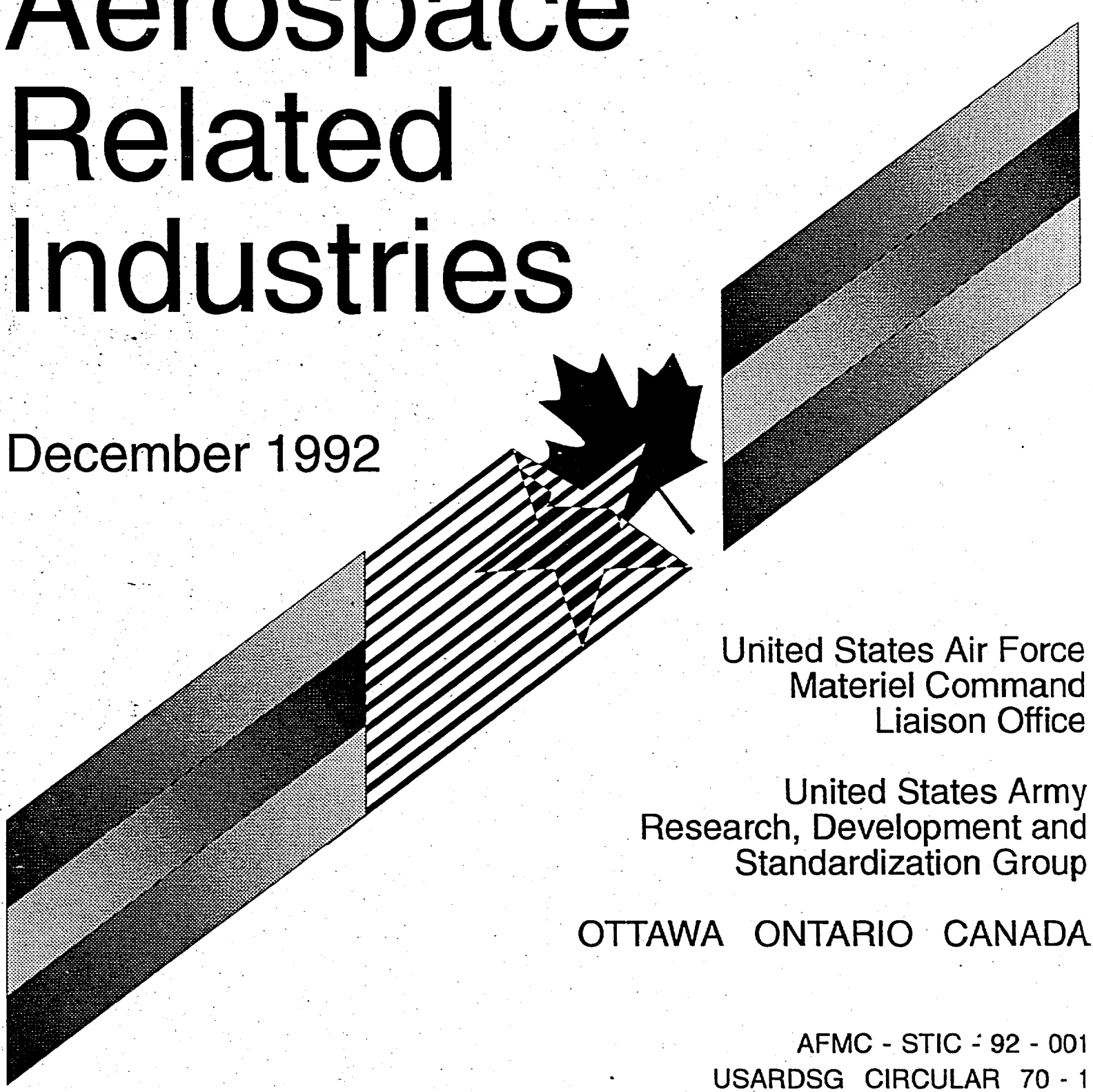
Guide to Canadian Aerospace Related Industries

December 1992



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Materiel Command
Liaison Office

United States Army
Research, Development and
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OTTAWA ONTARIO CANADA

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This report has been reviewed by the US Army Research, Development and Standardization Group (Canada) and is approved for publication and release to the National Technical Information Service (unlimited distribution).

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This report has been reviewed by the USAF Materiel Command Liaison Office (Canada) and is approved for publication and release to the National Technical Information Service (unlimited distribution).

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13. ABSTRACT *(Maximum 200 words)*
This guide is a contracting source list of Canadian aerospace-related industries to be used by USAF and USA procurement offices, program managers, project engineers, and scientists. It provides company profiles, a company keyword index, and contact points for each company.

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PREFACE

This guide to Canadian Aerospace-Related Industries presents a compilation of descriptive data on 270 companies located in Canada that have expressed interest in doing business with the United States Air Force and Army. This guide has been prepared with three main objectives in mind:

a. To encourage Air Force and Army Project Officers to take advantage of the industrial capability of Canada.

b. To engender interest with the USAF and USA for participating in the US/Canada Defense Production and Development Sharing Programs.

c. To encourage Canadian aerospace industry to take a more active role in presenting their capabilities to the USAF and USA.

The companies profiled in this guide represent a cross-section of Canadian industry and research facilities with capabilities that may be of interest to the USAF and USA research and development and logistics communities.

Comments and/or suggestions concerning the format or content of this guide are solicited. Questions concerning the US/Canada Defense Production and Development Sharing Arrangements or the subject matter of this guide should be directed to AFMC Liaison Office, Suite 202, 110 O'Connor Street, Ottawa, Ontario, Canada K1P 5M9. Telephone contact can be made at (613) 993-7725 or DSN 843-7725. Telefax is available at (613) 990-6787 or DSN 840-6787. EMAIL is available through STLOCAND@WL.WPAFB.AF.MIL.

US Army-related inquiries should be directed to USARDSG-C, National Defence Headquarters, MGen George R. Pearkes Building, Ottawa, Ontario, Canada K1A 0K2. Telephone contact can be made at (613) 992-5737 or DSN 842-5737. Telefax is available at (613) 992-7327 or DSN 842-7327.

Information can also be obtained from the Aerospace and Defence Programs Division of External Affairs and International Trade Canada (EAITC) at (613) 996-3437 or DSN 846-3437. Their mailing address is External Affairs and International Trade Canada, International Marketing Bureau, Aerospace and Defence Programs Division (TAG), 125 Sussex Drive, Ottawa, Ontario, Canada K1A 0G2.

The cooperation and assistance of External Affairs and International Trade Canada in the printing and distribution of this report is greatly appreciated.

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Section I
INTRODUCTION

One of the functions of the Air Force Materiel Command Liaison Office (Canada) and the US Army Research, Development, and Standardization Group Canada is to stay current on Canadian industrial capabilities and trends and to make this information available to the USAF and USA R,D,&A community. This guide was prepared in pursuit of that objective. It presents descriptive data on 270 companies that have expressed interest in doing business with the USAF and USA. 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 and defense industry.

Defense economic cooperation between the United States and Canada has deep roots. In the late 1950s, the governments initiated an agreement that has come to be called the Defense Production Sharing Arrangement (DPSA). The DPSA was historic in that it became US defense procurement policy to consider Canadian defense contractors as an integral part of the US industrial/mobilization base. The terms of this arrangement remain valid today. Canadian contractors are to be considered the same as domestic US suppliers. The Buy American Act is waived for all defense supplies made in Canada. US Customs duties are waived on most Canadian supplies entering the US for defense programs. The specifics of the arrangement are valid for both Canadian prime contractors and for Canadian subcontractors to US primes. The DFAR Section 25.71 and service supplements thereto apply to this program. The letter agreement itself is contained in DFAR Appendix T.

Under the procedures of the DPSA with Canada, the US buyer contracts with the Canadian Commercial Corporation (CCC). CCC is 100% government-owned and a Crown Corporation-basically an arm of the Canadian Government. CCC wholly subcontracts the work to the Canadian defense contractor. In the process, CCC guarantees the performance of the Canadian contractor, and if necessary, will re-procure at CCC's expense to get the job done. The DPSA provides US acceptance of all Canadian government contracting and contract management procedures. CCC and their associates with the Canadian Department of Supply and Services certify all pricing data supplied by the Canadian contractor. There are bilateral arrangements for quality assurance, in-plant inspection, and security for classified programs.

There is a second special arrangement with Canada called the Defense Development Sharing Arrangement (DDSA). The DDSA was signed by both governments in November 1963. The Development Sharing Program enjoys all the benefits of the Production Sharing Program. In addition, projects under the DDSA receive financial assistance from the Canadian Government. Project agreements are negotiated for each effort and generally reflect a 50/50 cost sharing ratio. The jointly-funded projects support US defense requirements, and the US project office remains the design authority throughout the effort. The DDSA is also contained in DFAR Appendix T. Use of the DDSA can really stretch your R&D dollars, an important consideration in the face of declining defense budgets.

The DPSA and DDSA have received high-level support from all administrations. The joint declaration by the Prime Minister of Canada and the President of the US at the Quebec Summit on 18 May 85 stated that "...To provide for an effective use of resources and to aid both our countries in bearing our share of the Allied defense burden, we reaffirm the Canada/United States Defense Development and Production Sharing Arrangements and agree to strengthen our North American defense industrial base." Similar expressions of support have come from subsequent meetings.

All project officers are encouraged to take full advantage of these arrangements with Canada and to submit Canadian sources for their projects. Please feel free to contact the AFMC Liaison Office (Canada), the USARDSG-C, or EAITC to assist in locating sources or in other aspects of the arrangements. Please use the addresses noted in the preface to this report. The international cooperative R&D focal point located at your organization can also provide insight in the process of doing business with Canada.

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 and USA R&D procurements, as well as for commodity buys. It is hoped that this Guide will provide the user with some insight into the Canadian system and encourage its use if deemed appropriate. Increased competition and "new blood" can reduce USAF and USA procurement costs and lead to better products.

Section II
COMPANY PROFILES

THE ACTON RUBBER Ltd

ADDRESS: 881, Landry Street
PO Box 300
Acton Vale, Quebec
Canada J0H 1A0

CONTACT: Mr Andre Fontaine, Manager Military Contracts
Tel: (514) 546-2776
Fax: (514) 546-3735

KEYWORDS: Boots PVC; Chemical Agent Protective Apparel; Footwear; Ice Skates; Rubber Custom Mixing; Rubber Molded Parts; Rubber Retreading.

HISTORY: Founded in 1930 by Alfred Lambert Inc, The Acton Rubber Limited, located in Acton Vale, Quebec, Canada, manufactures a wide range of rubber footwear, industrial molded rubber components, rubber custom mixing, and ice skates.

From its inception, Acton Rubber designed several styles of overshoes and boots to meet the needs of the country's armed forces, police, and field workers.

With the passing years, Acton Rubber has enjoyed continued growth:

1947 - Added molded rubbers to its production.
1967 - Equipped with injection molded machinery.
1974 - Awarded first contract of Canadian NBC boots.
1980 - Entered the tire retreading market.
1983 - Awarded first contract of Canadian NBC gloves.
1985 - Produced the Daoust ice skates.
1986 - Equipped with Desma injection PVC press.
1987 - Awarded a General Services Administration contract.
1988 - Awarded first Defense Logistics Agency contract for toxicological agent protective boots.
1989 - Awarded first Norwegian contract for overboots rubber chemical protective.
1990 - Developed new, lightweight NBC overboots. Awarded first Defense Logistics Agency contracts for toxicological agent protective covers.
- Also awarded first contract with Red River Army Depot in Texarkana, Texas, for the repair of US Army tank tracks.
1991 - Developed new, lightweight plastic toe cap with metatarsal protection ANSI class I.
- Awarded first Defense Logistic Agency contract for toxicological agent protective aprons.
- Awarded first German Army contract for ABC antistatic overboots.
1992 - Awarded first British Ministry of Defense contract for NBC overboots MK4.

CAPABILITY: Acton Rubber is geared to meet the highly varied requirements of the rubberized products market with an extensive range of standard and specialized equipment, combined with an experienced labor force. Their production schedules are carried through a flow chart which involves skillful activities: carbon black or color mixing, injection or press molding, extrusion or calendaring, cutting, marking, cementing, sewing, making, vulcanization, inspection, and packaging.

Their R&D, laboratory, and engineering staff meet regularly with their counterparts in production, marketing, and sales to determine how best to fulfill their customer's special project requirements in terms of rubber recipes, manufacturing processes, and the properties of the products themselves.

Acton Rubber maintains an active quality assurance program in order to meet NATO quality requirements such as AQAP-4. They also manufacture products to a number of military specifications related to Canadian, American, or foreign country's procurements.

PERSONNEL: Management - 12
Engineering - 12
Laboratory - 8
Quality Assurance - 6
Foremen - 8
Other - 25

GROSS SALES: 1990 - $23.0M
1991 - $21.6M

PLANT SIZE: 260,000 sq ft

EQUIPMENT: Banbury #3D (color mixer), Banbury F-270 (large capacity black mixer), 7 mills, 3 extruders, 4 calendars, 1 Barwell, 1 slitter, and 22 presses including compression and injection. Equipment for cutting and sewing.

EXPERIENCE: Canada: National Defence, RCMP, Correctional Service, Department of Transport, Energy Mines and Resources, Fisheries and Oceans, Atomic Energy, Canada Post, Bombardier Ltd, Camoplast Inc, Goodyear Ltd. US: Defense Logistics Agency (DPSC), several US DOD agencies, General Services Administration, Army Red River Depot, Camoplast Rockland Ltd, Goodyear Ltd. Overseas: Minister of Defense UK, Norwegian Army Matcomnor, British Antarctic Survey, Swedish Civil Defense and Material Administration, Germany, New Zealand.

ADGA GROUP

ADDRESS: Suite 601
116 Albert St
Ottawa, Ontario
Canada K1P 5G3

CONTACT: Mr J Kevin Burke, Senior Vice President
Tel: (613) 237-3022
Fax: (613) 237-3024

KEYWORDS: ATC; Communications; Computer Simulation; Consulting (Nav/Comm); Fire Control; Integrated Logistic Support; Radar; Radio Communications; Satellite Communications; Secure Communications; Software Services; Systems Engineering (Nav/Comm).

HISTORY: The ADGA Group was established in 1969 to serve the needs of clients throughout the world. ADGA is privately owned with over three hundred professional and technical employees.

The head office is located in Ottawa, Canada's capital, with branch offices in Montreal, Toronto, and Vancouver. ADGA is able to offer a broad range of services on an international basis.

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

CAPABILITY: The group possesses wide and proven experience in consulting, design, installation, operation, and maintenance of technical facilities for the support of a wide range of domestic and international projects in the electronics and computer systems areas.

Major areas of company expertise include data/voice communications, navigation aids, air traffic control, satellite systems, security system design, and software engineering and independent verification and validation (IV&V).

In addition, the company has in-house capability in the design of integrated logistics support (ILS) systems, automated configuration management, and AQAP-1 quality assurance consulting. The company works under a variety of business arrangements including industrial development and joint-venture projects and major subcontracts.

PERSONNEL: Professional - 110
Technologists/Technicians - 150
Others - 50

GROSS SALES: No data.

PLANT SIZE: No data.

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 Canada, the US, and overseas.

AERO MACHINING Ltd

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

CONTACT: Mr Bruno Julien, Marketing Director
Tel: (514) 324-4260
Fax: (514) 324-9997

KEYWORDS: Actuators; Airframe Components; Die Fabrication; Hinges; Hydraulic Servos; Landing Gear Components; Machining; Missile Components; Precision Machining; Titanium; Tooling.

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 precision machining, five-axis profiling, four-spindle profilers, CNC lathes and machining center, 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-I-45208 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 (AQAP-4) specification, for the manufacture of aircraft mechanical parts and mechanical and hydraulic assemblies.

PERSONNEL: Total - 60

GROSS SALES: No data.

PLANT SIZE: 25,000 sq ft

EQUIPMENT: Their equipment includes CNC lathes, borers, milling machines, machining centers (3, 4, and 5 axis), profilers, drills, honing machines, and grinders. They have a hydraulic assembly and test facility for all hydraulic assemblies and parts manufactured by the company. CNC equipment is integrated to a 5 axis CAD/CAM system.

EXPERIENCE: Aero principal customers include McDonnell Douglas Corp, Grumman Aerospace Corp, Pratt & Whitney, Menasco Aerospace, Canadian Marconi, Bell Helicopter, GE, Rolls Royce, Fleet Industries, Canadair, USAF, and Heroux.

THE AEROSPACE CONSORTIUM Inc

ADDRESS: 101 - 969 Derry Road East
Mississauga, Ontario
Canada L5T 2J7

CONTACT: Mr W H Reil, President
Tel: (416) 564-6601
Fax: (416) 564-6604

KEYWORDS: Antennas; Avionics; Build-To-Print; CNC Machining; Communications; Component Fabrication; Composite Fiberglass Components; Configuration Management; Coupler Systems; Electronics Assembly; Engineering Services; Fabrication/Assembly/Test; Fire Suppression Systems; HF Communications; Integrated Logistics Support; Industrial Benefits; Life Cycle Material Management; Machining; Manufacturing; Mechanical Assembly; Meteorological Instruments; Meterology; Precision Machining; Project Management; R&O (Avionics); R&O (Electronics); Radiosondes; Subcontract Manufacturing; Technical Publications; Whip Antennas; Wiring Harness Fabrication.

HISTORY: The Aerospace Consortium is a group of aerospace companies which jointly market their combined aerospace and defense engineering and manufacturing capabilities. The consortium, which was founded in 1984, is an independent company owned by the member shareholders.

CAPABILITY: The Aerospace Consortium is a group of Canadian aerospace companies who together posses an extensive array of engineering and manufacturing capabilities which are collectively offered to potential customers through a single source.

Consortium members can provide a range of subcontract services which in combination enable the group to furnish competitively priced, complete assemblies or subassemblies from one responsible source.

Member companies can provide any or all of the following services from their combined resources: precision machining of conventional and exotic materials, mechanical assembly work, electronic system assembly, communications systems design and manufacture, repair and overhaul of electronic/communications systems, specialty light metal fabrication, fiberglass filament winding, hydraulic components and subsystems, pneumatic components and subsystems, program management, and integrated logistics support services.

One of the consortium's principal avenues of business development is to establish working relationships with foreign companies who wish to enter into technology transfer agreements or other joint venture/development arrangements with Canadian firms. The multi-talented consortium members can undertake the total manufacture and support of complex systems and products for both domestic and export markets.

The single point contact with the consortium provides customers with a link to several business concerns thus enabling prime contractors to discharge industrial benefit (IB) obligations efficiently and effectively.

Typical of the products and systems that the consortium is capable of manufacturing include military and commercial aircraft; navigational systems; communications systems; radar systems; air, ground, and shipboard antenna systems; control systems; electronic processing systems; surveillance systems; radiosondes; and other meterological equipment.

Member companies of the consortium have established quality assurance programs which meet AQAP-1, AQAP-4, MIL-Q-9858A, MIL-I-

45208A, plus numerous customer-invoked standards.

Shock, vibration, environmental, and functional testing is undertaken in special facilities owned by member companies.

Member companies of the consortium are export oriented and are fully conversant with the intricacies of working on major programs and the management of large contracts.

PERSONNEL: Technical - 100 aggregate
Production - 200 aggregate
Others - 50 aggregate

GROSS SALES: No data.

PLANT SIZE: 150,000 sq ft (aggregate)

EQUIPMENT: Wide variety of numerical controlled (NC) and computer numerical controlled (CNC) machining centers and lathes, drill presses, milling machines, electronic assembly and test equipment, material handling equipment, fiberglass filament winding machinery, computer aided design (CAD) and computer aided manufacturing (CAM) facilities, thermal and vibration electronic components test facility, and desk top publishing equipment.

EXPERIENCE: Present customers of the member companies include various departments in the Canadian and US governments and industries in Canada, the US, and the international marketplace.

AEROTECH INTERNATIONAL Inc

ADDRESS: 100 Eagle Drive
Winnipeg, Manitoba
Canada R2R 1V5

CONTACT: Mr Paul R Sigurdson, President
Tel: (204) 633-1999
Fax: (204) 694-1612

KEYWORDS: AGE; Aircraft Heating; Heating (Aircraft); Portable Heaters.

HISTORY: Aerotech International Inc is a privately Canadian-owned, Winnipeg-based manufacturer and supplier of portable heaters and other ground support equipment for the aerospace industry.

CAPABILITY: Aerotech International Inc supplies and manufactures portable heaters and ducting and aerospace ground support equipment for commercial as well as defence applications.

The company offers a comprehensive line of heaters specializing in the BT400 series. The lightweight (250 kg), portable heaters withstand temperatures to -54° Celsius (-65°F) and provide instant heat output to 400,000 BTU per hour. The heater is designed to burn gasoline or diesel fuel and operate as a totally self-contained unit, or as a slave-type heater using an electric motor power package.

The company also manufactures its own line of canvas and vinyl ducting. It also supplies spare parts for all series BT400 heaters and other ground support equipment.

PERSONNEL: Total - 25

GROSS SALES: 1990 - $2.5M
1991 - $2.1M

EQUIPMENT: No data.

PLANT SIZE: 38,000 sq ft (on 8 acres)

EXPERIENCE: Aerotech International Inc's customer list includes the Departments of Defence in the governments of Canada, the US, the UK, Italy, Turkey, and Australia. Customers also include most major airlines including Air Canada, Canadian Airlines, United Airlines, Northwest Airlines, Finnair, Korean Air, Federal Express, and numerous regional and national carriers. Major oil and mining companies such as Gulf, Esso, Pan Canadian, Dome Petroleum, and Nova round out an impressive customer list.

AIRCRAFT APPLIANCES AND EQUIPMENT Ltd

ADDRESS: 150 East Drive
Bramalea, Ontario
Canada L6T 1C1

CONTACT: Mr B T Dawson, President and General Manager
Tel: (416) 791-1666
Fax: (416) 791-7218

KEYWORDS: Coalescing Filters; Components (Machined); Dehydrators; Demineralizers; Distribution (Aircraft Parts); Filters; Fuel Filters; R&O (Aircraft Components); R&O (Avionics); R&O (Ground Power); Reverse Osmosis Units; Separators (Oily Water); Tachometer Generators; Valves.

HISTORY: Aircraft Appliances and Equipment Limited (AAE) was founded in 1949 and was incorporated (Ontario Chapter) the same year. The principal operation of the company at first was the repair and overhaul of aircraft acces-

sories and the distribution of US-built aircraft electrical product accessories in Canada.

AAE commenced their design and manufacturing of fuel filters and coalescers in 1959. In 1966, they commenced to design and manufacture aircraft tachometer generators, and this was followed in 1973 by the design and manufacture of ground power AC/DC generators and generator sets. The principal market for AAE services and their products covered all aircraft manufacturers in Canada and the US; military requirements, which include US and Canadian Navy requirements; commercial ship builders; etc. AAE is a privatelyowned, Canadian company.

CAPABILITY: Presently AAE operates three basic divisions:

- Repair and Overhaul and Service Division (R&O) - For over 40 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, ground power units, motor generators, test stands, search lights, relays, gyros, inverters, 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 34 years of research and development in filtration and coalescing equipment (water separators). The major filtration systems are being supplied to all US-built frigates, cruisers, and destroyers, as well as Canadian frigates. The division also manufactures a wide selection of tachometer generators and valves.

- 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 36 years. It has distribution rights for aircraft electrical, avionics, and fuel accessories produced by world-leading manufacturers of quality aerospace products. Products distributed include heading reference units, land navigation, muzzle velocity radar, radar antenna, display and transceivers, fuel booster pumps, lube and scavenge pumps, and windshields. For industrial application, it handles ground air conditioning systems for commercial and military aircraft and a line of self-lubricating bearings. It also represents Cortec Corporation, which produces a wide variety of anti-corrosion products for all types of rust-inhibiting applications.

PERSONNEL: Engineers - 12
Engineering Technicians - 18
Others - 70

GROSS SALES: 1989 - $20.0M
1990 - $24.0M

PLANT SIZE: 80,000 sq ft

EQUIPMENT: AAE is fully equipped with avionics and flight control test equipment, various electrical test stands, hydraulic and coalescing test stands (including Skydrol), and an in-house Qantel computer system. AAE has in-house machining, winding, and engineering design capability.

EXPERIENCE: AAE has over 40 years of experience in R&O and product distribution/ marketing catering to Canadian and US government agencies and the commercial aerospace industry; e.g., deHavilland, Canadair, Beech, Cessna, Piper, and the airlines. Fluid Power Division has catered for over 34 years with their filters and coalescing equipment to major US ship builders; e.g., Ingalls Shipyards, Bath Iron Works, Todd Shipyards, etc. It has also exported its equipment to Spain, Australia, Taiwan, Greece, commercial marine companies, etc. In Canada, they supply their equipment to DDH 280 and new Canadian built patrol frigates.

AIRTECH CANADA

ADDRESS: RR 5
Peterborough Municipal Airport
Peterborough, Ontario
Canada K9J 6X6

CONTACT: Mr Bernard J LaFrance, General Manager
Tel: (705) 743-9483
Fax: (705) 749-0841

KEYWORDS: Airframe Components; Engineering Services; Modification (Aircraft); Modification (Helicopters); Structural Design.

HISTORY: Airtech Canada is a Canadian company founded in 1977. The company's development has occurred as a result of several large projects, many of which are an ongoing source of business. The company has developed and owns the STA/STCs related to the re-engining of the DHC-2 and DHC-3 to higher power current production radial engines.

Additionally, significant effort was put into the possible re-engining of the DC-3 with current production radials; however, research has come to a halt due to some limitations of funds, a very soft current market, and uncertain performance

of modifications being made to the engine by the factory.

As well, the company was deeply involved in the development of a prototype high performance training aircraft (known as the turbo Orlik). This project ended with the unfortunate crash of the prototype with the company president at the controls in an air demonstration to the Columbian Air Force.

CAPABILITY: The company's current priorities center around three areas:

- The ongoing sales and servicing of the market created in converting DHC-2 and DHC-3 aircraft to new radials engines imported by Airtech Canada.

- Marketing aircraft medevac conversions designed, developed, approved, manufactured, and installed in-house for various fixed and rotary winged aircraft.

- Special engineering and custom manufacturing of aircraft and aerospace parts and components and for other high tech applications.

PERSONNEL: Engs - 2
AMEs - 3
Machinists - 1
BBM - 1
Others - 2

GROSS SALES: 1990 - $.52M
1991 - $.64M

PLANT SIZE: 7,200 sq ft

EQUIPMENT: Complete machine shop and welding facilities. Complete sheet metal fabrication equipment including English Wheel and Eckold Piccolo for custom compound curves. In-house computerization including CAD on Macintosh and IBM.

EXPERIENCE: Present customers include Air Muskoka, Air Saguenay, Brock Air, Burton/Joyce Industries, Canadian Helicopters (Ontario Ministry of Health), CanAir Cargo, CARMA Industries, Eagle Aviation, Earlton Airways, International Racehorse Transport, Optech Limited (sub for US Army Eng Corp), Pem-Air Ltd, Plummer's Lodges, Prince Edward Air, Refurbair, Samaritan Air, Selkirk Air, Silver Pine Air, Toronto Avionics, and TS Manufacturing.

AIT ADVANCED INFORMATION TECHNOLOGIES Corp

ADDRESS: AIT Building
9 Auriga Drive
Nepean, Ontario
Canada K2E 7T9

CONTACT: Mr Al Hamblin, Director, Business Development
Tel: (613) 226-7800
Fax: (613) 226-3066

KEYWORDS: ATC Simulators; Atmospheric Monitoring; Data Acquisition; Data Processing; Expert Systems; Network Management; Optical Character Recognition; Project Management; Radar Signature Analysis; Radar Systems Analysis; Remote Sensing; Satellite Subsystems; Secure Identity Documents; Space Mission Planning; Systems Analysis; Systems Integration.

HISTORY: AIT Advanced Information Technologies Corporation is a Canadian-owned, electronic systems company incorporated since 1973. The firm was formerly known as Hitech Canada Ltd, an Ottawa-based, computer hardware and software consulting firm.

CAPABILITY: AIT Corporation Products Group is primarily involved in the design and manufacture of security document issuance and inspection systems based upon optical character recognition technologies. Their machine-readable passport systems are in use by government agencies in nations such as Canada, the US, Australia, the UK, Finland, New Zealand, and Hong Kong. They also design and manufacture word counters for translation bureau billing and typescript page readers.

