenerator, while P&WC designed the ducting, organized hardware fabrication, and demonstrated the concept (1964-1966); (2) P&WC won a contract to provide a twinned helicopter engine (T400/402 Twin Pac R) to the US Navy for Bell Aerospace helicopters where 1032 units have been supplied - also 2218 units in a civil version (PT6T3/6) have been produced to date development of the engine is a continuous process and P&WC are performing component improvements through a US Navy contract (1969); and (3) P&WC has also performed as a subcontractor to P&W, CPD, on a demonstration of single crystal turbine blades for gas turbine operation.

Environmental Protection Agency - (1) P&WC carried out a combustion research program for small, single can, highly loaded combustors for automotive application with good performance and low emissions (1973-1974); (2) P&WC was subcontractor to United Technologies Research Center (UTRC) on a study of the automotive application of gas turbines carried out a series of cycle studies and supported experimental work on combustion (early 1970s); and (3) P&WC also supported the Environmental Protection Agency (EPA) (Triangle Park) on studies of the carcinogenic effect of small gas turbine emissions (1977-1978).

National Aeronautical Space Administration (NASA) - (1) P&WC was subcontractor to P&W, CPD, on a turbofan core noise program at Ames carried out on a NASA owned P&WC JT15D engine - P&WC designed and fabricated an alternate fan core stator to increase the axial spacing between rotor and stator, and the number of stator vanes (1977); (2) P&WC was subcontractor to P&W, CPD, on a program of nose cone telemetry for NASA Lewis Research Center as applied to a NASA JT15D turbofan - P&WC designed a transmitter to operate within the nose of a JT15D to study the difference between ground and flight noise measurements (1978-1980); (3) P&WC was also subcontractor to P&W, CPD, on a program to supply NASA Langley with copies of the telemetry units from item #2

for flight use with stringent manufacturing requirements (1979-1980); and (4) P&WC was also subcontractor to United Technologies Research Center on a Combustor soot program - all combustor hardware was designed and fabricated by P&WC, while United Technologies Research Center assembled the rig and carried out all testing (1980-1981).

Keywords: Small Gas Turbine Engines; Engines; Turbine Engines; Engine Components; Engine Systems; Fuel Systems Research; Alternate Fuels Research; Roller Bearings; Combustion Research; Fuels Research; Helicopter Systems; Auxiliary Power Units; Engine Research; Test Equipment Instrumentation; Engine Emission Research; R&O (Engines); Manufacture (GT Engines); Compressors (GT Engines); Gas Turbine Engines.

Revised: Sep 85

PRECITECH Ltd

Code: PTL

Address: 4150 Poirier Blvd
St Laurent, Quebec, Canada H4R 2A5

Contact: Mr. Alex Britto, Sales Manager - (514) 337-9732

History: Preci-Tech Ltd is a Canadian-owned precision machining company incorporated in 1955 under the name of Preci-Tools Ltd. The present name was adopted in 1978 in order to project a truer image of their capabilities in PRECISION machining TECHNOLOGY.

Capability: Preci-Tech Ltd is involved in the subcontract machining of precision machine components to customer specifications. In collaboration with the customer, they also engage in design, engineering, development and manufacture of advanced precision components. In addition, their association with a metal finishing facility enables them to provide the customer with a completely finished component, plated and/or painted to most military and industrial specifications. Processes available include - electroless nickel, silver, gold, copper, chromium, irridite, dichromate, passivation and chromic anodizing.

Average Work Force: Engineers - 2
Quality Control - 6
Design Engr - 2
Supervisory - 8
Production - 65
Staff - 12

Gross Sales: 1984 - \$3.5M
1985 - \$4.0M (Est'd)

Plant Size: 30,000 sq ft

Equipment: As assortment of conventional, NC and CNC equipment, supported by an MDSI 300 Compact II in-house mini-computer, with dual floppy disc, Hewlett Packard plotter, printer, tape reader, puncher, and CRT. A detailed facilities list is available on request.

Experience: Customer list includes - McDonnell Douglas Astronautics Corp (FL), International Laser Systems (FL), E.C.I. Div of E-Systems (FL), Pratt & Whitney Canada Ltd (Montreal), United States Surgical Corp (CT), and Rolls Royce Canada (Montreal)

Keywords: Machining; Precision Machining; Finishing.

Revised: Aug 85

PRESENTY ENGINEERING PRODUCTS Ltd

Code: PEP

Address: 2784 Fenton Road
Ottawa, Ontario, Canada K1G 3N3

Contact: Mr. R Cardis, Technical Commercial Director - (613) 822-1251

History: Presenty is a Canadian company incorporated in 1958 with no other Canadian branches or US subsidiaries.

Capability: Presenty engages as a prime contractor in a wide variety of activities including research, development, production, and consulting for both the military and private sectors. Over the years, the company has designed and produced an assortment of hardware items that include airborne voice recorders and ground based reproducers for the CF-104 aircraft, transmitter teletypewriter controls for shipboard use, low drift DC amplifiers, multi-channel memory/loop tape recorders for high performance jet aircraft, 14 channel FM/AM data recorder for high altitude research, magnetometers, proton magnetometers, dust monitoring systems, rocket subcommutator, an ASW sonobuoy antenna, plus other items. They designed and produced the first Canadian air pollution monitor which is installed at various locations in the Ottawa, Toronto and Montreal areas.

Presenty was awarded all the contracts of a bankrupt electronics firm by the Canadian Government. All those contracts were successfully completed. At least two USAF contracts, transistorized missile check cards and radar target simulators, were part of that deal.

Recent projects include the design and development of the signal patch panel systems for the latest Canadian destroyers and a 64-channel A/D converter/recorder system. They have also been active in the fields of airborne photogrammetry, navigation aids and airborne photography film annotation systems. Another in-house product is a brushless DC motor. It is a low cost, high quality, long life, self-contained compact unit to be used in new equipment designs as well as a replacement for brush type motors in existing equipment. Applications include magnetic tape recorders, reels and capstan drives, film transports in cameras, airborne instruments, chart recorders, printers, blowers and various operations in hostile environments. The company is reasonably self-sufficient. They are equipped to carry out electronics work as well as to design and machine parts, tools, jigs and dies for production of parts, stampings and molds. Production equipment is available for electronics and mechanical operations. They also have the capability to design silicone elastomer molds and have made considerable progress in epoxies processing.

Average Work Force: Total - 21

Gross Sales: 1984 - \$1.0M
1985 - \$1.5M

Plant Size: 10,000 sq ft

Equipment: The company maintains a manufacturing capability in the electronics and mechanical areas. They are equipped with a machine shop for normal operations. They can carry out heat treating, stamping, tool and die cutting, oxy-acetylene and electrical welding, and sheet metal operations. Limited environmental and vibration testing can be carried out.

Experience: Presenty has worked with the Canadian military and has had contracts with the USAF (AFLC). Currently they are under contract with the Canadian Forces to produce their brushless DC motor, and also to develop a brushless blower motor for use in land vehicles and in unattended locations. They have also developed a UHF power amplifier for man-pack radios in vehicle configuration. They have delivered to the Department of Transport 40 transmissometers to measure light transmissivity at airports. They are also building similar devices for the Canadian DND.

Keywords: Voice Recorders; Voice Reproducers; Ground Based Reproducers; Transmitter Teletypewriter Controls; Amplifiers; Tape Recorders; Data Recorder Systems; Magnetometers; Proton Magnetometers; Pollution Sensing; Antennas; Rocket Subcommutators; Converter/Recorders Systems; Photogrammetry.

Film Annotation Systems; Motors; Brushless DC Motors; Simulators; Magnetic Anomaly Detection; Test Equipment & Instrumentation; Environmental Analysis; Navigation; Target Simulators; Power Supplies; Flight Data Recorders; Instruments; Transmissometers.

Revised: Oct 85

PRIOR DATA SCIENCES Ltd

Code: PDS

Address: Bell Mews Plaza - Nepean
39 Highway 7
Ottawa, Ontario, Canada K2H 8R2

Contact: Mr. Jim McInnes, Program Manager, Military Systems
- (613) 820-7235

History: PRIOR Data Sciences Ltd was founded in early 1977 and has experienced steady growth to its current level of 80 employees (Oct 85). The company is Canadian owned and is located in Ottawa (Headquarters), Halifax and Toronto. There are no US subsidiaries.

Capability: PRIOR has capabilities in:

- "Turnkey" computer systems development for real-time applications
- All phases of software project development and life cycle support
- Software engineering consultation and contact support services
- Software product development and sales

Computer systems development may range from microprocessors to mainframes. In the industrial field, PRIOR has considerable experience with the DEC PDP-11 family of computers, the RSX-11M, RT-11 and UNIX operating systems, and the Pascal and C programming languages. In the military field, PRIOR has significant expertise with the UYK-20 and associated computers, and the CMS-2 and ADA programming languages. They have assumed responsibilities as a software subcontractor, and as a turnkey system developer.

PRIOR has participated in all phases of software project development. This experience includes:

- Research and Development
- Feasibility studies and requirements analysis
- Systems analysis, systems specification, and hardware procurement
- Proposal preparation and evaluation
- System design and detailed module design
- Module code and testing
- System integration
- Acceptance test plan preparation
- Software maintenance and enhancements

Software engineering consultation and contract support services can be provided for all of the above phases of software project development, from requirements analysis to software maintenance.

Average Work Force: Professionals - 75
Others - 5

Gross Sales: 1984 - \$3.4M
1985 - \$4.2M

Plant Size: 11,000 sq ft (Ottawa)
2,000 sq ft (Toronto)
1,000 sq ft (Halifax)

Equipment: DEC PDP-11/44, Perkin-Elmer 7/32, WICAT 68000, Micro VAX II, and PCs.

Experience: PRIOR has participated in the following military application areas, Command and Control; Anti-submarine Warfare (ASW); Communications; Surveillance; Graphics; and Simulation.

PRIOR has worked directly for DND or as a subcontractor on many of DND's recent major projects. These include NFA, CPF, AURORA, ADLIPS, CANEWS SHINCOM, MACs, and MCOIN II. PRIOR has successfully teamed with other members of Canadian industry such as Leigh Instruments, Litton Systems Canada Ltd, Westinghouse, and Rockwell.

In the area of military research and development, PRIOR has had a continuing involvement with projects at the Defense Research Establishment Ottawa and the Communications Research Center. These projects have been concerned with radar, direction finding, electronic warfare, countermeasures, analysis, navigation, graphics and simulation.

PRIOR's three major real-time application areas are the Military, Air Traffic Control, and Supervisory Control and Data Acquisition.

Sixty percent of the company's work is military-related. There has been no direct contact with the US military. All experience to date has been either with the Canadian Department of National Defense or as a subcontractor on a DND sponsored project.

Keywords: Communications; Software Services; Turnkey Computer Systems; Project Development; Life Cycle Support; Feasibility Studies; Requirements Analysis; Systems Analysis; Module Design; Hardware Procurement; C3 Systems; Surveillance; Graphics; Simulation; Consulting; Electronic Warfare; Radar; Communications; Computer Design; ATC; Data Acquisition; ASW; Computer Graphics; Computer Simulation; Software; Software Development.

Revised: Oct 85

PYLON ELECTRONIC DEVELOPMENT CO Ltd

Code: PED

Address: 147 Colonnade Road
Ottawa, Ontario, Canada K2E 7L9

Contact: Mr. H Laks, President - (613) 226-7920

History: The Pylon organization celebrated its first 30 years of business 21 Mar 85. Within two years of incorporation under Federal Charter in 1955, the company was manufacturing 20Hz Ringing Generators and static power conversion equipment. This was the outcome of an R&D program to develop a line of "solid state" products to replace rotary equipment. The term generator is still used to describe these products. The name most commonly used by domestic phone companies was "Pylons" regardless of the type of equipment.

The use of solid state ringing and power conversion in the US came several years later. Telcos were quick to see the advantage of using one central office battery and the conversion method with redundancy for high reliability. In Canada, Pylon is the major supplier of DC-DC Converters and ringing machines.

With the acquisition of Armtrout Ltd in 1970, Pylon entered into the manufacture of electronic switching equipment. A line of trunk concentrators of CAMA application and ROTS apparatus were introduced.

Manufacture of digital equipment began in 1965 with systems involving photoelectric badge readers. The first system formed the basis of data gathering systems for the Post Office. Pylon has supplied a vast range of specialized data equipment to customers in North America and overseas. Pylon offers a complete engineering support team from the system concept through to the end product.

In 1977, the company expanded by opening a division in Ottawa which specialized in the manufacture and development of instrumentation. The Toronto division was opened in the fall of 1979.

Due to the growth of the Pylon market, it was decided to build a new development plant in Ottawa and to relocate the Pylon Head Office on completion of this facility. A year later, this was accomplished.

The company holds 21 Canadian patents, 13 US patents, and 5 trade marks. Approximately 25% of all telecommunication equipment, and over 80% of the nuclear equipment is exported.

Capability: Both Montreal and Ottawa maintain an R&D and engineering group capable of developing new equipment. These facilities will undertake contract work in the area of their competence.

- Montreal Branch – Telco Products, Ringing Generators, Ringing Talk Signal Supplies, UPS Systems, CO Power Plants, Wide Area Alarm Systems, Electronic Switching Equipment, and Custom Transit Cases.

- Toronto Branch – Cables, Harnesses, and Custom Test Equipment.

- Ottawa Branch – Manufactures a line of Time Code Generators, Distribution Amplifiers, Satellite Ground Station Equipment, specialized equipment for DND, and nuclear monitoring equipment.

Average Work Force: Scientists/Engineers – 30
Others – 100

Gross Sales: 1984 – \$5M
1985 – \$7M (Est'd)

Plant Size: Montreal – 18,000 sq ft
Toronto – 5,000 sq ft
Ottawa – 16,000 sq ft

Experience: Canada – Department of National Defense, RCMP, National Research Council, Bell Canada, Telesat, Trans Canada Telephone System, Atomic Energy of Canada, CNCP Telecom, Northern Telecom Ltd; and in the US – Danray Inc, Northern Telecom Inc, Bell South Advanced Systems, Digital Communications Corp, Shell Oil Co Inc, Siecor Optical Cable, Tellabs Inc, ABC, NBC, CBS, and various bodies involved with Health Physics investigations. Other areas include Nuclear Instrumentation world-wide.

Keywords: Converters; Telephone; Uninterruptable Power Supplies; Electronic Telephone Switching Equipment; Ring; Talk and Signal Supplies; Loop Back Units; Telephone Rectifiers, Battery Chargers; Inverters; Wide Area Alarm Units; Satellite Ground Station Alarm Equipment; Time Code Generators; Code Converters & Displays; Nuclear Instrumentation; Radioactive Gas Generators; Instruments; Monitoring (Microprocessors-Based); EMI Hardened Equipment.

Revised: Aug 85

QUANTUM INSPECTION AND TESTING Ltd

Code: QIT

Address: 916 Gateway
Burlington, Ontario, Canada L7L 5K7

Contact: Mr. Wm I Marcovitch, President – (416) 632-5869

History: Established in 1968 as a firm of consulting engineers, Quantum has evolved into Canada's largest specialist independent professional quality services/surveillance and laboratory testing/inspection organization dedicated to the aerospace, defense and precision manufacturing sectors.

Quantum's Test Center and corporate headquarters are strategically located in a new facility in the hub of Canada's manufacturing/industrial heartland which also provides convenient access to the East and Midwest regions of the US market.

Capability: Quantum's product is Contract Quality Services and Expertise people, facilities and related capabilities. The company's broadly-based resources, experience and capabilities are geared to integrate on either a complementary and supplementary basis with the client's organization in an efficient and cost effective manner to fulfill those requirements.

Quantum offers the following services:

- Vendor Surveillance – capability and pre-award surveys; performance monitoring; sampling inspection; test witnessing; expediting; and certification.

- Non-Destructive Testing – radiographic, ultrasonic, liquid penetrant, magnetic particle, and eddy current.

- Quality Management Consulting – quality systems development, training and problem solving/troubleshooting.

- Welding/Fabrication/Consulting – procedures development/evaluation, specialized fab/repair contract management and subcontracting, applications R&D, and failure investigation.

- Product Development and Research – Quantum participates in industry/government schemes for product development/improvement.

- Measurement Services – calibration laboratory; three coordinate measurement; laser theodolite dimensional coordinate analysing capability (unlimited size and contour); casting layout; dimensional verification; and relapping and calibration of granite surface plates.

Housed in a total environmentally controlled laboratory facility, Quantum is Canada's largest independent contract and subcontract service source for dimensional verification inspection with major Aero/Defense/Precision buyer approval of facilities and capabilities with recognized accuracies to 3 millionths of an inch.

Average Work Force: Engineers – 5
Scientists – 3
Technicians – 40
Others – 12

Gross Sales: 1984/85 – \$2.5M
1985/86 – \$2.5M (Est'd)

Plant Size: 15,000 sq ft

Equipment: Complete NDE Facility and Mechanical Metrology and Measurement Capability.

Experience: All test center facilities are traceable to NRC Canada (equivalent of NBS Washington) and the operational capabilities operate under such validated governmental recognitions as the Department of National Defense, Canadian Standards Association, Department of Transportation and Communications, and the Canadian Government Standards Board (US MIL and NATO Standards).

Buyer approvals include such organization as Pratt and Whitney, Boeing, McDonnell Douglas, Rockwell, General Electric, Bell Helicopter, Spar Aerospace and Sikorsky. Our status is typified by Quantum's recognition by NASA as being the sole Canadian source approved for the non-destructive testing of fracture critical components for the Space Program.

They are quality professional whose permanent staff resources and facilities base allows the aerospace sector optimal flexibility and economies in fulfilling its mandate for quality in confidence and security. They are interested in doing business with the USAF.

Keywords: Quality Services; Vendor Surveillance; Product Surveillance; Inspection; Non-destructive Testing; Precision Measurement; Metrology; Calibration; Training; Welding Procedures; Subcontract Management; Expediting; Failure Investigations; Fabrication Procedures.

Revised: Sep 85

QUESTOR SURVEYS Ltd

Code: QSL

Address: 6380 Viscount Road
Mississauga, Ontario, Canada L4V 1H3

Contact: Mr. P G Lazenby, Chairman - (416) 676-9880

History: Originally a one aircraft operations section of a mining company, the company split in 1961 and formed a Contract Survey Services Division. During this period, the company operated one owned aircraft and three leased aircraft. In 1970, they began expanding operations, and in 1979 acquired the geophysics division of Northway Survey Corporation. During this period, they specialized in the use and development of the Barringer INPUT electromagnetic system. They are Canadian owned and have no subsidiaries.

Capability: Questor specializes in all state-of-the-art airborne sensing for base metal, uranium and oil. In addition to the Barringer INPUT system (Time-Domain electromagnetics), they also are capable of acquiring and analyzing data from airborne standard & high sensitivity magnetics, and standard & multi-channel spectrometry. They also design and build very high sensitivity magnetometers along with their associated data acquisition systems. Their aircraft fleet includes - two Skyvans, two Trislanders, one DC-3. The INPUT systems generate a pulsed signal from a vertical dipole. The primary field induces eddy currents in conductive targets and these currents produce secondary fields. These secondary fields are then sensed. Through analysis of these secondary field anomalies, sulfide and graphite conducting pockets have been identified to a depth of 300 meters. Standard and high-sensitivity magnetometry provide detailed magnetic contour maps. Corrections for aircraft attitudes & maneuvers, and the use of precision clocks, etc., enable Questor to improve the normal high standard government contour maps by a factor of four in geologic resolution.