AIT Corporation Systems Division is involved in civilian and military radar systems clutter analyses and simulation studies, and was the prime contractor for a development of the Wind-Imaging Interferometer (WINDII) which measures the temperature and velocity of selected ionic species in the upper atmosphere from a station aboard NASA's Upper Atmosphere Research Satellite (UARS).

AIT has a multi-year contract with the Canadian Space Agency (CSA) through which it operates a contractor management office for management of the Canadian Mobile Service Systems (MSS), part of Canada's major contribution to the NASA Space Station Freedom.

AIT's air traffic control trainer, NATSIM, is used to train all Canadian air traffic controllers in eight centers across Canada. The company continues to develop its NATSIM family of airspace training simulators.

AIT's capabilities include systems analysis; electrical, mechanical, and optical engineering; software design and development; systems project management; systems integration and verification; product assurance (including reliability and maintainability analysis); production; quality assurance; documentation; training; installation; and service.

PERSONNEL: PhD - 5
Engs - 61
Others - 52

GROSS SALES: No data.

PLANT SIZE: 30,000 sq ft

EQUIPMENT: In-house computer systems include Apollo 3500 and 4500; Sun 386I, Apple MacIntosh, DEC DPI, Intel 80386 PC, variants of the IBM PC/AT, and Personal System/2 Model 30s and Model 60s.

EXPERIENCE: AIT's present foreign customers include Computer Sciences Corp for the US Immigration and Naturalization Service, the Bank of Finland Security Printing House, and Software Sciences Ltd of England for the UK Home Office. Present domestic customers include the Canadian Federal Government Departments of Communications, External Affairs, National Defence, National Research Council (Space Research), and Transport (Air Traffic Control and Coast Guard).

AMPTECH Corp

ADDRESS: 3202 12 Avenue NE
Calgary, Alberta
Canada T2A 6N8

CONTACT: Mr Malcolm Smith, Manager, Corporate Projects
Tel: (403) 221-0550
Fax: (403) 273-5528

KEYWORDS: Die Casting (Aluminum/Zinc); Plastic Injection Molding; Thixomolding (Magnesium Injection Molding); Tooling.

HISTORY: Amptech Corporation is a Canadian-owned company founded in Calgary in 1967. The company operates out of two facilities, both located in Calgary.

CAPABILITY: Amptech Corporation is capable of high-precision, custom, injection molding, aluminum and zinc die casting, and magnesium thixomolding. To complement these processes, Amptech has an extensive in-house tool and die making facility. Amptech inspection and test procedures comply with NATO AQAP-4 and MIL-I-45208.

PERSONNEL: Manufacturing - 140
Design and Engineering - 8 (4 P Eng)
Quality Control - 12
Office - 12

GROSS SALES: 1990 - $10.6M
1991 - $11.7M

PLANT SIZE: Plant 1 - 53,000 sq ft
Plant 2 - 24,000 sq ft

EQUIPMENT: Thirty-one plastic injection molding machines ranging from 5 to 715 ton; 2 aluminum/zinc diecasting machines ranging from 250 to 350 tons; 2 automatic zinc machines; full range of testing equipment; MacDonnell Douglas Unigraphics II CAD/CAM system; 3 CNC vertical machining centers; CNC wire EDM; and various milling machines, grinders, EDM machines, lathes, and presses.

EXPERIENCE: Present customers include Bristol Aerospace, Olin Corporation (General Defence Corporation), Automated Machine Product, Valentec Olivette, and Aerospatiale (Tactical Missiles Division).

ANACHEMIA CANADA Inc

ADDRESS: Plant
500 - 2nd Avenue
Ville St-Pierre
Montreal, Quebec
Canada H8R 1M3

Mail
PO Box 147
Lachine, Quebec
Canada H8S 4A7

CONTACT: Mr Guy R Quenneville, Contract Manager
Tel: (514) 489-5711
Fax: (514) 363-5281

KEYWORDS: Chemical Agent Detector Kits; Chemical Agent Liquid Simulator Airburst; Chemical Warfare Defense Equipment; Detectors (Chemical Agents); Laboratory Chemicals; Nerve Agent Vapor Detector; Paper (Chemical Agent Detector).

HISTORY: Anachemia Canada Inc has been in operation for more than 50 years and is a wholly-owned, Canadian company located in Montreal, Canada. For more than 20 years Anachemia has

been producing chemical warfare detection devices. The company has a subsidiary in Rouses Point, New York.

CAPABILITY: Anachemia is primarily involved in the manufacture of laboratory chemicals and chemical warfare detection devices. Its 20 years of experience in producing detection devices and the superior quality of its products, together with a record of better than 95% on-time delivery performance, is the reason that Anachemia Canada Inc is the prime supplier of these products to virtually all Western Alliance Countries.

PERSONNEL: PhD - 4
Engs - 3
Others - 200

GROSS SALES: 1990 - $20.0M
1991 - $25.0M

PLANT SIZE: 90,000 sq ft

EQUIPMENT: In-house computer systems include VAX and IBM.

EXPERIENCE: Present customers include the Department of National Defence in the Canadian Government, the United States Army (the company is the only supplier of Paper Chemical Agent Detector M9 and M8), and the departments of defense of all NATO countries.

ANDREW CANADA Inc

ADDRESS: 606 Beech Street West
Whitby, Ontario
Canada L1N 5S2

CONTACT: Dr George Tong, Business Development Manager, Government Electronics Group
Tel: (416) 668-3348
Fax: (416) 430-3964

KEYWORDS: Antennas; ATC; Broadcast Antennas; Build-To-Print; Earth Stations; Elliptical Waveguides; Equipment Shelters; Fabricated Aluminum Structures; HELIAX Coaxial Cable; HF Antennas; Radar Navigation Aids; Radar Weather; Special Purpose Antennas; Tactical Communications; Terrestrial Microwave Antennas; Towers (Antenna).

HISTORY: Andrew Canada Inc was incorporated in 1953, being granted a Dominion Charter by the Government of Canada, and is a subsidiary of Andrew Corporation of Chicago, Illinois. Andrew has grown and expanded with the dynamic communications industry. The design and manufacturing efforts of the company have been centered on antennas (earth station, terrestrial microwave, radar, navaid, and high frequency) and the supply of transmission lines (waveguides and coaxial cables) and related equipment. Through the years, Andrew engineers have paced the industry in these specialties.

CAPABILITY: Andrew can supply all of the elements for microwave, broadcast, earth station, HF, VHF, UHF, cellular, special application, military, and tactical antenna systems including antennas, waveguide and cable, towers, equipment shelters, transportation, installation, and project management. The company has also developed a wide variety of custom antenna systems for applications as varied as radar, navigation aids, telemetry, command and control, and tactical HF communications, in frequencies ranging from VLF to millimeter wave.

PERSONNEL: PhD - 2
Engineers - 10
Others - 204

GROSS SALES: 1990 - $48M
1991 - $45M

PLANT SIZE: 8,733 sq meters

EQUIPMENT: The Canadian operation includes punching, forming, an extensive machine shop with a number of automatic machine tools, a welding shop with equipment for tungsten/inert gas, silver brazing and soldering, complete facilities for metal finishing and painting, assembly and fitting shops, and packing facilities. Andrew uses an on-line Manufacturing and Production Information Control System (MAPICS), commercially available structural analysis software, including FAPMAT (an interactive program which interprets windloading), and RMSDISP (a post processor program which manipulates ASAS displacements to interpret antenna performance). The company's facilities include a fully equipped model shop, a 19-meter near field anechoic chamber, and an antenna pattern test range with unobstructed sources ranging from 200 to over 5,000 meters from the main test tower.

EXPERIENCE: Andrew's present customers include military and government agencies as well as prime contractors in Canada, the US, and abroad. Recent contract awards include the manufacture of 23-foot reflector antennas, feed systems, and waveguide for the Next Generation Weather Radar (NEXRAD) system to determine wind speed, wind direction, and storm configurations. Raytheon Company, under contract to the Electronic Systems Center of the USAF, awarded Andrew a contract for the manufacture of dual-space diversity 9.5 ft parabolic antennas and waveguide feeds for AN/TRC-170 (V2) tactical digital troposcatter equipment and a contract for the production of 35 ft L-band antennas for the

Radar Modernization Project (RAMP) to replace and modernize ATC primary and secondary en route and terminal radar systems. The company is manufacturing 98 earth station antennas for CANAC/Microtel to be used in the North Warning System. Under a production contract with Unisys Defense Systems are wind profiler antenna systems. These antennas, being built for the National Oceanic and Atmospheric Administration (NOAA) of the US Department of Commerce, will promote commercial airline flight safety and fuel economy by determining where and at what altitudes the best flying conditions are. HF antennas produced by Andrew Canada are sold to government and civilian agencies worldwide. Recent contracts include multi-mode SPIRACONE antennas to the Icelandic PTT for Northern Atlantic air-ground communication, a new transmit and receive site in Saudi Arabia for Saudi's Royal Flight, and a multi-year contract for a US DOD agency for shore stations worldwide. Continuing in the US, compact SPIRA-CONES have been provided to the FAA as part of the National Radio Communications Systems (NARACS) program, and work has just begun on the first phase of HF ground entry systems for the joint DND/USAF North American Air Defence Modernization Program (NAADM).

APPENDIX PUBLISHING Inc

ADDRESS: 1492A Star Top Road
Gloucester, Ontario
Canada K1B 3W6

CONTACT: Mr John Mertl, Manager, Business Development
Tel: (613) 748-1154
Fax: (613) 748-3698

KEYWORDS: Data Acquisition; Documentation; Electronic Publishing; Publication Service; Technical Publications; Technical Writing.

HISTORY: Founded and incorporated in 1989 by a team of technical writers and illustrators, Appendix Publishing Inc is a Canadian-owned documentation management and production firm.

CAPABILITY: MIL-SPEC, Canadian Forces Technical Orders (CFTO), and other forms of integrated logistics support documentation for the aerospace, defense, and high technology industries are Appendix Publishing Inc's foremost areas of expertise. Appendix offers full service documentation management and production services in a fully automated CALS compliant environment. Appendix provides state-of-the-art data management and source data generation, technical writing and editing, technical illustration and drafting, translation, typesetting, and final production and distribution management. Appendix covers wide areas of expertise in the domains of aerospace, marine, and land including electronics, avionics, communications, ballistics, pyrotechnics, weapon systems, vehicle, and transport equipment.

PERSONNEL: Administration - 5
Technical - 20

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: Completely automated production facilities in UNIX and IBM compatible PC environments. Scanning facilities. Software includes Interleaf, Docutran, CADD.

EXPERIENCE: Department of National Defence, Canada; subcontractor to major Canadian and international defense and aerospace firms such as Honeywell Limited, Aerospace Division; MDS AeroSupport Corp; MIL Systems Engineering Inc; and Bombardier.

APPLIED MICROSYSTEMS Ltd

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

CONTACT: Mr Steve McBeath, Sales and Marketing
Tel: (604) 656-0771
Fax: (604) 655-3655

KEYWORDS: Conductivity Sensors; Current Meter Systems; Data Acquisition; Data Logging; Depth Systems; Geophysical Instrumentation; Meteorological Instruments; Oceanographic Instrumentation; Sound Velocity Systems; Temperature Sensors; Underwater Acoustics; Underwater Instrumentation; Water Quality Measurement.

HISTORY: Applied Microsystems Ltd is a Canadian-owned, high-technology manufacturing company, incorporated in British Columbia in 1974. It specializes in the manufacturing of high-technology sensors and data-logging instrumentation.

CAPABILITY: Applied Microsystems' primary business is design and manufacture of standard and custom electronic instruments for use underwater. The products are reliable, high-precision, data-recording instruments built for long-term deployment based on battery power. The company designs and manufactures its own sensors, electronics, and pressure housings, and is well known for its oceanographic engineering and customized products. Approximately 33% of its sales are 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 most countries through an agency structure. In the US, agents in Florida, Texas, Massachusetts, California, and Virginia represent all of the standard products manufactured by Applied Microsystems Ltd.

PERSONNEL: Engineers - 4
Others - 12

GROSS SALES: 1988 - $430K
1989 - $560K

PLANT SIZE: 5,060 sq ft

EQUIPMENT: Applied Microsystems has machine shop facilities, an electronics assembly and production facility, a research and development division, an environmental test chamber, a deep ocean testing facility, and a sea water test tank.

EXPERIENCE: Past customers include nearly every oceanographic and hydrographic government research institution around the world.

THE ARMSTRONG MONITORING Corp

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

CONTACT: Mr Yves Grandmaitre, Sales Manager
Tel: (613) 225-9531
(800) 465-5777
Fax: (613) 225-6965

KEYWORDS: Calibration; Carbon Monoxide Gas Detection; Catalytic Sensors; Chlorine Gas Detection; Combustible Gas Monitors; Electrochemical Devices; Electronic Gas Detectors; Environment; Gas Detectors; Hazardous Gas Detection; Hydrogen Sulfide Sensors; Monitors (Gas); Petroleum Leak Detectors; Pollution Monitoring Equipment; Safety Equipment; Sensors; Solid State Devices; Toxic Gas Detectors.

HISTORY: The Armstrong Monitoring Corp is a Canadian-owned electronic hazardous gas and vapor detection systems manufacturing firm founded in January 1981. The company has distributors across Canada and the US.

CAPABILITY: The Armstrong Monitoring Corp (AMC) is primarily involved in the manufacturing of fixed and portable hazardous gas detection systems, in addition to vapor detection for the petroleum industry's fuel storage facilities. In the fixed gas detection, they offer both rack and wall mount systems incorporating a remote calibration sensor/transmitter that produces a time saving factor. In the area of sensors, they range from electrochemical, catalytic, and solid state. Offered in the solid state type is a specific poison proof H_2S sensor with a five year warranty and a ten year life expectancy. On the portable side, units range from hand-held AMC 1100 series to the AMC 3000 series. In the AMC 3000, AMC offers their exclusive three meter, three sensor concept in a compact portable unit which allows three separate conditions to be monitored simultaneously (oxygen, toxic, and combustible gases).

The other major product line developed for the petrochemical industry is the AMC leak detection system. A full line of sensors is available for both liquid and vapour sensing which can be used in conjunction with AMC's petrosense monitor. The leak detection system offers the owners of petroleum storage facilities both underground and above ground twenty-four hour surveillance of their tanks, in the event that leakage should occur.

AMC's human resources permit comprehensive maintenance of all levels of manufacturing from in-house R&D (consisting of engineering staff and product technician), to Quality Control, Quality Assurance, right through to their training programs.

PERSONNEL: Engineers - 4
Degrees - 7
Others - 25

GROSS SALES: No data.

PLANT SIZE: 14,000 sq ft

EQUIPMENT: Environmental chamber (1 ton), full line of instrumentation devices for alignment and testing capability, 210 unit TRX 12 volt power burn-in panel, 4 unit 115 volt monitor burn-in panel, and a 600 volt transformer power supply. Full calibration room set-up. Fume heads. Fully computerized manufacturing and tracking.

EXPERIENCE: Customer countries include Canada, the US, South America, Singapore, Malaysia, India, the Netherlands, Australia, Thailand, and Taiwan. Applications range from heavy water plants (H_2S), coal mining (CH_4), pulp and paper industry (H_2S, CO), offshore rigs (H_2S, CH_4), commercial properties (CO), underground vehicle tunnels (NO_2, CO), to marine and navy ships (CH_4), and now petroleum storage facilities (gasoline), plus many other institutions throughout the world.

ARRAY SYSTEMS COMPUTING Inc

ADDRESS: Unit 24
401 Magnetic Drive
Downsview, Ontario
Canada M3J 3H9

CONTACT: Mr Robert Bruce, Business Development Manager
Tel: (416) 736-0900
Fax: (416) 736-4715

KEYWORDS: Acoustic Signal Detection; Ada Programming; ASW; Automated Real-Time Detection; Computer Vision; Data Acquisition; Data Processing; Feasibility and Requirement Studies; Image Processing; Meteorological Satellite Ground Stations; Neural Networks; Radar Weather Stations; SAR; Satellite Aided Search and Rescue; Signal Processing; Software Maintenance; System Integration; Systems Analysis.

HISTORY: Array Systems Computing, Inc (ASC) is a private, Canadian-owned, high-technology, software development firm, incorporated in 1981.

CAPABILITY: Array focuses on the development of software and integration of real-time signal/image processing systems. Included are weather satellite data collection and image dissemination systems, unusual high-speed real-time data acquisition systems, large on-line data-based systems, complex radar systems, Ada programming and compiler, automated detection systems, simulation studies, and specialized scientific programming. ASC has installed several meteorological satellite ground stations including two for Environment Canada in Edmonton and Toronto and one for the Radio Research Laboratory in Seoul, Korea. Recently ASC developed an airborne synthetic aperture radar (SAR) system, a damage control console for a Canadian frigate, and a syntax-directed editor for Ada programming. ASC's capabilities cover the broad areas of system and software design and development, systems management, feasibility analysis, systems integration, quality assurance and configuration management, documentation, installation, testing, and training. ASC is also familiar with several military standards, such as MIL-STD-2167A, and has personnel and facility clearance at the Secret level.

PERSONNEL: PhD - 4
Computer Scientists and Engineers - 23
Other - 7

GROSS SALES: No data.

PLANT SIZE: 10,000 sq ft

EQUIPMENT: In-house computer systems include VAX, SUN Concurrent, IBM, Perkin-Elmer, and NCR Tower.

EXPERIENCE: Customers include Canadian Department of National Defence (DCIEM, DREA, DREO), Environment Canada (Atmospheric Environment Service), Transport Canada, Canadian Centre for Remote Sensing, Canadian Forestry Service, Metropolitan Toronto Department of Roads and Traffic, Motorola Information Systems Ltd, Ontario Hydro, Phillips Petroleum, Spar Aerospace Ltd, TRW Inc, US Department of Defense, and General Instrument of Canada Ltd.

A-R TECHNOLOGIES Inc

ADDRESS: 220 - 13155 Delf Place
Richmond BC
Canada V6V 2A2

CONTACT: Mr C Trsek, Director, Marketing
Tel: (604) 273-1717
Fax: (604) 273-1263

KEYWORDS: R&O (Components); R&O (Engines).

HISTORY: A-R Technologies Inc is a Transport Canada Authorized Maintenance Organization (AMO) specializing in high tech repair and overhaul of turbine components. Founded in 1982 by company president Augustin Trsek, A-R Technologies Inc was able to convince aircraft operators that there were big savings to be made in having worn out components repaired to exacting aviation standards without compromising safety.

Today the company employs some 30 expert staff and boasts technology not found anywhere else in North America. A-R Technologies Inc is located 15 minutes from Vancouver International Airport. Its facility totals some 20,000 square feet of modern surroundings.

CAPABILITY: Under the AMO designation, A-R Technologies Inc repairs and overhauls aircraft/aerospace components utilizing the following in-house services:

- high temperature vacuum furnace brazing
- vacuum brightening of superalloys
- Dayton cleaning process for superalloys (fluoride-ion cleaning)
- heat treatment
- high velocity plasma-thermo spray
- non-destructive testing

- airflow calibration services
- manual and semi-automatic GTAW welding
- precision and CNC machining
- repair development
- engineering and metallurgical services
- stripping of diffused coatings

A-R Technologies Inc has gained a reputation of providing its expert capabilities in repair and overhaul to an extensive list of aircraft owners, engine distributors, and engine manufacturers. From supporting single aircraft operator to fleets of aircraft, A-R Technologies Inc has its motto of quality performance and reliability well established within the industry.

With the anticipated growth of the aerospace industry in the Pacific Rim, A-R Technologies Inc is poised for significant growth to even better serve the aerospace community.

A-R Technologies Inc has recently been selected and approved as a subcontractor to Spar Aerospace Ltd for the Canadian Space Station Program.

PERSONNEL: PhDs - 1
Engs - 2
Others - 25

GROSS SALES: 1990 - $2.2M
1991 - $2.3M

PLANT SIZE: 20,000 sq ft

EQUIPMENT: Complete in-house repair and overhaul facility of jet engine turbine components.

Fluorocarbon Cleaning Furnace (Dayton Process):

- Most effective cleaning process for superalloys
- No over-etching and intergranular attack of components
- Advanced microprocessor control
- Only available system in Canada
- Hot chamber dimension: 42" dia x 60" deep
- Operating range to 1100 +/- 5°C

Airflow Calibration:

- Determining aerodynamic flow area of a wide range of gas turbine components
- Calibrations are consistent and reliable
- Advanced microprocessor control
- Computer print-out

EXPERIENCE: Present customers include original engine manufacturers, engine distributors, authorized maintenance overhaul facilities, airlines, aircraft owners, etc. A-R Technologies Inc services some 150 accounts including Pratt & Whitney, Spar Aerospace, Canadian Airlines International, Westcoast Energy Inc (Industrial), Airwork, and Aviall.

ASCENT POWER TECHNOLOGY Inc

ADDRESS: 146 Adesso Drive
Concord, Ontario
Canada L4K 3C3

CONTACT: Mr Greg Anderson, Senior Account Manager
Tel: (416) 660-9819
Fax: (416) 660-9567

KEYWORDS: Electonics; Power Converters; Power Supplies.

HISTORY: Ascent Power Technology Inc is a Canadian-owned, high technology company founded in 1991. It was originally owned by Murata-Erie North America. Ascent purchased the Murata-Erie power supply operation in a management buyout on April 1, 1991. Ascent maintains the intellectual design rights to over 400 products that were developed over the past 21 years.

CAPABILITY: Ascent is primarily involved in the design and manufacture of custom switch mode power conversion systems including AC-DC, DC-DC, and high voltage supplies for CRTs, helmet mounted displays (HMDS), and heads-up displays (HUDS). The company also offers SMT and through-hole capability for the general avionics industry. Ascent's power conversion products are used in commercial, military, and aerospace systems such as the KC-13R, the AH-6R helicopter, the Space Shuttle, and various business jets. Capabilities include design, CAD/CAE, program management, environmental testing, qualification to MIL-SPEC, quality assurance, and state-of-the-art manufacturing, encapsulation, and documentation. The facility is highly advanced in TQM and SPC procedures, measuring defects in PPM. The operation of the facility is compliant with MIL-I-45208A (AQAP-4) for inspection and MIL-STD-2000 for general workmanship, JIT, and Ship to WIP programs.

PERSONNEL: PhDs - 2
Engs - 12
Others - 77

GROSS SALES: 1990 - $4.5M
1991 - $7.5M

PLANT SIZE: 35,000 sq ft

EQUIPMENT: IBM MRP-II system with AIX software, SMT and through-hole electronics production facility, temperature shock chamber, computer controlled burn-in, automated test (ATE), vacuum encapsulation facility, computer controlled magnetics production.

EXPERIENCE: Present customers include Raytheon Corp, Rockwell International, IBM, General Electric-Astrospace Division, and Honeywell Military Avionics. Previous work has been completed for Canadian Marconi, DY-4 Systems, Bavaria Keytronics-Gmbh, and GEC-Ferranti-UK.

ATLANTIS AEROSPACE Corp

ADDRESS: 1 Kenview Blvd
Brampton, Ontario
Canada L6T 5E6

CONTACT: Mr Chris Lehman, Marketing Manager, Aircraft Programs
Tel: (416) 792-1981
Fax: (416) 792-7251

KEYWORDS: Animated System Trainers; Avionics; Computers; Electro-optics; Engine Component Simulator; Flight Training Devices; Maintenance Simulators; Operator Simulators; Radio/Radar Altimeters; Simulators; Software Development; Software Services; Systems Simulation; Test Equipment (Digital 1553); Testing/Test Equipment; Training; Training Simulators; Video Training (Thru-Site) Systems.

HISTORY: Atlantis Aerospace is a wholly-owned Canadian company incorporated in 1978.

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

Atlantis Aerospace Corp has firmly established itself in the international military and commercial marketplace with an excellent reputation for quality and performance.

The Simulation/Training Group offers total training systems capability that spans the complete range of training aids including maintenance trainers, part-task trainers, flight training devices, operational trainers, computer-based training systems, and hardware-in-the loop trainers.

Atlantis has produced simulator systems for use by the US, Australian, and Canadian forces which include a complete suite of maintenance trainers for the F/A-18 aircraft, the H-46 helicopter, and the E-6 aircraft. Each of these systems offers "O-level" maintenance training, and features free-play systems simulation, interactive laser video disk technology, mathematically modelled test equipment, and instructor selected faults. Current programs include a suite of F-15E aircraft maintenance trainers (AMTs) for the USAF, Blackhawk/Seahawk helicopter maintenance trainers for the Australian Army and Navy, and a C-90 King Air Flight Training Device for the Canadian Forces Contracted Flying Training and Support Program (CFTS).

The Avionics Test Equipment Group offers a complete line of commercial and military avionics support equipment including a full range of ARINC testers designed to support the new digital commercial aircraft such as the Boeing 757/767. MIL-STD-1553/A bus testing capability is provided by the DCM-1553 Digital Bus Communicator.

The Instrumentation/Control Group specializes in developing custom microprocessor-based technology such as autopilot/guidance systems for remotely piloted vehicles and target drones.

PERSONNEL: Engineering - 140
Manufacturing - 35
Others - 40

GROSS SALES: 1990 - $17M
1991 - $19M

PLANT SIZE: 64,000 sq ft plus 20,000 sq ft off-site storage

EQUIPMENT: No data.

EXPERIENCE: Atlantis has supplied equipment to the following companies: McDonnell Douglas, the US Air Force, Canadian Department of Defense, Boeing Helicopter Co, Boeing Military Airplane Co, Boeing Aerospace Co, the US Navy and Marine Corps, the Royal Australian Air Force, Air Canada, and Canadian Airlines International.

ATOMIC ENERGY OF CANADA Ltd

ADDRESS: 344 Slater St
Ottawa, Ontario
Canada K1A 0S4

CONTACT: Dr S R Hatcher, President and CEO
Tel: (613) 237-3270
Fax: (613) 563-9499

KEYWORDS: Candu; Ceramics; Chemical Analysis; Decommissioning; Electro-Optics; Engineering Services; Environmental Control; Heat Energy; Nuclear; Optics; Process Control; Robotics; Spectrometric Technology; Steam

Quality Stack-Gas Scrubbing; Structural Dynamics; Testing/Test Equipment.

HISTORY: Atomic Energy of Canada Ltd (AECL) was formed as a crown corporation in 1952 with a mission to develop nuclear energy and associated technologies for the benefit of Canada.

The company has recently redefined its strategic direction and now emphasizes innovation and the development of non-nuclear products and services based on traditional enterprises.

CAPABILITY: AECL research operates two world-class research and development facilities: Chalk River Laboratory at Chalk River, Ontario, and Whiteshell at Pinawa, Manitoba. They represent one of Canada's top multi-disciplinary teams of technical professionals with expertise in almost every branch of science and engineering including such fields as electronics, computer science, metallurgy, environmental management, design, construction, material physics, thermal hydraulics, wear and inspection, instrumentation, heat transfer, safety, etc.

AECL CANDU, located in Mississauga, Ontario, designs, markets, and manages CANDU nuclear reactor projects in Canada and internationally.

PERSONNEL: Professional experts - 1745
Technical Non-Production - 1083
Production - 912
Administrative - 763

GROSS SALES: 1991 - $227M
1992 - $308M

PLANT SIZE: 2 world-class laboratories (Chalk River, Ontario and Pinawa, Manitoba); Engineering Group in Mississauga, Ontario.

EQUIPMENT: Major facilities include research reactors, TASCC (Tandem Accelerator Superconducting Cyclotron), drop-test facility, thermal hydraulic loops, hot cells, radioisotope production facility, heavy water upgrading facility, physical security systems, tritium removal facility, computerized tomography equipment, neutron radiography equipment, corrosion testing equipment, fretting-wear test facility, material characterization equipment, fracture and failure analysis equipment, catalyst lifetime test facility, computer aided design facilities, machining, welding and sheet metal facilities, a wide array of research analytical equipment, underground research and storage facility, tow-phase flow and gas dynamics equipment, combustion test facility, etc.

EXPERIENCE: Atomic Energy's present customers include the Canadian Government, major electric power utilities, Canadian and international industries, and Canadian and foreign research institutes and associations.

ATS AEROSPACE Inc

ADDRESS: 1250 Marie-Victorin
St-Bruno, Quebec
Canada J3V 6B8

CONTACT: Mr Peter Swan, Director Marketing
Tel: (514) 441-9000
Fax: (514) 441-6789

KEYWORDS: Aerial Targets; Ammunition Design and Testing; ATC Simulators; Computer Aided Learning; Data Acquisition; Digital Recorders; Explosives (Underwater Testing); Radar Augmentation Devices; Software Development.

HISTORY: ATS Aerospace Inc is a high-tech engineering company focusing on aerospace and defense technology. Based at its new facility in St-Bruno, Quebec, ATS has two divisions: Aerospace, specializing in the development and production of fully integrated air traffic control (ATC) instructional systems; and Ballistech Systems (BSI), specializing in defense-related testing and trials services, and research and development of aerial targets and aeronautics.

CAPABILITY: ATS aims for exclusive niches in the aerospace and defense market and is a recognized leader in the design and development of radar and aerodrome tower visual simulators for ATC training, radar and infrared augmented projectile targets for air defense training, and rugged, stand-alone digital recorders. The civil aviation area comprises 70% of current business with visual and radar simulators operating in North, South, and Central America, Europe, Africa, Asia, and the Middle East. More than 60% of sales are exported. ATS ATC radar simulators are currently being used for basic, continuation, and certification training, design of noise-abatement procedures, design of MLS approach plates for major Canadian airports, military ATC training, student self-training, and much more. BSI's activities are divided between the sale of company proprietary air defense targets and providing engineering and technical services to the Canadian and other NATO governments. BSI aerial targets replicate the radar cross section, speed, trajectory, and even the infrared signature of incoming aerial threats. These devices are used in training for test and evaluation of air defense systems at a fraction of the cost of other training options. They are used as part of a comprehensive training scenario by sea, land, and air forces worldwide. BSI provides a range of engineering services at an underwater explosion (UNDEX) test facility in Bedford, Quebec. It is used for characterization of explosives and to study the effects of underwater

explosions on shipborne structures and equipment.

PERSONNEL: Technical - 40
Others - 20

GROSS SALES: 1991 - $4.5M

PLANT SIZE: 25,000 sq ft

EQUIPMENT: High performance real-time image generators, Silicon Graphics personal IRIS and SUN 4/C workstations, IBM AT/PS-2 compatible microprocessors, electronic and mechanical CAD, finite element structural modelling, solid modelling, digital electronics development facilities. The company operates test facilities, including a 1.8m x 50m FAE blast wave tunnel for DND/DRES at Suffield, Alberta, and an underwater explosion testing facility at Bedford, Quebec.

EXPERIENCE: Contract awarded by Federal Office of Civil Aviation in Vienna, Austria, to supply an advanced radar and airport visual simulator; contract awarded by Federal Section Division of IBM to supply software for all simulation functions for an air traffic control radar training system for the US FAA; customers include DND(Canada), DOT (Canada), US Army (BRL), Defense Nuclear Agency (DNA), Government of Norway, Government of West Germany (BWB), International Civil Aviation Organization (ICAO), Danish Navy, Government of Greece (civil aviation and Navy).

THE AUSTIN COMPANY Ltd

ADDRESS: 304 The East Mall
Suite 701
Etobicoke, Ontario
Canada M9B 6E2

CONTACT: Mr Ralph E Luke, Vice President and General Manager
Tel: (416) 239-4301
Fax: (416) 239-2459

KEYWORDS: Aircraft Manufacturing Facilities; Anechoic Facilities; Computer Aided Design; Constructors; Consulting (Engineering); Design Services; EMI-NEMP-EMP Shielding; Engineering and Construction; Engineering Services; Facilities Design; Feasibility Studies; Hangars; Maintenance and Overhaul Facility Planning; Master Planning; Project Management; Quality Assurance; Security Systems; Shielded Rooms (RF); System Integration; TEMPEST Enclosures.

HISTORY: The Austin Company, founded in Cleveland in 1878 and a subsidiary of the National Gypsum Company since 1984, is an international organization providing a comprehensive portfolio of professional consulting, design, engineering, and construction services to help industrial, commercial, and institutional managements solve their physical facility problems. The Austin Company Limited was incorporated in Canada by Federal Charter in 1930, though the Austin Company had built many projects in Canada in previous years. A nucleus operation was established in Montreal, Quebec, in 1956. Due to substantial growth, the Austin Company moved to Toronto, Ontario, in 1965 where they have been located in the 427/Burnhamthorpe/Bloor area ever since. The Austin Company Limited, Canada, is owned by The Austin Company of Cleveland, Ohio, which originated some 110 years ago. The Austin Company operates in Canada and United States through nine district organizations based in principal cities. The Austin Company has international units in five countries: Japan, the United Kingdom, Spain, The Netherlands, and Australia, with associate companies in Brazil and Italy and coordinating representation in Mexico.

CAPABILITY: The major focus of The Austin Company is to apply its 110 years of expertise in the development of productive and efficient facilities that contain the highest level of technology available. Austin resources cover the full range of services required to implement major projects and programs from space programming, planning, feasibility studies, and consulting to complete architectural, interior design, engineering, quality assurance, procurement, and construction. Over 1600 professionals in Austin's operating units are trained in the several disciplines needed to master plan, design, and construct the most sophisticated, state-of-the-art maintenance complexes in the world, with the most cost-effective solutions.

To assist in the effective design and preparation of construction drawings, Austin utilizes advanced CADD systems.

Austin has over 70 years of experience in the design and construction of manufacturing plants for commercial and military fixed-wing aircraft, helicopters, and missiles.

The Austin Company has possibly planned, designed, and/or built more aerospace support facilities than any other free-world firm. They have accomplished successful assignments for over 80 aviation/aerospace clients, most for repeat work, including over 23 million sq ft of facilities for The Boeing Company. This long span of aerospace involvement has provided The Austin Company with the opportunity to participate in the evolving technologies that have become the mode of aerospace development. Composite components, electronics, non-destructive testing, autoclaves, paint systems, corrosion control, and large size and weight of aircraft are all conditions that have to be econom-

ically accommodated. The Austin Company provides the airline industry a full range of professional consulting, design, engineering, and construction services dedicated to the support of timely maintenance operations in cost-effective, high-production facilities.

Austin's services are tailored to meet the specific needs and goals of each client for his particular project. The work to be performed can draw from a vast body of prior experience that has been provided for the following type facilities: aircraft maintenance; corrosion control; wash, strip, and paint facilities; electronic and instrument laboratories; engine overhaul shops; wiring shops; fabrication shops; avionics shops; automated warehouses; metrology laboratories; air frame fabrication; aircraft assembly, design, and engineering centers; related aircraft ramps, aprons, taxiways; and portable and fixed docks.

PERSONNEL: Canada - 90
US & International - 2100

GROSS SALES: $1.0B annually

PLANT SIZE: 14,000 sq ft plus 9 design locations across USA

EQUIPMENT: In-house CAD, CADD printers. CADD system is "Microstation," a PC-based intergraph compatible CADD system. Latest in Xerox management information system together with computerized accounting.

EXPERIENCE: Austin's client list includes Department of National Defence, Alaska Airlines, Alitalia, The Boeing Company, Easter Airlines, Federal Express, Hellenic Aerospace Industries, McDonnell Douglas Corporation, Northwest Airlines, Texas International Airlines, United Airlines, US Air Force, Naval Air Rework Facilities (NARF), US Navy, and Northrop.

In addition, the company provides a wide range of architectural, engineering, design, and construction services for a variety of aerospace support industries and other governmental departments.

AVIATION PLANNING SERVICES Ltd

ADDRESS: 17th Floor
1 Place Ville Marie
Montreal, Quebec
Canada H3B 2C1

CONTACT: Mr Eric McComachie, Chairman and CEO
Tel: (514) 878-4388
Fax: (514) 861-6310

KEYWORDS: Aircraft Leasing; Aircraft Performance Analysis; ATC Analysis; Business Planning; Consulting (Aviation); Economic Analysis; Equipment Procurement; Equipment Selection; Maintenance and Overhaul Facility Planning; Market Surveys; Master Planning; Navigational Aids; New Product Development; Operational Studies; Route Analysis; Simulation; Site Selection; Traffic Forecast.

HISTORY: Aviation Planning Services Ltd (APS) was formed in 1967 as a Canadian branch of R Dixon Speas Associates of New York. In 1971, it was incorporated under the authority of the Canadian Corporation Act. Since its inception, the company has performed approximately 400 projects for over 100 clients both domestic and in 35 countries outside of Canada.

CAPABILITY: APS was formed to provide professional consulting services to all sectors of the aviation industry. Major activities are directed toward commercial air transportation, airport planning, general aviation, product analysis for aerospace manufacturers, aircraft leasing, maintenance base planning, equipment procurement, airport and airspace simulation, and aviation system planning and development programs for industry and government.

The multi-disciplinary staff consists of specialists in engineering, flight operations, airline economics, aircraft maintenance, aircraft noise impact, and aviation products marketing. APS project supervisors average more than 25 years of aviation experience, both in industry and consulting services. The firm is dedicated to keeping pace with the latest developments in all facets of the industry and maintains an up-to-date library of research reports and aviation statistics.

APS developed a technique for the use of aircraft flight simulators equipped with computer-generated imagery for the evaluation of prospective airports. The firm is currently working on behalf of Canadair in the market assessment and marketing assistance of the Regional Jet. As consultants to the airline industry, the firm has also developed a number of procedures in the sizing of new maintenance and overhaul facilities which have been utilized on both domestic and overseas projects. The clientele of APS consists of international airlines; business aircraft operators; foreign, federal, provincial and local governments; financial and industrial organizations; and aircraft manufacturers. The high ratio of repeat business is an indication of the confidence these diverse groups have in the capabilities of the company.

PERSONNEL: Professionals - 9
Outside Consultants - 5-20
Support Staff - 4

GROSS SALES: No data.

PLANT SIZE: 4,100 sq ft

EQUIPMENT: Several IBM-compatible personal computers which are linked to a central file server over a Novell Netware 386 LAN (local area network). Two HP LaserJet Series II, one color HP PaintJet XL, and a modem.

EXPERIENCE: The firm has provided professional consulting services to organizations including major air carriers, international agencies, overseas government agencies, Canadian government agencies, aerospace manufacturing and sales organizations, and financial and business organizations.

AVIATION RESEARCH Corp

ADDRESS: 515 Chemin de L'Anse
Vaudreuil, Quebec
Canada J7V 8P3

CONTACT: Mr K Romi Singh, President
Tel: (514) 455-6699
Fax: (514) 455-2242

KEYWORDS: Aircraft Performance Analysis; Airspace Management; ATC; Consulting (Aerospace); Consulting (Aviation); Economic Analysis; Flight Management Systems; Government Relations; Planning (Airport); Simulation; Software Engineering.

HISTORY: Aviation Research Corporation (ARC) is a Canadian-owned, federally incorporated company founded in 1991 with associates in the USA, the UK, and Australia.

CAPABILITY: ARC is an aviation consulting firm specializing in engineering and business analysis including development of high technology aerospace products, hardware, and software. Services involve consultation and research on behalf of government and industry clients worldwide. Projects encompass the disciplines of engineering, flight operations, airport and airspace planning, airline economics and planning, computer science, man-machine interface, human factors, information systems, artificial intelligence, corporate transportation planning and operations, aircraft maintenance, environmental and technical evaluations, and design and marketing studies of aerospace products.

The multidisciplinary professionals of ARC have, on average, over 15 years of experience in operations and scientific research in the industry. They have conducted studies, developed design specifications, assisted with policy formulation, and managed projects in several countries. The benefactors of the professional services of the staff have included the International Civil Aviation Organisation, Transport Canada, Canadian Industrial Development Agency, Canadair, Federal Express, Aviation Planning Service Ltd, Pelorus Aviation, Canadian Marconi, and leading corporations with flight departments and service organizations such as insurance companies and financial institutions.

An important facet of ARC's capabilities is the training component. ARC provides seminars and individual training in aviation subjects, including project management, airport operations, benefit/cost analysis, as well as airport and airspace simulation techniques.

PERSONNEL: PhDs - 2
Engs - 5
Computer Scientists - 3
Pilots/ATC Specialists - 4
Others - 5

GROSS SALES: No data.

PLANT SIZE: 2,500 sq ft

EQUIPMENT: Five 80486, three 80386, three 80286 PCs; color photocopier; laser, paintjet, and dot matrix printers; plotters; fax machine; video and audio recording equipment.

EXPERIENCE: The firm is providing services to Transport Canada, Transportation Development Centre, Canadian International Development Agency, National Research Council, Concordia University, McGill University, Aviation Planning Services Ltd, and Moncrieff Management among others.

AVTECH ELECTROSYSTEMS Ltd

ADDRESS: (Mailing)
PO Box 5120, Station F
Ottawa, Ontario
Canada K2C 3H4

(Location)
55 Grenfell Crescent
Nepean, Ontario
Canada K2G 0G3

CONTACT: Dr W J Chudobiak, President
Tel: (613) 226-5772
Fax: (613) 226-2802

KEYWORDS: Bias Insertion Units; DC Powered Modules; High Speed Pulsers; Impedance Transformers; Impulse Generators; Inverting Transformers; Laser Diode Drivers; Linear Pulse Amplifiers; Monocycle Generators; Nanosecond Devices; Power Splitters; Pulse Amplifiers; Pulse Generators; Scope Probes; Solid State Devices; Transformers; Waveform Generators; Waveform Instrumentation.

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, Germany, Japan, Austria, the UK, Taiwan, Sweden, Norway, Denmark, Finland, the Netherlands, Belgium, Luxembourg, and Switzerland.

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 300 models. Their product line includes pulse generators, laser diode drivers, impulse generators, monocycle generators, pulse amplifiers, samplers, 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 800 volts, peak currents to 200 amperes, and single cycles of RF to 3000 MHz. They can design, develop, and build to customer requirements.

Avtech's large line of laser diode drivers covers the range from 100 mA pulses with 100 psec rise times to 100 Amp pulses with 500 nsec rise times and peak power to 25,000 volts. Avtech's inverting and impedance transformers are designed to be used with general purpose laboratory pulse generators, with subnanosecond rise time pulse generators and circuits, and other units.

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 rise time base band 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 rise times as low as 100 psec.

PERSONNEL: Total - 8

GROSS SALES: 1989 - $1.2M
1990 - $1.2M

PLANT SIZE: 6,000 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, Sandia National Labs, Los Alamos Scientific Laboratories, Hewlett Packard, Honeywell, Hughes Aircraft, Lawrence Livermore Laboratories, Martin Marietta, Bell Northern Research, etc.

B M HI-TECH Inc

ADDRESS: PO Box 97
20 Stewart Road
Collingwood, Ontario
Canada L9Y 3Z4

CONTACT: Dr S E Prasad, President
Tel: (705) 444-1440
Fax: (705) 444-6787

KEYWORDS: Acoustic; Hydrophones; Infrared Glass; Laser Materials; Materials (Piezoelectric); Piezoelectric Materials.

HISTORY: B M Hi-Tech Inc is a wholly-owned subsidiary of Sensor Technology Limited. Since incorporation in 1983, the company has grown steadily and offers a comprehensive range of piezoelectric ceramics and components.

CAPABILITY: B M Hi-Tech Inc produces a full range of advanced piezoelectric materials and acoustic components including sensors that have been developed through close cooperation with its customers. Other products made by the company include glasses for infrared applications and specialty electronic ceramics. B M Hi-Tech's research and development group is constantly looking at new materials and process technology.

B M Hi-Tech's products include:

- Piezoelectric ceramics, modified compositions of lead zirconate titanate (PZT), leadmetaniobate (PMN), and lead titanate (PT).

- Non-destructive evaluation (NDE) components to 50 MHz.
- Infrared glasses, glass ceramics, and laser materials.
- Sensors and devices: monolithic, multilayer, and composites.
- Process instrumentation.

B M Hi-tech's services include:

- Custom fabrication of ceramic materials and components.
- Pressure sintering.
- Silver, gold, and nickel metallization.
- Military Standards (MIL-STD) compliance and configuration.

PERSONNEL: 15-20

GROSS SALES: $1.0M

PLANT SIZE: 7,000 sq ft

EQUIPMENT: List available on request

EXPERIENCE: The company currently exports its products to the US and to the European community, Australia, and Asia.

BALLARD BATTERY SYSTEMS Corp

ADDRESS: 1164 West 15th Street
North Vancouver, BC
Canada V7P 1M9

CONTACT: Dr Alan C Harkness
Tel: (604) 986-4104
Fax: (604) 986-1048

KEYWORDS: Batteries (Lithium); Lithium Batteries.

HISTORY: Ballard Battery Systems Corporation is a Canadian-owned and operated company formed in 1985 to exploit lithium battery technology developed by its predecessor Ballard Research Inc after 12 years of R&D in the lithium battery field. Its parent company, Ballard Power Systems Corporation, develops and manufactures solid polymer electrolyte fuel cell systems. Ballard Battery Systems first product sale was in 1988 to the US Army followed by another in the same year to the Canadian DND. In 1990 Ballard Battery Systems was awarded multi-year contracts by the US Army. In 1991 it was given a Canada Export Award for its efforts. The company received commendations for its role in supplying batteries urgently needed for Operation Desert Storm.

CAPABILITY: The major product of Ballard Battery Systems is a line of non-rechargeable lithium sulfur dioxide batteries. These batteries are mostly used for portable communications and electronic equipment. Ballard has been awarded 7 of the last 18 US Army contracts. The company designs and manufactures cells and batteries to meet stringent military specifications. It has a comprehensive quality program based on both AQAP-1 and MIL-Q-9858 with extensive use of statistical process control. In addition to specification batteries, Ballard has designed and built batteries for space programs, emergency locator transmitters, and other special uses. There is an active New Products Division which provides product support and is developing other lithium battery chemistries, both rechargeable and non-rechargeable.

PERSONNEL: PhD - 4
Eng - 4
Technical - 10
Production - 110

GROSS SALES: 1990 - $2.9M
1991 - $6.1M

PLANT SIZE: 20,000 sq ft

EQUIPMENT: Dry rooms (<1% RH), cathode machines, automatic winder, electrolyte machines, battery assembly, automated test equipment, computer network, CADD.

EXPERIENCE: The major customer is US Army CECOM. Other sales have been made to Canadian DND, the UK, Europe, Australia, and the Mid-East. There are development contracts with US Army LABCOM and US Air Force Wright Laboratory.

BARRDAY Inc

ADDRESS: 75 Moorefield Street
PO Box 790
Cambridge, Ontario
Canada N1R 5W6

CONTACT: Mr Brian A Scherer, Marketing Manager
Tel: (519) 621-3620
Fax: (519) 621-4123

KEYWORDS: Aircraft Armor; Armor; Protective Clothing.

HISTORY: Barrday Inc is a wholly owned subsidiary of Allied-Signal in Morristown, New

Jersey. Allied Signal is heavily involved in the international aerospace market. Barrday is a weaver and an end manufacturer of many products, but specifically for aerospace are armor-related products in light aircraft, helicopters, and containers.

CAPABILITY: Barrday is involved in the design and manufacture of armor for helicopters and light aircraft. We have primarily worked in helicopter armor design with Bell, MBB, Sikorski, and Aerospatiale. Barrday has worked with the manufacturers for OEM and also with end users for retrofits for all the armor above. Barrday has the capability of taking the yarn or fiber and weaving or prepregging and pressing the required sections needed to produce custom-fitted armor. Barrday's capabilities also include specialized hard armor vests for pilots as well as ballistic helmets.

PERSONNEL: PhDs - 2
P Engs - 1
Engs - 2
Other - 100

GROSS SALES: 1991 - $14.0M
1992 - $14.5M (projected)

PLANT SIZE: 75,000 sq ft

EQUIPMENT: 32 high-speed looms, 3 600-ton presses, 3 heating drying ovens, 1 coater.

EXPERIENCE: Present customers include various departments of the Canadian Government and private industry in both Canada and abroad.

BELANGER, GUY & ASSOC Inc

ADDRESS: Suite 602
880 Wellington Street
Ottawa, Ontario
Canada K1R 6K7

CONTACT: Mr Guy Belanger, President
Tel: (613) 230-7175
Fax: (613) 230-3799

KEYWORDS: Business Planning; Consulting; Government Relations; Industrial Benefits; Offsets; Strategic Planning.

HISTORY: Belanger, Guy & Assoc Inc (BGA) was established in May 1990 as a consulting firm specializing in assisting high technology firms in interfacing with Canadian Government agencies and departments. The principal has many years of experience within government promoting and utilizing various assistance programs for the research and development of products, improving productivity, and seeking marketing, joint venture, and technology transfer opportunities in Canada and abroad in conjunction with client companies. The company since has added three senior associates bringing the benefit of lengthy and varied experience in defense activities in the private and public sectors.

CAPABILITY: BGA provides consulting assistance to firms in the aerospace, space, avionics, and defense electronics sector seeking to improve their business relationships and interaction with Canadian Government departments and agencies. It also assists these clients in approaching and dealing with other firms in the sector, including those involved in financial servicing, joint ventures, industrial benefits, and marketing assistance arrangements. The firm specializes in business planning and proposal preparation, evaluation, and presentation; assistance in marketing can be provided through experience in international trade show representation and participation.

PERSONNEL: Engs - 2
Others - 4

GROSS SALES: No data.

PLANT SIZE: 1,200 sq ft

EQUIPMENT: No data.

EXPERIENCE: During the last two years, BGA has managed a variety of projects including submissions for government assistance programs, development of industrial benefits package, marketing representation at the Paris Air Show, networking, business retainer agreements, and contracts with the Canadian Space Agency.

BENDIX AVELEX Inc

(Allied-Signal Aerospace Canada)

ADDRESS: Mailing:
PO Box 2140
St Laurent, Quebec
Canada H4L 4X8

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

CONTACT: Mr Robert Egery, Vice President, Marketing
Tel: (514) 744-2811
Fax: (514) 748-4419

KEYWORDS: Artillery Alignment & Control System; Avionics; Brake Parts; Compass

Systems; Computer Aided Learning; Drone Alignment Systems; Electro-Optics; Engine Fuel Control Systems; Fuel Control; Integrated Logistics Support; Image Intensification; Instruments; Machining; Navigation Systems; Night Vision; Precision Machining; R&O (Avionics); R&O (Components); R&O (Fuel Controls); Radar; Thermal Imaging; Training; Wheel Parts.

HISTORY: Bendix Avelex Inc is a unit of Allied-Signal Aerospace Canada. From its beginning in Montreal, Quebec (1931), Bendix Avelex has grown into a world-class supplier of high-technology defense electronics and aerospace products and services. Products include thermal imaging systems, night vision goggles, vehicle navigation systems, artillery gun alignment and control systems, computer-based training systems, and aircraft engine control systems and accessories. Services include repair and overhaul and comprehensive after-sales services and product support.

CAPABILITY: Bendix Avelex has established solid expertise in a wide range of engineering disciplines which include digital/analog electronics, software development, electro-optics, thermal imaging, lasers, simulation, communications, geo-magnetics, pneumatics, and fluid dynamics and hydro-mechanics.

These broad engineering skills are applied to the design of highly reliable products meeting stringent specifications in the fields of defense, aerospace, and general aviation for national and international customers.

The electronics manufacturing facility is equipped with latest generation continuous flow soldering and conformal coating equipment; environmental test cells which include sinusoidal and quasi-random vibration systems; burn-in chambers; automatic test equipment for PCB diagnostics and repair; and a class 100 clean room. The precision machining facility reflects 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 Management Program 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 standards (AQAP-1) and is approved by the Canadian airworthiness authorities.

The Support Services Division of Bendix Avelex provides a diverse range of integrated logistics support (ILS) services. These include complete life cycle management and systems engineering support services, technical publications, training programs, as well as the traditional repair and overhaul of Bendix Avelex proprietary aerospace and defense products. In addition, support is provided for the products of more than 300 different original equipment manufacturers. With this wide range of capabilities and expertise, Avelex is a competitive alternative source for US DOD repair and support programs. The company is a major supplier of support services to the Canadian Department of National Defence, Transport Canada, and to aerospace and defense contractors. The following "customer oriented" organization structure illustrates the company's commitment to provide responsive, timely, and cost-effective support:

- Three specialized operations groups, each equipped with dedicated management, logistic, and test engineering resources as well as independent quality assurance staff. The groups specialize in electronic systems, gas turbine engine controls, and the support services group which includes ILS planning and analysis, engineering support services, and a bilingual technical publications capability.

- The whole operation is supported by an integrated configuration control and data management group.

Bendix Avelex' support capabilities span 64 NATO stock classes, the most prominent being - 1630, 1650, 1660, 1680, 2915, 2925, 2995, 4320, 4810, 4920, 5826, 5855, 6125, 6610, 6615, 6620, 6665, 6680, and 6685.

PERSONNEL: Engineering - 125
Production - 325
Marketing - 20
Others - 325

GROSS SALES: 1990 - $82M
1991 - $86M

PLANT SIZE: 220,000 sq ft (Montreal)
32,000 sq ft (Vancouver)
21,000 sq ft (Cornwall)
15,000 sq ft (Summerside)

EQUIPMENT: No data.

EXPERIENCE: Bendix Avelex Inc's present customers include the Canadian Department of National Defence (Gun Alignment and Control Systems, Electro-optics, Night Vision Systems, Video Interactive Gunnery Simulators, Operations Tactical Training Simulators, repair and overhaul of aircraft instruments, accessories, navigation aids and airborne radar), Transport Canada

(Position Adjustable Range Reference Orientation Transponders), Pratt and Whitney Canada (engine 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), General Electric (USA) (engine fuel control systems), and Martin Marietta (Optical Encoder).

BLAIR CONSULTING SERVICES Inc

ADDRESS: 63 Beaver Ridge
Ottawa, Ontario
Canada K2E 6E2

CONTACT: Mr Barry D Blair, President
Tel: (613) 224-0688
Fax: (613) 224-0687

KEYWORDS: Aircraft Performance Analysis; ATC; Avionics; Consulting (Marketing); Planning (Airport); Weather Forecasting.

HISTORY: Blair Consulting Services Inc is a Canadian-owned consulting firm specializing in aerospace-related issues. The firm was founded in 1989.

CAPABILITY: Blair Consulting Services Inc provides a wide range of consulting services in the aerospace field including airport master planning, air navigation system planning, navigation system selection, state and commercial aircraft operations studies, aviation weather systems selection, air traffic control (ATC) systems selection, civil aviation regulation studies, marketing studies, and training needs analysis.

PERSONNEL: No data.

GROSS SALES: 1990 - $300K
1991 - $320K

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: Recent work conducted by the firm includes a study for the Airways Corporation of New Zealand on the regulation of an autonomous airways operation, a study for the Ontario government on means of increasing the efficiency and regularity of IFR service to 22 remote airports, a review for Canadian International Development Agency of airport planning proposals for Southern Africa Transport and Communications Commission, provision of recommendations for Canadian International Development Agency for provision by Canada of air navigation facilities and training support for the Peoples Republic of China, provision of overhead comparisons for the Australian Civil Aviation Administration, advice to a number of domestic and international firms on marketing of aviation products in Canada, development and conduct of a seminar on the human/machine interface in aircraft and air traffic control equipment for Airshow Canada, and development and conduct of a seminar on ways of enhancing the efficiency of ATC operations at airports.

BOFORS CANADA Ltd

ADDRESS: Suite 416
130 Albert Street
Ottawa, Ontario
Canada K1P 5G4

CONTACT: Col (Ret'd) David V Hampson, President
Tel: (613) 238-8784
Fax: (613) 238-1949

KEYWORDS: Ammunition; Armament.

HISTORY: BOFORS CANADA LTD is a wholly owned subsidiary company of BOFORS AB of Karlskoga, Sweden. BOFORS has had representation in Ottawa for over 20 years.

CAPABILITY: BOFORS CANADA LTD is responsible for product marketing and product support coordination on behalf of BOFORS AB. The company has supplied its 57mm MK2 gun system for the Canadian Patrol Frigate Program and offers a full range of naval guns, ammunition types, and subsurface products. It also manufactures a wide range of anti-armor/air defence gun and missile systems, artillery weapon systems including variable ammunition natures, and mines.

BOFORS AB has a total system support capability including design, development, manufacture, repair and overhaul, and life cycle support. The company is AQAP/TQMP qualified.