Gamma ray spectrometers are used to identify potential uranium deposits as well as for geologic mapping and identification of man-made radio-active wastes. Data reduction for all types of sensors/missions is provided by the company's specially developed algorithms and provides a variety of outputs depending on the users' needs.

Questor has recently organized an internal Research Division. They are presently working to improve the various sensors used by Questor to increase penetration, sensitivity and flexibility, and the new Division has recently developed a helicopter version of INPUT and vertical magnetic gradiometer system.

Average Work Force: PhD - 1
Prof Eng - 3
BsE - 8
Technicians - 10
Others - 40

Gross Sales: 1984 - \$7M
1985 - \$5M

Plant Size: 22,000 sq ft (plus rental hangar space)

Equipment: Equipment includes INPUT time domain electromagnetic system and Helium high sensitivity magnetometer and gradiometer.

Experience: Questor's clients include 49 different countries around the world for one or more of their surveys. Their surveys

have led to the discovery of fourteen base metals, precious metals, or uranium deposits in a variety of geologic environments. In Canada, customers have included - Noranda Mines, Falconbridge Mines, Inco, Imperial Oil, Shell Oil, and Gulf Oil. They are interested in conducting research for the USAF.

Keywords: Remote Sensing; Sensors; Pollution; Software; Mapping; Data Acquisition; Data Reduction; Data Analysis; Magnetometers; Helicopter Magnetic Gradiometer; Magnetic Gradiometer; Electromagnetic Surveys.

Revised: Aug 85

RAYLO CHEMICALS (A Division of Terochem Laboratories Ltd)

Code: RAY

Address: 8045 Argyll Road
Edmonton, Alberta, Canada T6C 4A9

Contact: Dr J F Prescott, Technical Manager - (403) 465-6060

History: Raylo Chemicals was incorporated in 1966, became a subsidiary in 1981, and a division in 1985 of Terochem Laboratories Ltd, a private Canadian corporation. Terochem has no US subsidiaries.

Capability: Raylo Chemicals specializes in contract research, custom synthesis, and sales of manufactured products. Areas of expertise include bench scale pilot plant design & operation; Synthetic chemistry (natural products, pharmaceuticals & hydrocarbon chemistry); high pressure & temperature reactions; polymer chemistry (synthesis of novel monomers and their polymers, characterization and chemical stability testing); and non-routine analysis. A major contract activity is polymer chemistry applied stable high-strength polymers for composites, elastomers, water soluble polymers, flocculation studies, and electrolyte cell separators. Other principal projects include supercritical gas technology applied to coal liquefaction & analyses of heavy oil, and development of physical & physicochemical data in support of various commercial industrial processes.

Raylo Chemicals offers custom manufacture of complex chemicals and polymers from a few grams to several thousand kilograms, including process design and development. Raylo routinely handles highly reactive solid, liquid, and gaseous reagents, and can operate under vacuum and inert atmospheres. The following reactions are performed regularly:

- Acylation
- Alkylation
- Condensation
- Dissolved Metal Reduction
- Friedel-Crafts Reactions
- Grignard
- Halogenation (substitution and addition)
- High Vacuum Distillation
- Hydrogenation
- Hydrolysis
- Metal Hydride Reduction
- Optical Resolution
- Phosgenation
- Reductions

Raylo Chemicals products include specialty polymers and other fine chemicals for high technology industries. Over 150 compounds are currently in production and for many of these, Raylo is the sole or principal world manufacturer.

Average Work Force: PhD Chemists - 8
Chemical Technicians & Operators - 26
Others - 7

Gross Sales: 1984 - \$3.0M
1985 - \$4.0M

Plant Size: 16,000 sq ft
6,000 sq ft (Laboratory + Library)

Equipment: Raylo Chemicals has well equipped laboratories with the following instruments - 60 MHz proton magnetic resonance spectrometer; infrared and ultraviolet spectrophotometers; high performance liquid chromatograph, equipped with a variable wavelength ultraviolet detector with stop-flow capability; gas chromatograph, both packed column and capillary column, with FID and TC detectors; size exclusion chromatography system with differential refractometer; and other up to date chemical, biochemical and physical equipment.

Under an established arrangement with the University of Alberta, high resolution instruments such as Fourier Transform Infrared Spectrometer; Fourier Transform (100, 200 and 400 MHz) and Carbon-13 magnetic resonance spectrometers; and low and high resolution mass spectrometers are available to Raylo's research staff. Raylo also has access to and experience in using a low angle laser scattering photometer (KMX-6), particularly useful for determination of absolute molecular weight and molecular weight distribution polymers.

Raylo's plant equipment includes multi-purpose glass and stainless steel, jacketed, stirred reactors in the 10-600 gallon range and a broad selection of separation equipment.

Experience: The company has produced 77 patents and 35 publications. Raylo's clients are government, universities, and industry in the US, Canada, Europe and Japan.

Keywords: Chemical Processing; Contract Research; Custom Synthesis; Physical Chemistry; Polymer Chemistry; Monomers; Non-Routine Analysis; Supercritical Gas Technology; Process Development; Product Characterization;

Revised: Sep 85

RAYSHIELD Ltd

Code: RSL

Address: 2630 Royal Windsor Dr, Unit #4
Mississauga, Ontario, Canada L5J 1K7

Contact: Mr R E Webster, VP, Sales - (416) 822-6100

History: Rayshield is a wholly owned Canadian company incorporated in 1968 with a US subsidiary, Rayshield Inc.

Capability: Rayshield Ltd specializes in the fabrication and installation of prefabricated RF shielded enclosures, and MIG welded rooms which are completely adaptable to all sizes and shapes of architectural spaces. The prefabricated system was developed to provide a quality-controlled technique for constructing shielding under adverse field conditions that would ensure a dependable performance. Manually operated doors require a very minimum of effort and are available as single, double and custom units. "Hands-Off" or automatic powered door operators are also available. Performance is tailored to meet requirements. Complete installation and turnkey services including testing and certification are available. A complete line of accessories vent panels, waveguide penetration, lighting, work benches, and connector panels are available. Power signal and communication line filters are available for all applications including tempest. Rayshield provides guaranteed performance installation, testing, and servicing. A line of RF shielded cabinets is also manufactured by Rayshield.

Average Work Force: Engineering - 7
Manufacturing - 18
Others - 10

Gross Sales: 1984 - \$5.0M
1985 - \$6.0M

Plant Size: 10,000 sq ft

Equipment: Rayshield's Manufacturing Division is equipped with a laminating press to manufacture shielded panels, drill presses, cut-off saws, welders, and other equipment to enable them to manufacture all components of shielded enclosures. Test equipment includes generation and measurement from 20 Hz to 26 GHz.

Experience: Rayshield has been providing RF & EMP Shielding to major Governments and companies in North America, Europe and the Middle East for over fifteen years.

Keywords: RF Shielding; EMP Shielding; Anechoic Chambers; Shielded Cabinets & Wireways; Shielding; Screen Rooms.

Revised: Oct 85

RE: ACTION MARKETING SERVICES Ltd RE: PRINT COPY & PRINTING Ltd

Code: RAM

Address: 517 Parliament Street
Toronto, Ontario, Canada M4X 1P3

Contact: Mr. Gerald R Graves, President - (416) 964-8049

History: Both Re: Action Marketing Services and Re: Print Copy & Printing were founded by Gerald R Graves, who is still president and sole director of both firms. Established in 1977, Re: Action initially offered advertising, marketing and promotion services primarily of automated office systems technology and expanded the two companies' facilities with this potential in mind, starting with the establishment of both Re: Print and Re: Action's Document Creation Center in 1978. As a result, Re: Action marketing Services and Re: Print Copy & Printing now offer not only advertising, marketing, sales promotion and public relations services, but even more importantly, automated text and data creation, management and transfer; data conversion; word and information processing; telecommunications; laser printing; writing; editing; and system facility management and consulting services.

Capability: Re: Action and Re: Print are primarily involved in large text creation, enhancement and print production projects, such as technical and training manuals; sales and support documentation; RFP responses; chemical, medical and engineering specifications and operations guides; biological abstracts; and reference works. Re: Action and Re: Print also offer complete writing, editing, graphic design, and promotional services. Both facilities and personnel have clearance to NATO secret level.

Average Work Force: Management - 3
Administration - 3
Marketing & Information Processing - 5 - 10
Graphic Design & Print Production - 5 - 10
Others - 5 - 30

Gross Sales: 1984 - \$0.8M
1985 - \$1.15M (Est'd)

Plant Size: 7,500 sq ft

Equipment: 5 Xerox 860 IPS; 3 Xerox 850 PDS; 2 Xerox 820-II; 1 Xerox 16/8; 1 Xerox 2700-II; 2 Xerox 9400 EPS; 1 Kodak 150; 1 Xerox 6500 Color EPS; 1 Compagica 5161; Visualizing Lucy; Bell 301C synchronous modem; Bell 212A asynchronous modem; SME-4 modem eliminator; and miscellaneous peripheral equipment.

Experience: Customers include General Motors, Thomson-CSF, Ontario Ministry of the Environment, Chemetics, Warner Lambert, Motorola Information Systems, Institute for Hydrogen

Systems, Procter & Gamble, Addiction Research Foundation, Guaranty Trust, Liquid Carbonic Inc, Ontario Economic Council, and Ontario Ministry of Education.

Keywords: Word Processing; Data Conversion; Graphic Design; Printing; Writing; Editing; Data Communications; Marketing; RFP Response; Text Management; Telecommunications; Systems Facility Services; Systems Facility Management; Reports; Specifications; Operations Manuals; Reference Manuals; Technical Manuals; Training Manuals; Documentation; Microcomputer Programming.

Revised: Aug 85

ROBERTSON PHOTOGRAMMETRIC Inc

Code: RPI

Address: Edmonton Research & Development Park
Research Center One
9415-20 Avenue
Edmonton, Alberta, Canada T6N 1E5

Contact: Mr. Gary Robertson, President - (403) 462-0166

History: Robertson Photogrammetrics Inc was incorporated in 1980.

Capability: RPI is the only company in Canada involved exclusively in the field of close-range photogrammetry. The company offers capabilities in research & development, consulting service, software, training programs, and manufacturing of close-range photogrammetric instrumentation.

Examples of some of the aerospace services provided by RPI are:

- Analysis of flight testing provided for RPV.
- Structural testing
- Measurements of prototype models
- Quality control of assembly fixtures
- Sales of specialized close-range photogrammetric software for aerospace use
- Training programs for aerospace companies
- Measurement of radar antenna and reflectors
- Consulting in specialized applications for aerospace use

RPI, working jointly with The Perkin-Elmer Corp, Applied Optics Operation, Garden Grove, CA, have developed an automated close-range photogrammetric instrument. The instrument is called PASS 2000 (Photogrammetric Automatic Scanning System).

The PASS 2000 system has been designed to provide a multi-role instrument for aerospace use. The system has the capability of measuring and analyzing any form of imagery.

Entire assembly tools can be photographed and target locations are automatically measured, to accuracies of less than .001 inches. This eliminates the use of manual measurements with a master tool gage. Photogrammetry has shown time savings of up to 400 hours per assembly tool.

The PASS 2000 has the capability to enhance and measure x-rays and ultrasound images. The PASS 2000 offers options which includes an automatic film transport unit that will automatically measure up to 8 rolls of cine theodolite data.

Average Work Force: Engineers & Photogrammetrist - 3
Perkin-Elmer/A00 Facility - 8
Others - 3

Gross Sales: No Data

Plant Size: 4,000 sq ft (Research Facility in Edmonton)
4,200 sq ft (Perkin-Elmer/A00, Garden Grove, CA)

Equipment: The company operates Digital VAX computers, DEC PDP/11, 4 photogrammetric cameras, PASS 2000 System Image Processing Work Station, flatbed plotter, graphics terminals, and a PDS Microdensitometer.

Experience: Currently 100% of aerospace sales have been to the US. The company is interested in working directly with the USA in particular to joint R&D programs. RPI has undertaken projects for USA prime contractors such as Northrop, General Dynamics, Martin Marietta and ITT.

Keywords: Photogrammetry; Measurement Systems; Software Training; Consulting Service; Analysis (Test Data); Structural Testing.

Revised: Aug 85

ROCKWELL INTERNATIONAL OF CANADA Ltd (Collins Canada Division)

Code: ROC

Address: 150 Bartley Drive
Toronto, Ontario, Canada M4A 1C7

Contact: Mr. R Zanette, Marketing Manager - (416) 757-1101

History: Collins Radio of Canada Ltd was formed in 1954 as a wholly owned subsidiary of Collins Radio Company of Cedar Rapids, Iowa. With the acquisition of Collins Radio by Rockwell International in 1973, it became a Division of Rockwell International of Canada.

Capability: The Collins Canada Division is engaged in the manufacture of radio communications products, systems designs and support activities. Principal products are HF Receivers and Transmitters, General Purpose VLF/LF/MF/HF Receiver, Miniature HF Single Channel Synthesized Receiver, HF Manpack Transceiver, Standard and Custom Transportable HF Communication Shelters, Lightweight HF Airborne Communication system and Airborne Direction Finding equipment. Products and systems are sold world-wide.

Average Work Force: Engineers - 40
Technicians - 65
Others - 270

Gross Sales: 1984 - \$34.0M
1985 - \$50.0M (Est'd)

Plant Size: 122,000 sq ft

Equipment: Rockwell's facility is equipped for all types of electrical and mechanical assembly employing advanced techniques such as computerized wave soldering, auto insertion for ICs and axial lead components. Product quality is assured by intensive in-process and completed item inspection. Test equipment is maintained and calibrated on regular cycles. Calibration is traceable to the Canadian National and US National Bureau of Standards. Requirements of the Canadian Government DND 1015 and by reciprocal agreement, US MIL-Q-9858A for quality standards are met. A detachment of the Canadian Forces Technical Services Agency is resident at the facility.

Experience: Since its inception as a manufacturing facility in 1955, Collins Canada has been providing UHF/HF equipment and systems to the Canadian Forces, the US military and a wide range of other countries. Current products are being supplied to all US Military Services, Canadian Forces and other countries. Products include equipment such as the HF-80 HF Transceivers, the HF-2050 HF Receiver, the S-1 HF Receiver, the AN/PRC-515 HF Packset, the AN/TSC-60(V)5 Communication Central, the OZ-11A/TSC-60(V) Radio Set Group, the HF-9000 Series of HF Airborne Communication Systems, and the DF-301E, ARA-50, and ADF-15 Airborne Direction Finders.

Keywords: Communications; HF Receivers; Hf Transmitters; HF Packet; Communication Shelters; HF Airborne Communication Systems; Airborne Direction Finders; Systems Designs; Support Activities; Avionics.

Revised: Aug 85

ROLLS-ROYCE (CANADA) Ltd

Code: RRC

Address: 9500 Cote de Liesse Road
P. O. Box 1000
Montreal AMF, Quebec, Canada H4Y 1B7

Contact: Mr. John Hawkes, Marketing Manager - (514) 631-3541

History: Rolls-Royce Canada was founded in 1952 for the production and support of Nene engines powering the Canadian Armed Forces' T-33 trainer aircraft built by Canadair. From that specialized beginning, Rolls-Royce Canada has continually grown and diversified. Still expanding today, Rolls-Royce Canada is a modern broadly-based aero and industrial engine facility. The company is a wholly owned subsidiary of Rolls-Royce Ltd.

Capability: Repair and overhaul has always been and will continue to be the backbone of Rolls-Royce Canada's business. The company has the ability to overhaul the following engines:

Military - Nene; GE T64; R 1820; and DDA 570K.
Civil - Spey; Dart; Viper; and Tyne.
Industrial - Avon; RB211; Spey; DDA 501; and DDA 570K.

A repair engineering group works closely with prime manufacturers and the repair industry to develop and apply new repair techniques and processes. Repairs are carried out in accordance with the original manufacturer's specifications. In addition, Rolls-Royce Canada has developed more than 3000 repair schemes on its own in an effort to increase component lives and to reduce overhaul costs.

Rolls-Royce Canada is the world source for the Industrial Spey and Industrial RB211 gas generators. These aero derivative gas turbines are manufactured to aerospace standards. The company has developed and manufactures the off-engine support systems for both industrial gas turbines.

Average Work Force: Salaried - 270
Hourly - 515
Management - 48

Gross Sales: No Data

Plant Size: 15,000 sq ft (Engine Assembly)
150,000 sq ft (Engine Overhaul and Common Support Shops)
170,000 sq ft (Offices & Warehouses)

Equipment: The repair shop contains a wide range of general purpose machine tools to enable turning, milling, jig boring, grinding, and electrical discharge machining to be carried out on a wide range of materials. Welding capabilities include TIG weld, metallic arc resistance, needle arc, torch brazing and vacuum, or inert gas high temperature brazing. Heat treatment includes argon or hydrogen controlled atmosphere, low and high temperature vacuum heat and aluminizing. Metal spray capabilities are thermal spray (powder and wire) including 6P gun and plasma spray, erosion or wear resistant hard coatings, abradable coatings, thermal barrier (ceramic) coatings and anti-corrosion coatings. Processing capabilities are - non-metallic coatings-rubber wear away and PL95, nickel, chrome, silver, cadmium, copper, SerMetal processing, tin, lead-tin and Tribomet wear resistant coatings, soft anodizing, alodine dichromate surface treatment and phosphating, vapor blasting, dry blasting and shot peening, electroless nickel plating, and aerofoil surface superfinish. Balance includes static/vertical and dynamic/horizontal

Rolls-Royce Canada operates four diverse engine test facilities capable of testing a wide range of equipment encompassing piston engines, turboprops and turbofans. The company designs and engineers all supporting systems (starting, fuel, lubrication, cooling), equipment (cradles, carts, tooling), safety controls (interlocks, alarms, trips) and instrumentation.

The laboratory presently holds DND approval number 020-2/56 to act as a chemical, metallurgical and mechanical test establishment and offers a wide range of services encompassing tensile testing, hardness testing, metallography, electronic and instrumentation testing and, radiographic and ultrasonic testing.

Experience: Rolls-Royce Canada is highly export-oriented - over 70% of the company's business is with non-Canadian customers. Although 80% of the customer base is within the continental Americas, Rolls-Royce Canada customers now originate in the Middle and Far East, Europe and Africa.

Rolls-Royce Canada has over 30 years experience in heavy maintenance support of aero engines for Military and Civil Operators around the world. A specialist repair engineering group develops new repair technology for economic piece part repair.

The sheet metal and welding shop carries out complex repairs on sheet metal fabricated components as well as repairing main casings by weld build-up prior to re-machining. Sheet metal components made from high temperature resistant alloys of nickel and chromium such as combustion liners, turbine entry ducts and jet pipes are repaired by direct welding or the fabrication of locally formed patches welded into the structures. Resistance weld certification in accordance with MIL W6858 and MIL STD 1595A and fusion weld approvals can be carried out in accordance with D49-001-24/SF-001.

Quality approval conforms with the following specifications - MIL-Q-9858A, MIL-I-45208, MIL-C-45667, DAR 7-103-S; DOT Approval No. 1/58, DND 1015/16/17/19; and CAA A1/2423/47.

Keywords: Aluminum Components; Augmentor Wing; Calibration; Combustion Research; Component Fabrication; Component Parts; Computer Design/Computer Manufacture; Corrosion Control; Engine Components; Engine Research; Heat Treating; Life Cycle Support; Magnesium; Metal Plating; Non-Destructive Testing; Precision Machining; Titanium; Tooling Fabrication; Turbine Blade Inspection; Welding; Turbine Engines; R&O (Engines).