PERSONNEL: 4 - BOFORS CANADA
6200 - BOFORS AB

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: Suppliers to the Canadian Department of National Defence. Subcontractors to Paramax and St John Shipbuilding.

BRISTOL AEROSPACE Ltd

ADDRESS: 660 Berry St
PO Box 874
Winnipeg, Manitoba
Canada R3C 2S4

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

CONTACT: Mr Keith Burrows, Senior Vice President
Tel: (204) 775-8331
Fax: (204) 885-3195

KEYWORDS: Aeroengines; Aerostructures; Airframe Components; Engine Components; Gas Turbine Components; Helicopter Wire Strike Protection; Propellant Motors; R&O (Aircraft); R&O (Engines); R&O (Helicopters); Rocket Launchers; Rockets.

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

CAPABILITY: Since inception, Bristol has grown from manufacturing and repairing seaplane floats (1930-1943) to a company with many distinct products and areas and three operating divisions:

- Aerocomponents Division: Comprehensive in-house capabilities enable Bristol to undertake even the most challenging work on some of the world's major aeroengine and aerostructure programs. Working with a wide range of materials, conventional, composites, and exotic, manufacturing operations at Bristol embrace a complete spectrum of technology.

Bristol manufactures "Hot End" gas turbine components and remanufactures afterburner assemblies under contract to the USAF, General Electric, Pratt & Whitney, Rolls Royce, and Textron Lycoming. Bristol also manufactures light alloy aircraft structures for major aircraft such as DHC-8, B-767, B-747, B-777, P3, and F-5.

- Aircraft Division: As the designated support center for the Canadian Force's F-5, Bristol will upgrade and extend the life of the fighter jet into the 21st century. Significant features of the program include the re-lifing of the wing, dorsal longeron, stabilizers, formers, and wiring and upgrading the avionics.

Bristol is the repair and overhaul contractor for the Canadian Forces' Bell family of helicopters. The work performed includes the repair and overhaul of structural and dynamic components as well as avionics integration and development of "night vision" instrumentation.

Responding to the need to reduce helicopter accident and fatality rates, Bristol developed the Wire Strike Protection System (WSPS). The WSPS is designed to provide a significant measure of protection against frontal strikes from horizontally strung mechanical, power, and communications wires and cables. This Bristol proprietary product is a low-cost, lightweight, maintenance-free passive system that can be configured for most makes and models of helicopters, military and commercial.

- Rockets and Space: Offering greater stand-off distances, higher kinetic energy, and superior accuracy, Bristol's 70mm air-to-ground rocket, the CRV7, is available for both fixed or rotary wing aircraft. Extremely cost effective and with a demonstrated reliability of over 99%, over 600,000 rockets have been produced. The CRV7 is in service in Canada and with various forces of NATO, Asia, and Australia.

Bristol's solid propellant, single or multi-stage Black Brant family of sounding rockets provides the lowest cost access to space. Providing up to 12 minutes of useful time for microgravity experiments, auroral studies, deep space observations, or other extraterrestrial research, Black Brants can carry payloads to altitudes in excess of 1500 kilometers. Black Brants have demonstrated reliability of over 98% in more that 600 launches.

PERSONNEL: Salaried - 500
Hourly - 800
Technical - 200

GROSS SALES: 1991 - $140M

PLANT SIZE: Production - 620,000 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. A complete range of computer numerical control (CNC) machining equipment such as Sandstrand S80/S60/OM2A, 5 axis machining center; Mazak 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 Mazak CNC horizontal mill center with robot loading. Bristol also has 2 Raycon CNC EDM machines and 2 electron beam welders, one of which is a Sciaky CNC machine with 54" x 50" chamber.

Also included is a McAuto CAD/CAM system with 3 VAX 8350 computers, 6 HP workstations, 126 design terminals, and Calcomp Plotter and Interim DNC system to the CNC machines.

Special facilities include a helicopter transmission test cell, non-destructive test laboratory, electronic test laboratory, and a CNC 4 axis coordinate measuring machine (CMM).

EXPERIENCE: Approximately 60% of Bristol's sales are exported, with over 50% of these sales to the US military.

Customers include Canadian Department of National Defence, National Research Council, Pratt & Whitney, Boeing, deHavilland, United States Air Force, United States Navy, Spanish Air Force, Norwegian Air force, Singapore Air Force, Dornier GmbH, Aerospatiale, and the Swedish Space Corporation.

Bristol meets the stringent quality requirements of Transport Canada (MOT) and the FAA. The company utilizes a single Quality Control System that conforms to the NATO standard AQAP-1 that in turn is fully compliant with MIL-Q-9858A. A resident team of Quality Assurance Representatives of the Canadian Forces Technical Service Department (CFTSD), along with Bristol's own inspectors, oversees all defence programs.

BRUCE D VALLILLEE ELECTRONICS Ltd

(Marketing Consultants)

ADDRESS: 36 Trawley Crescent
Ajax, Ontario
Canada L1S 5X8

CONTACT: Mr Shawn D Vallillee, Vice President, Finance & Marketing
Tel: (416) 427-7968
Fax: (416) 427-1828

KEYWORDS: Analysis; Audio Visuals; Business Planning; Consulting (Marketing); Government Relations; Marketing; Presentations; Quality Assurance; Sourcing; Surveys; Training.

HISTORY: Bruce D Vallillee Electronics Ltd was established in 1971 and is a wholly-owned, private Canadian corporation. The company has two divisions also located in Ontario, M & T Management and S C Investments. The firm was formed by Mr Bruce Vallillee who has extensive background in the Canadian, US, and European electronic and military component market. Mr Vallillee was formerly VP of Marketing & Sales, ITT Cannon Connector Division, with previous equivalent positions with Erie Technological Products, Amphenol Canada, and J R Longstaffe.

CAPABILITY: Bruce D Vallillee Electronics Ltd, Marketing Consultants, was established to create a market research, advisory, and consulting function capable of developing timely and significant information useful in determining short- and long-range technical marketing strategies within the Canadian/US electronics industry. The company specializes in the investigation of market opportunities relative to military offset requirements and major programs, as well as identification and pursuit of cross licensing, technology transfer arrangements. They provide an advisory and consulting service to both industry and government on electronic components and systems. The variety of services includes business planning and quality control programs, R&D funding, sourcing, industry surveys, export analysis, "in-house" training programs, audio visuals, and professional presentations.

PERSONNEL: Engineers - 1
Finance - 1
Others - 3

GROSS SALES: 1990 - $500K
1991 - $500K

Note: These figures represent consulting figures only.

PLANT SIZE: No data.

EQUIPMENT: Complete computer capabilities relative to consulting requirements.

EXPERIENCE: Present and past clients include the Government of Canada; Dept of Industry, Science, and Technology; Connector Standardization Program; BOSS Trade Shows; NEI Ferranti Packard Electronics Ltd; DGW Compar Connectors (Canada); RD Associates (Canada); Carma Industries (Canada); Numet Engineering (Canada); IBM (Canada); Lakeview Publications (Canada); Andrew Antenna (Canada); Arrow Electronics Canada Ltd; High Technology Shows (Canada); Matrix Science Corporation (USA); Struthers Dunn (USA); Oak Switches (USA); Ellis & Watts Division, Dynamics Corp of America (USA); ITT Defense-Electro Optical Products Division (USA); ITT Defense Tube and Sensor Labs (USA); A L Stainless Inc (Canada); Burndy Canada; Econ Optics (Greece); and Aselsan Military Products (Turkey).

A number of clients shown above are currently doing business with the Canadian Armed Forces, the USAF, and the USN. We are actively positioning several clients in the military market and wish to do business with the USAF.

BURNDY Inc

(an FCI Company)

ADDRESS: 1530 Birchmount Road
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Canada M1P 2G9

CONTACT: Mr Doug Goodridge, Sales and Marketing Manager
Tel: (416) 757-8761
Fax: (416) 757-2111

KEYWORDS: Design Engineering; Electronic Connectors; Fiber Optic Cable Systems.

HISTORY: FCI is a newcomer and yet is already a key player among the leading connector companies in the world. FCI's full name is Framatome Connectors International. It owns and operates three connector companies, Burndy, Souriau, and Jupiter, which were acquired by Framatome in 1988 and 1989. In February 1989, Framatome set up FCI as a wholly owned subsidiary to which it transferred the ownership of the companies. FCI employs more than 7000 people worldwide and operates 32 manufacturing locations in North and South America, Europe, Japan, South East Asia, and Australia.

FCI's global product offering is broader than most of its competitors. Combining the strengths of Souriau, Jupiter, and Burndy, FCI occupies a leadership position in the military, aerospace, and marine markets and also in the telecommunication, data processing, industrial, electrical construction, and utility markets.

CAPABILITY: Burndy Canada is part of a worldwide organization that designs, manufactures, and markets electrical and electronic connectors and allied products to a broad customer base in Canada and around the world. Headquartered in Toronto, the firm operates two manufacturing plants and has 11 sales offices located in principal cities.

In responding to customers' requirements, Burndy's Canadian sales engineers can provide connectors and related products selected from over 80,000 available standard items. If standard connectors can't meet the customer's need, Burndy designs and manufactures new, proprietary products to meet the unique specifications of the application.

Products sold to the aerospace and defense market include 26482 series 1 and 2, 38999 series 1-2-3-, engine connectors, Arinc 600 and 700, NAFI, Sub-D and microminiature, special umbilical connectors, hermetic connectors, filtered connectors, audio connectors, waterproof connectors, fire wall connectors, diode connectors, terminal junction modules, and limiters for aircraft wiring.

PERSONNEL: Engs - 10
Tech - 11
Other - 187

GROSS SALES: 1990 - $35M
1991 - $35M

PLANT SIZE: 165,000 sq ft
65,000 sq ft

EQUIPMENT: A non-ferrous, process controlled foundry; metal machining equipment; automatic assembly machines; high speed stamping presses; automatic injection molding equipment; specialized equipment designed and developed by Burndy; computer-aided design system.

EXPERIENCE: Major customers include Spar, Canadian Marconi, Litton, Garrett, de Havilland, CAE, and Boeing of Canada.

CAE INDUSTRIES Ltd

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Saint Laurent, Quebec
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KEYWORDS: ATC Simulators; Avionics; Computer Graphics; Computers; Control Systems; Data Acquisition; Data Control Systems; Displays; Flight Simulators; Graphics; Helmet Mounted Displays; Hydraulics; Magnetic Anomaly Detection; Magnetometers; Man-Machine Interface; Nuclear Simulation; PC Board Design and Fabrication; R&O (Avionics); Radar Simulation; Real-Time Systems; Simulation; Simulation Programs; Simulators; Software Development; Software Services; Sonar Training Systems; Space Systems; Tactical Team Trainers; Tactical Training Systems; Training; Training Simulators; Video Display Systems.

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. In 1988, CAE formed CAE-Link Corporation following acquisition of Link Domestic Simulation and Training Systems Division, the leading supplier of military simulation systems and training services to the US

Army, Navy, and Air Force, and NASA. Other subsidiaries, with the exception of US-based CAE Vanguard Inc, are based in Canada and include CAE Electronics Ltd, Northwest Industries Limited, CAE Fiberglass Ltd, Canadian Bronze Company Limited, CAE Machinery Ltd, and USP Industries Inc. This profile will concentrate on CAE Electronics Ltd.

CAPABILITY: CAE Electronics Ltd designs and manufactures sophisticated commercial and military aircraft flight simulators and related training devices. They have also become a major producer of computer-based supervisory control and data acquisition systems in the areas of electrical power generation and transmission, power plant simulators, machinery control systems for naval vessels, air traffic control systems, and space products.

In simulation, CAE is a leading designer and producer of flight simulators. Their simulators include state-of-the-art technology such as digital six-degree-of-freedom motion systems, digital control loading systems, digital sound systems, reduced instruction set computers (RISC), and visual systems. CAE simulators reproduce aircraft performance in all flight regimes and, in particular, the critical landing phase. Flight simulators have been developed for the Airbus A300, A310, A320, A340; Boeing 727, 737, 747, 757, 767; McDonnell Douglas DC-8, DC-9, DC-10, MD-11, MD-80; Lockheed L-1011; Bombardier/Canadair Challenger and Regional Jet; Fokker F28, F50, F100; SAAB 340; Cessna Citation 500; and Aeritalia Aerospatiale ATR42. In addition, CAE will develop the world's first simulators and flight training devices for the new generation Boeing 777 and McDonnell Douglas MD-90 aircraft. 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. CAE is presently developing the world's first simulator for the Agusta A-109 helicopter.

CAE produced a crew station research and development facility (CSRDF) for the US Army which is used to evaluate crew and cockpit configurations for helicopter designs. The CSRDF was instrumental in the evaluation of the designs for the new generation LH Army helicopter (Comanche). As an adjunct to its simulators, CAE recently introduced the MAXVUE™ visual system, a product which narrows the gap between a synthetic image and the real world by offering superior performance and demonstrable advantages including greater realism from true, full-color photographic images, lower throughput display, and superior three-dimensional content. In addition to flight simulators, CAE produces training simulators for fossil fuel and 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 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 and an oceanic flight data processing system (OFDPS) for air traffic control. Both systems are modular and the displayed information can be tailored to user requirements. CAE is active in the space area having supplied hand controllers for the remote manipulator system for the NASA Space Shuttle. CAE is currently involved in the Canadian Space Station program supplying the manipulator development simulation facility, closed-circuit television system, and man-machine interface equipment. In addition, the company runs a EEE parts procurement facility for the Canadian Space Team. CAE is also working on the European space program under contract to the European Space Agency (ESA) for defining the requirements of a Hermes flight simulator.

PERSONNEL: Total (CAE Electronics) - 3,400
Technical Staff - 1,700

GROSS SALES: No data.

PLANT SIZE: 620,819 sq ft

EQUIPMENT: No data.

EXPERIENCE: CAE Electronics customers include defense forces from more than 20 nations, the world's major airlines, aircraft manufacturers, training institutes, and government agencies. CAE is continuing its high level of research and development activities. This includes work in helmet mounted displays for advanced simulation applications, remote presence, and virtual reality. The fiber optic helmet mounted display incorporates an area of interest high resolution computer generated imagery slaved to the pilot's head and eye movements giving the pilot an unlimited field of view. Work also continues in the development of advanced graphics systems, Computer Assisted Training System (CATS), expert systems, advanced simulation techniques, etc. CAE continues its work on the simulator complexity test bed for the US Army--this equipment will be used to evaluate simulation fidelity requirements for various training needs. Work is starting with the US Army on SPIRIT (Simulation and Improved Rotorcraft Integration Technology) to develop a next-generation helmet, flight hand controllers, advanced simulation cockpit and advances in

CAE's Interactive Tactical Environmental Management System (ITEMS).

CAL Corp

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Canada K2H 8K7

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KEYWORDS: Antennas; Battery Management Systems; Computers; Data Reduction; ECM; Electro-Optics; Electromechanical Design; Electronic Warfare; ELINT/SIGINT; Environmental Testing; Image Processing; Navigation Systems; Phased Array; Planar Array; Power Converters; Radar; Remote Sensing; RF Subsystems; SAR; Satellite Communications; Satellite Electronics; Satellite Ground Stations; Search and Rescue Equipment; Side-Looking Airborne Radar; Signal Processing; Simulators (EW); Software Services; Space Based Radar; Space Systems; Structural Analysis; Structural Design; Systems Studies; Tactical Signal Simulator; Test Rigs; Testing/Test Equipment; Ultraviolet Imagers.

HISTORY: CAL entered the aerospace industry in 1974 and has grown into a world-class supplier of aerospace communications and electronic systems and subsystems. CAL is an international company with subsidiaries in the United States, Europe, and Australia, and a worldwide network of agents and distributors.

CAL's primary interest is in four business areas: Space Systems, Communications and Radar Systems, Advanced Systems, and Defense Electronics. In addition to these development and manufacturing activities, the company performs engineering design/study work in all four areas.

CAPABILITY: As previously mentioned, CAL Corporation is divided into four business areas with capabilities as follows:

- Space Systems - CAL has an excellent capability in development and manufacture of spacecraft equipment and subsystems. Particular examples include antennas, RF subsystems, electro-optical equipment, battery management systems (NiCd and NiH_2), and power converters (high voltage and high efficiency).

- Communications and Radar Systems - 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. CAL designs and manufactures a variety of cellular base station antennas, and is currently designing and manufacturing mobile earth terminals for terrestrial and aeronautical applications.

- Defense Electronics - Electronic warfare (EW) and advanced military communications are the main activities of this division. 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 VCOs for ECM and simulator applications. In MILCOM, CAL has designed and built a Spread Spectrum Radio Simulator which generates a multiplicity of voice/data spread spectrum RF signals. CAL is also involved in producing a variety of communication simulators and ELINT/SIGINT systems.

- Advanced 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, 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. The Advanced Systems Group also performs acoustic studies for anti-submarine warfare (ASW) applications.

PERSONNEL: Scientists & Engineers - 120
Others - 162

GROSS SALES: 1991 - $36.0M

PLANT SIZE: 93,600 sq ft modern office and laboratory facilities which include corporate offices, 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.

EQUIPMENT: No data.

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. Contracts are typically divided between the Canadian Government (60%), NASA (20%), and others (20%). Canadian Government departments include Communications; National Defence; 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 is heavily involved via the SARSAT program and space based radar. One of the four SARSAT ground stations provided to NASA is located at Scott AFB, Illinois. CAL has supplied EW equipment to the US Naval Air Test Center. CAL can perform to military specifications.

CALIAN COMMUNICATIONS SYSTEMS Ltd

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KEYWORDS: Adaptive Receivers; Automated Monitoring and Control; Build-To-Print; Communications; Communications (Simulators); Data Acquisition; Data Processing; Digital Communications; Digital Modems; Electronic Warfare; Ground Stations; HF Antennas; HF Communications; HF Modems; Jamming; Modems; R&O (Electronics); Radio Communications; Satellite Carrier Monitoring; Satellite Communications; Signal Identification Systems; Signal Processing; Spectrum Analysis; Spectrum Management; Spread Spectrum Modems; Synthesizers; Systems Design; Telecommunications; Terminals; Test Instrumentation; Testing/Test Equipment; UHF and S-Band Telemetry Trans; Voice Privacy Communications.

HISTORY: Calian Communications Systems (CCS) is a wholly Canadian-owned company founded in 1974. It is primarily a systems engineering company specializing in the planning, design, and implementation of a wide range of communication systems.

CAPABILITY: CCS designs and manufactures advanced communications systems and equipment for both military and commercial applications. The company is structured into complementary divisions as follows:

- The Advanced Space Systems Engineering Group performs design studies, analyses, and simulations, principally in the fields of space communications. 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 Product Engineering Group 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. In addition, the group 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 off-line processing and an aircraft motion compensation system which corrects aircraft imagery for yaw and drift angle motion.

- The Technical Services Division operates and maintains aerospace facilities, supplies specialized personnel to project management offices of two prestigious Canadian space programs, and provides installation and maintenance support for remote sensing locations. Historically, the Technical Services Division has provided quality assurance support services for government, defense, and commercial markets.

PERSONNEL: Engineers/Computer Scientists - 35
Total - 122

GROSS SALES: 1990 - $6.2M
1991 - $5.9M

PLANT SIZE: CCS 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.

EQUIPMENT: No data.

EXPERIENCE: No data.

CAMETOID Ltd

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Canada L1N 2C2

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Tel: (416) 666-3400
Fax: (416) 666-3413

KEYWORDS: Anodizing; Chemical Films; Coatings; Conductivity Testing; Dry Film Lubricants; Electroplating; Hardness Testing; Hydrogen Embrittlement; Infrared Coatings; Ion Plating; Ion Vapor Deposition; Ivadizing™; Materials Processing; Metal Coatings; Metal Finishing; Multi-Layer Coatings; Optical Coatings; Optical Filters; Protective Coatings; R&O (Coatings); Salt Spray (Fog) Testing; Scanning Electron Microscopy; Stress Relieving; Surface Finishing; Taber Abrasion Testing; Teflon™ Coatings; Thermal Barrier Coatings; Thickness Testing; Thin Films; Ultraviolet Coatings; Vacuum Coatings.

HISTORY: Cametoid was incorporated in 1950 and was originally owned by Dowty Equipment of Canada Ltd. In 1967, it was acquired by the Newman family of Whitby, Ontario, and is today a wholly-owned subsidiary of Newman Aerospace Inc, a Canadian company.

In 1988, Newman Aerospace incorporated Cametoid Technologies Inc of Manchester, Connecticut, to acquire assets of Chromalloy Technical Services, a division of Chromalloy Gas Turbine. Cametoid Technologies Inc in Manchester, Connecticut, has facilities for ion vapor deposition of aluminum (Ivadizing™) in chambers similar to those at Cametoid Ltd. Additionally, this company has facilities for specialized spray coatings including epoxy and metal-rich paints.

CAPABILITY: Cametoid has three divisions:

- The Plating 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. In 1981, an Ivadizing™ facility was added for the ion vapor deposition of aluminum 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 connectors.

- The R&D Division - established in 1984, specializes in the design, development, and testing of PVD coatings. They include multiple wavelength, narrow band optical rejection filters, graded thermal barrier coatings for gas turbine engines, and atomic oxygen resistant space coatings for use on Space Station Freedom. Development is also proceeding on the establishment of facilities for the manufacture of optical components and the production of optical materials.

- The Electronics Division - formally called Industrial Measurements Limited, designs and builds the Digisponder™ family of Supervisory Control And Data Acquisition (SCADA) systems for versatile, reliable, and low-cost monitoring and control of unattended equipment sites. Communication by data or synthesized voice is possible at any distance via telephone (including cellular), dedicated line, radio, microwave, or satellite.

PERSONNEL: 30 to 40 persons with 12 professionals including 5 PhDs (Canadian facility)

GROSS SALES: $2.0 - $5.0M (annually - Canadian facility)

PLANT SIZE: 35,000 sq ft (Canadian facility)

EQUIPMENT: The Plating Division has complete chemical, electro-chemical, and vacuum-coating facilities; baking ovens; exhaust systems; an in-house water treatment plant; and a process control laboratory. The R&D Division has facilities which include electron beam evaporation, ion beam sputtering, and electrical resistive heating. Also available is a sophisticated computer software and hardware capability for coating design and automated process control. Characterization and test facilities include metallurgical and scanning electron microscopes, energy dispersive X-ray analyzer, infrared and VIS spectrophotometers, profilometer and precision cutting and polishing equipment for sample preparation, annealing furnaces, and environmental test chambers. The Electronics Division has a full line of design, build, and test equipment for the manufacture of the SCADA system from circuit board to finished product.

EXPERIENCE: Cametoid has more than 35 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 Defence and the

Department of Transport Canada. It maintains approvals with its principal customers including Andrew Canada, Bell Aerospace, Bell Helicopter, Boeing, CAE Electronics, Canadair, Canadian Astronautics, CBC, COMSAT, Canadian Space Agency, Cleveland Pneumatic, Computing Devices, deHavilland, Devtek, Dowty, DREV, Fleet, Garrett, Grumman, Hawker Siddeley, Indal, ITT Cannon, Kaman Aerospace, Litton, Martin Marietta, McDonnell Douglas, Menasco, MBB, NRC, Ontario Hydro, Pratt and Whitney, Raytheon, Sikorsky, Spar, Telesat, Unisys, and Wabco.

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

CANADA FORGINGS Inc

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Welland, Ontario
Canada L3B 5P8

CONTACT: Mr N F Carpentier, President
Tel: (416) 735-1220
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KEYWORDS: Forgings; Machining; Non-Destructive Testing; Specialty Forgings.

HISTORY: Canada Forgings Inc is a Canadian-owned, custom-forging producer founded in 1912. The company operates two plants on 8 1/2 acres of land in Welland: one for closed die forgings and the other for open die forgings.

CAPABILITY: The closed die plant occupies 60,000 sq ft of production space and is equipped with double-acting air hammers to 10,000 lbs supported by appropriate heat treating, cleaning, and quality assurance facilities. There is capability for forging products up to 450 lbs in weight along with a machine shop equipped with die sinking equipment.

The open die plant occupies 117,000 sq ft under roof, and it houses Canada's only seamless ring rolling facilities. This plant operates Ontario's largest open die hydraulic forging press (3300 tons), two other open die presses of 1200 and 600 ton capacity respectively, hammers, heat treating furnaces, full machine shop, and complete non-destructive testing facilities.

Canada Forgings employs an up-to-date quality control system meeting military, nuclear, and aerospace requirements and a number of qualified and experienced personnel to handle customers' metallurgical, NDE, and quality requests.

Our management information services are fully computerized and extend into all areas of the operation including estimating, inventory control, order processing, accounting, and cost controls.

PERSONNEL: 140

GROSS SALES: $18-25M average annual sales

PLANT SIZE: 177,000 sq ft

EQUIPMENT: See discussion under CAPABILITY above.

EXPERIENCE: Canada Forgings produces high-quality, specialty forgings for the most demanding and sophisticated engineering applications: jet engines, nuclear reactors, power generation, energy exploration, pipeline, off-road transportation, mass transit, and ground defence. A list of our customers features such companies as Pratt & Whitney, Boeing, General Dynamics, Garrett, Avco Lycoming, Bell Helicopter, General Electric, Westinghouse, South West Engineering, Linimar Machine Ltd, etc.

CANADAIR GROUP

(Bombardier Inc)

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Canada H4R 1K2

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Canada H3C 3G9

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KEYWORDS: Aerodynamics; Aircraft; Airframe Components; Castings; Coatings; Components (Airframe); Composite Components; Computational Design; Extended Length Machining; Flutter Analysis; Forgings; Fracture Analysis; Heat Treating; Machining; Metalworking; RPV; Software Services; Testing/Test Equipment.

HISTORY: Canadair was originally incorporated in late 1944 and is a group of Bombardier Inc. The company has a fully-owned subsidiary, Canadair Challenger Inc, in Windsor, Connecticut, and Challenger Service Centers in Tucson, Arizona; Montreal, Quebec; and Obenpfaffenhofen, Germany.

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
- Canadair Regional Jet airliners
- CL-415 and CL-215T multi-purpose amphibious aircraft
- CL-227 and CL-289 unmanned airborne surveillance systems.

They have active subcontract work on the Boeing 767, Lockheed P-3C, McDonnell Douglas F/A-18A, and Aerospatiale and BAe A330/340 and A320/321. 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.

The CL-289 (AN/USD-502) is a longer range updated version of the CL-89 (AN/USD 501) unmanned airborne surveillance system which is stocked in the arsenals of the UK, Germany, France, and Italy and was developed jointly with Dornier GmbH of Germany. This vehicle carries both a photographic sensor and an InfraRed Line Scan (IRLS) sensor and covers a 150 kilometer range at speeds in excess of 700 kph. A real-time data transmission link is associated with the IRLS System. On-board computers carry the flight instructions for the CL-289. Deliveries of the CL-289 for the armies of Germany and France are underway.

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.

PERSONNEL: 8000

GROSS SALES: 1990 - $1,055.3M
1991 - $1,741.2M

PLANT SIZE: - 3,145,000 sq ft

EQUIPMENT: Their special equipment includes:

- Six Cincinnati profilers modified to CNC control, 5 axes; each bed 212 ft long, 13 ft 4 in wide. Each bed has 3 gantries with 3 spindles each.
- Two Cincinnati profilers: CNC, 5 axes on a 120 ft long bed, 15 ft 3 in wide that have 2 gantries with 3 spindles each.
- One Ingersoll profiler: numerically-controlled; 3 axes; bed 96 ft long, 17 ft 5 in wide; single gantry with 3 spindles.
- Nine Wilson profilers: tracer-controlled; 3 axes: some 6 spindle, some 4 spindle.
- Several CNC Kearney and Trecker 3, 4, and 5 axes profilers.
- Three autoclaves: one 15 ft dia, one 12 ft dia, one 6 ft dia for metal-to-metal, honeycomb, and composite bonding.
- Heat-treat, stretch forming system: Electrically heated furnace takes sheets 30 ft by 8 ft. 1000-ton stretch press takes sheets 30 ft by 8 ft and 1/2 in thick.
- Gerber drafting machine: computer controlled with a working surface of 5 ft x 22 ft.
- One Cincinnati Profiler: CNC 5 axes on a 129 ft long bed, 16 ft 9 in wide, single gantry with 3 spindles.
- Three Cincinnati (rail type) Profilers: CNC 5 axes on a 40 ft long bed, 10 ft wide, single gantry with 3 spindles.
- One Cincinnati (bridge type) Profiler: CNC 5 axes on a 10 ft long bed, 5 ft wide, single spindle.
- One Huffman cutter grinder: CNC 7 axes.
- Several CNC Kearney & Trecker Profilers: three 3 axes, 3 spindle profilers; three 5 axes, single spindle Model MM III; and nine 4 axes, single spindle Model MM 200.

EXPERIENCE: The Canadair experience over the past four years includes subcontracts for components for the Lockheed P-3C and CP-140, rear fuselage sections for Boeing 767, components for the McDonnell Douglas F/A-18A, shipsets of components for the Lockheed C-5B, and shipsets of components for BAe and Aerospatiale for the A330/340 aircraft. Current products include Challenger business jet, CL-215T and CL-415

multipurpose amphibian, three surveillance systems, and subcontracts.

CANADIAN AIRCRAFT PRODUCTS

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Fax: (604) 278-9618

KEYWORDS: Airframe Components; CAD/CAM; Composite Components.

HISTORY: Canadian Aircraft Products (CAP) has been in business since 1955 as a designer and manufacturer of aircraft structures for a variety of companies. CAP has developed over the years from an initial 20,000 square foot facility to the current 100,000 square foot operations in two plants on a seven-acre site.

CAPABILITY: CAP is primarily involved in the design and manufacture of structural components such as horizontal stabilizers, elevators, rudders, spoilers, flaps, veins, leading edges, etc., in conventional light alloy or thermoset composite materials. CAP's quality assurance system is in accordance with Department of Defense AQAP-1 (equivalent MIL 9858). In conjunction with DND Defence Research Establishment Pacific, CAP designed and built test components representative of the F-18 outer wing. We are now conducting finite element modelling of the damage and repairs patch.

PERSONNEL: Engs - 10
QA - 20
Manufacturing Engs - 10
Shop Floor - 200
Other - 30

GROSS SALES: No data.

PLANT SIZE: 100,000 sq ft

EQUIPMENT: CADKEY-SMARTCAM, autoclaves 6' dia x 20', NC 3 and 4 axis machining, metal bonding, 1200 ton hydro press, NC router.

EXPERIENCE: Customers include deHavilland Inc (Dash 8 Series 100 and 300: horizontal stabilizer, elevators, rudders, fin fairing, fin leading edge, wing to nacelle fairings), Boeing Canada Winnipeg Division (details 747 program), McDonnell Douglas (MDCan) (MD80 and MD87 programs fin fairing), Canadair Inc (CL601 and Regional Jet horizontal stabilizer and elevators and CL215 wing tip floats), FMC Corporation (missile canister closures), Martin Marietta (missile canister closures), and Boeing Commercial Aeroplane Group (various details, metal).

CANADIAN COMPONENT SERVICES

ADDRESS: 3531 Viking Way
Richmond, British Columbia
Canada V6V 1W1

CONTACT: Mr Jim Campbell, Vice President of Operations
Mr Gary Leskiw, Director of Marketing
Tel: (614) 270-8255
Fax: (614) 270-8240

KEYWORDS: Airframe Components; Avionics; Hydraulics; Mechanical Components; R&O (Helicopters).

HISTORY: Canadian Component Services (CCS) is a division of the Repair and Overhaul Group of Canadian Helicopters Limited. Affiliated R&O divisions are Canadian Gas Turbines (CGT) in Langley, BC, and Atlantic Turbines Inc (ATI) in Summerside, PEI. Canadian Helicopters Limited was formed in 1987 through the amalgamation of Sealand Helicopters, Toronto Helicopters, and Okanagan Helicopters.

CAPABILITY: CCS has extensive repair and overhaul capabilities for dynamic components from the following commercial aircraft and their military equivalents: Bell 204, 205A, 206B, 206L/L1/L3, 212, 214B/ST, 412; Aerospatiale AS350, AS355; and Sikorsky S58, S61, S76. CCS's accessory capabilities include:

- Hydraulics - servos, pumps, cylinders, dampers, landing gear actuators.
- Electrical - starter generators, batteries, relays, blowers, heaters, ignition units, beacons, landing lights, fans.
- Electromechanical - actuators, contactors, cargo hooks, fire bottles, load cells.

CCS is a Transport Canada-approved maintenance organization and holds service center certificates from many manufacturers including Bell and Sikorsky.

PERSONNEL: Technicians - 38
Support - 87

GROSS SALES: 1991 - $14.0M
1992 - $18.0M

PLANT SIZE: 45,000 sq ft

EQUIPMENT: All necessary facilities for R&O are available for disassembly, cleaning, NDT, inspection, reassembly, and testing in accordance with the appropriate manufacturer's overhaul or maintenance manuals.

EXPERIENCE: See Capability.

CANADIAN HELICOPTERS Ltd

(Repair and Overhaul Group)

ADDRESS: 3531 Viking Way
Richmond, British Columbia
Canada V6V 1W1

CONTACT: Mr Frank Hynes, Vice President Business Development
Tel: (604) 278-8255
Fax: (604) 270-6822

KEYWORDS: Helicopter Modifications; Helicopter Operations; Modification (Helicopters); R&O (Accessories); R&O (Avionics); R&O (Components); R&O (Engine Components); R&O (Engines); R&O (Helicopters); R&O (Hydraulics).

HISTORY: Canadian Helicopters Limited is a Canadian-owned company formed in 1987 with the amalgamation of Okanagan Helicopters, Sealand Helicopters, Toronto Helicopters, Ranger Helicopters, Offshore Helicopter Technologies Limited, and Aero Flight Holdings Limited. Canadian Helicopters' Engineering Support Division originated with Okanagan Helicopters Ltd, which was established in 1947 by company founder, Carl Agar. Canadian Helicopters is the largest helicopter operator in Canada and one of the two largest in the world.

CAPABILITY: Canadian Helicopters is primarily involved in the inventory and engineering support of its fleet of over 250 aircraft in addition to supporting over 200 customers worldwide. Within the engineering support operations are an engine shop, a component shop, an accessory shop, an avionics/instrument shop, an engineering design department, and a materials control group which is responsible for a $43 million inventory. The company is fully authorized to support and service General Electric CT58/T58, Detroit Diesel Allison 250 series, and Pratt & Whitney PT6T aircraft engines, as well as repair, overhaul, and supply parts for components, accessories, hydraulics, avionics, and instruments on the following aircraft models: Bell 204, 205, 206 (A, B, B111, L L1), 212, 214(ST); Sikorsky S76 (A, B), S61 (L, N); and Aerospatiale AS350 (B, D), AS355F-1.

PERSONNEL: Pilots - 301
Engineers - 330
Technicians - 90
Other - 475

GROSS SALES: No data.

PLANT SIZE: 55,000 sq ft (Plant 1)
40,000 sq ft (Plant 2)
10,000 sq ft (Hangar)

EQUIPMENT: Company equipment includes twin cell engine test facility; state-of-the-art equipment for cleaning, non-destructive testing, precision balancing, machining, and coordinate measuring; computerized carousel inventory storage system; and all equipment necessary to overhaul aircraft components.

EXPERIENCE: Canadian Helicopters' present customers include various departments in the Canadian Government such as Canadian Coast Guard (Victoria, Prince Rupert, and Hovercraft), RCMP, and DND as well as Pemex, Greenlandair, British International Helicopters, Trump Air, and others.

CANADIAN MARCONI COMPANY

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

CONTACT: Mr A M Bell, Manager, Business Development & Programs (Mr Bell is physically located in Kanata, Ontario.)
Tel: (613) 592-7436
Fax: (613) 592-7427

KEYWORDS: Adapters; Aircraft Satellite Communications Antenna; Avionics; Calibration; Circuit Packaging; Cockpit Displays; Communications; Components (Avionics); Data Communications; Digital Order Wire; Displays; DME; Doppler Navigation Systems; ECCM Antenna; ECCM Radio; Electronic Warfare; Engine Instruments; Hybrid Circuits; Illuminated Panels; ILS; Image Processing; Infrared Systems; Injection Molding; Instrument Repair; Integrated Logistics Support; Intelligent Instruments; Inventory Control Systems; Landing Aids; Lighted Panels; Line Terminating Unit; Machining; Magnetic Devices; Microcircuits; MLS; Multiplexers; Navigation Systems; Navstar GPS; Omega Navigation Systems; PC Board Design and Fabrication; Photoplating; Power Supplies; Precision Machining; R&O (Avionics, Communications, Electronics); Radar; Radio Ancillaries; Radio Communications; Radio Wire Integrator; Satellite Communications; Space

Electronics; Surveillance; Tactical Radio Relay; Tactical Switchboards; Testing/Test Equipment; Thick Film Hybrid Microcircuits; Thin Film Hybrid Microcircuits; Transformers; VOR; Welding.

HISTORY: Canadian Marconi Company (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 company is organized into five more or less autonomous divisions, each performing in separate product and/or services areas. The divisions are Components and Commercial Communications, based almost entirely in Montreal; Avionics Division, based in Montreal but with a fairly large R&D and systems group in its Kanata facility; Datacom Products Division in Kanata; and Communications Systems Division, based in Montreal, but with a recently opened new facility in Cornwall, Ontario. CMC has two wholly-owned subsidiaries in the US, CMC Electronics Inc in Eatontown, NJ, and Cincinnati Electronics Corp (CEC) in Cincinnati, Ohio.

CAPABILITY: The divisional product areas are:

- Avionics Division - Navigation systems, monitoring and display instruments, and performance management products; also repair and overhaul of C&E equipment and calibration of electronic test equipment. Ship surveillance, search and rescue, surface radar systems and related equipment, instrument and microwave landing systems (ILS + MLS), VOR, and DME.

- DataComm Products - Telex/data exchange systems and bidirectional telex to fax converters.

- Components Division - Multi-layer printed circuit boards, hybrid micro-circuits, illuminated panels, power supplies, precision machined parts, surface mount technology, and rigid-flex boards.

- Communications Systems Division (CSD) - Tactical communications equipment.

- CMC Electronics Inc - Support for marketing and sales of company products in the avionics, navaids, and defense communications fields. Also provides full service for CMC Avionics equipment at its FAA-certified repair center.

- Cincinnati Electronics Corp - A long-established company in the USA which specializes in defense and space products, EW systems, integrated logistic support, and radar systems.

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.

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. CMC cockpit instrumentation is 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.

CMC Avionics has now developed a family of avionics management systems which provide system commonality and flexibility to cockpit control. It is state-of-the-art display and control equipment.

The division has recently qualified an airborne SATellite COMmunication (SATCOM) CMA-2102 antenna for use on civil and military aircraft such as 747, 707, MD-11, C130, and C141.

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. The latest Omega development is the Omega/GPS combined system, CMA 764. Finally, the division designs and manufactures airborne MLS and GPS receivers.

The Avionics Division's expertise also includes - calibration of precision test equipment, repair and overhaul of electronics systems, and field support of communications and detection installations. The division also manufactures ground-based MLS, and designs and manufactures ILS, DME, and VOR equipment.

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. The division's latest product is a full-color, raster scan display, the CMR-90.

Few companies in North America possess CMC's high technology ability for the production of printed circuit boards (including SMT and rigid-flex), 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 CMA-755 telex exchange now handles all of the UK's telex traffic originating from 11 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. The division's latest product is a bidirectional fax-to-telex converter, the Transcriber 2020.

CMC's Communications Systems Division (CSD) is a world leader in design and supply of line-of-sight tactical radio, having supplied 8,000 sets to the US Army and 7,000 sets to 25 other countries. This radio, the AN/GRC-103(V), has recently been joined in the US Army inventory by a multiplexer, the TD-1427, and two converter types, all contained in Radio Terminal Set AN/TRC-180(V), built specifically for the 9th Infantry Division Quick Reaction Program.

CMC's most recent contribution to the US Army inventory is the AN/GRC-226(V), the exclusive line-of-sight radio set for the Mobile Subscriber Equipment program. CSD is also currently developing a digital UHF ECCM radio, the AN/GRC 512, which is expected to be produced in large numbers in the 1990s.

On the telephone side, CSD has established a world reputation with the SB-4170/TT Switchboard and is now offering the Subscriber Access Radio Telephone (SART) which increases capabilities and flexibility in the combat radio networks.

Cincinnati Electronics Corp (CEC) was acquired by Canadian Marconi Company in September 1988. CEC has many distinguished "firsts" to its credit including the first integrated secure radio, the first transistorized military radio, and the first manpack satellite communications terminal. CEC is currently engaged in work on special communications projects such as MISTE and the PCI family of equipment, designed with forward error correction and message authentication. The company is still involved with space launch range safety receivers, having provided range safety receivers for two-thirds of all US space launches in the last five years. CEC is the producer of the AN/AAR-34 Infrared Tail Warning Systems for the USAF and, in a joint program with Grumman, is updating the device 15E34A combat training simulator at Whidbey Island, Washington, which is used in simulated training for the EA-6B aircraft.

PERSONNEL: *Engineers - 267
*Technologists - 60
Others - 2133
Total - 2500

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

GROSS SALES: No data.

PLANT SIZE: 500,000 sq ft (Montreal)
200,000 sq ft (Kanata)
42,000 sq ft (Cornwall)
550,000 sq ft (Cincinnati)
21,360 sq ft (Eatontown/East Rutherford)

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 worldwide. The company is qualified to every MIL SPEC available.

CANAM TOOL & ENGINEERING Inc

ADDRESS: #6-9761-192 Street
Surrey, British Columbia
Canada V3T 4W2

CONTACT: Bruce Fraser
Tel: (604) 888-7699
Fax: (604) 888-5944

KEYWORDS: Cargo Handling Equipment; R&O (Accessories).

HISTORY: Canam Tool is a Canadian-owned company founded in 1988.

CAPABILITY: The company can work to the following specifications: AQAP-2(less 207) pending-NATO, AMO 67-90, DND Specification D-49-001-024-/ST-001 (aircraft and missile application welding); and ASME Section IX (qualified pressure welders).

PERSONNEL: Engs - 1
Tool & Diemakers - 5
Others - 2

GROSS SALES: 1990 - $440K
1991 - $560K

PLANT SIZE: 2250 sq ft - conventional machining
1500 sq ft - automated (CNC)
1500 sq ft - welding

EQUIPMENT: 6 milling machines, 3 lathes all with digital 3-axis readout. Inspection equipment exceeds requirements of AQAP-1, MIL-C-45662, and MIL-I-45208A.

EXPERIENCE: Clients include Airbus Ind, Air Canada, Allison, Arriel (Turbomeca), Bell Helicopters, Boeing, Canadian Airlines, Canadian Helicopters, Canadian Gas Turbines, Garrett, General Electric, Kawasaki, Lycoming, and Sikorsky.

CASEY COPTER ACCESSORIES Ltd

ADDRESS: 511 Lepine
Dorval, Quebec
Canada H9P 2S9

CONTACT: Mr M J Casey, President
Tel: (514) 636-6155
Fax: (514) 636-4831

KEYWORDS: Air Conditioning (Aircraft); Aircraft Air Conditioning; Aircraft Heating; Electronic Controls; Heating (Aircraft); Motor Speed Control; Temperature Control.

HISTORY: Casey Copter Accessories Ltd is a subsidiary of Dynamic Air Engineering, Santa Ana, California, founded in 1975 with no other Canadian divisions.

CAPABILITY: The major products of this company are heating and air-conditioning 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 or 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 air-conditioning system is of the vapor cycle type with an engine-driven or electric 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.

PERSONNEL: Engineers - 2
Inspection - 1
Others - 9

GROSS SALES: No data.

PLANT SIZE: 6,000 sq ft

EQUIPMENT: No data.

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 air conditioner is in production for both helicopters and fixed-wing aircraft. Assemblies meet the requirements of MIL-STD-810 and RTCA DO 180B. Speed controls have been provided for military land vehicle installation and test stands. It is estimated that 60-70% of total sales are to the US (10% to the National Guards).

CEL AEROSPACE TEST EQUIPMENT Ltd

ADDRESS: Suite 502
375 Roland-Therrien
Longueuil, Quebec
Canada J4H 4A6

CONTACT: Charles Lussier, President
Tel: (514) 442-9994
Fax: (514) 442-1149

KEYWORDS: Data Acquisition; Engine Test; Fuel Systems; Instrumentation; R&O (Facility Plan); Testing/Test Equipment.

HISTORY: CEL Aerospace Test Equipment Ltd is a Canadian-owned, high-technology company founded in 1988. It provides systems engineering support for gas turbine engine test facilities.

CAPABILITY: CEL Aerospace Test Equipment Ltd specializes in maintenance equipment for aircraft and turbine engines. It manufactures engine test cells, engine components test equipment, landing gear hydraulic test rigs, and complete hangars. CEL designs and builds complete engine overhaul test facilities and specializes in turboshaft, turboprop, and turbojet testing.

PERSONNEL: Engs - 10
Others - 20

GROSS SALES: 1992 - $3.0M

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: CEL Aerospace Test Equipment's present customers include various departments in the Canadian Government and aerospace industry in Canada and in the US.

CELLPACK AEROSPACE Ltd

ADDRESS: PO Box 1150
71 Hall Street
Lunenburg, Nova Scotia
Canada B0J 2C0

CONTACT: Mr Maurice Guitton, General Manager
Tel: (902) 634-8448
Fax: (902) 634-3993

KEYWORDS: Airframe Components; Autoclaving; Composite Components; Filament Winding; Rocket Launchers.

HISTORY: Cellpack Aerospace is a Canadian company which was incorporated in November 1987. Cellpack Aerospace is a subsidiary of Cellpack Ltd, Wohlen, Switzerland.

CAPABILITY: Cellpack Aerospace manufactures advanced composite components from the aerospace and defense industries using filament winding and autoclave technologies. Cellpack uses laser machining to compliment the production of items such as launch tube assemblies, rocket motor cases, missile components, cryogenic pressure vessels, struts (all composite or bonded metal end fittings), tower assemblies, spacecraft structures, and aircraft components. Cellpack also supplies tactical shelters to the North American market. Cellpack can work with any type of fiber: carbon, glass, quartz, Kevlar, Boron, Spectra, Matrix resin thermoset, epoxy, peek, PPS phenolics, polyester, or thermoplastic resin. Technology includes filament winding, hand lay-up, resin transfer, compression molding, pultrusion, laminates, sandwich panels, braiding, injection resin and thermoplastic parts, arc-spray coating, machining any type of composites, thermoplastics, and metals, and autoclave.

PERSONNEL: Engs - 12
Others - 38

GROSS SALES: 1991 - $1.5M
1992 - $3.0M

PLANT SIZE: 52,000 sq ft

EQUIPMENT: CNC winding machine, autoclave, fabric winding machine, resin transfer system, batch oven, extractor, NC milling machine, arc-spray coating equipment, paint booth, injection machines, laser CNC, sanding and trimming booth, painting/curing booth and MRPII computer system.

EXPERIENCE: US customers include Raytheon, Thiokol, ARDE Inc, Beech Aircraft, and Martin Marietta. Canadian customers include Ballistech Systems, IMP Group, Bell Helicopter, and Pratt & Whitney. European customers include Aerospatiale, and Oerlikon.

CERCAST

(Division of Howmet Cercast (Canada) Inc)

ADDRESS: 3905 Industrial Blvd
Montreal North, Quebec
Canada H1H 2Z2

CONTACT: Mr Dieter Rupp, Sales Manager
Tel: (514) 322-2371
Fax: (514) 322-1340

KEYWORDS: Castings; Investment Castings.

HISTORY: Cercast Inc was incorporated in Montreal in 1959. It has since expanded to seven manufacturing plants: Cercor (Georgetown, Ontario), Ceramet (Bethlehem, Pennsylvania), Cercon (Hillsboro, Texas), Sigma Casting Corp (City of Industry, California), CIRAL SA (France), and Microfusione De Aluminio, SA (Spain). In

1989 Cercast Inc became a division of Howmet Cercast (Canada) Inc.

CAPABILITY: Cercast is well known for its capabilities of producing large, complex, investment castings used primarily in the aerospace industry.

The company's quality control systems are approved by all major Canadian, US, and European aerospace manufacturers and their in-house special processes include heat treating of aluminum alloys, radiographic inspections, penetrant inspections, chemical analysis, mechanical testing, metallurgical laboratory, and repair welding of aluminum castings. These special processes are all customer approved.

PERSONNEL: Production Workers - 200
Quality Control - 20
Engineering/Admin - 40

GROSS SALES: 1990 - $23.0M
1991 - $18.6M

PLANT SIZE: 92,000 sq ft

EQUIPMENT: Cercast is a very modernly equipped investment casting foundry, including the latest robotics for shell dipping, computerized chemistry, mechanical testing, and 3-dimensional measuring. Data is transferred to their main computer for further processing and certification.

EXPERIENCE: Cercast's present customer list is extensive including all major aerospace and defense-related industries in Canada, the US, and Europe.

CHERNIAK GIBLON

ADDRESS: Suite 400
10 Commerce Valley Drive E
Thornhill, Ontario
Canada L3T 7N7

CONTACT: Mr Robert N Cherniak, Partner
Tel: (416) 771-7011
Fax: (416) 771-6288

KEYWORDS: Analysis and Design Tools; Computer Aided Software Engineering; Computer Software Development; Consulting; Economic Analysis; Feasibility Studies; Inventory Control Systems; Query Language; Simulation; Software Engineering; Surveys.

HISTORY: Cherniak Giblon is a Canadian-owned, high-technology computer systems company founded in 1978. Cherniak Giblon is located in Thornhill, a suburb of Toronto, Ontario, Canada. Since 1985, Cherniak Giblon has focussed on developing computer systems applications in the UNIX™ environment.

CAPABILITY: The professionals at Cherniak Giblon specialize in the development of high quality computer software systems that are instinctive to use and tailor-made to the requirements of the client. Cherniak Giblon provides a complete service, engineering each stage of a project, including analysis of requirements, evaluation, recommendation and acquisition of hardware, design and implementation of software, and comprehensive user training; it brings to each client high standards, superior technical expertise, and extensive experience in a broad range of application areas. Personal attention to every need and active roles by the principals are emphasized in every development project. Along with custom application system development, Cherniak Giblon has developed a number of standard application packages. All are fully integrated, on-line systems which operate in a multi-user environment, allowing different terminals to perform different jobs at the same time. While too numerous to mention in full, a partial list would include proposal management, wholesale distribution, manufacturing, and comprehensive accounting systems. In addition, Cherniak Giblon uses an advanced set of 4GL tools - Leonardo's ToolCASE™. Leonardo's ToolCASE™ is a powerful environment designed to facilitate the design, implementation, and maintenance of high performance, multi-user computer applications. It runs on UNIX™-based machines and is written in C.

PERSONNEL: Engineers - 6
Other Technical - 4
Other - 1

GROSS SALES: 1991 - $1M
1992 - $1M

PLANT SIZE: 4,000 sq ft

EQUIPMENT: In-house computer systems hardware includes MAPS UNIX™-based minicomputer and PCs. Software tools include Leonardo's ToolCASE™.

EXPERIENCE: Present customers include Allied Signal Aerospace, several manufacturing and distribution companies, and various professional organizations.

CHICOPEE MANUFACTURING Ltd

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

CONTACT: Betty Sims, President and General Manager
Tim Rueffer, Marketing Manager
Tel: (519) 893-7575
Fax: (519) 893-5952

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

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 AQAP-1, 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.

PERSONNEL: 190

GROSS SALES: No data.

PLANT SIZE: 100,000 sq ft (Manufacturing Area)

EQUIPMENT: Equipment consists of a full range of CNC and NC profile milling machines including two 5-axes CNC gantry profile milling machines; 4-axes CNC travelling column machining centers with automatic tool changers; CNC high-speed vertical and horizontal machining centers, CNC and conventional lathes; CNC and conventional boring mills; drilling and grinding tools; and all other necessary support equipment to produce precision custom products.

EXPERIENCE: Present customers include Boeing Commercial Airplanes, Boeing Military Airplane Co, Cleveland Pneumatic Co, deHavilland Inc, Ernst Leitz Canada Ltd, Bombardier Inc, Fleet Industries, Herox Limited, Kaman Aerospace Corp, Lockheed Georgia Company, McDonnell Douglas Canada Ltd, and Menasco Aerospace Ltd.

CIBA-GEIGY CANADA Ltd

ADDRESS: PO Box 2000
Mississauga, Ontario
Canada L5M 5N3

CONTACT: Mr Niels M Nielsen, Regional Sales Manager
Tel: (416) 821-4420
Fax: (416) 567-3436

KEYWORDS: Adhesives; Advanced Composites; Composite Components; Fabrics (Composite); Honeycomb Materials; Laminates; Plastics.

HISTORY: CIBA-GEIGY Canada Ltd is a Canadian-member company of the worldwide CIBA-GEIGY Corporation based in Basel, Switzerland. The company was formed on 1 January 1971 by the merger of two well established chemical corporations. CIBA has been operating in Canada since 1922 and GEIGY since 1945. The group consists of affiliates in some 60 countries, employing more than 82,000 people.

CAPABILITY: There are six business units within CIBA-GEIGY Composites; each runs autonomously but each also offers the same high standards of quality, service, and technical support. Importantly, this structure enables manufacturers to introduce genuine dual sourcing from businesses which offer exact common specifications for a range of materials produced in differing locations.

Bonded Structures, at Duxford near Cambridge, UK, manufactures a comprehensive range of adhesives, prepregs, and honeycomb sandwich panels as well as finished and semi-finished structures. The site also has extensive research and development facilities supporting customers in their use of these products.

Brochier SA based in Lyon, France, offers particular expertise in the production of volume and customized engineering fabrics using a range of materials including glass, carbon, boron, silicon carbide, and aramid fibers. The company also produces a wide range of prepreg materials complementing those made by Bonded Structures.

Composite Materials at Anaheim, California, matches Duxford's range of products and services. Also in the USA just minutes away from Seattle-Tacoma Airport in Washington state,

Heath Tecna offers specialist fabrication and component manufacture to customers worldwide.

Additional European expertise is available through two other units: Salver srl in Brindisi, Italy (fabrications and components) and Danutec Werkstoff GmbH in Linz, Austria (prepregs).

The worldwide head office for CIBA-GEIGY Composites is located in Anaheim, California. A sales/marketing office is located in Mississauga, Ontario.

PERSONNEL: No data.

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: CIBA-GEIGY Composites' current customer list includes the Canadian and US governments as well as all major industries worldwide involved in aerospace and industrial design and manufacture.

CIRRUS AVIATION

ADDRESS: Aeroport de Bagotville
CP 191
Laterriere, Quebec
Canada G0V 1K0

CONTACT: Mr Arnim R Rogel, President
Tel: (418) 693-3838
Fax: (418) 678-2311

KEYWORDS: Aerial Photography; Airborne Reconnaissance; Paraglider; Portable Aircraft.

HISTORY: Cirrus is a fully Canadian-owned aviation firm now specializing in developing and adapting paraglider technology to commercial applications. It was formed in 1989 in Kingston and now is headquartered in Laterriere, Quebec.

CAPABILITY: The company's primary revenue is from aerial photography, video, and advertising using the large surface area of the paraglider as a flying billboard. Revenues have been channeled into R&D for application of these quiet, slow, and maneuverable craft for use in military special operations for troop insertion and extraction. Portable aircraft can also be used for battlefield observation, artillery spotting, and laser targeting.

PERSONNEL: MAs - 1
B Engs - 2
Others - 6

GROSS SALES: 1991 - $350K

PLANT SIZE: 2,100 sq ft

EQUIPMENT: PagoJet propulsion units, Colibri paragliders, airborne video and camera equipment, sewing machines for paragliders.

EXPERIENCE: National Capital Commission, Ottawa; Téléphil Communications-television network contractor.

COM DEV Ltd

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

CONTACT: Mr P Mabson, Director of Marketing
Tel: (519) 622-2300
Fax: (519) 622-1691

KEYWORDS: Antennas; Electronic Warfare Subsystems; Microelectronics; Microwave Subsystems; Microwave Switches; Millimeter Wave Systems; Radar; Radiometer; Satellite Communications; Satellite Subsystems; Signal Processing; Surface Acoustic Wave Subsystems.

HISTORY: COM DEV was incorporated federally in 1974 and is Canada's largest exporter of payload subsystems for communications satellites.