Revised: Sep 85

SCI-TEC INSTRUMENTS Inc

Code: STI

Address: 1526 Fletcher Road
Saskatoon, Saskatchewan, Canada S7M 5M1

Contact: Mr. Richard B Firth, VP Marketing - (306) 934-0101

History: Sci-Tec Instruments Inc is a Canadian owned high technology electronics company incorporated in 1981. There are no other Canadian or US facilities.

Capability: Sci-Tec Instruments was established to design, manufacture and market high quality scientific and industrial instrumentation and electronic systems. They can offer a broad range of capabilities in: data acquisition, microprocessors, communication, remote sensing, remote control systems, as well as electronic system engineering and instrumentation from the conceptual stage through to delivery of a finished product. Along with the capability of machining components for their products, in-house machining experiences have included a range of intricate, close tolerance machining in satellite low noise amplifier housings, rocket payload extend/retract mechanisms, payload booms and payload prototyping

The management objectives for the company comprises of continued market penetration for their three main products and diversifying its operations to include US Government solicited contracts in areas of research and development, off-load or sub-contract opportunities in the scientific and industrial electronics fields.

Average Work Force: Scientists and Engineers - 4
Others - 11

Gross Sales: 1984 - \$0.75M
1985 - \$2.50M (Est'd)

Plant Size: 7,200 sq ft

Equipment: Sci-Tec Instruments employs the following equipment:

Electronics - Microprocessor development system for development and test of software and hardware. Lab test equipment for the R&D and production testing of products and prototypes. Optical assembly and alignment facility which includes a laminar air flow bench, lasers and optical benches. Drafting facilities for mechanical, electronic and printed circuit boards.

Machining - CNC Mill/Precision engine lathe and other machine shop facilities to manufacture precision components.

Experience: The "Brewer Ozone Spectrophotometer" was jointly developed by Sci-Tec and the Canadian Government. The Brewer is a highly sophisticated instrument capable of monitoring ozone (O₃) and sulfur dioxide (SO₂) atmospheric overburdens and vertical concentration profiles. In addition, this instrument is presently being used in monitoring the horizontal irradiance in the ultraviolet and has been further developed to provide automatic azimuth and elevation tracking with additional features allowing for unattended operation. The Brewer is sold world wide to various governments, universities and scientific organizations.

The "Cosmos Tracking System" was developed to meet demand for a two-axis, microcomputer controlled point/tracking system. Applications for this device include pointing specialized scientific or industrial instruments at celestial objects and tracking as it moves through the objects' trajectory. Because of the medium load capability (100 lbs maximum), they expect the market to expand in the near future to cover a wide range of industrial, space and military applications.

An exclusive manufacturing and marketing license was secured for the "High Line Data Acquisition System" (HILDA). This instrument is the foremost system for measuring vibration on high voltage (730 kV) transmission lines. The ability of the system to provide remote, unattended measurements over a long time frame is expected to increase utility and maintenance/installation groups' demand for this instrument.

World-wide exclusive licenses exist to manufacture and market two petroleum industry related products - the Fluid Level Monitor and the Posi-Stop Block Limit Control System. These products reached commercialization in early 1985.

The Fluid Level Monitor (FLM) will uniquely facilitate automated inventory control of contained hazardous and non-hazardous fluids in the petroleum and petro chemical industries. The FLM is cost-comparable and a more accurate device than existing electronic and mechanical monitors.

The Posi-Stop Block Limit Control System is a patented solid state device designed to prevent the traveling block on a drilling rig from moving past preset upper and lower limits in the derrick. This microprocessor based product assists in preventing rig personnel injuries from hazardous traveling block breaks as well as assisting rig operators to determine and increase drilling efficiency. The Posi-Stop System is seen as a replacement for conventional systems due to reliability and ease of use and installation.

Keywords: Electronics; Environment; Image Processing; Machining; Software Development & Services; Space Systems; Testing/ Test Equipment; Telemetry Systems; Data Acquisition Systems; Microprocessor Circuits & Software; Remote Sensing; System Design & Engineering; Instrumentation; Remote Control Systems.

Revised: Aug 85

SCIEX (Division of MDS Health Group Ltd (MDS))

Code: SCI

Address: 55 Glen Cameron Road, Unit 202
Thornhill, Ontario, Canada L3T 1P2

Contact: Dr N M Reid, Marketing VP - (416) 881-4646

History: Sciex was incorporated in 1970 under provincial charter (Ontario). In late 1981, Sciex amalgamated with MDS Health Group Ltd, a Canadian controlled public corporation. In early 1982, an associate company to MDS Ltd, Sciex Inc, was established in Amherst, New York, and is conducting marketing operations in the US.

Capability: Sciex is engaged in the design, R&D, manufacture, servicing, and marketing of trace chemical analysis systems, sample inlet systems, ionization modules, and custom designed application software for the industrial, environmental, health, medical, and military markets. The company currently has the world's leading Atmospheric Pressure Chemical Ionization (APCI) research capability. The Trace Chemical Analysis systems, TAGA[®] 3000 and TAGA[®] 6000 MS/MS, and the Elemental Analyzer, ELAN[®] ICP/MS, are the main products of the company. Both TAGA[®] systems can be fully mobile and are up to 1000 times more sensitive and 1000 times faster than other available systems. The TAGA[®] 3000 is primarily used for targeted compound analysis, while the TAGA[®] 6000 MS/MS is used for rapid mixture analysis and structure elucidation, and in many cases avoiding the preparative steps and time delays of chromatographic separation. The ELAN[®] system is an exceptionally sensitive instrument used for elemental analysis and the determination of isotopic ratios of elements.

The AROMIC[™] Cargo Examination System is based on the same fundamental proprietary patented technology that is utilized in the TAGA[®] system. The AROMIC equipment is a "vapor detector" used in surveillance systems. This new product is used to detect and identify, without manual inspection, minimal quantities of commonly smuggled substances such as explosives, drugs and alcohols. A continuous sampling inlet system obtains a sample for analysis by the computer controlled mass spectrometer. Any chemical related to the contraband will activate an alarm. The high sensitivity and selectivity, rapid sample throughput and simple operation are all AROMIC features necessary for contraband detection.

Average Work Force: Engineers - 18
PhDs - 14
Systems Analysts - 8
Others - 78

Gross Sales: Apr 84/Mar 85 - \$3.2M
Apr 85/Mar 86 - \$5.0M

Plant Size: 28,000 sq ft

Equipment: Facilities are geared to specific applications requiring rapid measurement, monitoring or investigation of specific trace components in complex mixtures. Sciex equipment includes:

- Three fully computerized atmospheric pressure ionization mass spectrometers - laboratory based and mobile

The TAGA® 3000 is a single quadrupole MS system. The TAGA® 6000 MS/MS is a triple quadrupole mass spectrometer. Unique features include – detection of compounds at sub-picogram or low parts per trillion level, minimal memory effects which facilitate high sample throughput, high ion transmission, cryogenic pumping, and gas dynamically confined CID target with collision energies to 150 eV. Total system control, data display and manipulation are achieved via the PDP-11/03 or PDP-11/23 DEC computers, with RT-11 (single user) or RSX-11M (multi-user) operating systems. The appropriate peripheral terminal, graphic and hardcopy capabilities are integrated with the system.

- With the mobile unit, trace compounds at any accessible site can be detected, identified and their concentrations measured. The extent of environmental air contamination can be plotted throughout an area rapidly to pinpoint sources of contamination.

- Elemental Analysis Laboratory, equipped with the computerized ELAN® instrument and preparative wet chemistry laboratory. The ELAN® is a hybrid instrument incorporating an Inductively Coupled Plasma ion source interfaced to a computer-controlled mass spectrometer. The ELAN® permits the determination of elemental composition at the part-per-billion level in complex sample matrices as well as the measurement of isotopic ratios.

- Good design capability and reliability backed up by a team of skilled professionals able to provide application-oriented hardware, software and methodology development.

- In-depth customer training and comprehensive documentation.

- Toxic Chemical Laboratory capable of handling hazardous and carcinogenic compounds.

- Analytical facilities – expertise in the field of gas chromatographic column technology enables preparation of both packed and open tubular capillary columns.

- Organic Laboratory.

- Electronic Circuitry Development Laboratory.

- Product testing facilities – experienced in testing vacuum systems involving cryogenics and ultra high vacuum.

- Effective working arrangement with the Aerospace Institute Laboratory of the University of Toronto. Work is carried out in this laboratory on fundamental questions pertinent to TAGA® and ELAN® developments.

Experience: Sciex sales of TAGA® 3000 and TAGA® 6000 MS/MS systems on an international basis include IBM, Xerox Corp, US Customs, National Research Council of Canada, Battelle (Edgewood Arsenal), Defense Research Establishment Valcartier, Defense Research Establishment Suffield, General Electric/New York State Environment, Ministry of Environment (Ontario), Ministry of Defense (UK), US Army Natick laboratories, and TRC Advanced Analytics.

Since the introduction of the ELAN® in March 1983, sales have been confirmed to the University of Alberta, National Research Council of Canada, XRAL Ltd, Geological Survey of Canada, Geological Survey of Ontario, Agriculture Canada, Ontario Ministry of the Environment, Eagle Pitcher Ltd (US), and the US Geological Survey (Denver).

The company has developed methods for real-time detection of explosives, illicit drugs, and CW agents in the parts-per-trillion range. In addition, Sciex has participated in special consulting studies including those dealing with pre-collected sampling systems in the field or workspace.

The company received the 1978 Canada Enterprise Award. In 1980, Sciex received an IR-100 Award for developing the TAGA®

3000 as one of the 100 most significant technical products in 1979. In 1984, Sciex received the Canadian Award for Excellence in Technology Transfer with the National Research Council of Canada (NRC).

Keywords: Chemistry; Environment; Security & Safety; Mass Spectrometry; Ion Physics; Ion Molecule Chemistry; Fluid Dynamics; Vacuum Technology; Ultra-Trace Analysis; Electronics Design; Instruments; Mobile & Laboratory Based Analytical Services; Product Characterization; Quality Assurance; Professional Services; Toxic Agent Detection; CW Agent Detection; Explosives Detection; Drugs Detection; Trace Gas Detection; Chemical Agent Detection.

Revised: Aug 85

SCINTREX Ltd

Code: SCX

Address: 222 Snidercroft Road
Concord, Ontario, Canada L4K 1B5

Contact: Dr. H O Seigel, President – (416) 669-2280

History: Scintrex Ltd began as Sharpe Instruments Ltd in 1947 and was incorporated as Scintrex Ltd, a public Canadian owned company, in 1967.

Scintrex Defense Products Division is a supplier to the US DOD of high sensitivity portable (Mark 22) magnetometers for explosive ordnance detection. In addition, it supplies area radiation monitors (AN-GDQ-3) for the determination and transmission of the level of nuclear radiation around strategic locations. Similar military-specification radiation monitors are being developed for mobile applications (ship and aircraft installations). An explosives vapor detector (bomb sniffer) has been developed in conjunction with the National Research Council of Canada for defense against acts of terrorism. The potential application of laser-based, active remote sensing methods to certain defense problems is now being investigated.

Capability: The Contract Instrumentation Division of Scintrex began developing monitoring instrumentation in 1974 for CANDU nuclear power plants. Since then, the company has manufactured tritium monitors, reactivity control logic cabinets, shut-off rod logic modules, high radiation hand-held monitors and logic panels for safety shut-down systems. CANDU reactor operators in Ontario, Quebec, New Brunswick, Korea, and Argentina use this equipment.

The Exploration and Analytical Equipment Divisions of Scintrex are a major part of its business. They include the design, development and manufacture of geophysical and geochemical instruments for the mining industry, and analytical instruments for chemical laboratories. Over the years, geophysics has become the key exploration tool for discovering new mineral deposits. The steady depletion of surface ore bodies and consequent need to detect buried deposits have produced a growing dependence on geophysical methods. Scintrex is a leader in the design, development and manufacture of mining exploration equipment. Its products, services and skills have contributed directly to numerous major mineral discoveries in different parts of the world. Out of this experience, there is an expertise in developing portable analytical equipment for remote, on site chemical analyses.

The Systems Engineering Group of Scintrex is highly experienced in the installation of sensing systems in aircraft, helicopters and vehicles for mobile applications. Many magnetic, electromagnetic, radiometric and laser installations have been made, operated and serviced.

Ruggedized, portable gas chromatographs have been developed which are optimized for detecting various vapors of interest to defense forces, including those arising from explosives and torpedo fuel, to date.

Average Work Force: Electronic Engineers - 14
Mechanical Engineers - 2
Chemists - 4
Geophysicists - 4
Physicists - 4
Technicians - 50
Machinists - 20
Sales, Office Staff & Others - 111

Gross Sales: 1984 - \$10.5M
1985 - \$16.0M (Est'd)

Plant Size: 70,000 sq ft

Experience: Scintrex has had experience with the US Army and Navy (contracted to build nuclear radiation monitoring systems and explosive ordnance detectors); Ontario Hydro (contracted to supply hand-held radiation dosimeters for nuclear power plants); and other CANDU reactor users (contracted to build a variety of radiation monitoring devices).

Keywords: Radiation Monitoring Systems; Dosimeters; Tritium Monitors; Gamma Ray Monitors; Beta Ray Monitors; Geophysical Equipment; Electromagnetics; Magnetic Sensors; Gravity Sensors; Geochemical Equipment; Atomic Absorption Spectrophotometers; Ultraviolet Fluorescence Systems; Toxic Gas Detectors; Hazardous Gas Detectors; Remote Sensing; Ordnance Detectors; Trace Gas Detection.

Revised: Aug 85

SEAGOLD INDUSTRIES Corp

Code: SEA

Address: 4008 Myrtle St
Burnaby, British Columbia, Canada V5C 4G2

Contact: Mr. Grant McFarlane, Sales Manager - (604) 437-4445

History: Seagold was formed in 1978 to carry out research related to reverse osmosis desalination. TDC Technology Development Corp acquired controlling interest in Seagold Industries Corp in 1979. The company began commercial production in 1981.

Capability: Seagold manufactures a full line of reverse osmosis desalinators from a hand operated unit for emergency use in life rafts, to motorized desalination systems for making up to 100,000 gallons of fresh water per day from sea water or brackish water.

Average Work Force: Engineers - 7 - 10
Others - 5 - 10

Gross Sales: 1984 - \$1.2M
1985 - \$1.7M

Plant Size: 7,500 sq ft

Equipment: Precision machine shop, Recirculating seawater test-bed system, and Analytical laboratory.

Experience: Seagold Industries Corp has supplied a broad range of units for various applications to various commercial, governmental and individual customers world-wide. These customers include the US Army (MERADCOM), US Navy, Canadian Coast Guard & Canadian Navy.

Keywords: Reverse Osmosis; Desalination; Energy Recovery Pumps; Seawater; Water Makers; Freshwater; Brackish Water; Potable Water.

Revised: Aug 85

SED SYSTEMS Inc

Code: SED

Address: P. O. Box 1464
Saskatoon, Saskatchewan, Canada S7K 3P7

Contact: Dr. D H Kjosness, Vice President - (306) 244-0976

History: SED Systems Inc is a high technology systems engineering and production company located in Saskatoon, Saskatchewan, Canada. They evolved from the Space Engineering Division of the University of Saskatchewan. Originally, their activities consisted of the design and construction of rocket payloads for upper atmospheric research. Since their incorporation as a private company, SED has pursued a development policy which has led them increasingly into commercial markets with innovative products derived from aerospace technology. SED was incorporated in 1972.

Capability: SED supplies products and services to three principal markets aerospace, communications, and agricultural instrumentation. They are organized along functional lines as follows:

- Advanced Systems Engineering Division (i.e. projects)
- Products Division

SED's research affiliate is SED Research Ltd. These groups are coordinated by a centralized corporate office. The major products and services offered in each area are:

Projects - Communications systems engineering, custom satellite communications earth stations, complete satellite telemetry tracking and command earth stations, satellite ground control equipment, customized telemetry and tracking systems, sounding rocket payloads, and scientific instrumentation for use on the space shuttle.

Products - Two-way, voice and data satellite communications system, SKY SWITCH, for private networks; TV satellite (cable, quality) receivers, TVRO systems and other microwave components, subsystems for satellite earth stations, and agricultural instrumentation.

Diversification is one of SED's major strengths. An assessment of the range of the company's products and services shows that they are based on a relatively narrow range of technologies that have been developed in depth. The specific technologies are highly complementary which allows the penetration of highly diversified markets with innovative products resulting from knowledge acquired in other fields. Complementary technologies have also strengthened SED by permitting staff mobility in response to market fluctuations and to facilitate employee development.

Average Work Force: Professional - 100
Technical - 230

Gross Sales: 1985 - \$17M

Plant Size: 108,000 sq ft

Equipment: SED has a variety of specialized facilities including: metal finishing and painting shop; computer systems, earth stations and payload integration facilities; microwave clean room; and a medium volume PCB production facility QA to military specifications.

Experience: SED experience in the space and defense areas include:

Space:

Payloads - Sounding rocket and balloon payloads (1965-present) (produced over 60, Canadian National Research Council); Firewheel sub-satellite (1980 launch on Ariane), NRC (Max Planck Institute - Germany); and Wide Angle Michelson Doppler Imaging Interferometer - Atmospheric Test Instrument (1980-present-NRC).

Mission Planning and Support - Communications Technology Satellite - CTS or Hermes (1970-1976) (planned attitude acquisition phase, designed ground control station

and developed software, Canadian Department of Communication (DOC)).

Satellite Telemetry, Tracking and Command Stations – ANIK A (TAC station for A2 (1972), Telesat Canada); ANIK C/ANIK D (transportable tracking station – located in Guam (1982), Hughes Aircraft Co); and LANDSAT/GOES (1972-present) (Canadian tracking station, Canadian Center for Remote Sensing (CCRS)); and Brazil Telecommunications Satellite System Satellite Control Facility (1982-1985).

Ground Control Equipment – ANIK C, ANIK D, and SBS (1978-1982) (variety of equipment (50) including command generators and upconverters and telemetry displays, Hughes Aircraft Co).

Communications Earth Terminals – A wide variety of over 200 terminals including low cost 4 and 12 GHz TV receive only, and 2 way fixed and transportable terminals (4/6 and 12/14 GHz) (1974-present).

Satellite Systems Test Sets – ANIK C/SBS (12/14 GHz computerized payload test and integration support unit, Hughes Aircraft Co, and DOC); and ANIK D – 4/6 GHz (as for ANIK C, SPAR Aerospace and DOC) (1978-1981).

Defense:

Digital Switches – NORAD Joint surveillance System (1979-1981) (digital switches to handle up to 84 channels of digitized radar data, Hughes Aircraft Co); and Miscellaneous Digital Switches (1981-present) (as for JSS above, Hughes Aircraft Co).

Satellite Control Centers – SARSAT Canadian Mission Control Center (1981-1982) (installed at Trenton, Ontario as part of Canada's contribution to the international Search and Rescue Satellite (SARSAT) Program, provides control and monitoring capability for the entire Canadian SARSAT system, Department of National Defense).

Tracking Systems – Air Defense Aerial Target Tracking System (1981-present) (developing a tracking antenna, telemetry receiving system for use with target drones at the Defense Research Establishment Suffield in Alberta, Department of National Defense).

Communications Systems – Project Eureka (1981-1983) (designed, developed and installed a full, 2-way satellite communications ground system in Ottawa and Eureka to provide a data link for the DND (Project Hurricane), and Telesat Canada).

SED is the system designer and the system integration manager for the external and miscellaneous interior communications systems, and the meteorological systems for the six new Canadian Patrol Frigates for PARAMAX Electronics (a subsidiary of Sperry) (1983-Present).

Keywords: Ground Stations; Telephone Communications; Simulations Programs; Communications Systems; Instrumentation; Systems Studies; Satellite Communications Ground Stations; Satellite Telemetry Tracking Stations; Ground Control Equipment; Payload Design; Payload Test Services; Computer Systems; Digital Switches; Aerial Target Tracking System; Systems Engineering; Program Management.

Revised: Oct 85

SEI INDUSTRIES Ltd

Code: SEI

Address: P. O. Box 35412, Station E
Vancouver, British Columbia, Canada V6M 4G5

Contact: Mr. Don Arney, President – (604) 270-6433

History: SEI Industries Ltd was incorporated in May 1978 as a product development/marketing company, and since January 1983, has been involved exclusively in the design, manufacture and marketing of its own products.

Capability: SEI Industries Ltd is primarily involved in the design, manufacture and marketing of fabric related products for the aviation and marine industries. Current products include:

- The Bambi Bucket – an all-fabric fire fighting bucket for helicopters. Since its introduction to the world market in 1983, the Bambi Bucket has become the standard for such equipment and is now being specified as the only product acceptable for forest fire-fighting contracts by a growing number of forestry agencies, fire departments and military organizations all over the world.

- The Fuel-Easy – a fully collapsible lightweight, free-standing, flyable fuel container for helicopters is a convenient and cost-effective alternative to fuel drums. The Fuel-Easy reduces the causes of fuel contamination because it fills from the top and is locked for security by a Kamlo cap. It empties from the bottom to prevent wastage through unused fuel.

- The Terra Tank – SEI Industries utilizes the latest in high-tensile strength/lightweight fabrics to produce a new generation of ground fuel storage bladders which replace the old generation of bladders made of heavy rubber compounds. This lightweight feature is crucial to the aviation industry. The Terra Tank is used in helicopter operations (often in conjunction with the Fuel-Easy), as well as in many other operations requiring high volume, collapsible, ground fuel storage capabilities. The Terra Tank is also available for POTABLE WATER storage and can be made to meet military specifications. Standard grades for potable water use US Food and Drug Administration approved fabrics. Custom Terra Tanks can be made for boats, trucks, helicopters, fixed-wing aircraft, etc.

- The Jet-Net – is SEI's answer to the logistical problems of high seas marine personnel search and rescue operations. Developed with assistance from the Canadian Coast Guard, the Jet-Net is an inflatable, self-propelled, remote controlled rescue net designed for use from helicopters, ships, oil rigs, etc. Helicopter rescue situations are greatly aided by use of the Jet-Net because it can be inflated and lowered away from the victim to protect them from the rotor blade downwash. The Jet-Net can then be directed by a crew member by remote control to the victim. Once captured in the Jet-Net, the victim is winched aboard and flown to safety.

Other capabilities include – the design and manufacture of high-thrust electric thruster motors for marine craft; inflatable float design and manufacture for light aircraft; technical problem-solving involving new-generation high strength/lightweight fabrics; design and manufacture of underwater lifting balloons for marine salvage and construction; internal fuel bladders for fixed-wing and rotary-wing aircraft; and lightweight fabric buckets for concrete used in general construction or remote-controlled operations (i.e., helicopter-borne operations).

Average Work Force: 25

Gross Sales: 1984 – \$0 650M
1985 – \$1 350M (Est'd)

Plant Size: 5,000 sq ft

Equipment: Equipment includes Electronic RF welding equipment for welding of coated fabrics, assorted sewing and machining equipment, 6000 gal test tank with crane (max capability 1,000 lbs), and in-house computer systems – IBM and Wang.

Experience: Present customers include various departments in the Canadian and US Governments, as well as other government, military, paramilitary and commercial operations world-wide.

Keywords: Fuel Systems; Fire Fighting Equipment; Helicopter External Load Equipment; Fuel Storage; Water Storage; Water Transport; Rescue Equipment; Lift-Saving Equipment; Aircraft Floats; Thruster Motors (Electric); Collapsible Storage Containers (Fabric); Underwater Salvage Equipment; Fabric Structures; Inflatable Floats; Inflatable Rescue Equipment; Search & Rescue Equipment.

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SERMATECH CANADA Inc

Code: SER

Address: 747 Riddle Avenue
Dorval, Quebec, Canada H9P 1H4

Contact: Mr. Paul Bonin, Director of Marketing - (514) 631-2240

History: Sermatech Canada is but one of an international organization of highly technical service units which serve the aerospace industry world-wide. They have three centers in Europe and five in the US. Sermatech also has three joint ventures - two in Europe and one in the US. Sermatech is a new name for service centers which apply SermeTel coating systems against corrosion. Sermatech International headquarters are located in Limerick, PA.

Capability: SermeTel developed a series of specialized coatings for corrosion protection. These coatings are galvanic in nature and offer extended life for metal parts operating in severe environmental conditions. The coatings are metallic ceramics which offer unique protective characteristics for turbine components. Once a compressor section is coated with SermeTel 5380, it benefits not only from the corrosion protection properties of the coating, but also due to the extremely high surface finish of the coating, the engine runs more efficiently, i.e., 20 - 30°C reduction in EGT and a 1% (SFC) fuel savings. These figures will vary with the engine type and model.

Average Work Force: Administration - 3
Others - 15

Gross Sales: 1984 - \$1.7M
1985 - \$2.2M (Est'd)

Plant Size: 31,500 sq ft

Equipment: Complete coating facility - spray booths, conveyor oven 6' x 45' long, electric ovens, strip tanks, degreasing unit, diffusion type vacuum furnace, and automatic and manual sandblast cabinets.

Experience: Present customers include Pratt & Whitney Canada Inc, Hawker-Siddeley Canada Inc (Orenda Div), Westinghouse Canada Inc, Rolls-Royce Canada Ltd, Solar Turbines Ltd, CP Airlines, and other small machine shops.

Keywords: Coating Treatments (Engine Components); Galvanicly Active; Electron Transfer; Potential Difference; Positive and Negative Ions; Diffusion Coatings (Simplex or Duplex).

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SHARP SPECIAL SYSTEMS (Ottawa) I. P. SHARP ASSOCIATES Ltd

Code: IPS

Address: 265 Carling Ave, Suite #600
Ottawa, Ontario, Canada K1S 2E1

Contact: Mr. E A M Dorman, Mgr, Special Systems (Ottawa) - (613) 236-9942

History: I. P. Sharp Associates Ltd is a Canadian owned company incorporated in 1964. The corporate headquarters is located in Toronto. Sharp Special Systems is a division of I. P. Sharp that began operation in 1973. All of the company's minicomputer-related activities are amalgamated in the division. Wholly owned subsidiaries of this Canadian company are located in Australia, Austria, Belgium, Denmark, France, the Far East, Germany, Italy, Mexico, The Netherlands, Norway, Sweden, Switzerland, the UK, and the US. The company has twelve Canadian locations in six provinces. There are nineteen US locations in twelve states and Washington, DC.

Capability: I. P. Sharp is a computer software company specializing in - (1) Provision of timesharing service called SHARP APL; (2) Development of software to handle projects ranging from large database applications to small real-time monitor and control systems; and (3) Research and development of software tools to aid in the production of trusted systems.

SHARP APL is offered in both interactive and batch modes and can be used at your own premises, using a variety of terminals, via a telephone connection. Each user has 256 kilobyte workspace that may contain both functions and data. Any number of work-spaces may be stored on disk for later retrieval. The file system is based on the principles of shared direct access and total security.

Development of turnkey computer systems now represents the major portion of the Special Systems activities. However, they continue to offer a wide range of services, including:

- Project Management
- Facilities Management
- Feasibility Studies
- System Specification and Design
- Hardware Evaluation, Selection and Acquisition
- Design and Selection of Communications Facilities
- System Operational Audits
- Contract Programming
- Complete Turnkey systems

Average Work Force: Total - 550 (Professionals plus Support Staff)

Gross Sales: 1984 - \$50M
1985 - \$55M

Plant Size: 10,000 sq ft (Special Systems Office Space - all locations)

Equipment: Amdahl 480/V8; 1 x IBM 3081-D; 2 x VAX 11/750; 1 x VAX 11/780; and n x PDP 11/34.

Experience: I. P. Sharp has experience in the following areas:

Timesharing - Using SHARP APL, many multi-national companies and governments access private and public data bases in Socio/Economic, Financial, Commodities, Airline Schedules, and Natural Resources.

Process Monitoring and Control - Warehouse Automation System for Liquor Distribution Center; Mail Handling Systems for Canada Post Office; Plant Monitoring System for General Electric Company; Process Monitoring Systems for Atomic Energy of Canada; Radar Control for Canadian Department of National Defense; and Command and Control System for Canadian Department of National Defense.

Real-Time Information Display - Operational Information Display System for airports administered by Canadian Ministry of Transport; MAX-PAK, a micro film information system developed for Illinois State Police; Aviation Communication Measurement System, an airborne communications monitor for Canadian Ministry of Transport; Schipol Airport Information System for the Amsterdam airport; and Computer Aided Dispatch and Records Entry for Police and Fire Departments.

Communications - The SHARPnet, designed and built by I. P. Sharp Associates Ltd to facilitate access to SHARP APL; and X.25 compatible front-end processors and Network Interface Machines for Canadian Department of National Defense.

Research and Development - Specification of trusted Database Management Systems for USAF project Guardian; Implementation of Euclid compiler jointly funded by the US Defense Advanced Research Projects Agency (DARPA) and Canadian Department of National Defense; Front End Security Monitor for Canadian Department of National Defense; Formal Verification Methodology for Canadian Department of National Defense; and Integrated Verification System for the US Navy.

Keywords: Facility Management; Data Acquisition; Data Processing; Graphics; Displays; Computer Security; Measurement & Control Systems; Timesharing Service; Real-Time Monitor Systems; Real-Time Control Systems; Turnkey Computer Systems; Project Management; Feasibility Studies; Signal Processing; Hardware Evaluation; Radar Control Systems; Command & Control Systems; Information Displays; Interface Systems.

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SHELLCAST FOUNDRIES Inc

Code: SF1

Address: 10645 Lamoureux
Montreal North, Quebec, Canada H1G 5L4

Contact: Mr. Bruno Innus, Vice President - (514) 322-3760

History: Shellcast Foundries Inc is a Canadian-owned company founded in 1970 which has experienced a very steady and impressive increase in both its technological and production capabilities. The company has a US subsidiary, Shellcraft Industries Inc located in Winooski, Vermont, and associate facilities in Europe.

The company's founders were previously engaged in the management of an investment casting foundry and in the design of electronics enclosures and systems utilizing investment castings. The company has grown from a facility of 6,000 sq ft employing major outside services such as x-ray and testing of materials, to a fully integrated facility (total in-house capability) exceeding 50,000 sq ft.

Capability: Shellcast Foundries Inc are founders of non-ferrous precision investment castings - by the lost wax process. Its major customers are in the aerospace, defense electronics, and electronics industries. Their foundries are capable of producing small and intricate castings of 1" plan area to large complex castings of a maximum of 36" cube, to the highest MIL and commercial standards. They are equipped to produce castings by either the shell or the solid mould process.

Average Work Force: Engineers - 8
Others - 132

Gross Sales: 1984 - \$8.3M
1985 - \$9.0M

Plant Size: 50,000 sq ft

Equipment: Equipment includes Robotics in production, in-house computerized production planning and financial systems - Basic 4, Spectograph and coordinates measuring machines both with computer print outs, "Mechanical Properties" and hardness test equipment, a laboratory including a photo microscope, and etch facilities.

Experience: Present customers include most of the major contractors in the aerospace and defense industries in North America and they also have major customers in Europe and Israel.

Keywords: Foundry; Investment Castings; Thin Wall Castings; Castings; Enclosures (Electronic); Shell Castings; Solid Mould Castings.

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SHERITT GORDON MINES Ltd

Code: SGM

Address: Fort Saskatchewan, Alberta, Canada T8L 2P2

Contact: Mr. Herbert Veltman, Dir, Sherritt Research Center - (403) 998-6432

History: Sherritt is a highly diversified company with a US subsidiary located in Portland, Oregon (Sherritt Fertilizers Inc). Sherritt was incorporated in 1927 as a mining company. In 1954, their processing plant at Fort Saskatchewan was opened. Located at this latter site is the Sherritt Research Center which is their R&D arm.

Capability: Besides mining copper, zinc & precious metals, and refining nickel & cobalt, Sherritt Gordon carries out R&D at their Research Center in the area of powder metallurgy. Also at Ft Saskatchewan, Sherritt has their Fabricated Metal Products Division which manufactures a wide range of secondary products based on Sherritt's raw materials and technology. These products include nickel strip and coinage, a wide range of special powders and composite powders, dispersion strengthened nickel, magnetic alloys and wear resistant materials. Sherritt is active in developing dispersion strengthened alloys and abrasible seals for turbine engines. They have recently expanded their research activities to include rare earth cobalt magnets, wear resistant materials, and ultra fine metal powders.

Sherritt's research and development work continued in these areas and several new products reached commercial production - notably composite powders for turbine seals, and wear resistant materials for the mining industry.

Average Work Force: Total (Research) - 91
PhDs - 13
MSs - 3
BSs - 21
Others - 54

Gross Sales: 1984 - \$397M

Equipment: Sherritt's Research Center is well equipped for process research in hydrometallurgy and product research. This includes autoclaves, solvent extraction and ion exchange equipment, standard chemical laboratory equipment, and an analytical laboratory. Also included are powder presses, sintering furnaces, rolling mills, vacuum induction melting equipment, and flame & plasma spray guns. Physical testing equipment includes tensile testing, stress rupture, wear resistance, metallography, transmission and scanning electron microscopes, electron microprobe, and x-ray diffraction.

Experience: A large portion of Sherritt's total metal sales go to the US which includes fabricated metal products, such as dispersion strengthened nickel and composite powders for turbine engines. The products, which may be used in military aircraft, are sold to engine manufacturers. Sherritt is interested in doing business with the USAF when the research area is consistent with their research objectives. Research and development projects have been carried under USAF contracts in the late 1960s and early 1970s. These contracts were in the area of dispersion strengthened nickel-chromium alloys. The research specifically dealt with improved oxidation resistance and mechanical properties.

Keywords: Engine Components; Engine Systems; Powder Metallurgy; Specialty Alloys; Dispersion Strengthened Alloys; Alloys; Abradable Seals; Rare Earth Magnets; Wear Resistant Materials; Continuous Casting; Cobalt-Samarium Magnets; Thermal

Spraying; Magnets; Casting; Ultra Fine Metal Powders; Metal Powders; Composite Powders; Nickel; Nickel Powders; Nickel Strip; Nickel Coinage.

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SIMMONDS PRECISION CANADA Ltd

Code: SPC

Address: 2752 Slough St
Mississauga, Ontario, Canada L4T 1G3

Contact: Mr. Andrew Byrne, General Manager - (416) 678-7430

History: Simmonds Precision Canada Ltd is a wholly owned subsidiary of Simmonds Precision Products Inc of Tarrytown, NY, which in turn is a wholly owned subsidiary of Hercules Incorporated. The company has been in Canada since 1947 and has been at the current location since 1975.

Capability: Simmonds Precision Canada Ltd is the repair and overhaul center for most Simmonds products in Canada. This includes fuel quantity gauging systems, ignition exciters, torque indicators and actuators.

Average Work Force: Engineer - 1
Others - 6

Gross Sales: No Data

Plant Size: 2,800 sq ft

Equipment: Test equipment for electronic and electromechanical equipment.

Experience: Present customers include most Canadian airlines, many Canadian business aircraft operators, and Canadian Departments of Supply & Services and National Defense.

Keywords: Instrument Repair; Fault Diagnosis; Testing/Test Equipment; R&O (Instruments).

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SPAR AEROSPACE Ltd

Code: SPA

Address: Executive Offices
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*Government Relations Office
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21025 Trans-Canada Highway
Ste-Anne-de-Bellevue, Quebec, Canada H9X 3R2

Communications Systems Division
21025 Trans-Canada Highway
Ste-Anne-de-Bellevue, Quebec, Canada H9X 3R2

Remote Manipulator Systems Division
1700 Ormont Drive
Weston, Ontario, Canada M9L 2W7

Defense Systems Division
4100 Weston Road (Location)
Weston, Ontario, Canada M9L 1W7
P. O. Box 13050 (Mailing)
Kanata, Ontario, Canada K2K 1X3

Gears & Transmissions Division
825 Caledonia Road
Toronto, Ontario, Canada M6B 3X8

Aviation Services Division
1190 McTavish Road, Northeast
Calgary, Alberta, Canada T2E 7G6

Subsidiaries:

Astro Research Corporation
6390 Cindy Land
Carpinteria, California 93013

Commercial Telecommunications Corp
3130 Skyway Dr, Bldg #604
Santa Maria, CA 93455

Contact: *Mr. B R Machum, Dir, Gov't Relations & Mkg Support
- (613) 563-0230

History: Spar commenced operations as a public company in January 1968, following the acquisition of the Special Products and Applied Research (SPAR) Division of The de Havilland Aircraft of Canada Ltd. The company developed by internal growth and through acquisitions including:

- 1969 - The assets of York Gears Ltd
- 1972 - Astro Research Corporation of California
- 1977 - The assets of the Government and Commercial Systems Division of RCA Ltd and certain assets of the space electronics manufacturing unit of Northern Telecom Ltd
- 1984 - ComTel of California

Capability: Spar Aerospace Limited is a Canadian owned company engaged in the design, development, manufacture and servicing of systems and products for the space, communications, defense, aviation and remote manipulator markets. The company employs about 600 engineers and technicians, one of the largest technological groups in the private sector in Canada.

In sixteen years of growth, Spar has gained international recognition as a diversified technology company and has achieved financial stability by balancing the steady sales base of its gears and transmissions and aviation services operations with businesses serving the fast-growing markets of space and communications. Spar's areas of expertise are outlined below:

• **Space** - Spar's facility in Ste-Anne-de-Bellevue near Montreal is the principal supplier in Canada and a major international manufacturer of satellite communications systems, including satellites and satellite subsystems.

Spar and its predecessor companies have contributed to the design and manufacture of 50 satellites and subsystems, including the fabrication of structures and payloads for all the Canadian and many international satellites. The company's contract from Telesat Canada in 1979 to supply two 24-channel Anik D communications satellites was the first such prime contract to be granted to a Canadian company. Anik D1 was successfully launched in August 1982 and Anik D2 is scheduled for launching in 1984.

In 1982, Spar was awarded a prime contract to provide two satellites and a related ground control system for EMBRATEL, the Brazilian government-owned telecommunications company. The project known as Sistema Brasileiro de Telecomunicacoes por Satellite (SBTS) is scheduled to be completed in 1985. This is the largest satellite contract won by Spar and will be the first domestic communications satellite system in Latin America. In addition, Spar is working on the following major communications satellite projects - Intelsat VI; G-STAR; Olympus; and MSAT.

Spar's subsidiary Astro Research Corporation, designs and develops lightweight deployable structures for space and ground applications. These include the patented STEM antenna product line and Astromast deployable structures used in many spacecraft to deploy antennas, experiments and solar arrays.

- **Communications** - Spar designs and manufactures satellite earth stations and related projects. The development of its newest product - the Time Division Multiple Access/Digital Speech Interpolation (TDMA/DSI) equipment was largely completed during 1983 and the first terminal will be delivered to Telelobe Canada in 1984. The system is now being offered in international markets.

SPARCOM, the company's low cost telephony satellite earth terminal developed in conjunction with the Department of Communications, offers unique advantages to users in remote locations and in private networks. The company is working on a SPARCOM and FM-SCPC program with Maritime Telegraph and Telephone and Newfoundland Telephone to improve communications with oil rigs operating off the east coast of Canada.