CAPABILITY: COM DEV is the premier supplier of multiplexing and switching equipment for the communications satellite market. COM DEV's products are also used in spaceborne and ground-based surveillance radar and electronic warfare 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. COM DEV is a participant in the Canadian DND EHF SATCOM project and Radarsat.

- Radar Products - Specialized radar antennas, feed networks, phase shifters, high-power filters and circulators, and SAW-enhanced pulse compression subsystems. COM DEV supplies pulse compression subsystems to Raytheon (MOT RAMP program), Mitsubishi Electronics, and other international radar primes.

• Electronic Warfare Products - Microwave and millimeter wave subsystems; antennas for ESM and ECM applications; microwave subsystems; millimetric receivers; unique passive/active circular phased array; mm-wave payloads for RPVs; and made-to-order mm-wave frequency extensions for RWR and RSM systems.

• Antenna Products - Design and manufacture of specialized antenna subsystems for spaceborne, 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. A dual-polarized SAR antenna is flying in the Arctic with the Canadian Center for Remote Sensing.

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

• Research and Development - Active and passive techniques at frequencies from DC to over 115 GHz; SAW devices as signal processing elements for digital communications and radar systems; high-power ferrite technology and beam reconfiguring networks. Several EW projects funded by the Canadian DND and two by the US Army.

PERSONNEL: Technical Staff - 255
Manufacturing & Other - 245

GROSS SALES: No data.

PLANT SIZE: 110,000 sq ft

EQUIPMENT: A large computer facility supports hardware used for the 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 from helicopters to shuttle launch. The microelectronics facility includes a recently enlarged and updated clean room, machining of items to 0.0001 inch tolerance and 6 micron finish, GaAs processing and MIC assembly. The plating facility is equipped to produce space-qualified 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: COM DEV equipment is being flown on over 130 international satellites and is used in radar applications around the world. Customers include Hughes Aircraft, RCA, Ford Aerospace, Litton, Lockheed, SPAR Aerospace, Marconi (UK), Harris, Siemens Plessy Radar, TRW, and the Canadian and US governments.

CompEngServ Ltd

ADDRESS: Suite 300
19 Fairmont Avenue
Ottawa, Ontario
Canada K1Y 1X4

CONTACT: Mr David G Bowen, Director of Engineering
Tel: (613) 722-3008
Fax: (613) 722-5660

KEYWORDS: Airport Flight Display Systems; Artificial Intelligence; ATC; Computer Engineers; Data Acquisition; Environmental Data Management; Expert Systems; Independent Verification/Validation; Integration; Neural Networks; Real-Time Systems; Software Development; Systems Design; Systems Integration; Training; Training Simulators.

HISTORY: CompEngServ Ltd is a 100% Canadian-owned, high technology, computer systems development company, founded in 1975. The company specializes in advanced software systems employing the latest technologies.

CAPABILITY: CompEngServ Ltd is involved in developing proof-of-concept systems for ATC, operational ATC systems, weather processing research, data validation, and management systems as well as systems design, independent verification, and validation. Their capabilities cover the broad areas of systems engineering and computer science, system integration, project management, military standards, and training.

PERSONNEL: PhD - 3
Engs - 4
Computer Science - 1
Other - 3

GROSS SALES: 1990 - $1.0M
1991 - $1.2M

PLANT SIZE: 2,000 sq ft

EQUIPMENT: Electronics prototyping equipment, Unix development environments, desk top publishing, numerous state-of-the-art software packages, life cycle project management software.

EXPERIENCE: Our customers include Transport Canada, Department of Defence Electronic Warfare System Training (EST) Program

Management Office, Boeing Corporation, Hughes Aircraft Company, Pan Am Computer Systems, Digital Equipment Company, Canadian Space Agency, Department of Fisheries and Oceans, Atmospheric Environment Services, USAF OTH Program Office, and German Hydrographic Institute.

COMPUTING DEVICES CANADA Ltd

ADDRESS: PO Box 8508
Ottawa, Ontario
Canada K1G 3M9

CONTACT: Mr G M Mount, Senior Vice President
Tel: (613) 596-7105
Fax: (613) 820-5081

KEYWORDS: 1553 Data Buss; Acoustic Sensing; ASW; Avionics; Ballistic Computer Systems; C3 Systems; Cockpit Displays; Computers; Data Acquisition; Data Analysis; Data Handling; Fire Control; Instruments; Secure Communications; Signal Processing; Surveillance; Systems Integration; Video Display Systems.

HISTORY: Established in 1948, Computing Devices Canada Ltd is the founding member of Ottawa's "Hi-Tech" community. Early successes included the sale of 4500 Position and Homing Indicators (PHI) to the F-104 aircraft of 17 nations and the fitment of the Projected Map System (PMS) in USAF/USN A-7 D/E aircraft and USAF Pavelow 3 helicopters. The company designs and manufactures advanced electronic systems for military applications. It markets on a worldwide basis with the US DOD as the largest customer. It is a subsidiary of Ceridian Corporation.

CAPABILITY: Computing Devices is divided into five business areas: ASW Systems, Ground Systems, Display Systems, Communications Systems, and Contract Manufacturing.

The business areas are supported by comprehensive laboratory and CAD/CAM facilities and vertically integrated manufacturing facilities.

Quality Control systems are compliant to DND 1015/MIL-Q-9858, AQAP-1/13, and MIL-STD-2000.

• ASW Systems: The company's start in ASW Systems was with the USN SOSUS and Nav Air communities. Present products include the company-designed and developed sonobuoy processor (UYS-503) which has been sold to the Swedish Air Force, Canadian Navy, Australian Navy, and United States Navy. For Canada's and Portugal's surface fleets, the company is producing the SQS-510 Active Sonar and the SQR-501 Towed Array Sonar for Canada. For Canada's new Shipborne Aircraft Project, Computing Devices is developing the dipping sonar/sonobuoy system and the command and control system which also serves as the integrating element for the mission sensors on the 1553B data bus.

• Ground Systems: The company has worked on ballistics computation since the early sixties. This work led to the development and production of a digital ballistic fire control computer for the US Army Abrams M1A1 main battle tank. In excess of 10,000 systems have been fielded, and the company has been contracted for the balance of the M1A1 production run.

The Ground Systems Division is also producing ballistic fire control computers for the Republic of Korea main battle tank, the M48A5/T2 main battle tank upgrade for Turkey, and the M48H main battle tank upgrade for Taiwan. In addition, a prototype battle field management system has been installed in the Abrams main battle tank. Also under development is the fire control system for the UK Challenger 2 main battle tank. This division also developed and produced the MiliPac artillery computer for the Canadian Forces, and a derivative C^3 system for the Avibras Astros II. A new product, Computerized Laser Sight (CLASS), has also been developed for anti-tank weapons, machine guns, and other small arms with capabilities similar to more complex weapon systems at a fraction of the cost. Finally the Digital Data Set--a compact, robust data and graphics terminal--is in full-scale production for the Canadian Low Level Air Defence Program.

• Display Systems: The Shipboard Integrated Processing and Display Systems (SHINPADS) has been developed for the Canadian Navy to provide state-of-the-art system integration encompassing the entire ship including combat system equipment and the administrative support hardware. Computing Devices' SHINPADS standard display (SSD) is a true multi-sensor display that accepts video input data from all shipboard sensor systems and, through digital scan conversion techniques and large scale real-time random access memory, provides both sensor information and complex graphical overlays on high resolution, full color television monitors.

Computing Devices' SSD interfaces with any general purpose NTDS-capable computer functioning as a display processor or with an Ada-capable embedded processor. Standardization of hardware, software, and interfacing has been achieved to the point where this unique display satisfies all of the requirements for operational interface with any sensor, weapon, or machinery control function. It is a powerful tactical and command situation display providing the command and control team instant access to all data available on board. The SSD may be reconfigured dynamically by system command and

operator intervention to any function in the user's repertoire.

Computing Devices' SHINPADS standard display has been adopted as the standard display for the Canadian Navy. Using this experience, CDC has codeveloped the TAC-90 display with Westinghouse Electric. This extremely powerful display is used with Westinghouse's TPS 70 Radar and is currently in production by Computing Devices.

Out of this, a new generation of multi-sensor displays called Magic 2000 has evolved.

The Display Systems Division also produces MIL-STANDARD electroluminescent panels. In addition, they are currently in full scale engineering development of the sensor scan converter for the US Navy's AN/SAR-8 shipboard infrared system.

The Display Systems Division is also under contract to the US Navy to develop and manufacture a waterside surveillance system. The system provides the command, control, communications, and display (C^3D) of a completely integrated perimeter intrusion detection system. This sophisticated system displays a variety of sensors such as radar, sonar, infrared cameras, and TV cameras with spotlights.

- Communications Systems: Acting as prime contract and systems integrator, this division was established to fulfill the requirements of DND's TCCCS/Iris program. The Iris system is a comprehensive suite of secure communication elements to support tactical field forces. Besides heading up the program, Computing Devices is also developing the heart of the Iris system--the Headquarters Information Distribution System--and manufacturing all system components in Canada. The system will be capable of operating effectively in a hostile environment, permitting commanders at all levels to fully use electromagnetic, manpower, material, and time resources to tactical advantage.

- Contract Manufacturing: Computing Devices' fully integrated manufacturing facilities are made available to companies requiring alternate sources of supply for sophisticated electronics systems. Major customers include Hughes Aircraft and FMC.

PERSONNEL: Professionals - 400
Total - 1100

GROSS SALES: 1990 - $107M
1991 - $134M

PLANT SIZE: 425,000 sq ft (five buildings) - Ottawa
110,000 sq ft - Calgary
400 Acres - Stittsville research facility

EQUIPMENT: Computing Devices' extensive equipment holdings include CAD/CAM, NC machining, robotic assembly, and environmental test facilities.

EXPERIENCE: Computing Devices has considerable experience with the US military (approximately 50% of their total sales). They have outstanding production facilities.

CONAIR AVIATION Ltd

ADDRESS: PO Box 220
Abbotsford, British Columbia
Canada V2S 4N9

CONTACT: Mr Robert Stitt, Marketing Representative
Tel: (604) 855-1171
Fax: (604) 855-1017

KEYWORDS: Aerial Delivery Systems; Fire Control; Fire Detection and Mapping; Modification (Aircraft); Oil Spill Control; R&O (Aircraft).

HISTORY: Conair Aviation Ltd is a Canadian-owned, specialty aviation company founded in 1969. Conair is comprised of three divisions: Conair Aviation, the fixed-wing operating division; Conair Aerospace, the manufacturing division; and Frontier Helicopters, the rotary-wing division. Collectively, they are involved in providing specialty aviation products and services.

CAPABILITY: Conair is primarily involved in providing aerial fire control services and products for fixed and rotary wing aircraft. Conair also provides complementary training for ground crews and fire managers as well as supplying the appropriate infrastructure for an initial attack forest fire control system.

The company converts aircraft to fire control aircraft configuration, such as the F27 Firefighter, Firecat, and Turbo Firecat, and designs and manufactures fire control systems for various types of helicopters. The company also designs and manufactures aerial spray systems for fixed and rotary wing aircraft. Conair-developed aircraft and systems are used in Canada, Australia, France, the US, Mexico, Spain, Portugal, Italy, Japan, and Saudi Arabia. The company's capabilities include aeronautical engineering (using computer-aided design (CAD)), aircraft modification and systems manufacturing, fleet management (Conair operates the largest

private fleet of specialty aircraft and helicopters in the world.), quality assurance, and training.

PERSONNEL: Engineering - 16
Production - 81
Operations - 220
Others - 21

GROSS SALES: 1991 - $40.0M

PLANT SIZE: 130,000 sq ft

EQUIPMENT: Conair's equipment includes a fleet of 52 fixed wing and 38 rotary wing aircraft, CAD system, and in-house manufacturing, aircraft maintenance, and modification, repair, and overhaul shops.

EXPERIENCE: Conair's present customers include various departments in the Canadian, British Columbia, Alberta, and CNWT governments; the USAF; the Government of France; and forest protection agencies in Spain, Italy, and Mexico.

CON-SPACE COMMUNICATIONS Ltd

ADDRESS: 102 11400 Bridgeport
Richmond, British Columbia
Canada V6X 1T2

CONTACT: Mr T A Ibbetson, President
Tel: (604) 244-9323
Fax: (604) 270-2138

KEYWORDS: Alarm Systems; Communications; Intercom.

HISTORY: CON-SPACE COMMUNICATIONS LTD is a Canadian-owned and operated high technology electronics and service company specializing in communication and services to a wide range of industries requiring their employees to enter and work in confined space environments. The company was incorporated in Richmond, British Columbia, in February 1991, and its first year of operation was spent developing an intrinsically safe communication system with rescue alarm specifically for the safety and comfort of confined space entrants while at the same time establishing a strong financial base. CON-SPACE COMMUNICATIONS LTD is a public company listed on the Vancouver Stock Exchange.

CAPABILITY: CON-SPACE COMMUNICATIONS LTD has full R&D capabilities for electronic based systems, but specializes in communication products.

CON-SPACE developed a Confined Space Intercom/Rescue Alarm System and is manufacturing it in their Richmond facility. The system is intrinsically safe approved for North America and is built to military standards for reliability. It is environmentally sealed and is extremely rugged, utilizing stainless steel military connectors and many other military specified components and hardware.

CON-SPACE markets this system to airlines for fuel tank entry; municipalities for sewer and water vault entry; transportation companies for tanker trucks, rail tanker cars, and shiphold cleaning and maintenance; and various other industries.

PERSONNEL: Eng - 1
Production Manager - 1
Technician - 1

GROSS SALES: No data.

PLANT SIZE: 2,500 sq ft

EQUIPMENT: Analog and digital electronic production facility. In-house computer.

EXPERIENCE: Bringing the CSI-2000 Intercom System from basic design to full production took over one year, but first shipments have been made. Prospective clients include airlines, public utilities, petrochemical companies, and the US Air Force.

COORDINATE INDUSTRIES Ltd

ADDRESS: 2915 Portland Drive
Oakville, Ontario
Canada L6G 5S4

CONTACT: Mr Ivan Krajac, President
Tel: (416) 625-1666
Fax: (416) 829-4899

KEYWORDS: Aircraft Parts; Machining; Milling; Parts (Aircraft); Precision Machining.

HISTORY: Coordinate Industries Ltd is a private, Canadian-owned company specializing in application of precision CNC and conventional machining. The company was incorporated in Ontario in 1985.

CAPABILITY: Coordinate Industries Ltd (CIL) is primarily involved in manufacture of aerospace and aircraft parts. CIL provides engineering and production services exclusively to aircraft and aerospace industries. The company specializes in close tolerance and complex production requirements.

PERSONNEL: 15

GROSS SALES: 1990 - $0.75M
1991 - $0.95M

PLANT SIZE: 12,000 sq ft

EQUIPMENT: CIL has various precision CNC and conventional machining equipment including BMC 40 and BMC 20 Hurco CNC machining centers, Mazak VZC 15/40 and Mazak AJV 25/405 CNC machining centers, Deckel FP4 CNC milling machine, Hardinge tool room lathe, Universal and Bridgeport milling machines, and Mitytoyo Coordinate Measuring Machine.

EXPERIENCE: No data.

CROVEN CRYSTALS Ltd

ADDRESS: 500 Beech Street
PO Box 420
Whitby, Ontario
Canada L1N 5S5

CONTACT: Mr Bob McCormick, Marketing Manager
Tel: (416) 668-3324
Fax: (416) 668-5003

KEYWORDS: Crystals; High Q Crystals; Quartz Crystals.

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 Oak Industries, 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, Voyager Space Craft, and many of GE Astrospace'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.

PERSONNEL: Engineers - 5
Technicians - 10
Others - 120

GROSS SALES: 1990 - $9.0M
1991 - $8.9M

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, M/A 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.

CRYSTAR RESEARCH Inc

ADDRESS: 102-721 Vanalman Avenue
Victoria, British Columbia
Canada V8X 3B6

CONTACT: Mr Jeffrey D Edel, Business Manager

Tel: (604) 479-992
Fax: (604) 470-2734

KEYWORDS: Aluminum Oxide (High Purity); Crystals; Domes (Missile); Flux Crystal Growth; Infrared Optics; Laser Rods; Lithium Triborate Crystals; Magnesium Fluoride Crystals; Missile Domes; Nonlinear Optic Materials; Optical Materials; Quartz Crystals; Sapphire Crystals and Materials; Titanium Doped Sapphire.

HISTORY: Crystar Research was founded in August 1987 and is a wholly-owned subsidiary of Johnson Matthey PLC of London, England. Crystar plant and offices are located in Victoria, British Columbia.

CAPABILITY: Crystar Research Inc is involved in the growth, fabrication, and characterization of

sapphire crystals for optic applications. In addition to sapphire fabrications, including IR lenses, Crystar is engaged in production of titanium doped sapphire for laser materials and in a number of flux growth crystal technologies including zinc oxide and lithium triborate.

PERSONNEL: PhD - 2
Engs - 2
Others - 7

GROSS SALES: 1990 - $1.1M

PLANT SIZE: 11,500 sq ft

EQUIPMENT: Crystal growth furnaces including ADC-Czochralski up to 2200°; hard materials fabrication shop, including polishing and quality control facilities. Large scale vacuum or inert gas isothermal annealing capability to 2000°. The company has a number of in-house-developed hard-material fabricating equipment.

EXPERIENCE: Present customers include various departments of the Canadian government, as well as corporate entities in Europe, Canada, and the United States.

CSI ENGINEERING MECHANICS Inc

ADDRESS: Suite 501
2201 Finch Ave West
Weston, Ontario
Canada M9M 2Y9

CONTACT: Mr Alan C Carr, President
Tel: (416) 741-4733
Fax: (416) 741-8872

KEYWORDS: Accident Analysis; Aircraft Component Design and Analysis; Consulting; Modification (Design and Supply); Stress Analysis; Studies; Testing/Test Equipment; Vibration Test Fixtures.

HISTORY: CSI Engineering Mechanics Inc (CSI) is a Canadian-owned high-technology aerospace consulting company founded in 1984. The company is wholly owned by its directors, Alan C Carr and Haig Saadetian.

CAPABILITY: CSI's principal field of specialization is aerospace. Other fields of interest are ground transportation, nuclear, CAD/CAM/CAE, and heavy industrial.

Capabilities offered by CSI are detailed aircraft design (aerodynamics and stress analysis); design and approval of airframe modifications; design, analysis, and manufacture of custom test rigs and equipment; consulting services for 'finite element structural analysis'; and consulting services for CAD/CAM/CAE.

CSI also markets specialty PC-based software for structural analysis, CAD/CAM, fracture analysis, and heat transfer/thermal analysis

CSI's typical projects include:

- Aerospace - Design, analysis, and airworthiness certification of a large radome and SAR antenna installation for Canadair CL600 Challenger; antenna and chaff cutter installations for EST Challenger aircraft; design of wing-mounted fuel tank for SKYVAN Aircraft (EMR); aerodynamic design and stress analysis for LW-SKAD wing-mounted stores; detail stress analysis of various components on DASH-7 and DASH-8 aircraft (DeHavilland Inc); accident analysis including expert witness advice in court; design and manufacture (procurement) of test rigs for AN/SAR-8 Program including commissioning and project management (shipborne surveillance system for SPAR Aerospace); design, analysis and manufacture of vibration fixtures for ADATS and space station components; research and development of frangible towers for airport use; and design of containers and test equipment for ANIK-E Satellite.

- Transportation - Detail stress analysis of ORION I bus including field test measurements - Ontario Bus Industries and detail stress analysis of ORION II Bus - Ontario Bus Industries.

- Nuclear/Piping - Consulting services to review reports (Ontario Hydro), and detail analysis of piping system for a waste-recycling system (B & R Engineering).

- Robotics - Feasibility study and preliminary designs of a 5-axis router for cutting doors in airframe structures (deHavilland Aircraft of Canada).

- Heavy Industrial - Detail stress analysis of mine hoist and winch drums (John T Hepburn Co), and detail stress analysis of various press platens (John T Hepburn Co).

PERSONNEL: Professional Engineers - 6
Designers - 2
Others - 2

GROSS SALES: 1990 - $760K
1991 - $667K

PLANT SIZE: 3,000 sq ft (office space)

EQUIPMENT: Various microcomputers including IBMs, (2-486, 4-386 machines), CAD work station, and plotter (E size).

EXPERIENCE: CSI's present customers include various departments of the Canadian Government, but most of their business is with the private sector. Customers include SPAR Aerospace Ltd, DeHavilland Inc, Intera Technologies, Lockheed Canada, Bombardier Inc, CAE Electronics Inc, John T Hepburn Ltd, Innotech Aviation Ltd, and Ontario Bus Industries.

CTS OF CANADA Ltd

(Industrial Electronics Division)

ADDRESS: 80 Thomas Street
Streetsville, Ontario
Canada L5M 1Y9

CONTACT: Mr R J Holmes, Operations Manager
Tel: (416) 822-1141
Fax: (416) 858-9058

KEYWORDS: Battery Chargers; Converters (Power); DC Power Supplies; DC Rectifiers; Degaussing Systems; Inverters; Power Supplies (Uninterruptible); Static Switches.

HISTORY: The Canadian company was founded in 1932 as C C Meredith. CTS Corporation purchased C C Meredith in 1953 and expanded production and engineering capabilities into the industrial electronic market in 1958 through the purchase of Allied Industrial Electronics of Canada, Limited of Toronto. The company's name was changed to CTS of Canada, Limited in 1960.

The Industrial Electronics Division of CTS of Canada, Limited is a major Canadian manufacturer of power conversion equipment. CTS designs and manufactures custom DC power supplies, battery chargers, DC rectifiers, AC-AC and DC-DC converters, DC-AC inverters, static switches, uninterruptible power supply systems, degaussing systems, and cathodic protection rectifiers.

CAPABILITY: CTS has over 30 years' experience in custom designing and manufacturing of equipment to customer specifications. The Industrial Electronics Division has complete research and development, design, manufacturing, and testing responsibilities at the Streetsville, Ontario, facility. Their major customers have utilized their products in the defense, power generation, telecom, government, nuclear power, transportation, and communications sectors of the market. Equipment has been successfully qualified to meet commercial and military specifications for shock, vibration, seismic, EMI, and nuclear environments.

PERSONNEL: 30

GROSS SALES: $2.5M

PLANT SIZE: 20,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: CTS customers include provincial and federal governments and manufacturing, power generating, and communications companies throughout Canada.

CUSTOM STEEL MANUFACTURING Ltd

ADDRESS: 1425 Whyte Avenue
Winnipeg, Manitoba
Canada R3E 1V7

CONTACT: A J Derksen
Craig Wallace
Tel: (204) 783-2272
Fax: (204) 783-6588

KEYWORDS: Fabrication; Painting; Sheet Metal Fabrication; Welding; Welding (Sheet Metal).

HISTORY: Custom Steel Manufacturing Ltd is a 100% Canadian-owned company, centrally located in Winnipeg, Manitoba, since its inception 17 years ago. Custom Steel has provided quality products to the aerospace, communications, electronics, and commercial sectors.

CAPABILITY: Custom Steel Manufacturing Ltd specializes in fabrication, welding, painting, and assembling of sheet metal components and products. The company can offer time-saving certified welding in standard or heli-arc processes and MIL-SPEC electrostatic painting in 1 of 2 booths. They specialize in forming partnerships so as to provide additional services, e.g., machining, heat treating, chemical conversions, and electrical assemblies.

PERSONNEL: Technicians - 21
Engineers - 1
Support Staff - 5

GROSS SALES: 1991 - $1.8M
1992 - $2.4M

PLANT SIZE: 26,500 sq ft (Indoor rail siding)
60,000 sq ft available

EQUIPMENT: CAD/CAM; CNC metal processing; in-use computer system.

EXPERIENCE: Customers include Bristol Aerospace (AIU Program), Unisys Canada, Unisys Texas, Computing Devices (EMI/RFI shielded cabinets), Canada Post Corporation (postal cart), and Canadian Broadcasting Corp.

DALSA Inc

ADDRESS: 605 McMurray Road
Waterloo, Ontario
Canada N2V 2E9

CONTACT: Mr Tom Jenkins, Vice President and General Manager
Tel: (519) 886-6248
Fax: (519) 886-8023

KEYWORDS: CCD Image Sensors; CCD Imaging Cameras; Imaging Arrays; Industrial Imaging Cameras; Industrial Imaging Sensors; Machine Vision; Satellite Reconnaissance Sensors.

HISTORY: DALSA was established in 1980 by Dr Savvas Chamberlain in Waterloo, Canada, to pursue advanced CCD design. DALSA now has a product line of over 100 CCD image sensors and modular expandable cameras.

CAPABILITY: DALSA specializes in the manufacture, design, research, and development of high performance, solid-state CCD image sensors and modular expandable cameras, which provide the highest spatial resolution at the highest data transfer speed of any known products in the industry. DALSA's CCD image sensors and cameras are used worldwide in document scanning, image capture, surveillance, process monitoring, and manufacturing inspection. DALSA also develops customized products for specific customers and applications.

DALSA's major achievements include:

- developing and marketing of over 75 different models of modular expandable industrial cameras which incorporate the TURBOSENSOR™ and QUIETSENSOR™ CCD technology developed by DALSA.

- developing and marketing CCD TURBOSENSOR™ line scan and area scan technology. TURBOSENSOR™ technology uses an advanced CCD shift register profiled for high speed operation. TURBOSENSOR™ technology is ideal for high speed inspection and document scanning.

- developing and marketing of CCD QUIETSENSOR™ Time Delay and Integration (TDI) line scan technology for high sensitivity and low noise operation under low light level conditions. QUIETSENSOR™ technology provides 80 times greater sensitivity than comparable line scan sensors. It is ideal for scanning and inspection applications requiring high spatial resolution at a high data transfer speed under low light conditions.

- Developing, patenting, and marketing CCD DYNASENSOR™ technology with a dynamic range of more than 1,000,000:1. This device is suitable for applications requiring wide optical dynamic range such as welding vision and space applications.

PERSONNEL: Total - 55
Sales Representatives - 75
(located in 30 sales office worldwide)

GROSS SALES: No data.

PLANT SIZE: 12,000 sq ft

EQUIPMENT: Equipment includes full design and manufacturing equipment for custom image sensor production.

EXPERIENCE: DALSA's standard products have been recognized by such industry leaders as KODAK, Quad Graphics, DuPont, and NCR.

DAVIS AIRFIELD FIBEROPTEK Ltd

ADDRESS: 115 Weber Close
Edmonton, Alberta
Canada T6M 2H1

CONTACT: Ms C Davis, President
Tel: (403) 444-4459
Fax: (403) 444-0825

KEYWORDS: Distance-To-Go Markers; Fiberoptic Airside Guidance Signs.

HISTORY: Davis Airfield Fiberoptek Ltd is a wholly Canadian owned company established in 1988 that manufactures airside guidance signs and distance-to-go markers, utilizing fiberoptics for illumination.

CAPABILITY: Research and development takes place in Edmonton with support from an American fiberoptics manufacturer, Electro Fiberoptics Corp, 56 Hudson Street, Northboro, Massachusetts 01532, suppliers of fiber and harnesses to specification. Engineering, CNC punching, high-intensity retroreflective laminating, wiring, and frangible mounting are all within Davis' capability. R&D with fiberoptics in other aerospace-related devices is ongoing.

PERSONNEL: Engs - 2
Other - 12-15

GROSS SALES: 1990 - $65K
1991 - $500K

PLANT SIZE: No data.

EQUIPMENT: Macintosh in-house computer facilities, plotter, CNC punch machine Amada-Pega 244.

EXPERIENCE: Davis products are installed at Edmonton International, Edmonton Municipal, Halifax International, Pearson International at Toronto, Calgary International, Fort MacMurray, and Cambridge Bay airports.

DEDICATED TECHNOLOGIES Corp

ADDRESS: 146 Colonnade Road
Nepean, Ontario
Canada K2E 7Y3

CONTACT: Mr Greg Gravelle, Sales and Marketing Manager
Tel: (613) 228-0548
Fax: (613) 228-0678

KEYWORDS: Real-Time Systems; Site Monitoring; Turnkey Image Processing Systems; Video Display Systems.

HISTORY: Dedicated Technologies Corporation (DTC) has, since its incorporation in February of 1989, proven its capability to expand its resources and revenues steadily.