Spar's subsidiary, ComTel, designs and builds light and medium rate earth station nets for such customers as Dow-Jones Inc, NASA and US Defense Department.

Spar has signed a multi-year joint development and technology transfer program with the People's Republic of China.

- **Defense** - Spar develops electro-optical defense products, builds electronic assemblies for satellites, and manufactures combat equipment for the Canadian Armed Forces. It also provides technical support to the Forces, particularly systems engineering. Facilities include a manufacturing plant, optical, electronics and systems laboratories, and a dedicated computer for developing military software and the real-time processing and display of complex optical data.

Spar is a leader in the field of remote heat sensing technology, having worked for 16 years to develop the unique AN/SAR 8 infrared surveillance system for the passive detection of ships, missiles and aircraft for defense and navigation purposes. Following successful trials of the system by the Canadian and US Navies, a project agreement was signed by the two governments in 1983 to undertake, on a joint basis, the final development of this equipment.

Spar has been selected by Hollandse Signaalapparaten B.V., the Netherlands, to manufacture and support fire control or other equipment that may be selected for the new Canadian Patrol Frigate.

- **Aviation Products** - Spar is an industry leader in the production of high precision aerospace gears and transmissions. The company manufactures and assembles lightweight, high-speed, high-torque power transmission systems and equipment for gas turbine engines and fixed and rotary wing aircraft. This facility also manufactures, assembles and tests the joints of the RMS.

In 1982, Spar signed an initial contract with Sikorsky Aircraft to produce the main, intermediate and tail gearboxes for the Sikorsky H-60 series helicopter. Under this agreement, Sikorsky has options to purchase additional hardware which, if fully exercised, will provide Spar with more than a dozen years of gear production. As well, the company manufactures the tail rotor, intermediate gearboxes and main rotor shafts for the Sikorsky S-76 commercial helicopter.

In 1983, General Electric Company awarded Spar six contracts for follow-on production of accessory gearboxes and other components for engines that power turboshaft helicopters and turboprop and turbojet aircraft. Spar produces accessory gearboxes for General Electric's J85-21 turbojet engine (used in the F-5E/F aircraft), the T700 turboshaft engine (used in the Black Hawk, Sea Hawk, Advanced Attack, and Bell 214ST helicopters), and the CT7 turboprop engine variants. Engine gearboxes are supplied for General Electric's new J79-17X engine development program, the CF6-80 commercial transport engine and for the

CFM56 turbofan engine, a joint project of General Electric and SNECMA of France. Gearbox components are also manufactured for Avco Lycoming's T53, T55, and ALF 502 engines.

The company fabricates the transmission and components for the Boeing Vertol CH-46 helicopter, transmission gears for the Westland Lynx helicopter (UK) and gear box components for the Puma helicopter made by Aerospatiale of France.

- **Aviation Service** - Spar repairs and services aircraft components, sells aviation products and accessories, and overhauls helicopters.

Services cover engine and flight instruments; components of electrical, oxygen, navigational and autopilot systems; constant speed drives; accessory gearboxes; and components for flight control and heating systems. Customers are military and commercial operators in Canada, the US, Mexico, and Central and South America. A large part of Spar's business is with 17 aircraft equipment manufacturers in North America and Europe, which have appointed the company as a Canadian warranty and service station for their products.

For helicopters, Spar provides an authorized customer service facility for Bell, Aerospatiale and Hughes. Services include the sale of parts and accessories, the repair and overhaul of mechanical, hydraulic and avionic components, rebuilding and maintaining airframes, and providing field service. Customers are located in Canada, the US, Mexico, Central and South America, and Indonesia.

- **Remote Manipulators** - A major project being completed at Spar is the production of the Remote Manipulator Systems (RMSs) for the US Space Transportation System. This contract awarded in 1979 calls for the delivery of three systems to the National Aeronautics and Space Administration (NASA) through 1984. Canadarm, the original RMS, was successfully tested for the first time on the Space Shuttle "Columbia" in November 1981 and continues to perform flawlessly on space flights. It was produced in Canada under the agreement between the National Research Council of Canada (NRCC) and NASA. Spar was the prime contractor to NRCC for the design, development and manufacture of this flight system.

Since 1980, Spar has been working on a contract from Ontario Hydro to design a remote manipulator and control system to replace and repair fuel tubes in nuclear reactors. In addition, Spar, Ontario Hydro and the Canadian Fusion Fuels Technology Program are engaged in the concept definition stage of a project to apply remote manipulator technology to the Tokamak fusion reactor project in Princeton, NJ.

Average Work Force: Engineers & Technicians - 600
Others - 1400

Gross Sales: 1983 - \$220M
1984 - \$191M

Keywords: Airframe Components, Antennas, Communications, Computer Produced Maps, Controls, Digital Mapping, Engine Components, Gear Boxes, Ground Stations, Helicopter Subsystems, Infrared Instrumentation, Mapping, Mechanical Arms, Remote Sensing, Satellite Subsystems, Satellites, Structures, Transmissions, R&O (Aircraft), R&O (Avionics), Remote Manipulator Systems.

Revised: Sep 85

SPARTON OF CANADA Ltd

Code: SOC

Address: P. O. Box 5125, Terminal A
100 Elm St
London, Ontario, Canada N6A 4N2

Contact: Mr. Lawrence R Staszak, President & General Mgr -
(519) 455-6320

History: Sparton, incorporated under Federal charter in 1930, is a wholly owned subsidiary of Sparton Corp, Jackson, MI.

Capability: Sparton specializes in the development, engineering, and manufacture of specialized electronic products for the military, industrial, and Original Equipment Manufacture (OEM) markets. Their R&D activities include development of a directional command active sonobuoy, new improved low noise passive sonobuoys, line array sonobuoys, depth-compensated ring shell acoustic projectors, and switch-mode electronic power supplies.

Sparton's Engineering Department staff covers professional disciplines of electrical/electronic engineering, mechanical engineering, physics, hydrodynamics, and hydroacoustics. They are experienced in the preparation and management of engineering projects from proposal through to implementation (development, specifications, testing, and production).

Sparton of Canada Ltd is a qualified producer meeting the requirements of DND 1015 and US MIL-Q-9858A Quality Assurance Programs. There is a resident military QC detachment on the premises. Sparton is cleared by DSS Industrial Security for projects up to SECRET classification. Current product lines are active and passive sonobuoys for military customers, and switch mode and linear power supplies for large and small computer systems.

Average Work Force: Production: - 150/200
Engineering Dept: PhD - 2
MSc - 5
BSc - 10
Tech - 18
Others - 7

Gross Sales: No Data

Plant Size: 170,000 sq ft

Equipment: Sparton's engineering facilities include fully equipped laboratories, hydrodynamic test tank, RF shielded rooms, computer terminal access to a wide range of engineering software including FF2E, SPICE and OSCAR; and two IBM 370 systems and two Perkin Elmer Corporate computers.

Experience: Sparton is a supplier of passive sonobuoys to the Canadian Government; Range Only (RO) active sonobuoys (AN/SSQ-47B/522) to the Canadian Government, to the US Navy, and to other overseas users; OEM supplier of various types of regulated power supplies to Canadian manufacturers; responsible for the development of the Canadian Command Active Sonobuoy System for the Canadian Government; is now in advanced development of the Directional Canadian Command Active Sonobuoy (DICANCAS) for the Canadian Government; and is also manufacturing heavy duty depth compensated underwater Ring Shell Sound Projectors. Applications for the latter device are anti-submarine warfare (ASW) crew training, dipping sonar, and scientific investigations of ocean sound propagation characteristics or sound detection systems.

Keywords: Sonobuoys; Hydrophones; Power Supplies; Active Sonobuoys; Passive Sonobuoys; Command Active Sonobuoys; Underwater Ring Shell Sound Projectors; Acoustic Sensing; Environmental Sensors; Geophysics; ASW.

Revised: Oct 85

SPECIALIZED WELDING & FABRICATION Ltd

Code: SWF

Address: 2222 South Sheridan Way, Unit #10
Mississauga, Ontario, Canada L5J 2M4

Contact: Mr. Peter M Draycott, Vice President & General Mgr
- (416) 823-4080

History: Specialized Welding and Fabrications Ltd is a Canadian owned company founded in 1964.

Capability: Specialized Welding and Fabrication Ltd provides a special service of welding, custom fabricating, and radiographic and fluorescent penetrant inspection to the aircraft and allied industries. The company was founded by the two major share holders whose life-time experience in aircraft manufacturing, servicing, inspection and tool design, provided the foundation upon which this company was established. Working to quality controls and procedures designed specifically to meet the requirements of the Department of National Defense, and the Department of Transport, Air Services Branch, ensures that product quality is always acceptable. The exceptional skill and versatility demanded of the staff is achieved through in-plant training and the experience of working with a wide variety of aircraft materials. Only fully certified material is used and all shipped material is certified as having been processed and inspected to the appropriate specification.

Average Work Force: Management and Engineers - 2
Accounting - 1
Production - 3
Inspection - 1

Gross Sales: 1984 - \$250K
1985 - \$300K (Est'd)

Plant Size: 3,000 sq ft

Equipment: Welding - 300 amp AC/DC welding machines, Cobramatic GMAW machine; Fabricating - Shear, press brake, notcher, turret punches, drill press, sanding equipment and hand tools; Inspection - Westinghouse 250Kv constant potential X-Ray machine, Picker 150Kv X-Ray machine, and fluorescent and dye penetrant equipment.

Experience: Present customers include: Aeroquip (Canada) Inc, Air Canada, The de Havilland Aircraft of Canada Ltd, Dowty Equipment of Canada Ltd, Garrett Manufacturing Ltd, Genaire Ltr, IMP Group Ltd, Aerospace Division Spar Aerospace Ltd, Tube-Fab Ltd, Wardair Canada Inc, and Walbar of Canada Inc. Much of the work for these companies is under government contract.

Keywords: Radiographic Penetrant Inspection; Airframe Components; Fluorescent Penetrant Inspection; Engine Components; Welding; R&O (Components); Manufacturing (Components); Inspection; X-Ray Inspection.

Revised: Aug 85

SPERRY Inc Aerospace and Marine Group

Code: SPE

Address: Highway 17, P. O. Box 1300
Rockland, Ontario, Canada K0A 3A0

Contact: Mr. Ron Muir, General Manager - (613) 446-6011

History: Sperry Inc is a wholly owned subsidiary of Sperry Corp of the US. They started design, development and manufacturing in Canada in 1951.

Capability: Sperry Aerospace and Marine Group is primarily involved in the design, development and manufacture of Horizon Reference Systems, Air Traffic Control Systems, Time Division Multiplexers and Computer Aided Simulated Training Systems.

Sperry is also engaged in the logistic support, modification and repair & overhaul of airborne radar and all types of avionic systems including air data computers, flight directors and gyros.

Sperry's Air Traffic Control Systems are fitted at all control towers in Canada. The Horizon Reference Systems are fitted on all helicopter carrying Canadian destroyers, and are presently in quantity production for the US for use on the LAMPS III Program.

Sperry's facilities are approved under Canadian National Defense Quality Assurance, and staff resources permit Sperry to cover the broad areas of Integrated Logistic Support (ILS) systems management, software design, reliability and maintainability analysis, configuration control and training.

Average Work Force: Engineers - 20
Assembly - 120
Quality Assurance - 15
Field Service & Support - 30
Others - 100
TOTAL - 285

Gross Sales: 1984 - \$19.3M
1985 - \$19.9M

Plant Size: 89,000 sq ft
53,000 sq ft (added in 1981)

Equipment: Complete electronic assembly including semi-automatic printed wiring assembly capability. In-house computer systems include Sperry (Univac) and "Sperry Link".

Experience: Sperry's present customers include: The Canadian Government National Defense, Ministry of Transport (Air), Ministry of Transport (Coast Guard), and Royal Canadian Mounted Police; the US Government - DOD (Navair); and other local industry - other US units of Sperry, Canadian National Telecommunications, Aeritalia (Italy), and Canadian Aircraft operators including CP Air. Sperry is interested in doing business with the US Coast Guard.

Keywords: Horizon Reference Systems; ATC Systems; Time Division Multiplexers; Multiplexers; Integrated Logistics Support; Marine Diesel Simulators; Marine Simulators; R&O (Avionics); R&O (Radar); Training Systems; Simulation (Training).

Revised: Aug 85

SPERRY Inc Defense Products Group

Code: SDP

Address: 85 Albert St, Suite 1505
Ottawa, Ontario, Canada K1P 6A4

Contact: Mr. J F Squires, VP and GM, Canadian Operations - (613) 234-3321

History: Sperry's Winnipeg Manufacturing Plant was established in 1977 as a result of the procurement policy of the Canadian Department of National Defense as it related to the CP-140 Aurora Patrol Aircraft. Rapid expansion of areas of endeavor required a new facility which started operation in 1981. The initial plant charter was to assemble components for the Sperry CP-140 Computer which is the heart of the sophisticated computer technology developed for submarine detection and also deployed on the US Navy P3C and S3A Aircraft.

A Systems Engineering and Marketing facility was established in Ottawa in December 1980 to assist in the integration of the Engineering Systems requirements for the Canadian Patrol Frigate Program with hardware design, software development, manufacturing, and system integration efforts in Winnipeg. In response to sustained growth, Systems Engineering was expanded and moved, in accordance with industrial benefits requirements, to a Montreal facility in 1984, and a Canadian head office was established in Ottawa in 1985.

Capability: Sperry's charter has expanded from assembly to complete design, development, test integration and support with established Systems engineering, Product Engineering, Logistics and Field Engineering resources, and a staff of over 500 employees.

The Winnipeg facility has the latest in high-technology manufacturing, test, engineering and office facilities and is qualified to the Department of National Defense Quality Assurance Specification 1015. Winnipeg has the product manufacturing and support mandate for the An/UYK-502 microcomputer, the AN/UYC-501 SHINPADS® (Shipboard Integrated Processing and Display System), Serial Data Bus and the VIPS (Voice Information Processing Station). Manufacturing activities include printed circuit assemblies, power supplies, coil wound products, core memories, maintenance consoles, switches and harnesses.

The Montreal organization has a complete software development capability to bring to bear on Defense programs. There is a basic software analysis capability to support system design with particular expertise in ASW, EW, and Navigation. Test is backed by an extensive software simulation capability and an organization dedicated to the development of test documentation and test conduction. The complete process is overseen and audited by a Software Quality Assurance group under the umbrella of the associated MIL-spec requirements. In conjunction with the development capabilities, a publications group with an automated word processing capability is in place to support both unclassified and classified activities.

Key personnel in all facilities are cleared to the level of SECRET (Canadian) and many individuals hold NATO endorsements.

Average Work Force: Engineers - 140
Manufacturing - 260
Administrative - 128

Gross Sales: 1984 - \$18.0M
1985 - \$28.0M

Plant Size: 6,000 sq ft (Ottawa Facility)
13,500 sq ft (Montreal Facility)
44,000 sq ft (Winnipeg Facility)

Equipment: Sperry employs such equipment as Computer Aided Design Tools (hardware and software); Word Processors; Personal Computers; Environmental Test Chambers; Automated Card and Final Test Systems; Flow Solder Machines; Component Lead Formers; Semi-Auto Dip Inserters; and Static Controlled Work Stations.

Experience: Sperry Defense Systems is a major supplier of high technology, reliable and ruggedized information handling products and systems. Customers include the Canadian and US Military, US industry, and International military procurements.

Keywords: Computers; Computer Parts; Measurement & Control Systems; Distributed Processing; Local Area Networking; Vibration/Acoustic Intensity Measurement; Multi-Layered Board Assemblies; Pre-Wired Board Assemblies; PC Board Design; PC Board Fabrication; Power Supplies; Video Display Systems; Surveillance/Navigation; Core Wound Products; Core Memory Arrays; Magnetic Tape Transports; Maintenance Consoles; Harnesses; Switches; Information Handling Products; Navigation; Microcomputer; Software Services; Integrated Processing & Display Systems.

Revised: Sep 85

SPIECE ASSOCIATES

Code: SAS

Address: 17 - 18 Windmill Way
Winnipeg, Manitoba, Canada R3R 3A1

Contact: Mr. E L Spiece, President - (204) 895-7743

History: Spiece Associates was founded in 1979 to provide task-oriented management and consulting services to the global high-technology industries.

Capability: Spiece Associates is capable of providing high technology companies and government agencies involved with high technology industries with a full selection of task-oriented management and management consulting services. Services provided include - Project Management, Strategic Planning, Project/Program Audits, Project Risk Analyses, Economic Feasibility Studies, Cost Location Studies, Marketing Research, Industrial Development Assistance, Proposal Preparation, Preparation of Business Plans, etc. Spiece Associates personnel are also available for Marketing, Strategic Planning and Business Development management positions within governments and industry on a short term contract basis.

Average Work Force: MBAs - 2
BSc - 1
Other - 1

All personnel are experienced in the aerospace and other high technology industries.

Gross Sales: 1984 - \$0.3M

Plant Size:

Equipment: The company is well computerized with a complete range of business application software

Experience: Aerospace business clients include prime manufacturers, component and systems manufacturers, service companies and government departments and agencies in Canada, the US and Western Europe.

Keywords: Management Consulting; Project Management; Risk Analysis; Economic Studies; Market Research.

Revised: Aug 85

SPILSBURY COMMUNICATIONS Ltd

Code: SCS

Address: 120 East Cordova St
Vancouver, British Columbia, Canada V6A 1L1

Contact: Mr R E Macpherson, International Sales Manager - (604) 684-4131

History: Spilsbury is a Canadian owned company incorporated in 1941. A branch office is located in Halifax, Nova Scotia. There are no US subsidiaries.

Capability: Spilsbury specializes in radiotelephone equipment, antennas, and navigational aids for long range frontier and coastal marine communications. The company develops and manufactures HF single sideband radio communication equipment for land and marine use, fixed and mobile. They are also concerned with the overall concept of providing a system of communications rather than with the manufacture of specific units. One of the major areas of innovation in this field has been the design of a unique series of antennas which increases the effective communicating power of a radio by ten to fifteen times over a conventional installation. These Spilsbury, center-loaded, variable tuned, HF, whip, antennas are used in portable, mobile and fixed service on land, sea and air. In addition to the above, Spilsbury manufactures VHF/FM radiotelephone equipment for mobile and fixed station land or marine use. Other specialized equipment includes low frequency, non-directional beacon systems for medium range aeronautical or marine navigation installations.

Average Work Force: Professional (Technical) - 16
General Assembly - 20
Others - 35

Gross Sales: 1984 - \$4.1M
1985 - \$5.0M

Plant Size: 18,000 sq ft

Experience: Spilsbury equipment is used in over 50 countries including the US.

Keywords: Communications; Radiotelephone Equipment; Antennas; Navigational Aids; HF Radios; Single Sideband Radios; HF Whip Antennas; Variable Tuned Antennas; Center-Loaded Antennas; VHF/FM; Beacon Systems; Low Frequency Beacon Systems; Non-Directional Beacon Systems; Antennas; Fixed Radios; Mobile Radios.

Revised: Aug 85

STANDARD AERO Ltd

Code: SAL

Address: 33 Allen Dyne Road
Winnipeg International Airport
Winnipeg, Manitoba, Canada R2Y 2G6

Contact: Mr. A C Daily, Dir of Marketing & Sales - (204) 775-9711

History: Standard Aero is Canada's largest independent overhauler of aircraft engines. The company is a wholly owned subsidiary of Federal Industries Ltd, a Canadian holding company. It was started in 1935 as an overhauler of reciprocating engines. Since 1960, it has been involved in the overhaul of turbine engines.