Dedicated Technologies is a computer and communication engineering house now in its third year. Engineering services are geared to create products directly suited to customer's needs. DTC's first contract, in 1988, was to develop and deliver a microwave based closed circuit video network for advertising to link more than 60 major grocery stores in metropolitan Toronto. Since then, the company has grown and diversified its products and services to satisfy the engineering needs of government and private sector clients.

Carlo Shimoon is the company's president, founder, and principal shareholder of Dedicated Technologies, which is 100% Canadian owned.

CAPABILITY: Dedicated Technologies is an engineering research and development firm, producing custom products and services for its customers. Its track record to date has been excellent - quality products have been successfully delivered to both public and private sector clients as evidenced by customer testimonials.

Of particular note, Dedicated Technologies has been involved in R&D efforts in the area of digital video technology since 1989. From 1989 to 1990, DTC produced research for the Instore Advertising Network of Toronto to study the feasibility of a digital video store and forward system. The result of this work has defined a product prototype to be developed on technology developed under this project. Most recently, DTC has successfully completed basic research under IRAP-M in conjunction with CRC. This research project, "Proof of Concept: Digital Video Compression", has laid the foundation for in-depth research and development effort aimed at technology production rather than just feasibility.

Because of the company's success with the assistance of IRAP-M, DTC now has a video compression simulation system functioning in-house. This system will significantly enhance DTC research efforts and probable success under IRAP-R by allowing several algorithm studies to be tested before implementing them in hardware. This system has been used to successfully demonstrate DTC technical ability to potential customers.

PERSONNEL: Engs - 8
Others - 5

GROSS SALES: 1991 - $1.5M

PLANT SIZE: 3,500 sq ft

EQUIPMENT: Our lab consists of specialized test equipment, Tektronix Vectorscope/Waveform monitor, Tektronix Digital Signal Generator, and a Hi Spectrum Analyzer. Our computer equipment includes PCB CAD facilities, PCAD Schematic capture and layout, and a MAXROUTE autorouter. DATA I/O is our hardware programmer.

EXPERIENCE: Present customers include a mixture of government and private industry such as Environment Canada, Revenue Canada, Telesat, and Simware.

DELORO STELLITE Inc

ADDRESS: PO Box 5300
Belleville, Ontario
Canada K8N 5C4

CONTACT: Mr Dave Adamson, Commercial Manager
Tel: (613) 968-3481
(800) 267-2886
Fax: (613) 968-8269
(800) 565-4407

KEYWORDS: Alloys; Castings; Wear Resistant Materials.

HISTORY: Deloro Stellite is a wholly owned subsidiary of Thermadyne Holdings Corp of St Louis, Missouri. With over 70 years of experience,

Deloro Stellite continues to be a leader in engineered wear and corrosion resistant products for service at elevated temperatures.

Deloro Stellite is THE producer of the trademarked STELLITE family of alloys.

CAPABILITY: Deloro Stellite is involved in providing custom cast or P/M parts in the fully machined condition to meet the most stringent nuclear and aerospace requirements. Parts are produced in cobalt and nickel base super alloys for applications such as engine hardware, valve trim, nozzles, stator vanes, etc. The capabilities of Deloro Stellite cover the broad range of engineering, material design and evaluation, product assurance, quality assurance, and documentation control.

PERSONNEL: Engs & Support - 10
Production - 150
Other - 30

GROSS SALES: 1990 - $24.0M
1991 - $24.0M

PLANT SIZE: 114,000 sq ft

EQUIPMENT: Complete dimensional control and layout capability with Coordinate Measuring Machine and CAD/CAM and document scanning. Complete in-house quality control/assurance using an emission spectrometer and X-RAY, LPI, and mechanical testing. The QC/QA system meets MIL-I-45208, MIL-I-9858, and ASME Sec III NA 3700. Deloro Stellite's process capabilities include computer solidification modeling for design of gating and risering; vacuum investment casting; centrifugal casting; sand casting; powder metallurgy parts; hardfacing service; a machine shop with a range of surface grinders, NC mills and CNC lathes; and EDI communication link.

EXPERIENCE: Customers include Pratt & Whitney Canada; Hawker Siddley Canada Inc, Orenda Division; Vac Aero International Inc; deHavilland; General Electric; Hamilton Standard; Bristol Aerospace; and Bombardier, Canadair Aerospace Group.

DESIGNED PRECISION CASTINGS Inc

ADDRESS: 75 Eastern Avenue
Brampton, Ontario
Canada L6W 1X9

CONTACT: Mr Mike Holland, Vice President
Tel: (416) 453-0421
Fax: (416) 453-3694

KEYWORDS: Castings; Investment Castings.

HISTORY: Designed Precision Castings Inc is a Canadian-owned investment foundry that was established in Brampton in 1958.

CAPABILITY: Designed Precision Castings Inc is an investment casting firm involved in the aerospace, defence, nuclear, and commercial markets. The company pours both ferrous and non-ferrous alloys in a size range from ounces to sixty pounds. The plant is located in Brampton, Ontario-a suburb of Toronto, Ontario. From Brampton it serves both the local market and the greater North American market, with customers from California to Nova Scotia.

Comprehensive in-house testing is performed according to a written quality control manual. Testing facilities include spectrographic alloy analysis, magnetic particle inspection, liquid penetrant inspection, x-ray, hardness, and tensile testing.

Work is done in accordance to military specification MIL-I-45208 and to many of our customers' private specifications for whom we are an approved source. As required, traceability is maintained and records are preserved for 7 years.

PERSONNEL: Office - 8
Inspection - 5
Production - 31
Engineering - 3

GROSS SALES: 1990 - $3.0M

PLANT SIZE: 42,000 sq ft

EQUIPMENT: Designed Precision Castings has a complete investment casting facility including a spectrometer, a 100 ton wax extruder, temperature and humidity controls in the shell room, autoclave dewaxing and induction melting. The Quality Control department has hardness and tensile testers, liquid penetrant and wet magnetic particle inspection systems, and a 320 KV x-ray machine.

EXPERIENCE: Designed Precision Castings has done work for a wide range of customers in the aerospace and nuclear industries including some Class 1 Grade A castings. We have been surveyed and hold quality control approvals for the following firms: General Dynamics, McDonnell Douglas Corp, Pratt and Whitney Canada, deHavilland Aircraft, Colt Industries, Garrett Manufacturing, Brunswick Defense Corp, Hazeltine Corp, Bendix Avelex, and Sikorsky Helicopter.

DEVTEK AEROSPACE COMPANY

ADDRESS: c/o Magtron
1840 Birchmount Road
Scarborough, Ontario
Canada M1P 2J2

CONTACT: Mr Robert Bergey
Tel: (416) 291-4306
Fax: (416) 291-6866

KEYWORDS: Acoustic Sensing; Actuators; Airframe Components; Alum Dip Brazed Heat Exchangers; ASW; Bonded Enclosures; EMI/RFI Cabinetry; Engine Components; Engine Control Valve Bodies; Engine Rotating Components; Engine Weldments; Environmental Laboratory; Fasteners; Flight Controls; Helicopter Rotors; HF Antennas; HF Communications; Hydraulic Actuators; Landing Gear Components; Machining; Naval Cabinetry (EMI/RFI); Oil Coolers; Optic Housings; R&O (Small Arms); Satellite Platforms; Small Arms Components; Sonobuoys; Stabilization; Towed Arrays; Weather Stations; Welding.

HISTORY: Devtek Aerospace Company is a division of Devtek Corporation, a Canadian public company founded in 1981. Companies affiliated with Devtek Aerospace Company are Diemaco Inc, Hermes Electronics Ltd, Magtron Precision, Verral Metal Fabricators, Aerobond Technologies, West Heights Mfg Inc, Hochelaga Aerospace Inc, Dexter Tool Co, and GMI Precision Corp.

CAPABILITY: Devtek Aerospace has twelve modern plants, each specializing in distinct areas of high technology, engineering, and manufacturing products ranging from undersea surveillance devices to components for outer space vehicles. Having pursued markets in the aerospace/defense and high technology industrial sectors, Devtek Aerospace 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 Aerospace one of the fastest growing international manufacturing corporations. Devtek Aerospace's nine companies offer a wide range of modern manufacturing technologies and highly qualified people with unique experience in fabricating critical components and subassemblies. Devtek Aerospace has assembled extensive engineering and manufacturing skills for the design, development, testing, and production of components and systems for military small arms, hydro-acoustic sensor systems, flight controls, and stabilized platforms. In addition, there are proven strong manufacturing capabilities for aircraft engine rotating components and weldments, aircraft landing gear, electronic enclosures, heat exchangers, helicopter rotors, shipborne electronic cabinetry, and aircraft fasteners. Devtek Aerospace's divisions and companies operate to the following quality specifications as appropriate: AQAP-1, MIL-Q-9858A, AQAP-4, MIL-I-45208, and Boeing D-1-9000 AQS.

PERSONNEL: 1350

GROSS SALES: 1991 - $145M
1992 - $157M

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: Devtek Aerospace's varied clientele includes Bell Aerospace Co, Boeing Seattle, Boeing Canada, Bristol Aerospace Ltd, CAE Electronics Ltd, Canadair Ltd, Dowty Rotol, Menasco Aerospace, Cleveland Pneumatic, Bell Helicopter, Pratt & Whitney, Hamilton Standard, Burroughs, USAF, IBM Federal Systems Division, Kaiser Electro-Optics, Paramax Electronics, US Navy, French Navy, Swiss Army Signal Corps, Australian Navy, Canadian General Electric, Computing Devices of Canada Ltd, the dehavilland Aircraft Company of Canada Ltd, Dowty Canada Ltd, General Electric Co, Hughes Aircraft, Honeywell Inc, Leigh Instruments, Litton Guidance and Control Systems, Litton Systems Canada Ltd, Martin Marietta, McDonnell Douglas Corp, Northern Telecom, Raytheon Co, Sandards Associates, Spar Aerospace, Sperry Unisys, Canadian Department of National Defence, and others.

DEW ENGINEERING AND DEVELOPMENT Ltd

ADDRESS: 3429 Hawthorne Road
Ottawa, Ontario
Canada K1G 4G2

CONTACT: Mr Frank Robillard, Vice President
Tel: (613) 736-5100
Fax: (613) 736-1348

KEYWORDS: Decontamination Systems; Engineering Services; Training.

HISTORY: DEW is a Canadian-owned, defense contracting firm founded in 1978 to provide a vehicle systems engineering capability to the Department of National Defence.

CAPABILITY: DEW Engineering is primarily involved with defense contracting in Canada. Dew provides a full range of engineering services which includes design, prototype, and development; test and evaluation; bilingual technical manuals; and level III technical data packages to

DND specifications. DEW has fully equipped metal fabrication NBC decontamination equipment, communication shelters, and SMP trailers. Most of these systems are designed, developed, and manufactured by DEW.

PERSONNEL: Engs - 15
Other - 45

GROSS SALES: 1990 - $6.0M
1991 - $6.0M

PLANT SIZE: 55,000 sq ft, secure 11 acre site

EQUIPMENT: Complete metal manufacturing facility with CNC lathe, milling machines, and laser cutter.

EXPERIENCE: Customers include Department of National Defence primarily within Director General Land Engineering Maintenance (DGLEM); Department of Transportation, Energy Mines and Resources; Health and Welfare; and Canada Post Corporation.

DIEMACO (1984) Inc

ADDRESS: 1036 Wilson Avenue
Kitchener, Ontario
Canada N2C 1J3

CONTACT: Maurice A Clermont, Marketing Director
Tel: (519) 893-6840
Fax: (519) 893-3144

KEYWORDS: Electro Mechanical Systems; R&O (Small Arms); R&O (Stabilization System); Small Arms; Stabilization; Technical Publications; Weapons.

HISTORY: Diemaco (1984) Inc is a division of Devtek Corporation, a Canadian-owned company. Diemaco was established in 1976 as Canada's Centre of Excellence for Small Arms to provide an assured source of supply and mobilization base.

CAPABILITY: Diemaco is the prime contractor for Canada's Small Arms Replacement Program (SARP) and is the Centre of Excellence for Small Arms in Canada. The division provides a complete capability for design, development, and life cycle support. New projects include a .22 calibre training rifle and 5.56mm light machine gun. Recent efforts are directed toward larger calibre weapons systems, machine gun mounts, and under armour weapons posts. The company offers a design, development, and production capability for stabilization systems. It produces the stabilized platforms for the Air Defence Anti-Tank System (ADATS) for Canada, the United States, and world markets. Other capabilities include the manufacture of high-precision, machined and laser-welded components for weapons, platforms, and missiles.

PERSONNEL: Engs - 10
Others - 100

GROSS SALES: 1990 - $29.3M
1991 - $32.5M

PLANT SIZE: 38,000 sq ft

EQUIPMENT: GFM Hammerforge for barrel production, gun drilling, high precision NC machining, 30- and 50-metre test range, laser welding, stabilization modelling, experimental and production test stations, clean room assembly, and electrical harness manufacturing and test equipment.

EXPERIENCE: Prime contractor for Canada's Small Arms Replacement Program (SARP); manufacturers of the stabilized platform for the ADATS electro-optical module; developer of the .50 cal soft mount for the LAV25.

DIFFRACTO Ltd

ADDRESS: 2835 Kew Drive
Windsor, Ontario
Canada N8T 3B7

CONTACT: Dr Omer L Hageniers, President
Tel: (519) 945-6373
Fax: (519) 945-1467

KEYWORDS: Inspection; Inspection Systems (Remote); Non Destructive Testing.

HISTORY: Diffracto Limited is a Canadian-owned, high technology company founded in 1971. It specializes in application of advanced electro-optical techniques to inspection and measurement problems. The company has a US subsidiary, Diffracto Ltd, located in Detroit, Michigan.

CAPABILITY: Diffracto Limited develops, designs, and manufactures inspection and measurement equipment for the automotive and aerospace industries. Products include PACS for high accuracy and high speed measurement of jet engine airfoil shapes. Also provided by Diffracto are NDI systems for aircraft inspection for impact damage on composite structures and corrosion detection on metal aircraft structures. Custom engineering efforts for unique inspection tasks can also be provided.

PERSONNEL: PhDs - 2
Engs - 5
Others - 18

GROSS SALES: 1990 - $6.0M
1991 - $4.7M

PLANT SIZE: 16,000 sq ft

EQUIPMENT: Four complete optics labs, high precision measurement equipment. In-house computer facilities include VAX and IBM computers.

EXPERIENCE: Present customers include the Canadian Department of National Defence, General Electric, Northrop, Rocketdyne, Walbar, TRW, IBM, General Motors, Ford, Chrysler, Toyota, Nissan, Honda, BMW, Renault, and Budd.

DIPIX TECHNOLOGIES Inc

ADDRESS: The Baxter Center
1050 Baxter Road
Ottawa, Ontario
Canada K2C 3P1

CONTACT: Mr R Rincker, US Sales Executive
Tel: (613) 596-4942
Fax: (613) 596-4914

KEYWORDS: Digital Image Analysis; Geographic Information Systems; Image Processing; Inspection Systems; Landsat Data; Machine Vision; Microscopic Imaging; Radar Processing; Robotic Vision; Software Development; Software Services; Storage of Digital Imagery; Transmission of Digital Imagery; Turnkey Image Processing Systems.

HISTORY: Dipix was founded in 1978. The company quickly became recognized as a world leader in the design of advanced display and processing technology for the remote sensing market. In 1987, Dipix diversified into other areas of imaging technology with leading edge design thrusts resulting in a family of microscopic imaging products and several high performance board products directed at machine vision, industrial inspection, medical, military, and microscopic imaging markets.

CAPABILITY: Dipix Technologies is an electronic imaging company. The company designs, manufactures, and markets its own proprietary products. Product sales and service are facilitated through a direct sales force and various agents/representatives/distributors worldwide. Company operations are presently split in four divisions.

• Remote Sensing Division: The DIPIX/ARIES image processing hardware and extensive library of software packages are internationally acclaimed as being among the most advanced in the world. The company has manufactured and installed over 200 ARIES systems in 24 countries with users in survey/exploration companies, government mapping/remote sensing agencies, leading research organizations, and various universities.

The DIPIX/ARIES 300 and ARIES 4000 series high resolution image display offers the flexibility of handling large multispectral images and graphic overlays. The software combines more than 600 functions into logically arranged tasks for efficient interactive sequences. Software is also available to interface to GIS systems and a variety of peripheral imaging devices.

• Microscopic Imaging Division: The DIPIX I440 microscopic imaging instrument family combines microscopic imaging with high-speed digital imaging computers. These products, which are directed at the food industry, are used in measuring performance and quality parameters directly. The I440 family provides a scientifically verifiable and quantitative way to measure selected ingredients or food sample constituents.

The DIPIX I440 became available in late 1990 and has already been endorsed by major milling companies in Canada and the United States.

• Board Products Division: The Board Products Division markets specialized PC imaging boards to the OEM and VAR community. These high performance boards incorporate the very leading edge of available technology with application in industrial inspection, biomedical imaging, and medical diagnostics.

The P360 Power Grabber product family uniquely combines a frame grabber with the TMS320C30 Digital Signal Processor and up to 16 MB of memory all on a single PCB. The hardware, combined with a comprehensive software package, allows users to develop their own application programs.

The A4000 is a family of layered, standards-based PC imaging boards and software designed for high speed, high resolution image processing and display. They surpass currently available PC/workstation imaging products by handling images of unprecedented size, depth, variety, and complexity. Using state-of-the-art devices such as the TI34020 and custom-designed ASICs, the A4000 family delivers real hardware power and performance.

DIPIX board products are being successfully incorporated into design cycles by leading system integrators around the world. The products have

also been incorporated in Army, Navy, and space projects in the USA.

• Industrial Systems Division: This division provides turnkey system solutions to industrial customers with demanding imaging problems. It draws on the products and resources of the other divisions to configure comprehensive solutions to a large variety of measurement and quality control problems in the printing, manufacturing, security, and inspection industries. This division is responsible for all aspects of a system's contract, ranging from system definition, through system design, assembly, and installation, to training and maintenance.

PERSONNEL: PhDs - 2
Masters - 3
Bachelors - 10
Others - 7

GROSS SALES: 1990 - $4.3M

PLANT SIZE: 10,000 sq ft

EQUIPMENT: Dipix has a full range of modern test equipment including DEC VAX, micro VAX computers and PCs, as well as a number of Dipix ARIES 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. Dipix has had a close relationship with the Canada Center for Remote Sensing, where they have provided both hardware and software development. At present, Dipix has in excess of 200 turnkey digital image analysis systems installed worldwide. Typical remote sensing applications include mapping, forestry, agriculture, geology, cartography, and hydrology. Other non-remote sensing markets are cereal grains, biomedical particle analysis, and machine viscont turnkey inspection systems.

DMR GROUP Inc

ADDRESS: Suite 600
360 Albert Street
Ottawa, Ontario
Canada K1R 7X7

CONTACT: Ms Robin Harlick, Director of Large Federal Account Unit
Tel: (613) 238-2697
Fax: (613) 238-2802

KEYWORDS: Management Consulting; Software Development; Systems Integration; Technical Support; Technology Development; Training.

HISTORY: DMR Group Inc is an information management and technology consulting firm. Founded in Montreal in 1973, the company is recognized as a Canadian leader in its field.

CAPABILITY: DMR Group Inc is a group of corporations operating worldwide in the field of information management and technology providing business solutions for its clients through management consulting, system development and implementation, technical support, education and training, technology development, outsourcing, and system integration. Specialties include air traffic control, tactical command and control, electronic warfare, intelligence support, and software engineering. DMR employs over 2300 staff in a variety of offices spread across North America, Europe, and Australia.

PERSONNEL: Project Managers - 45
Project Leaders - 70
System Development Architects - 175
System Development Programmer/Analysts - 325
Technology Specialists/Architects - 160
Technology Consultants - 165
Management Consultants - 65

GROSS SALES: 1990 - $169M
1991 - $200M

PLANT SIZE: No data.

EQUIPMENT: The DMR Ottawa facilities include workstations, software, printers, scanning devices, facsimile and copying equipment, and E-mail communications, all shared via a dedicated local area network.

EXPERIENCE: Present clients include various departments in the Canadian Government and private industry worldwide. A partial listing includes Employment and Immigration, Department of National Defence, National Research Council, Supply and Services Canada, Industry Science and Technology Canada, Telesat Canada, Bank of Canada, Mitel Corporation, Digital Equipment of Canada, Bell Northern Research, and Canadian Space Agency.

DOMINIS ENGINEERING Ltd

ADDRESS: Unit 15
5515 Canotek Road
Ottawa, Ontario
Canada K1J 9L1

CONTACT: Mr S (Bodo) Gospodnetic, Vice President Engineering
Tel: (613) 746-7547
Fax: (613) 746-3321

KEYWORDS: Antennas; Cavitation Tunnels; Machining; Milling; Propellers; Wind Tunnels.

HISTORY: Dominis Engineering Ltd is a privately owned Canadian corporation. The company provides services and products related to the definition, manufacture, and measurement of complex sculptured surfaces. The firm was incorporated in September 1985 by Dr Draško Gospodnetic, an internationally recognized research scientist and naval architect.

Dominis Engineering has developed proprietary technology and CAD/CAM (computer aided design/computer aided manufacturing) systems for design and CNC (computer numerically controlled) milling of sculptured surfaces to their final form. DOMINIS IPMS (integrated propeller manufacturing system) is a CAD/CAM system developed and now used for the design and CNC milling of propeller blades and monoblock propellers.

CAPABILITY: Using DOMINIS IPMS system for propeller manufacturing, propeller blades and/or monoblock propellers are milled in one setting completely under computer control. Dominis system has the capability to mill the propeller blade tips, the leading and trailing edges, and variable radius fillet. With Dominis state-of-the-art technology, the manual finishing of propeller blades is completely eliminated from the manufacturing process. Global accuracy of 0.001 of an inch is routinely achieved over the complete surface of the propeller.

The company performs CNC milling of propeller blades for CP propellers, patterns for casting of propeller blades, templates for propeller blades, monoblock propellers, Kaplan and Francis turbine blades, and ship model propellers.

Dominis Engineering Ltd is involved in fairing of ship lines, preparation of data for CNC milling of ship models, and CNC milling of ship models. Aerospace applications include CNC milling of molds for sections of aircraft fuselages (for example, radomes), turbine blade models, aircraft propeller models, and aircraft models. They also do CNC milling of molds for shaped reflector antennas and high precision machining of large antenna elements.

PERSONNEL: PhD - 2
Engs - 2
Other - 5

GROSS SALES: 1990 - $725K
1991 - $700K

PLANT SIZE: 6,000 sq ft

EQUIPMENT:

- Computing Facility: The company's in-house computing facility includes VAXsystem 4200, VAX station 4060, IBM and Compaq computers, and high resolution graphic terminals, digitizer, plotters and printers by HP, Tektronix, Qume, and Xerox Imaging Systems. Their CAD/CAM software capability includes standard CAD/CAM systems such as AutoCAD 11, CADKEY 4, and MASTER CAM 3.1. Additionally, Dominis IPMS and AMS (antenna manufacturing system) are used extensively.

- Manufacturing Facility: The Dominis manufacturing facility is centered around a Toshiba BMC-80 machining center. This is a 5 axis simultaneous contouring machining center with a working volume of 1.6m by 1.1m by 1.0m. It is equipped with two pallets and an automatic tool changer with 60 tools.

For propeller and turbine milling, the BMC-80 machining center has the capacity to mill propellers and propeller blades of the following dimensions:

- Monoblock propellers up to 1.4m in diameter.

- Propeller blades for controllable pitch propellers with maximum 1.1m span and 1.6m chord.

- Turbine blades for Kaplan and Francis turbine wheels with maximum 1.1m span and 1.6m chord.

EXPERIENCE: A partial list of Dominis Engineering Ltd clients includes Berlin Model Basin, Berlin; Boeing Canada Ltd, de Havilland Division, Downsview, Ontario; Defence Research Establishment Atlantic, Dartmouth, Nova Scotia; Defence Research Establishment Ottawa, DND, Ottawa, Ontario; Hydraulics Laboratory, National Research Council of Canada, Ottawa, Ontario; and University of British Columbia, Hydraulics Laboratory, Vancouver, British Columbia.

DONLEE PRECISION

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

CONTACT: Mr George Neil, Sales Representative
Tel: (416) 743-4417
Fax: (416) 746-8998

KEYWORDS: Boring; Cylinders; Gears; Grinding; Jet Engine (Components); Landing Gear Components; Machining; Non-Destructive Testing; Shafts.

HISTORY: Donlee Precision is a Division of General Donlee Limited. 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.

PERSONNEL: Engineers - 3
Manufacturing - 35
Administrative - 8

GROSS SALES: No data.

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 Assurance 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.

DOWTY AEROSPACE PETERBOROUGH

ADDRESS: 2000 Fisher Drive
PO Box 4525
Peterborough, Ontario
Canada K9J 7B1

CONTACT: Mr D Crook, Vice President and General Manager
Mr G Metcalf, Sales Representative
Tel: (705) 743-6903
Fax: (705) 745-1394

KEYWORDS: Analog/Digital Steer by Wire; Avionics Design Engineering; Build-To-Print; Cabinet Testing; Cabinets; Landing Gear Control Unit; PC Board Fabrication; Specialized Test Equipment; Test Equipment; Wiring Harness Fabrication.

HISTORY: Dowty is an international group of advanced engineering companies creating innovative systems and products using the latest electronic, hydro-mechanical, and polymer technologies. Its customers are mainly in the aerospace, maritime, professional electronics, information technology, industrial, and automotive industries.

The group objective is "to become the preferred partner of its customers and associates worldwide by providing competitive advantage to them through the quality of its products, performance, and service."

Since its foundation in 1931, Dowty has expanded to over 50 operating units structured in four divisions and based in 17 countries across the world. It has a turnover of $1.3 billion US, of which 58% is overseas and 68% civil based, and employs over 14,000 people.

Dowty Aerospace Peterborough's primary mission is the design, manufacture, and qualification of microprocessor-based control and monitoring systems. In conjunction with that activity, they also produce electronic and electromechanical assemblies on a build-to-print basis to MIL SPEC level.

This unit was formed in 1982 by Dowty Aerospace Toronto acquiring an existing contract manufacturing facility in Peterborough.

CAPABILITY: Dowty Aerospace Peterborough's activities are divided into the following 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 Bombardier/Canadair/ Challenger and Regional Jet, the deHavilland Dash 8, and Gulfstream IV Aircraft. Dowty Aerospace Peterborough is approved to AQAP-4 levels which have direct equivalency to MIL-Q-9858A or MIL-STD-2000 requirements.

Their developmental engineering group has designed complete monitor/control subsystems for a variety of projects including the analog digital steering control (ADSC) steer-by-wire system for the British Aerospace's HAWK and the landing gear control unit (LGCU) for the Boeing/Bell/ Vertol V-22 aircraft.

- Build-To-Print - Dowty Aerospace Peterborough 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 Aerospace Peterborough to offer design, redesign, and substitution services on subcontract work. The company's production

facility is one of the very few facilities in the world that is fully qualified to the extremely strict US Navy soldering specification MIL-STD-2000.

• Transit - Ongoing transit projects such as UTDC's Vancouver Skytrain are using a brake assurance monitor co-developed by DAP and UTDC. They have been manufacturing and providing new development support for this system since 1986.

Dowty's brake controller technology is continuing to evolve with the brake and operator assurance system developed for Greater Cleveland RTA. This microprocessor-based, fully redundant system is retrofitted to existing LRT and HRT vehicles.

PERSONNEL: R&D - 3
Engineers - 4
Technicians - 3
Production - 15
Others - 16

GROSS SALES: 1990 - $3.8M
1991 - $3.7M

PLANT SIZE: 20,000 sq ft

EQUIPMENT: Equipment includes Hollis Wave Soldering Machine, degreasing unit, various R&D and test equipment, and vibration and environmental chambers for engineering, R&D, and manufacturing screen testing.

EXPERIENCE: See Capability Section.

DOWTY AEROSPACE TORONTO

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

CONTACT: Mr Fran Stilwell, Director, Landing Gear Business Development
Mr Terry Rego, Manager, Industrial Hydraulics and Systems
Tel: (416) 683-3100
Fax: (416) 686-2914

KEYWORDS: Actuators; Advanced Materials; Aircraft Landing Gears; Certification Testing; Damping; Electromechanical Design; Helicopter Landing Gear; Hydraulics; Hydromechanical; Integrated Systems Management; Landing Gears; Liquid Springs; Machining; Microprocessor Control Units; Motions Compensation; Shock Mitigation; Steering (Ground) Systems; Steering Systems.