Capability: Standard Aero Ltd is involved in the overhaul of both piston and turbine aircraft engines. The company is an authorized Service Center for Allison Gas Turbine Operations, (Allison 250 and T56/501) and for the Lycoming T53, T55, and Alt 502 engines. In addition, the company overhauls the GE T58, the Garrett 85 Series APU'S, and all associated engine accessories.

Standard Aero is an authorized distributor and overhauler for Continental and Lycoming piston engines as well as overhauling the Pratt & Whitney R985, R1340, and R800 series radial engines. Piston engine related accessories are also overhauled.

The company overhauls the above mentioned engines for commercial operators, the Canadian Armed Forces and as such, has a complete engineering, quality control and parts remanufacturing operation. A complete field service capability is also provided to the companies world-wide customer base. Standard Aero Ltd has a complete test facility for both piston and turbine engines.

Average Work Force: Engineers - 24
Mechanics - 150
Others - 440

Gross Sales: 1984 - \$71.3M
1985 - \$80.0M (Est'd)

Plant Size: 265,000,000 sq ft

Equipment: Complete in-house machining operation including metal and plasma spray, turning, grinding and EDM equipment.

Experience: The company provides service to the Canadian Government, most helicopter operators in Canada, as well as those fixed wing operators using the Allison 501 engine. The company also deals with customers around the world and has service centers in England, Italy and Singapore.

Keywords: Engine Overhaul; Aircraft Engine Overhaul; R&O (Engines).

Revised: Aug 85

SUPRECA Inc

Code: SPI

Address: 1050 St Amour Street
Montreal, Quebec, Canada H4S 1J2

Contact: Mr. Anthony Slator, Sales Manager - (514) 337-4551

History: Supreca Inc is a privately-owned, non-union manufacturer of precision investment castings. Established in 1953 under the name Supreme Precision Castings, the company relocated in 1977 to a newly equipped facility close to Dorval Airport, and has been under new management since Sep 1983.

Capability: Supreca Inc is equipped to cast in ferrous and non-ferrous alloys using both the ceramic shell and solid mould processes. With an accentuation on quality, they manufacture castings to exacting specifications for the aerospace, military, electronic and electronuclear industries. They provide in-house radiography and fluorescent penetrant inspection and those outside services which their customers require including heat treatment, destructive and non-destructive testing. Experienced and fully equipped sources are available to manufacture all required tooling. A demanding Quality Assurance Program is in operation, managed and executed by personnel with professional qualifications in all relevant non-destructive testing and mechanical inspection disciplines. Quality approvals have been accorded by most major North American aerospace manufacturers and Canadian electronuclear manufacturers. They are approved to DND 1015, MIL-I-45208 and NATO AQAP-1.

Average Work Force: Engineers/Techs - 9
Clerical - 4
Others - 40

Gross Sales: 1984 - \$2.4M
1985 - \$2.8M (Est'd)

Plant Size: 20,000 sq ft

Experience: Customers include - Atomic Energy Canada Ltd, Bata Engineering, Bell Helicopter Textron Inc, Bendix Corp, Boeing Co, Canadair, Canadian Armed Forces Supply/Services, Canadian Marconi Co, deHavilland Aircraft Canada Ltd, General Electric Co, General Dynamics, Gould Inc, Hazeltine Corp, Hughes Aircraft Co, Litton Systems Canada Ltd, McDonnell Douglas Corp, Menasco Aerospace Ltd, Northrop Corp, Pall Corp, Parker-Hannifin Corp, Raytheon Co, Rohr Industries, Stewart-Warner Corp, Strite Industries, Teleflex Inc, and Westinghouse Canada Inc.

Keywords: Precision Investment Castings; Investment Castings; Castings (Investment); Ferrous Castings; Non-ferrous Castings; Nuclear Valves; Reactor Components; Communications Equipment (Castings); Commercial Hardware.

Revised: Aug 85

SHL SYSTEMHOUSE INC

Code: SYS

Address: 99 Bank St, 3rd Floor
Ottawa, Ontario, Canada K1P 6B9

Contact: Mr. Bob Barker, Manager, Marketing Services - (613) 236-9734

History: Systemhouse is a public Canadian company incorporated in mid-1974. The head office is located in downtown Ottawa while branch offices are located across Canada (Vancouver, Edmonton, Calgary, Regina, Winnipeg, Toronto, London, Montreal, and Halifax) and in the US (Chicago, San Francisco), with the US subsidiary located at 1655 North Fort Myer Drive, Arlington, VA telephone: (703) 276-0500.

Capability: *The Bridge Between Users and Technology* - Systemhouse has always been dedicated to one principal business, the business of successfully making computer technology serve specific users.

Systemhouse began operations in 1974 with the object of becoming a bridge between the technology and the user. In forming this bridge, we continually strive to maintain a complete understanding and awareness of advances in software and hardware technology. Over a decade of serving end users makes us keenly aware of the evolution of their business requirements.

In recent years, a host of actors has made the process of bringing users and technology together even more complicated and demanding. As computers have continued to become less expensive and more accessible, users have become more sophisticated in their requirements, and their applications more varied. The user is now turning more and more to systems integrators who not only develop software systems, but also assemble software and hardware products from various manufacturers to create customized solutions for their needs.

From the beginning, we have sought to be held accountable for all aspects of the delivery of successful computer-based systems to our clients. As a systems integrator, we develop, select, and configure the most appropriate solution and assume prime responsibility for delivery and, in some cases, operations of all the system components. In all cases, we endeavor to combine our knowledge of the client's business, our technical expertise, and our project management skills, with the appropriate hardware and software tools to create and implement the optimum solution for the client.

The Systemhouse Methodology - The mainstay of our bridge and the vehicle by which we transfer useful technology to clients, is our proprietary system delivery methodology. This methodology has been tested and proven again and again, as the most effective way to introduce new systems. The process begins with a clear general definition of the client's requirements and moves through a feasibility study which determines the viability of the proposed project to a detailed analysis of the system content and scope. At the design stage, the "how" of the system including formats and procedures, is drawn up. System development entails the creation or modification and testing of computer programs to meet design specifications, implementation procedures for hardware/software installation, user training and data conversion are defined and applied. Finally, an evaluation is conducted to assess the performance of the system.

The Systemhouse methodology, although a logical, rational blueprint, is nonetheless dynamic. Depending on the options which fit a particular problem, some phases of the process may be compressed or overlapped. This would depend on whether they include packaged or custom software or a combination of both and on the tools and techniques being used, such as fourth generation programming languages, application prototyping, structured analysis, etc. At all points, client participation is actively encouraged.

Within this framework, we can apply the latest tools and techniques in data base management and productivity aids to arrive at solutions which are most appropriate to a client's business needs. Comprehensive knowledge of both technology and the long range objectives of a client ensure that a Systemhouse solution is designed to anticipate and accommodate changes in the computer industry and changes in a customer's business environment.

Our methodology is one factor distinguishing us from our competitors in the data processing industry. Whereas companies with a narrower focus - hardware vendors, consultants, software firms - can perform some phase or phases of the system life cycle, Systemhouse takes a project from start to finish. We deliver total solutions.

Command Systems - Systemhouse develops software to MIL SPEC standards using a proven system engineering and project management methodology. Each phase of a project is supported by technical documentation which includes - software development plan, software functional specification, software design specification, module specification(s), test software design specification, test plan and procedures, code lists, review reports, test reports, reference manuals, user manuals and maintenance manuals. Software quality assurance programs stress through

design reviews, code walkthroughs and final audits to ensure that every project meets exacting standards of quality and performance.

SHL's custom software engineering environment focuses upon (but is not restricted to) VAX technology using a rigorous Program Design Language (PDL), and ADA, Assembler, C, Fortran or Pascal as target-system implementation languages. Our development facilities include dual VAX 11/750 VAXCluster systems operating under VMS or UNIX emulation, a Codata CTW300 (68000) and various configurations of microcomputers.

Systemhouse is approaching the completion of a radar display system using Norcontrol equipment for Halifax Harbour. Systemhouse will also deliver at least \$3 million of software to Raytheon, which is updating the airport radar facilities across Canada.

In Summary - Our business approach is, and has always been, to understand our client's requirements and then to bring together the appropriate combination of hardware, software, and professional working skills in a disciplined manner to create an effective solution and to fully support the implementation of systems into our client's business operations. This involves more than understanding what the client wants the resulting computer system to do. We must also understand our client's objectives and aspirations, worries, and concerns. Systemhouse consists of more than talented computer programmers and experts in the latest hardware and telecommunications technologies. We have specialists in general management, organizational analysis, project management, user education and training, and human factors engineering. Our system integration services extend far beyond those merely required to create working computer programs.

Average Work Force: 550 employees (80% professional)

Gross Sales: 1984 - \$36.0M
1985 - \$46.0M

Experience: Systemhouse clientele includes US Federal Government, US Navy, US Army, State of Alaska, State of North Dakota, Canadian Federal and Provincial Governments, the Australian Government, and private industry. Approximately 25% of the sales are to the US.

Keywords: Commercial Systems Integration; Long Range Systems Planning; Technology Consulting; Information Management; System Design; Custom Software Development; Project Management; Value Added Reseller; Training & Education; Command & Control; Software Package Search & Evaluation; Software Package Customization.

Revised: Sep 85

TARGA ELECTRONICS SYSTEMS Inc

Code: TES

Address: P. O. Box 8485, 3101B Hawthorne Road
Ottawa, Ontario, Canada K1G 3H9

Contact: Mr. Peter Fillmore, Director of Marketing -
(613) 731-9941

History: Targa Electronics Systems Inc is a Canadian company founded in 1981.

Capability: Targa Electronics is the manufacturer of ruggedized, solid-state mass storage systems. Targa products provide small, low powered, mass memory recording systems for hostile environments. By eliminating the use of mechanically rotated memory and substituting solid-state technology (e.g., bubble technology, E² PROM, CMOS RAM, etc). Targa is able to meet the demands of applications where the quality and value of data is of paramount importance. Their equipment is ideally suited to handle either the rigors of field work (land, air and marine mobile), or the factory floor environment, while offering the convenience of small removable media cartridges of large capacity.

Targa offers four systems to meet different requirements:

The DR-series data recorders are self-contained bench-top or rack-mounted data storage systems with a variety of interfaces, software protocols and options.

The FDE-series solidrive emulators are solid-state memory units that are compatible with most standard floppy disk drives.

The CH-series interface units are suitable as low cost data storage components for integration into systems.

The "Solidrive 1" Bubble Memory Cartridge System for IBM Personal Computers, XT, 5531, 7531, and 7532.

All systems come with removable memory cartridges that allow convenient transport of data. They are available in 128 kByte up to 512 kByte versions.

Targa is also able to supply custom designs where the requirements are not met by the existing range of products.

Average Work Force: Engineering - 8
Manufacturing - 5
Others - 7

Gross Sales: 1984 - \$600K
1985 - \$1.3M

Plant Size: 2,500 sq ft

Equipment: In-house computer systems include DEC, IBM, Hyperion, and Hewlett-Packard. Test equipment includes circuit emulation oscilloscopes, etc.

Experience: Targa products are presently used by automobile manufacturers in mobile onboard vehicle tests, by the Canadian Government for both airborne and shipborne survey work, by portable computer manufacturers for ruggedized peripheral mass storage, and by offshore technology companies in support of oil well drilling.

Keywords: Harsh Environment Equipment; Ruggedized Mass Storage Systems; Removable Media Mass Storage Systems; Solid State Memory; Data Recorders; Data Loggers; Floppy Disk Emulators; Peripheral Mass Storage; Mass Storage Systems; Computer Mass Memory; Bubble Memory.

Revised: Sep 85

TEKLOGIX Inc

Code: TEK

Address: 1199 Fewster Dr
Mississauga, Ontario, Canada L4W 2A9

Contact: Mr. J R Coutts, President - (416) 625-5673

History: Incorporated in 1967, Teklogix Inc is Canadian owned, privately held and all shares are owned by active participants. The company was formed to provide special hardware and software for minicomputer users and has evolved with this industry.

Capability: Special hardware and software systems for process control, material handling, machine control, plant and warehouse control, and digital data communications systems. Products include digital radio links for remote control of cranes and locomotives, radio linked mobile data terminals for use aboard forklift trucks, etc. Primary capabilities are in systems design and engineering, development, production and related R&D. Normal Spec Level - CSA level 4. Mil Spec capability in selected areas.

Average Work Force: 30 (including Engineers, Mathematicians, Programmers, Technicians, Production, and Support Staff)

Gross Sales: 1984 - \$1.6M
1985 - \$2.8M

Plant Size: 18,000 sq ft

Equipment: Normal electronic lab and production equipment, including communication test sets. In-house data processing equipment used for systems design, development, and support include PDP11/84, PDP11/05 (two), PDP11/23, PDP8 and all normal peripheral equipment.

Experience: Sort and conveyor control systems for the Canada Post office in Calgary, Toronto, Montreal and Halifax; Steel plant control systems for LASCOR (Canada), Irish Steel Ltd (Cork, Ireland), Chaparral Steel (Midlothian, Texas), and Raritan River Steel Co (New Jersey); area paging control system for Bell telephone; digital radio link systems for the Steel Company of Canada, Aluminum Company of Canada, and Boeing Aircraft; warehouse and material handling systems for Kellogg-Salada, Dylex and Dominion Stores; Warehouse automation systems for Digital Equipment Corp (Phoenix), Defense Logistics Agency (Richmond), and the Liquor Control Board of Ontario.

Keywords: Software Services; Automation; Process Control; Mobile Data Design; Machine Control; Control Systems (Process); Communications (Digital); Mobile Terminals.

Revised: Aug 85

TELECONSULT Ltd

Code: TCL

Address: 402 W Pender Street
Vancouver, British Columbia, Canada V6B 1T6

Contact: Mr. N M Lopianowski, Principal - (604) 684-1144

History: Teleconsult Ltd is an independent firm of engineering consultants providing a full range of engineering services in all major areas of telecommunications. The firm was the result of a merger between Mr. N M Lopianowski and Mr. A C Gardiner. It was incorporated in 1974 and operated under the name of Cantel Engineering Associates Ltd until 1985 when the name was changed to Teleconsult Ltd.

Capability: The scope of work performed by Teleconsult includes needs analysis, marketing studies, feasibility studies, advisory studies, system engineering and design, cost estimating, specifications, tender processing and evaluation, construction supervision, project management, acceptance testing, instructional services, maintenance philosophies and planning.

Teleconsult's areas of technological specialty include Satellite Communication (thin route and heavy route), Long and Short Haul Transmission Systems (microwave, UHF, VHF, coaxial, and fiber for voice, data, and video), Telephony (network design, switching, cable distribution), Business Communications (PBXs, voice services, data integration), Multiplex (FDM & TDM), Broadcasting (AM, FM, Television, CATV), Supervisory & Control Systems, Cable Carrier, Telegraphy, Vehicular Mobile Systems, Data Transmission Systems, Interface with Communication Systems, Electromagnetic Compatibility Studies, and Special Application Communication Systems (law enforcement, public safety, municipal government, recreational services, libraries, schools, hospitals, urban transit, etc).

Average Work Force: Professionals - 6
Administrative - 2

Gross Sales: 1984 - \$0.70M
1985 - \$0.65M

Plant Size: 2,500 sq ft

Equipment: Xerox 1035 duplicating system, Xerox 850 word processing system, five IBM PC computers networked, computer

aided drafting software, letter quality and graphic printers, extensive capability in word processing, accounting, engineering and project management programs, terminal access to Telex, electronic mail (Envoy100), and public domain data bases (iNet).

Experience: Teleconsult has served a diverse domestic and international clientele including government agencies, transportation authorities, telephone utilities, law enforcement and safety agencies, industrial enterprises, cable television operators, broadcast stations, etc. Some customers include: Alcan Chemical and Smelting Works, Asian Development Bank, Canadian International Development Agency, Department of Communications, Canadian Police Information Center, GTE Sprint, Knowledge Network of the West Communications Authority, Microtel Ltd, North-westTel Inc, Telephone Organization of Thailand, Telesat Canada, USAF (sub consultant of Bell Lavalin), and Yukon Territorial Government.

Keywords: Communications Consultants; Consultants (Communications); Feasibility Studies; Needs Analysis; Advisory Services; System Engineering & Design; Cost Estimating; Project Management; Acceptance Testing; Instructional Services; Maintenance Planning; Studies; Transmission Systems; Terrestrial Communications; Satellite Communications; Broadcasting; Supervisory & Control Systems; Cable Carrier; Telegraphy; Telephony; Vehicular Mobile Systems; Business & Office Communications.

Revised: Nov 85

TELEMUS ELECTRONIC SYSTEMS Inc

Code: TEL

Address: 310 Moodie Drive
Nepean, Ontario, Canada K2K 8G3

Contact: Mr. Paul A Racine, VP, Marketing - (613) 726-1102

History: Telemus Electronic Systems was incorporated in October 1982 in Ottawa, Canada to produce high technology MIC products as well as to design and manufacture EW products for the ECM and ESM markets, both in Canada and the US.

The company has a broad base of experienced personnel involved in taking advanced microwave and ECM products from concept through to delivered hardware. The capabilities include RF hardware design and development, packaging, software support and design through analysis and simulation. Because of Telemus' experience in EW, the question of offsets can be addressed by a 100% owned and managed Canadian company.

Capability: Telemus Electronic Systems Inc is involved in the design and manufacture of high speed multi bit "smart" digital RF memories for use in either airborne or naval systems. These systems are designed for applications where ships or aircraft require an electronic countermeasure capability in a hostile RF environment. Other products are lower cost "Loopless Memories" for less sophisticated ECM applications. Telemus additionally manufactures and ESM based product, the high speed radar "signature" analyzer for use in ultra fine grain radar signal analysis.

The company is currently developing products and technologies associated with microwave expendable jammers for airborne applications. To complement the defense products, Telemus carries out custom modeling and analysis of EW scenarios and emitter threat analysis.

A new technology introduced by the company is the frequency "Halver", an RF module that provides RF division by 2, 4, 8, 16, 32, etc., without the use of local oscillators. This product leads to custom products in the area of RF division modules for ECM systems, synthesizers and frequency counters.

Average Work Force: PhD - 3
Engineers - 12
Others - 11

Gross Sales: 1985 - \$1.2M

Plant Size: 10,000 sq ft

Equipment: Equipment includes - MIC production lab, Tempest shielded room, DEC microvax II computer, Photo lithography lab, Micro soldering and micro bonding equipment, microwave computer aided design system (MICAD), Microwave phase and amplitude network analyzer, Microwave scalar network analyzers, Sweepers and sources, Spectrum analyzers (20 GHz), Logic analyzers, Microprocessor development system, and Oscilloscopes, power meters, and counters.

Experience: Present customers buying both defense and microwave products include - Canadian DND, Sanders Associates, Lawrence Livermore, Ratheon, Hughes Aircraft, ATT Technologies, Decom Systems, and Texas Instruments.

Keywords: RF Memory (Digital); Loopless Memories; Radar Signature Analysis; ESM Products; ECM Jamming Products; Coherent Countermeasures Systems; Custom Software; Frequency "Halver"; Coherent RF Division; Synthesizers; Frequency Counters; Microwave Prescalers; MIC Design & Production.

Revised: Sep 85

THOMSON-CSF SYSTEMS CANADA Inc (TCSC)

Code: TCS

Address: 350 Sparks St, Suite #406
Ottawa, Ontario, Canada K1R 7S8

Contact: Mr. Norman R A Smyth, President - (613) 053-3796

History: Thomson-CSF Systems Canada Inc is a Canadian company incorporated in 1984 with principal office in Ottawa, Ontario. TCSC's business is Systems Management. TCSC has been established to meet the needs of the Canadian, North American and world markets for the management and delivery of sophisticated complex systems and their associated logistics support.

Capability: TCSC has the resources, the multidisciplinary capabilities and the sophisticated business practices to respond to complex and functionally diverse requirements in aerospace, communications, command and control, marine and transportation for military, government, industrial, and commercial customers. With its Systems Engineering expertise, its software development capability, its logistics engineering tools, and its proven management know-how, TCSC is able to develop and deliver to its clients, systems which meet all performance, cost, schedule and logistics requirements. As a true Systems Management company, TCSC is not an equipment manufacturer, as such, it free to integrate equipment from any subcontractor which best meets the customer's needs.

TCSC is a subsidiary of Thomson-CSF, a member of the French based multinational corporation, Thomson-SA, that operates in over 80 countries. Thomson-SA is comprised of many branches, subsidiaries and operating division which develop a very extensive range of consumer products, electronic components, medical equipment, television equipment and scientific instrumentation, and the full range of defense, aerospace and government electronic systems. In 1983, Thomson-SA, with assets in excess of \$1.2 Billion, had revenues of over \$7 Billion and a work force of 107,300.

TCSC is staffed with a Canadian team of the highest caliber. The professional engineering staff are top level systems engineers with a successful track record in the management of major national and international programs. TCSC currently operates out

of 6,000 sq ft of office space that has a secure area which is equipped with a TEMPEST facility for housing equipment assigned to classified projects. Computers and office equipment are both owned and leased. Sufficient resources, people and infrastructures are in place to handle medium sized projects (\$100 Million).

Average Work Force: PhD - 1
Engineers - 8
Others - 2

Gross Sales: 1985 - \$1.0M (Est'd)

Plant Size: 6,000 sq ft

Equipment: Secure facilities, Tempest Room Apollo DN 550, IBM PC XTs, and VAX (Time Shared).

Experience: Present customers include various departments in the Canadian Government and industries based in Canada, the US and Europe.

Keywords: Systems Management; Systems Engineering; Program Management; Operational Analysis; System Studies; Effectiveness Evaluation; Logistics Engineering.

Revised: Sep 85

3-L FILTERS Ltd

Code: TLF

Address: 427 Elgin Street N
P. O. Box 371
Cambridge, Ontario, Canada N1R 5V5

Contact: Mr. Les Kadar, Mgr, Marketing - (519) 621-9949

History: 3-L Filters Ltd is a Canadian filtration system and cartridge manufacturing company founded in 1965 by the present owners, Mr. John Kadar and Mrs. Magdalene Kadar, president and vice president of the company. The company has a US plant located at 56 Harvester Ave, Batavia, NY.

Capability: 3-L Filters Ltd is primarily involved in the design and manufacture of aviation, marine, industrial and nuclear filtration systems, and filter cartridges. The aviation division products are micronic filters, fuel water separators, fuel monitors, fuses, nozzles, and refueling hoses for airports (fixed or mobile).

All Canadian airports, and some US and world-wide airports, refuel aircraft with 3-L equipment. The function of the 3-L system is to filter out the solids from jet fuel and to separate water from fuel guaranteeing clean dry fuel for the aircraft. 3-L provides domestic and world-wide service, product assurance, including reliability and maintainability analysis, documentation, testing and free training.

Average Work Force: PhD - 1
Engineers - 6
Others - 76

Gross Sales: 1984 - \$6.046M
1985 - \$6.250M (Est'd)

Plant Size: 55,300 sq ft

Equipment: Equipment includes in-house testing lab, and complete R&D facility with pressure vessel fabrication, metal forming, and welding and testing equipment. Other equipment includes cartridge manufacturing, pleating, winding, and knitting equipment, curing ovens and metal stamping, and a fully equipped machine shop.

Experience: Customers include oil companies such as Esso, Exxon, Shell, Gulf, Texaco, Petrocan, Mobil, Chevron, Sunoco, Petrosar and others; DOD, CP Air, Air Canada, Boeing, Delta Air, Westinghouse, General Electric, Pratt & Whitney, De Laval Turbines, and many other industries including the USAF.

Keywords: Refueling Systems; Filters; Separators; Fuel Monitors; Refueling Hose; Nozzles; Coalescer; Cartridges; Separator Cartridges; Fuses; Air Gas Separators; Water Purification Systems; Pressure Vessel Filters; R&O (Refueling Systems).

Revised: Sep 85

TIL-TEK Ltd

Code: TTL

Address: P. O. Box 550
Kemptville, Ontario, Canada K0G 1J0

Contact: Dr W V Tilston, President - (613) 258-2470

History: TIL-TEK Ltd is a privately-owned Canadian company founded in 1979 to conduct research and development in the field of antennas, filters, and related electromagnetic problems. TIL-TEK Manufacturing Incorporated is a wholly-owned subsidiary of TIL-TEK Ltd and manufactures all commercial antennas designed by the parent company.

Capability: TIL-TEK Ltd is involved in the design and development of antennas and related systems. Antennas have been designed for all common VHF and UHF bands and are currently being manufactured by its subsidiary company. TIL-TEK is extensively involved in the design and development of advanced EHF antenna systems at 22 and 44 GHz for various government agencies, as well as the design and manufacture of the HF antenna interface unit for the WISP experimental package in the US Space Shuttle program. Other developments include a 225-400 MHz 8 channel fast switching network and a 30-90 MHz RPV aircraft antenna.

Average Work Force: PhD - 1 (Plus 4 Consultants)
Engineers - 4
Others - 10

Gross Sales: 1984 - \$0.36M
1985 - \$0.58M (Est'd)

Plant Size: 5,000 sq ft

Equipment: RF test and measurement equipment from 100 kHz to 44 GHz. Use of Antenna Lab and Electromagnetics lab at the National Research Council of Canada.

Experience: TIL-TEK's customers include a number of government departments and commercial industries including - Communications Research Council, Defense Research Establishment (Ottawa), Dept of Communications, Dept of Transport, National Research Council of Canada, Canadian Broadcasting Corp, Alberta Government Telephones, Saskatchewan Telephone, Manitoba Telephone System, Canadian Astronautics Ltd, SR Telecom Inc, Farinon Canada Ltd, and Telletra Espanola.

Keywords: Antennas; EHF Antennas; Electromagnetics; Filters; HF Antennas; HF High Power Transformers; RF Subsystems; UHF Antennas; VHF Antennas; RPV Antennas.

Revised: Sep 85

TRACKER INDUSTRIES Ltd

Code: TIL

Address: 244 Jane St
Toronto, Ontario, Canada M6S 3Z1

(Mailing Address)
P. O. Box 1094, Station A
Toronto, Ontario, Canada M5W 1G6

Contact: Mr. Lou Fedyna, President - (416) 762-8744, 364-2943

History: Tracker Industries was incorporated in 1974. It is a wholly owned Canadian company with no other Canadian locations.

Capability: Tracker is engaged in custom design/prototyping/manufacture of analog/digital/microprocessor circuits and systems. Specifically, the company R&D areas include microprocessor/microcomputer application engineering, evaluation and specification.

Real-time control programming using assembly and high-level languages has been implemented for use in office and plant automation, data communications, data acquisition, process control, and local area networks.

Software Experience: Operating Systems - UNIX, OS-9, and MD-DOS. Languages - BASIC, APL, "C", FORTRAN, ADA, and Assembly (6809, 68000).

Hardware Experience: Microcomputer controlled data collection & control system, office and plant automation, local area network systems. IBM PC-XT, IBM 7456, HP 150, HP 9000, Motorola 6809, and 68000 CPU.

Present Activity: Industrial automation & control systems, data communications networks, LAN's, and Manufacturing Automation Protocol Standard (MAPS).

Average Work Force: Engineers - 5
Others - 2

Gross Sales: \$0.5M

Plant Size: 3,000 sq ft

Experience: Tracker Industries' clients include General Motors of Canada, Bell Canada, other corporations, universities, and the Federal & Provincial governments. Products include data communication networks, data terminals, microcomputers, local area networks (interfacing, systems design), and fiber-optics modems.

Keywords: Software Services; Consulting; Solid State Devices; Microprocessors; Interfacing; Network Systems; Programming; Environmental Programming; Avionics Programming; Data Communications; Data Acquisition; Monitoring Systems; Control Systems; Data Terminals; Systems Design; Telephone Communications; Transportation Control Systems.

Revised: Aug 85

TRIDEX SYSTEMS Inc

Code: TSI

Address: 190 Colonnade Road, Suite #202
Nepean, Ontario, Canada K2E 7J5

US OFFICE
8247 Lewiston San Antonio, TX 78250

Contact: Dr Cedric V W Armstrong, President - (613) 727-5255

History: Tridex Systems Inc is Canadian-owned and was incorporated in 1979. It has one Canadian office and one US office. The company started as a consulting company, but branched out into both hardware and software engineering and development. Its current R&D and product development activities will lead to the introduction of a series of products in the parallel processing and fault-tolerant areas in the near future.

Capability: The company's technical expertise is in research and development and systems engineering related to computer systems. Areas of expertise include distributed systems, parallel processors, and fault-tolerant systems for various application areas.

Average Work Force: Technical Staff - 6
Administration - 2

Gross Sales: 1984 - \$330K
1985 - \$350K
1986 - \$500K (Est'd)

Plant Size: 1,200 sq ft

Equipment: Two personal computers for word processing and laboratory use.

Experience: Major projects have included the development of a fault-tolerant digital signal processor for space-based radar, the design of a fault-tolerant distributed computer system for space applications, and assistant in evaluating the concept of space-based radar. Previous projects have included the development of a high-speed data acquisition system for low-angle tracking radar, a multiprocessor simulator for multitarget tracking studies, and the evaluation of parallel fault-tolerant computer systems for use in defense applications. In addition, training course development and course delivering has also been provided to a number of customers.

Keywords: Computer Systems; Systems Engineering; Fault-Tolerant Software; Digital Signal Processor; Radar Processing; Training (Computer Systems).

Revised: Oct 85

UDT INDUSTRIES Inc

Code: UDT

Address: 2125 East, St-Catherine East
Montreal, Quebec, Canada H2K 2H9

Contact: Mr. Alberto Stagnaro, Purchasing Agent -
(514) 526-9454

History: UDT was incorporated in 1942 under the name of Universal Die & Tool. Name was changed to UDT Industries Inc in 1975 to reflect more accurately their machine shop business. The company is Canadian owned and there are no other Canadian or US subsidiaries.

Capability: UDT's major product is machined parts ranging from light-medium to hard core items, such as fittings, splice plates, hinges, bulkheads, slat-tracks, spars, dog legs, spar caps, leg assemblies, etc., made from plate stock, forgings, extrusions, aluminum alloys, steels, titanium, etc. CNC and conventional equipment are utilized.

Aluminum alloys heat treating electrical air furnace is part of UDT's capability. 5 ft diameter by 18 ft high, it is continuously performing quench & age hardening of major structural parts for McDonnell Douglas & Lockheed Aircraft from AL-AL 7075 T 411 & 2014 T 411 condition F to T6 or T73 condition. UDT works to MIL-Q-9858A and DND 1016. Tolerances are maintained as per customer's requirements.

Average Work Force: Engineers - 1
Inspectors - 5
Machinists - 40
Programmers - 1
Others - 24

Gross Sales: 1984 - \$4.5M
1985 - \$6.5M

Plant Size: 81,000 sq ft

Equipment: NC equipment includes vertical machining centers, horizontal machining center, vertical profiling milling machines, vertical profiler bed type (3 & 4 axis).

Experience: UDT's customers include McDonnell Douglas Canada Ltd (DC 9 & DC 10), Canadair (from T33 to Challenger), Enheat, deHavilland Aircraft, Fleet Industries (Lockheed Product), NATO, USAF, CCC, DND, Rohr, Research & Development

Canada (Propulsion Pod), ITT Gilfillan (Antenna Radar), McDonnell Douglas Corporation - St Louis (F-18), and Grumman Aerospace.

Keywords: Machining; Precision Machining; Heat Treating; Coating; Parts (Machining).

Revised: Sep 85

ULTRA LASERTECH Inc

Code: ULI

Address: 6415 Viscount Road
Mississauga, Ontario, Canada L4V 1K8

Contact: Dr R A Crane, President - (416) 677-8091

History: Ultra Lasertech is a high-technology company incorporated in 1979 with a laser technology base and licensing derived from RCA. There are no other Canadian divisions and no US subsidiaries.

Capability: Ultra Lasertech is engaged in the design and manufacture of custom CO₂ lasers and wave guide lasers. They are involved in R&D associated with laser photoacoustics, laser spectroscopy, and laser communications & radar. Other areas of expertise include remote sensing, pollution detection, ultra high power laser modeling and design, and laser applications. Their product line includes sealed, continuous wave, isotopic CO₂ lasers; tuneable CO₂ lasers; a CO₂ laser optoacoustic detector; industrial type sealed CO₂ lasers; laser stabilizers; laser power supplies; and mirror mounts.

Average Work Force: Total - 8 full-time
3 part-time

Gross Sales: 1984 - \$377K
1985 - \$0.5M

Plant Size: 3,000 sq ft (R&D Laboratories)
1,000 sq ft (Production Facility)

Equipment: A laser based optoacoustic facility for measuring absorption co-efficients of gases and vapors in the 9 - 12 um region. Measurements can be made at reliable pressure and temperature. A facility for fabricating hard seals required for CO₂ laser structures of glass and ceramic materials. These seals can be made between various thermal mismatched materials.

Experience: From it's principals, the company has a background of some 12 years experience in sealed CO₂ laser technology and ultra high power, fast flow CO₂ laser development. Since its founding in 1979, Ultra Lasertech has continued developments in long life, sealed CO₂ laser systems, tuneable and non-tuneable, to power ranges from 5-90 watts CW and with various CO₂ isotopes. These projects include the development of the ¹³CO₂, ¹⁴CO₂ and ¹⁸CO₂ laser systems covering the 8.9 to 12.1 um range; a folded 75 watt system, a feedback stabilization system based on the optogalvanic effect for controlling the laser to a line center or off-set; a stark cell frequency controller for shifting waveguide lasers by ± 500MHz; and a variety of customized laser systems for special research applications. Presently under development is a compact CW or pulsed air cooled, sealed CO₂ laser. Also ULI has, since 1979, a continuing program in laser based optoacoustic research and development. These projects include the development of CO₂ laser optoacoustic trace gas analyzer for detecting ambient nitric acid vapors to the 1 ppb level; a balanced dual spectro-phone chamber; a stark modulated optoacoustic detector that can detect amonia of concentrations of 0.2 ppb in air; the measurement of the optoacoustic signatures of 30 hazardous gases of environmental and industrial concern - it is anticipated that this technique is suitable for the detection of hydrazine at low ppb levels; the investigation concerning detection of PCBs and explosive vapors; and precise measurements of water vapor at various partial pressures and temperatures in the 9 to 12 um region.

ULI has delivered laser system to companies around the world. Among these are NASA, JPL, Vought Aerospace, NOAA, McDonnell Douglas, Naval Research Labs, Brookhaven, Max Planck Institute, Horiba & Sumitomo. ULI has also performed contract research for the Department of National Defense, National Research Council and Atmospheric Environment Service.

Keywords: CO₂ Lasers; Waveguide Lasers; Photoacoustics; Spectroscopy; Communications; Remote Sensing; Pollution Detection; Ultra High Power Modeling; Ultra High Power Design; Sealed CO₂; Continuous Wave CO₂; Tuneable CO₂; Isotopic CO₂; CO₂ Optoacoustic Detector; Mirror Mounts; Optoacoustic Trace Gas Analyzer; Cavity Enclosure; Trace Gas Detection; Toxic Gas Detection; Power Supplies; Hazardous Gas Detection; Modeling; Lasers; Lasers (Radar); Radar (Lasers); Laser Controllers; Frequency Stabilizers; Optogalvanic Effects.

Revised: Aug 85

VAC-AERO INTERNATIONAL Inc

Code: VAI

Address: 1371 Speers Road
Oakville, Ontario, Canada L6L 2X5

Contact: Mr. Ross E Pritchard, President - (416) 827-4171

History: VAC-AERO is a Canadian owned, high technology company offering heat treating, brazing, electron beam welding, and repair and coating services to the aerospace, airline, avionics, electronics and other key industries throughout the US and Canada. In addition, VAC-AERO designs, manufactures and sells specialized heat treating and vacuum furnaces to these industries.

VAC-AERO was originally founded in 1959 in Oakville, Ontario, and a Montreal Division was established in 1967 to meet the growing demand for its services from Quebec area customers.

Capabilities: VAC-AERO holds processing approvals from all major aerospace manufacturers for the following services:

Thermal processing of OEM components:

Vacuum heat treatment of high strength steels - Landing gear components, structural airframe parts.

Vacuum heat treatment - Turbine parts, shafts, turbine blades, casings, nuclear components.

Vacuum Brazing - Turbine nozzles, compressor stators, afterburner casings, combustion cowls, wave guides, aluminum cold wall assemblies and heat exchangers, nuclear parts.

Electron beam welding - Turbine assemblies, electronic components.

Plasma spray coating - Combustion liners, fan and stator casings, miscellaneous parts.

Repair and overhaul of jet engine components:

VAC-AERO is approved by Transport Canada and various aerospace companies for a variety of repairs using plasma spray, vacuum brazing, tungsten arc and electron beam welding.

Specific components repaired include - compressor stators, turbine vanes and nozzles, combustion chambers, shafts and miscellaneous components.

Manufacture of new parts to print:

VAC-AERO can also manufacture brazed and electron beam welded assemblies to customer

specifications and drawings. They specialize in components such as aluminum vacuum brazed heat sinks and cold wall assemblies for radar and avionics equipment.

VAC-AERO offers a complete line of cold wall vacuum furnaces ranging from small laboratory models to large bottom loading production units. They have supplied these furnaces to a wide variety of customers in the aerospace, nuclear and other high technology industries.

In addition, they can supply ancillary furnace equipment such as high temperature molybdenum fixtures, water recirculating units, and work handling systems. They also offer complete turnkey installation services, extensive operator training programs and post sale preventive maintenance service.

Average Work Force: Engineers - 6

Gross Sales: 1984 - \$4.4M
1985 - \$4.6M

Plant Size: 17,740 sq ft (Oakville Division)
9,250 sq ft (Montreal Division)

Equipment: VAC-AERO employs the following equipment:

Vacuum oil quenching furnaces capable of hardening part sizes to 72 in. dia. x 84 in. high, vacuum brazing and heat treating furnaces suitable for temperatures to 2700°F and ultra high vacuum levels to 1x10⁻⁶ torr.

Electron beam welding chamber size of 36 in. deep x 36 in. high x 52 in. wide can be extended to accommodate shafts and similar parts to 72 in. long.

Plasma coating equipment including Metco 3M, 45kW and Metco 7M, 80kW plasma guns.

In-house facilities for repair and overhaul including lathes, vertical mills, grinders, and EDM equipment for machining.

Complete metallurgical laboratory in addition to normal dimensional checking equipment, complements quality control capabilities.

Experience: Present customers include numerous companies in the aircraft, avionics, electronics and nuclear power generation industries. VAC-AERO holds current processing approvals from the following companies - Canadian Forces; Boeing Aircraft Co; Canadair; The deHavilland Aircraft of Canada Ltd; McDonnell Douglas Aircraft Co; General Dynamics; Grumman Aircraft; Pratt & Whitney Aircraft, Hartford, CT; Pratt & Whitney Canada; General Electric, Burlington, VT and Lynn, MA; Garrett Airsearch Mfg; Litton Systems (Canada); Litton Systems (USA); Hawker Siddeley Canada, Orenda Division; Menasco Canada Ltee; Menasco, Burbank, CA; Spar Aerospace; Bristol Aerospace Ltd; McDonnell Douglas; Cleveland Pneumatic; Bell Aerospace, Fort Worth, TX; Sikorsky Aircraft, Stratford, CT; DAF Indal Ltd; Fleet Industries; Kaman Aerospace, Bloomfield, CT; and Avco Lycoming, Stratford, CT.

Keywords: Machining; Vacuum Brazing; Vacuum Heat Treating; R&O (Engine Components); Electron Beam Welding; Plasma Spray Coating; Vacuum Furnaces; Brazed Aluminum Heat Sinks.

Revised: Aug 85.

VARIAN CANADA Inc

Code: VAR

Address: Varian Canada Microwave Division
45 River Drive
Georgetown, Ontario, Canada L7G 2J4

Contact: Mr. G Plhak, Marketing - (416) 877-0161

History: Varian Canada Inc is a wholly owned subsidiary of Varian Associates of Palo Alto, CA. The Canadian operation, located near Toronto, Ontario, was originally incorporated in 1955 to supply microwave tubes to the Canadian military.

The engineering and manufacturing segment of the company, Varian Canada Microwave Division (VCMD), operates under the umbrella of the Electron Device Group of the parent company. This group forms the largest electron tube manufacturing operation in the free world. Since its inception, the Microwave Division has grown steadily and expanded its original charter to include many unique and customized products for world-wide markets (75% of sales are exported). Currently, the product line is split evenly between electron tubes and electronic equipment.

Capability: The following is a brief description of the major products manufactured at Varian Canada Microwave Division. Since many of the products were designed by the Division, full facilities and capabilities exist in-house for customizing to the needs of individual customers. Both MIL and commercial specifications can be met.

Travelling Waves Tubes: These tubes are produced for microwave Line-of-Sight (LOS) Communication applications and cover frequencies ranging from 3.5 GHz to 15 GHz at power levels up to 50 watts. The product line includes a complete selection of conventional technology TWTs as well as metal-ceramic high efficiency and high linearity tubes. The company has the capability to customize existing designs to meet customer's unique requirements, and to develop retrofit packages to upgrade older field installations.

Power Klystrons: This product line consists of a series of power klystrons used primarily as high power amplifiers in satellite earth stations and troposcatter communication applications. These are available at frequencies of 5, 6, and 14 GHz with power levels up to 3 kilowatts. Various channel tuner configurations are available, including a microprocessor-controlled, automatic-channel tuner.

Reflex Klystrons: VCMD has an extensive line of reflex klystrons typically used in communications and radar systems for airborne and ground based applications, plasma diagnostics, spectroscopy, meteorological instrumentation and other experimental and scientific applications. The line ranges from the lower frequency tubes (8 to 25 GHz) with power outputs from 10 to 450 mW up to millimeter reflex klystrons ranging from 30 to 220 GHz with output powers from 5 to 800 mW.

Extended Interaction Klystrons: This product line originated at the VCMD facility and extensive development efforts are continuing. The products address the very high frequency ranges for microwave applications, ranging from 30 GHz to 280 GHz. EIKs are rugged, lightweight, compact and are capable of generating medium rf power levels in either continuous or pulsed modes. The cw power levels of these klystrons range from 1 kW at 18 GHz to 1 watt at 280 GHz. Peak power outputs range from several kilowatts at 30 GHz to 60 watts at 220 GHz. These EIKs are well suited as rf power sources for a wide range of applications such as - Fire control radar; terrain following radar; illuminators; weather radar; plasma heating; radio astronomy; surveillance radar; satellite communications; tracking radar; radar modelling; and fusion diagnostics.

Millimeter Wave Subsystems: VCMD offers a range of millimeter wave transmitter subsystems which consist of a modulator, a power supply and control circuitry driving the Varian line of Extended Interaction Klystrons. These transmitter systems operate in discrete frequency bands ranging from 30 to 220 GHz for pulsed and cw applications and can be designed to meet customer requirements to commercial or MIL specifications.

Power Supplies: The basis of this product line is a complete series of power supplies which complement VCMD's electron tubes. However, in addition, specialized, complex power supplies have been developed and manufactured by the Division to both MIL and commercial specifications, requiring capabilities such as - high and low voltage outputs; DC or AC inputs; multiple outputs; stringent noise and regulation requirements; and unique shapes and sizes. Power levels up to 30 kW and voltages up to 50 kV have been achieved.

Satellite Communications Power Amplifiers: A series of high power commercial amplifiers of VCMD design is available for satellite communications in frequencies ranging from 2 to 14 GHz with power levels up to 3 kW. These amplifiers consist of the power klystron, power supplies, cabinetry, waveguide/RF circuits, and control circuitry. A specialized military high power (10 kW) amplifier for satellite communications has also been designed and manufactured in Canada. The amplifier forms a complete subsystem incorporating an X-band klystron, power supplies, control circuitry, waveguide runs, and liquid cooling equipment consisting of a water-to-air heat exchanger and a purification loop.

VCMD is able to qualify and test to MIL and commercial specifications. Customized products are a specialty of the Division. Organizational and administrative systems are in place to ensure the smooth execution of commercial and military contracts requiring exceptional attention to detail. These include fully computerized and on-line Manufacturing Resources Planning and a complete Quality Assurance system appropriate for MIL requirements.

Average Work Force: Total - 300

Gross Sales: 1984 - \$23M
1985 - \$25M

Plant Size: 100,000 sq ft (2 Facilities)

Equipment/Facilities: VCMD has, in-house, all of the extensive facilities and capabilities needed for the manufacture of high quality electron tubes and electronic equipment. A few of the facilities which support such precise and delicate design and manufacturing activities are: "Watchmaker accuracy" machine shop; in-house manufacturing of high voltage transformers; test facilities for microwave tubes, subsystems and power supplies; clean rooms; vacuum sealing facilities; electric discharge machining; environmental test facilities; hydrogen and vacuum furnaces; and laser welding.

Experience: VCMD has in excess of twenty-five years of experience working with original equipment manufacturers of microwave and satellite telecommunications equipment. The Division has also been involved in various development programs for power supplies and other electronic subsystems to customers' specifications for many years.

Military programs have been a successful part of VCMD's operation. The largest single program lasted three and one-half years and was valued at approximately \$6.0M. In 1979, the company produced a space qualified instrument which was successfully flown on a NASA satellite designed to measure the earth's magnetic field. As well as private industry throughout North America, Europe and the Far East, the clientele also includes the Canadian, US and several European Governments, plus various agencies, laboratories and research institutions associated with these governments.

Keywords: Electronics; Solid State Devices; Travelling Wave Tubes; Klystrons; Reflex Klystrons; Power Klystrons; Extended Interaction Klystrons; Power Supplies; Power Amplifiers; Satellite Communications Power Amplifiers; Pulsers; Millimeter Wave Subsystems; Waveguides; Amplifiers; Amplifier Subsystems; Control Circuitry.

Revised: Aug 85

VICTRIX LTD

Code: VIC

Address: Box 1807
Guelph, Ontario, Canada N1H 7A1

Contact: Mr. H Lawry, Vice President - (519) 836-1480

History: Incorporated in 1975 (100% Canadian owned).

Capability: Approximately 80% of their R&D and manufacturing is for the Canadian Department of National Defense. Typical engineering projects include:

- Technical investigations and engineering services to DND on marine weapon systems drives and controls.
- Engineering services to industry on control systems for machinery and large winches.
- Engineering services to industry on sound and vibration problems in gear systems.
- Designed and developed 1.2 m plastic parabolic antenna for 11.6 GHz satellite receiving.
- Developed production techniques for fabrication of outdoor unit to house LNA of satellite receiving antenna.
- Investigated dielectric feed horn problems and developed modifications
- Engineering services on avionics flight surfaces control systems.

Manufacturing capability include the following items:

- Amplifiers, reactors, special transformers, & RF coils
- Fiberglass microwave dish antennas
- Small gears and gear reducer assemblies
- Extrusion and molding of miscellaneous plastic and rubber parts
- Aircraft smoke signal markers pyrotechnics
- Cable assemblies
- Marine projectile line throwing devices
- Inflatable mast antennas
- Marine weapon system drive and controls
- Modular practice bombs

Victrix also has an R&O capability for radar duplexers, precision electronic components and power supplies.

Average Work Force: 1 Senior Scientist (Electronics)
1 Mechanical Engineer
1 Telecommunications Engineer
2 Technologists
2 Technicians
3 Machinists
10 - 30 Production People
1 Quality Control Manager

Gross Sales: 1984 - \$4.25M
1985 - \$4.50M

Plant Size: 30,000 sq ft (2 locations)

Equipment: Machining (CNC), vacuum molding, fiberglass layup and forming, & electronic laboratory to 20 GHz measurement, and pyrotechnic manufacturing.

Experience: DND - Marine Weapon System Drive Controls
- Aircraft Smoke Signal Markers
- Marine Line Throwing Device
- Portable Antenna Masts
- Modular Practice Bombs

DOC - Satellite M/W Parabolic Dishes

Keywords: Ground Station Antennas; Pyrotechnics; Smoke Markers; Portable Antenna Masts (Surface); Weapon System Controls; Electronics; Plastic Fabrication; Modular Practice Bomb; Practice Bomb.

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VORTEK INDUSTRIES Ltd

Code: VOR

Address: 1820 Pandora Street
Vancouver, British Columbia, Canada V5L 1M5

Contact: Dr G G Albach, President - (604) 251-2451

History: Vortek is a private Canadian company, incorporated in 1975 in the Province of British Columbia, with no other branches or US subsidiaries.

Capability: Vortek designs and manufactures the world's most powerful arc lamps and related optical systems. Production lamps are available with input powers up to 300,000 watts, using a patented internal cooling method. Radiant heating systems using these lamps are sold for production-line semiconductor processing, large-area sunlight simulation, industrial heat-treating, laser damage studies and advanced thermal testing. Lamp production includes material handling, precision machining, electrical and mechanical assembly and final testing. In-house R&D facilities are used for testing new product designs and for development of specialized lamp systems on a contract basis.

Average Work Force: Scientists & Engineers - 5
Others - 15

Gross Sales: 1984 - \$2.0M
1985 - \$3.0M

Plant Size: 10,000 sq ft

Equipment: The company has developed sophisticated fabrication techniques for liquid-cooled tungsten electrodes, and operates the only commercial tungsten electrode fabrication facility in Canada. Engineering of large, high-power optical systems is done using an in-house computer system. The company fabricates liquid-cooled optical assemblies, and maintains a large area rhodium metal plating facility for reflector production.

Experience: The company is an OEM supplier of ultra-power arc lamps and optics to Eaton Corp in Boston, for use in semiconductor annealing equipment. USAF, NASA and DNA use Vortek lamps for laser development and radiation testing. Large area solar simulators are installed in Canada and Europe.

Keywords: Laser Simulation; Heating; Semiconductor Processing; Lamps (High Power); Solar Simulation; Electrodes; Optics; Lighting (High Power).

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WHITESHELL NUCLEAR RESEARCH ESTABLISHMENT

Code: WNR

Address: Pinawa, Manitoba, Canada R0E 1L0

Contact: Mr. Raymond O Sochaski, Mgr, Commercial Ops Office
- (204) 753-2311

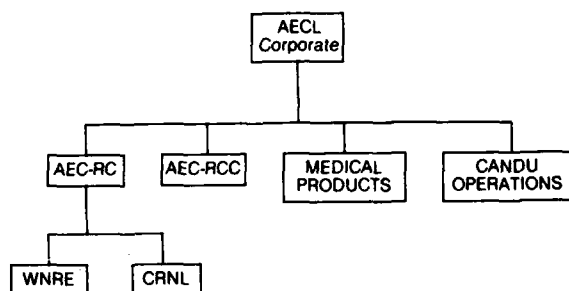
History: The Whiteshell Nuclear Research Establishment (WNRE) came into being in 1963 for the purpose of developing the organic cooled nuclear power reactor concept. WNRE is part of the Atomic Energy of Canada Research Company (AEC-RC), which in turn is a part of Atomic Energy of Canada Ltd (AECL). The latter is a crown corporation of the Government of Canada.

Canada's nuclear program had its beginning during the Second World War when a team of Allied scientists was assembled in Montreal for work related to the development of atomic weapons. With the end of the war, the Canadian effort was redirected, and since then all work on atomic energy has been concerned with peaceful uses.

The program was initially administered by the National Research Council of Canada, but by 1952 it had expanded so much it was placed under a new, specialized organization (AECL). In the fall of 1979, a commercial Operations Office was established at WNRE for the purpose of marketing site services, products and transferring technology.

AECL pursues a wide range of activities, from basic science to wholly commercial operations, with the main effort being devoted to the development, testing, commercialization and marketing of CANDU reactors, heavy water, isotopes, irradiation equipment and nuclear fuel.

AECL is a Crown Corporation with a total staff of approximately 6500 people. The Corporate Office is located in Ottawa, Ontario. It manages the five companies listed below:



AEC-RESEARCH CO (AEC-RC) – Head office is in Ottawa with sites at Chalk River, Ontario and Pinawa, Manitoba.

AEC RADIOCHEMICAL CO (AEC-RCC) – Head office and manufacturing facilities at Kanata, Ontario, with offices scattered in foreign countries.

AEC-MEDICAL PRODUCTS – Head Office in Ottawa, Ontario.

AEC-CANDU OPERATIONS (Operations) – Head Office in Mississauga, Ontario.

AEC-CANDU OPERATIONS (Sales & Proposals) – Head Office in Mississauga, Ontario.

AEC-CANDU OPERATIONS (Finance, Commercial & Resources) – Head Office in Mississauga, Ontario.

Capability: WNRE is an Research & Development site. It performs fundamental and applied research, develops processes, products and components, and has a large staff of experienced people in most disciplines and trades. Our greatest asset is the ability to innovate, develop, test, commercialize and market a concept.

Average Work Force: Professional – 300
 Technical – 330
 Clerical – 175
 Prevailing Rate – 200

Gross Sales: 1984/1985 – Annual Budget – \$82M
 Gov't Appropriation – \$73M
 Commercial Revenues – \$ 9M

Plant Size: Approximately 10 major buildings which house R&D facilities engineering offices; machine, construction and maintenance work shops; administrative offices; protective services; fire department; and stores and warehousing. Very rough area of all facilities is 150,000m².

WNRE has a variety of facilities and expertise available for undertaking commercial work, e.g.:

- Other irradiation devices – a gamma-irradiator, Van de Graaf and fast neutron generator.
- "Hot Cell" facilities capable of handling up to 10⁶ Curies of radioactive material.
- Various test "loops" for materials, component and corrosion testing.
- Comprehensive metallurgical and mechanical testing facilities with expertise in testing ferrous and non-ferrous metals, ceramics, glasses, rocks and composites.
- Expertise in electron microscopy, acoustic emission, fracture mechanics, etc., that can be applied to solving problems involving deformation, hydrogen embrittlement, stress corrosion cracking, creep cracking and fracture.
- Extensive analytical chemistry facilities including micro-analytical, radiochemical, neutron activation, mass spectrometry, atomic absorption spectroscopy, plus a unique capability for the characterization of surfaces by such means as scanning electron microscopy, scanning auger microscopy, secondary ion mass spectrometry and photoelectron spectroscopy.
- A research chemistry group adept in the measurement of the thermodynamic properties of solutions at high temperature and pressure, in the application of electrochemical techniques to the study of corrosion and film formation, in the study of gas phase reactions, and in several areas of colloid and surface chemistry.
- Combustion test facilities to study the detailed deflagration and detonation behavior of mixtures of combustible gases from the fundamental chemistry of combustion to engineering scale verification or demonstration experiments.
- Environmental research laboratories and field test facilities with experienced staff to study the impact of chemical and radioactive effluents on the environment.
- Biophysical research laboratories with expertise in virology, cell biology, radiobiology, biochemistry and biophysics.
- A geotechnical research capability which, by 1986, will include an underground research laboratory for excavation damage experiments for different excavation techniques, development of in-situ stress measurement techniques, evaluation of rock thermal/mechanical properties, hydraulic conductivity and rock porosity measurements and various geochemistry experiments.
- Expertise in modelling fluid heat transport systems and high pressure steam/water behavior.
- Consulting service groups encompassing nuclear engineering, risk analysis, development of computer models, mathematical analyses and meteorological assessments.

Experience: AECL has been in existence for approximately 36 years. During this time, it has developed the CANDU-pressurized heavy water reactor system. It has helped to commercialize the radioisotope industry in the medical, pharmaceutical and industrial fields; developed and commercialized the Canadian heavy water industry. Canada is currently the world's largest producer of this commodity. In addition, AECL has been instrumental in developing the Canadian nuclear fuel industry and has played a large part in developing the US nuclear fuel designs, for both military and civilian reactors. It has also played a major role in developing and commercializing zirconium alloys.

More recently, AECL has been charged with the responsibility of managing the Canadian Waste Management program. It includes conceptual planning, fundamental research, development, testing, piloting, verification, acceptance, optimization, and providing specifications for the commercial system. Spent fuel storage (wet and dry), transportation, fission products removal and waste disposal are sub-sets of the total program. All of this work is being coordinated from WNRE.

AECL's major assets are experienced staff and state-of-the-art facilities and equipment. Its reputation as a respected leader in the nuclear and non-nuclear industries is acknowledged both domestically and internationally.

Keywords: ASME Codes; Biological Environment; Chemical Analysis; Chemical Processes; Chemistry; Colloid Chemistry; Combustion; Computer Code Development; Corrosion; Derived Release Limits; Detonation; Disposal; Electrochemistry; Electronics-Nuclear; Environment; Explosions; Fluid Dynamics; Fracture Mechanics; Health Physics; Hydraulics; Instruments-Nuclear; Irradiations; Isotopes; Materials Characterization; Materials Testing & Development; Mechanical Testing; Medical Biophysics; Metallography; Metallurgical; Mathematics; Neutron Activation; Non-Destructive Testing; Nuclear; Nuclear Design; Pathways Analysis; Professional Services; Physics; Quality Assurance; Rail Transport; Reactors; Radiation; Radiation Shielding; Radioactive Wastes; Risk Analysis; Separation Processes; Surface Chemistry; Tailings; Thermal Analysis; Toxic Chemicals; Trace Analysis; Vitrification; Waste Management.

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ZARGES AFC CANADA Ltd

Code: ZAC

Address: 3839 Burnsland Road, SE
Calgary, Alberta, Canada T2G 3Z4

Contact: Mr. S J McCuaig, Military Sales Manager -
(403) 287-1311

History: Zarges AFC Canada Ltd is a Calgary-based, Canadian-owned company incorporated in 1980.

Capability: Zarges specializes in the manufacture and distribution of custom aluminum cases, containers, transport systems, and ladder/scaffold systems. Custom access ladders and maintenance platforms for military and civilian aircraft are also available. All manufacturing is to NATO standards.

Average Work Force: Total - 20

Gross Sales: No Data

Plant Size: 7,000 sq ft

Experience: Zarges products are currently in use with the armed forces of West Germany, Austria, Sweden, Italy, Canada, England, and the Netherlands. Civilian customers include the major oil companies and the major television companies in Canada.

Keywords: Custom Packaging; Packaging (Custom); Cases (Custom); Test Equipment (Cases); Armament (Cases); Ladder Scaffold Systems.

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