HISTORY: Dowty Aerospace Toronto is a member of Dowty Aerospace Division, a part of the Dowty Group. The Group, with headquarters in Cheltenham, England, has interests in aerospace, electronic systems, information technology, and polymer engineering.

Dowty Aerospace Toronto has a long-standing reputation as a supplier of state-of-the-art aircraft landing gear, microprocessor-controlled hybrid actuation systems, and industrial and marine hydraulic systems.

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, electro-hydraulic, mechanical, and electronic controlled actuation and control system needs. Current R&D activities include landing gear studies for soft/rough field usage, advanced material applications, and crashworthiness features for helicopter landing gears.

PERSONNEL: Design & Development Engineering - 70
Sales & Technical Staff - 30
Quality Control - 32
Operations - 164
Financial & Administration - 28
Total - 324

GROSS SALES: 1991 - $50M

PLANT SIZE: 12 acres (land)
200,000 sq ft

EQUIPMENT: Dowty Aerospace Toronto 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; a Honeywell H-TMS 3000 test management system; strength, fatigue, drop, and photo-elastic test rigs; and environmental test chambers. A wide range of state-of-the-art manufacturing equipment ensures cost-effective production of the sophisticated components produced by Dowty. In addition to CAD/CAM, Dowty has implemented an integrated machining cell system linked to a distributive numerical control (DNC) system which provides immediate electronic

transfer of data from CAD/CAM direct to the CNC control. Quality assurance and reliability functions are performed in accordance with the standard practices of the aerospace and marine industries. Dowty Aerospace Toronto operates in accordance with Canadian and US military and commercial standards meeting MIL-Q-9858A, AQAP-1, AQAP-4, AQAP-6, FAA, and DOT requirements.

EXPERIENCE: Since its inception in 1940, Dowty Aerospace Toronto 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 military programs include the wing landing gear for the McDonnell Douglas USMC AV-88 V/STOL light attack aircraft and the main landing gear for the Kaman USN SH-2F (LAMPS MK1) helicopter. Dowty also designed and developed the main landing gear for the Bell-Boeing V-22 Joint Services Vehicle Lift Aircraft and provides support for the CF-18 landing gears.

Dowty Aerospace Toronto currently produces lightweight capstans for the Bell Aerospace US Navy Aircushion Landing Craft (LCAC), and 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.

Dowty has developed aircraft ground steer-by-wire systems. Dowty designs and manufactures the microprocessor-based electronic control unit, the hybrid electrohydraulic actuation, and the landing gear, providing complete systems management throughout the project. The steer-by-wire systems have been developed for deHavilland Dash 8, Canadair CL-601 and Regional Jet, and Gulfstream G-IV aircraft.

Dowty was selected by Boeing Helicopter to design, develop, and produce landing gear control units for the V-22 FSD program. The system performs several functions related to landing gear and door sequencing during retraction and lowering of the gears, interfaces with the on-board computer, and is equipped with Built-In Test Equipment (BITE) for self test and maintenance activities.

DSMA-BABCOCK, Inc

ADDRESS: 6655 Airport Road
Mississauga, Ontario
Canada L4V 1V8

CONTACT: Dr Gary M Elfstrom, Director of Business Development
Tel: (416) 672-3800
Fax: (416) 672-3507

KEYWORDS: Acoustic Chambers; Aerodynamic Test Facilities; Calibration; Climatic Test Facilities; Design Services; Engineering Services; Instrumentation; Test Facilities; Test Management; Wind Tunnels.

HISTORY: Dilworth, Secord, Meagher and Associates Limited was established in 1952 to provide high-technology test facilities to the aerospace, automotive, and petroleum industries. In 1992 the key subsidiary company, DSMA International Inc, was acquired by TLT-Babcock of Akron, Ohio. A new Canadian company, DSMA-Babcock Inc, has been formed to better serve the North American market place.

CAPABILITY: DSMA's primary business focus lies in the engineering and turnkey supply of custom-design test and research facilities for a worldwide client base in the automotive, petroleum (fuels and lubricants), and aerospace communities.

The range of DSMA test facility projects is comprised, for the most part, of two families of wind tunnel designs:

- Aerodynamic Test Facilities - various types of wind tunnel designs to support full- and reduced-scale investigations into the aerodynamic (and aero-acoustic) characteristics of airborne and surface vehicles.

- Climatic Test Facilities - various types of controlled-environment wind tunnel and test chamber designs to support product development investigations involving the thermodynamics of surface vehicles at the whole-vehicle and component-test levels.

In addition to these two families of facilities, DSMA has also executed test facility projects having to do with acoustics, altitude effects, hydrodynamics, icing, and boundary layer aerodynamics for aircraft, vehicles, buildings, and structures.

Most recently, they have gone on to develop a significant new product to satisfy the ever-increasing demand for test facility automation, a unique and proprietary software system, registered under the "TALENT" trade name. TALENT represents the culmination of an intensive DSMA development program. In all, eight turnkey projects have been supplied with TALENT, plus several other fully-automated systems have been designed to meet specific client requirements.

PERSONNEL: PhD - 1

Engineers - 20
Others - 15

GROSS SALES: 1990 - $20M
1991 - $20M

PLANT SIZE: 27,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: As stated above, DSMA's experience and expertise lies in the engineering and turnkey supply of custom-design test and research facilities. They serve a worldwide market having worked on 150 test facility projects for clients in 18 countries. The company has a net capital value of $600 million.

DY-4 SYSTEMS Inc

ADDRESS: 21 Fitzgerald Road
Nepean, Ontario
Canada K2H 9J4

CONTACT: Mr John Beaven, Vice President of Marketing
Tel: (613) 596-9911
Fax: (613) 596-0574

KEYWORDS: 1553 Data Buss; ATC; Avionics Computers; C3 Systems; Computers; Digital Signal Processing; Graphics Subsystems; Radar Processing; Systems Integration; VME Computer Modules.

HISTORY: DY-4 Systems Inc is a Canadian-owned manufacturer of high-performance VME bus computer modules 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, Canada; Campbell, California; Boston, Massachusetts; Arhus, Denmark; Sydney, Australia; and Cardiff, UK.

CAPABILITY: The board-level products, which the company has developed and manufactures to commercial as well as MIL-SPEC levels, are based on the industry standard VME bus architecture using 68000/10 (16-bit), 68020 (32-bit), 68030 and 68040 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 rugged commercial and military applications. High-level languages are offered including Ada.

In addition to the above products, the company 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 C^3 and air traffic management. DY-4's manufacturing has a Quality Assurance Program equivalent to Z-299.1 MIL-Q-9858A.

PERSONNEL: Employees - 185

GROSS SALES: 1991 - $24.0M
1992 - $26.0M

PLANT SIZE: 40,000 sq ft

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

EXPERIENCE: The DY-4 present customer base for commercial and military VME programs includes Raytheon (Canadian Radar Modernization Program), Magnavox (air traffic control), Terma Electronik (C^3 systems and graphic display), Picker International (army mash units), Hughes Aircraft, Boeing Aerospace, Rockwell (computer systems for Royal Australian Navy submarines), and Honeywell Ltd (integrated navy system and sonar stabilization).

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 for the Canadian Armed Forces Navigation Trainer, and a similar system for a remote sensing ice reconnaissance aircraft is under contract with Canadian Armed Forces for a militarized reconfiguration multiprocessor for ship computing systems.

DYNACON ENTERPRISES Ltd

ADDRESS: Suite 200
5050 Dufferin Street
Downsview, Ontario
Canada M3H 5T5

CONTACT: Mr Glen Sincarsin, President
Mr Frank Naccarato, Director of Business Development
Tel: (416) 667-0505
Fax: (416) 667-0109

KEYWORDS: Control Systems; Expert Systems; Flexible Structures; Robotics; Simulation; Software Development.

HISTORY: Growing out of the consulting activities of its current Chairman, Dr P C Hughes,

Dynacon became a corporation in 1980. This small, privately owned Canadian company has been providing highly advanced technical research and development assistance to the Canadian federal government and the aerospace industry for more than two decades. Historically, the company's expertise, for which it is world renowned, has been in the dynamics and control of rigid and flexible spacecraft. At present, a number of new initiatives are being pursued in the areas of robotics, artificial intelligence, and smart structures.

CAPABILITY: Dynacon's areas of expertise include, but are not limited to:

- Manipulators and robotic arms.
- Spacecraft dynamics, control and mission analysis.
- Structural dynamics modeling, analysis, and testing.
- Deployment analysis and simulation.
- Multibody dynamics, including applications to deployment.
- Control of flexible spacecraft.
- Computer simulation and custom application software.
- AI/expert system technology.
- Operations planning software.
- Research and development hardware.

Dynacon's excellent analytical capabilities are complemented by its equally capable software skills. A number of computer simulations and custom application software packages have been produced to date, including some to military specifications.

Most recently Dynacon has been developing the concept of using variable geometry trusses (VGT) as manipulators and robot arms. The company plans to apply AI principles to these devices to produce "smart" robots. Automated operations are a paramount concern for such devices; Dynacon has recently launched a program to create an expert system software package capable of performing this task. Finally, the need for strong, light-weight materials in advanced robot designs has led Dynacon to its current interest in space manufacturing.

Of course, Dynacon is not forsaking its traditional role and remains very active in the dynamics and control — attitude, orbit, shape, and vibration — of spacecraft. A study of a third-generation flexible spacecraft advanced control system has recently been completed using the *Daisy* facility-a structure designed, built, and qualified by Dynacon on behalf of the Department of Communications for the purpose of emulating large flexible spacecraft. The creation of this complex, actively-controlled structure represents Dynacon's largest effort to date in the design and fabrication of prototype research and development hardware, a service Dynacon continues to provide. In addition, Dynacon's research activities have spawned two software products:

- Æsop™—an automated expert system operations planner, and
- CAD Tutor™—CAD training software.

PERSONNEL: PhDs - 4
Engs - 16 (6 MASc, 4 BASc)
Others - 2

GROSS SALES: 1990 - $0.9M
1991 - $1.4M

PLANT SIZE: 3,500 sq ft (office space)
500 sq ft (robotics lab)

EQUIPMENT: In addition to the standard resources and equipment of an engineering company, Dynacon has an extensive computing system which includes four Sun Workstations (two SPARCstation2, two SPARCstation1) and seven Apollo Workstations (two DN-3500, three DN-3000, one DN-660, one DN-330). In addition to these workstations, Dynacon personnel have access to numerous personal computers. In all, Dynacon's computer resources provide substantial analytical, simulation, and graphics capability.

Operating systems on these workstations include Bell and Berkley UNIX, *Ægis*, and SunOs. Available computer languages include FORTRAN 77, 3, Pascal, and ADA. Technical reports are prepared using "T_EX."

Dynacon's engineering software packages include *Matrix* (a control systems simulation tool), NASTRAN, Treetops (a multibody dynamics tool) and AutoCAD. In addition, Dynacon has developed various in-house packages capable of modal analysis, orbit determination, atmospheric modeling, and 3D solid modeling.

For AI/Expert system applications, Dynacon uses Lisp, Prolog, and ART, as well as an object-oriented version of C.

In addition to its considerable computing facilities, Dynacon maintains a robotics laboratory. The centerpiece of this testbed is a CRS*Plus* A-460 six degree-of-freedom manipulator, with dedicated control hardware.

EXPERIENCE: Dynacon's past and present customers include government agencies, private industry, and institutions. Within the Canadian government, the company has worked with Canadian Space Agency (CSA), National Research Council of Canada (NRCC), Space Station Project Office of NRCC, Department of National Defence (DND), Communications Research Centre (CRC), and External Affairs

Canada (EAC). Some of their industry clients include Spar Aerospace, Electrical Engineering Consociates, Aastra Aerospace, AERCOL, Virtek, INTELSAT, Eastman Kodak, Charles Stark Draper Laboratory, and Photon Research. The University of Toronto, UCLA, and the Jet Propulsion Laboratory are some of their institutional clients.

DYNAMIC SIGNAL ANALYSIS Corp

ADDRESS: 430 - 3700 Gilmore Way
Burnaby, British Columbia
Canada V5G 4M1

CONTACT: Mr Allan J Lees, President
Tel: (604) 433-8515
Fax: (604) 433-8838

KEYWORDS: Artificial Intelligence; Expert Systems; Health and Usage Monitor; Maintenance (Predictive); Mechanical Diagnostics; Vibration Analysis.

HISTORY: Dynamic Signal Analysis Corp (DSA) is a Canadian-owned and operated consulting engineering and systems development company which was founded by Allan Lees in 1979. DSA has seven shareholders and directors of which three are operating officers of the company. DSA's corporate goals are to improve the reliability, maintainability, and operational readiness of critical equipment.

CAPABILITY: Founded on a solid consulting engineering background, DSA's team of engineering specialists have developed vibration based data acquisition hardware and expert systems software for mechanical condition assessment of machinery dynamic components. This PC computer based software called Check-Mate Expert™ was initially developed for the Canadian Department of National Defence for maintenance and logistics support on military helicopters.

Check-Mate Expert™ has been in successful use on US Navy helicopters and at industrial sites since 1991. Other applications include rotary and fixed wing aircraft, shipboard propulsion and auxiliary systems, tanks, light armored vehicles, and other mobile equipment.

DSA's services include mechanical condition assessment, helicopter testing, software development, systems integration, and training. DSA also supplies high speed data acquisition and DSP hardware. Brochures and technical information are available upon request.

PERSONNEL: Engineers - 5
Technologists - 3
Computer Scientists - 2
Others - 3

GROSS SALES: 1991 - $700K
1992 - $900K

PLANT SIZE: 2,000 sq ft

EQUIPMENT: Spectrum analyzers, FM tape recorders, data collectors, and other electronic test equipment as well as a number of high-speed development computers.

EXPERIENCE: DSA has worked under contract to the US Navy, the Canadian Department of National Defence, National Research Council, BC Science Council, the Canadian Government, as well as many Canadian and foreign industries.

EBCO AEROSPACE INDUSTRIES Inc

(Division of Ebco Industries Ltd)

ADDRESS: 8510 River Road
Delta, British Columbia
Canada V4G 1B5

CONTACT: Mr Helmut Eppich, Chairman and Chief Executive Officer
Mr David Belanger, Vice President and General Manager
Tel: (604) 946-4900
Fax: (604) 946-4671

KEYWORDS: Aluminum; Coatings; Extended Length Machining; Heat Treating; High Strength Steels; Hydraulics; Invar; Mechanical Assembly; Precision Machining; Repair Capability Machining; Stamping; Structural Components; Titanium; Tooling.

HISTORY: Ebco Aerospace Industries Inc is a wholly Canadian-owned company formed in 1983 and is a division of Ebco Industries Ltd, formed in 1956. Ebco Aerospace recently moved into a newly constructed 43,000 sq ft state-of-the-art DNC machining facility to support the precision manufacturing needs of the North American aerospace industry for the machining of structural components. The Ebco Group has over 900 employees and 500,000 sq ft of manufacturing facilities. In addition to Aerospace, the operating divisions of Ebco Industries are Light Metal Fabrication, Metal Finishing, Tool and Die, and Heavy Fabrication and Machining. Within the Ebco Group are companies manufacturing office systems, commercial and institutional furniture, automotive products, and electronic data collection systems.

CAPABILITY: Ebco Aerospace machine tools operate under direct numerical control (DNC). The system includes IGES capability, allowing Ebco customers to off-load high priority machined parts at short notice by furnishing cutter instruction on electronic media.

Special machine tools acquired during 1987 are listed below:

- Four, three-spindle, 5-axis SNK gantry profilers, numerically controlled, Fanuc 12M control system - 30 HP spindle drives separately equipped for steel and aluminum, 40" between spindles, 20 - 4,000 rpm speed range (steel), 1,000 - 7,000 rpm speed range (aluminum) - 500 lbs/ft^2 maximum load on work mounting surface - 110' x-axis travel; 164" y-axis travel; 28" z-axis travel; $\pm 25^0$ spindle swivel (a-axis) and tilt (b-axis) - work mounting surfaces: 160" width, 190.3' length.

- SNK Type FSP 100-V five-axis machining center, numerically controlled, Fanuc 11M control system - 25 HP spindle drive, 20 - 5,000 rpm speed range - two pallet, size: 30.4" x 39.4" maximum pallet capacity: 5,500 lb - maximum distance, pallet surface to spindle center, spindle horizontal: 55.1", spindle vertical: 39.4 - 60" x-axis travel; 56.3" y-axis travel; 55.1" z-axis travel; $+30^0$ to -120^0 spindle tilt (a-axis); 360^0 table rotation (c-axis).

- SNK gantry type single spindle five-axis profiler, numerically controlled, Fanuc 12M control system - 30 HP spindle drive, 20-4,000 rpm speed range - 500 lbs/ft^2 maximum load on work mounting surface - 240" x-axis travel; 56" y-axis travel; 28" z-axis travel; $\pm$ 25^0 spindle swivel (a-axis) and tilt (b-axis) - work mounting surfaces: 48" width, 240" length (354" bed length).

- Mori Seiki Model TL-5B 3000 turret lathe, numerically controlled, Fanuc control system - 25HP spindle drive, 12 - 1,4000 rpm speed range - 5,000 lb capacity - 14" diameter swing over carriage, 100" between centers, eight indexing stations on turret.

PERSONNEL: 70 (Aerospace Division)
900 (Ebco Industries))

GROSS SALES: No data.

PLANT SIZE: 43,000 sq ft (Aerospace Center on 52 acres for future development)

EQUIPMENT: In addition to the equipment described above, EBCO maintains the following special purpose equipment:

- Cincinnati Milicron machining center, 3-axis
- Giddings & Lewis machining center, 3-axis
- Automated UT inspection (immersion type)
- Mitutoyo coordinate measuring machine
- Automated PT inspection
- Other heavy conventional manufacturing capability
- Cranes: 2 x 10 Tons (Aerospace)
- Computers: DEC Microvax II/VMS (McDonnell Douglas) Unigraphics/DC-135 CAD/CAM

EXPERIENCE: Ebco's customers include The Boeing Co, deHavilland, Canadair, Bristol Aerospace, Hooker Chemical, University of British Columbia, Robbins Company, Lockheed Petroleum Services and McDonnell Douglas.

EDA INSTRUMENTS Inc

ADDRESS: 4 Thorncliffe Park Drive
Toronto, Ontario
Canada M4H 1H1

CONTACT: Mr Bruce Brydon, Vice President
Tel: (416) 425-7800
Fax: (416) 425-8135

KEYWORDS: Artillery Battery Communication Systems; Communication Systems Consulting; Communication Systems Design; Network Management; Packet Switching Multiplexors; R&O (Communications); Switches (X.25).

HISTORY: EDA Instruments Inc is a Canadian-owned, high-technology company engaged in military and commercial electronic design, consulting, and manufacture. The company was founded in 1977. It has a US sales office in Orlando, Florida.

CAPABILITY: EDA Instruments Inc is involved in the design and manufacture of electronic systems for use in military communications and commercial data communications. Its field artillery battery communications system is used by the Department of National Defence of Canada. The company has an AQAP-4 manufacturing facility. The company performs subassembly manufacturing and test and also repair and overhaul of its equipment. The company's capabilities cover the broad areas of engineering including hardware, software, and system design and development; systems management; product assurance; production; repair and overhaul; quality assurance; documentation; and training and after-sales support.

PERSONNEL: Engineers - 9
Technologists - 12
Others - 40

GROSS SALES: No data.

PLANT SIZE: 20,000 sq ft

EQUIPMENT: Computer systems include IBM PC ATs.

EXPERIENCE: Present customers include the Department of National Defence (Canada), Computer Sciences Corporation (US), Union Carbide (US), Revenue Canada (Customs and Excise), as well as distributors in western Europe, Australia, New Zealand, East Asia, and South America.

EDO CANADA Ltd

ADDRESS: 1940 Centre Avenue NE
Calgary, Alberta
Canada T2E 0A7

CONTACT: Fraser B Rea, Director, Marketing and Contracts
Tel: (403) 569-5400
Fax: (403) 569-5499

KEYWORDS: Composite Components; Composite Materials; Filament Winding; Hand Lay-Up Aerospace Components; Survey (Satellite) Equipment.

HISTORY: EDO Canada Ltd (ECL) was established in Calgary in 1979 as JMR Instruments Canada Ltd. In 1983 the company was purchased by the EDO Corporation of New York, and in 1987 a 40% equity share of EDO Canada Ltd was acquired by the Alberta Government. ECL is a high-technology company specializing in survey electronics and advanced materials.

CAPABILITY: In less than a decade, ECL has grown from a specialized manufacturer of electronic survey equipment to a multi-faceted company servicing a broad range of electronic and aerospace requirements. While ECL's electronics capability has been the cornerstone of ECL, the Advanced Materials Division has established niches in the space, aerospace, and commercial utilities industries.

The Electronics Division was initially concerned with developing and manufacturing survey instrumentation utilizing the Navy Navigational Satellite System (NNSS). The division has since pioneered some of the most sophisticated and accurate navigation and positioning equipment available today.

The AN\SYN-501 Marine Integrated Navigation System is a low-cost system that combines the inputs of GPS (Global Positioning System), Transit, Omega, Loran-C, Speedlog, and Gyro sensors to provide optimum positions for marine surface vessels. It is currently being installed on Canada's Navy surface fleet. The Multi-Sensor Integrated Navigation System (MSINS) is an extension of the AN/SYN-501. It provides a "stand alone" navigation system complete with sensor box, processor, and optional display.

The AN\URN-502 Automatic Position Correlator was designed to provide real-time navigation and positioning for land-based electronic warfare vehicles and is also currently in use by the Canadian Armed Forces. EDO Canada's most recent land-based program, the Primary Land Arctic Navigation System (PLANS), is an integrated system for arctic defense vehicles. PLANS integrates Transit, GPS, magnetometer, odometer, and gyro sensors to provide the vehicle operator with instantaneous azimuth and position, relative motion, and true velocity.

In addition to EDO Canada's own GPS product line, a 1990 agreement with one of North America's leading manufacturers of GPS equipment, Ashtech Inc, has secured EDO Canada Ltd as the exclusive Canadian distributor of the Ashtech XII line of GPS equipment.

In 1987 EDO Canada Ltd diversified into engineered materials and established capabilities for filament winding and hand lay-up of composite materials. EDO Canada's contracts to manufacture 480 gallon external fuel tanks for the CF-18 fighter aircraft and to develop space antenna reflectors for commercial communications satellites have established a complete range of in-house design, design engineering, production, and quality assurance capabilities.

The innovative technology and commercial success of ECL is the result of an experienced team of engineers and technicians, in-house R&D facilities, complete design and manufacturing capabilities, and a NATO-standard quality assurance program.

PERSONNEL: PhD - 2
Engs - 10
Production - 50
Others - 48

GROSS SALES: 1991 - $10.0M

PLANT SIZE: 65,000 sq ft

EQUIPMENT: Materials (composites): 2 winding machines; 2 computer controlled 26' x 9' x 8' 500°F ovens; 1 10' x 46' autoclave; cold storage; extractor; spray booth; cranes; rotation fixtures; solvent recovery system; dust extraction system; drill, route, and grind area; tooling/machine shop; vacuum pump; clean room; mechanical/chemical test laboratory area; barricaded test cells.

EXPERIENCE: Present customers include the Canadian Armed Forces, the Canadian Air Force, the Canadian Navy, and the Canadian Department of Communications, Westinghouse, McDonnell Douglas, and Bristol Aerospace.

EG&G CANADA Ltd

(Optoelectronics Operation)

ADDRESS: 22001 Dumberry Road
Vaudreuil, Quebec
Canada J7V 8P7

CONTACT: Mr Ronald Swarbrick, General Manager
Tel: (514) 424-3377
Fax: (514) 424-3411

KEYWORDS: Electro-Optics; Electronics; Emitters and Detectors; Industrial Benefits.

HISTORY: EG&G Canada Ltd, Optoelectronics Operation, forms part of the Solid State Products Group of EG&G Inc, a fortune 200 company headquartered in Wellesley, Massachusetts. The Solid State Products Group specializes in opto-electronics components including photodetectors, emitters, and imaging devices for a broad range of military, aerospace, industrial, and commercial applications.

EG&G Optoelectronics is located in a state-of-the-art building in Vaudreuil, Quebec, and houses advanced manufacturing facilities for high end production of laser emitters and detectors. These products are largely exported to aerospace companies around the world involved in advanced military projects. The facility came to EG&G from GE Canada three years after the purchase of RCA by GE Canada's parent, the General Electric Company of Fairfield, Connecticut.

CAPABILITY: EG&G Optoelectronics specializes in the design, development, and manufacture of high-quality laser emitters and detectors for use in military and space applications. The manufacturing facility, built in 1986, features the latest in design and manufacturing tooling for this type of industry. The plant is fully qualified and performs to AQAP-1 specifications.

PERSONNEL: Engs - 30
Technologists - 10
Technicians - 35
Other - 100

GROSS SALES: No data.

PLANT SIZE: 100,000 sq ft

EQUIPMENT: EG&G Optoelectronics has a world-class facility of 100,000 square feet including 30,000 square feet of class 10,000 clean rooms and 3,500 square feet of class 100 clean rooms. State-of-the-art equipment includes all equipment required for production, characterization, and testing of electro-optical semiconductor components and subsystems.

EXPERIENCE: Optoelectronics has produced products for the US market, Europe, and the Far East. Customers have included Loral, Matra, Martin Marietta, McDonnell Douglas, Hughes, Raytheon, and other companies involved in military and space applications.

EMCON EMANATION CONTROL Ltd

ADDRESS: 14 Colonnade Road
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Canada K2E 7M6

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Tel: (613) 723-1838
Fax: (613) 723-2752

KEYWORDS: Consulting (TEMPEST); Shielded Cabinets; TEMPEST Engineering; TEMPEST Manufacturing; TEMPEST Testing (NACSIM); Workstations (TEMPEST).

HISTORY: Emcon Ltd is a Canadian-owned, high technology, electronics company founded in 1985. The company provides products and services for use in the processing and communication of government classified information.

CAPABILITY: Emcon specializes in the development and endorsement of TEMPEST data processing equipment and systems. Emcon products and services are used to facilitate the communication or processing of government classified information in normal office or harsher environment conditions. Since 1985, Emcon's performance and growth, primarily due to contracts with the Government of Canada and Canadian government contractors, have enabled it to amass the largest Canadian private-sector expertise in TEMPEST engineering and testing.

The TEMPEST Engineering and Manufacturing division is a leader in the design, manufacturing, and testing of secure electronic equipment for data processing, data communications, image processing, voice communications, and encryption.

Emcon's TEMPEST test facilities are certified by the Canadian Government under the Canadian Industrial TEMPEST Program. Emcon has one of

the largest independent TEMPEST test facilities in the country. Other areas of expertise include electromagnetic compatibility, radio frequency interference and data distribution, and local area networking.

Emcon manufactures and sells TEMPEST client server computing systems and Compartmented Mode Workstations (CMW). Emcon desktop TEMPEST workstations receive TEMPEST certification to NSTISSAM Level 1 and Level 2 categories in accordance with NSA and CSE technical and security requirements. Emcon desktop TEMPEST workstations are based on Sun SPARCstation technology and run SunOS and SunOS CMW. Emcon TEMPEST workstations are listed on the NATO Recommended Products List and meet all Canadian and US regulatory requirements for acquisition and use by Canadian and US government departments, agencies, and contractors.

Emcon's TEMPEST test and manufacturing facilities are located in Ottawa, Ontario, Canada. Emcon is a member of the Canadian Government's Industrial TEMPEST Program and is authorized under that program to perform the following activities: (1) Endorsed TEMPEST Product Program (ETPP) for manufacturing; (2) Endorsed TEMPEST Test Services Program (ETTSP) for TEMPEST testing and certification; (3) Endorsed TEMPEST Support Services Program (ETSSP) for sales, service, and installation of TEMPEST equipment. Emcon practices total quality assurance in the conduct of its business and is currently awaiting final AQAP-1 approval from the Canadian Government for its quality assurance procedures and processes.

PERSONNEL: Certified TEMPEST Professionals - 4
PhD (Electronics) - 1
MASc (Electromagnetics) - 1
BEng (Electrical) - 1
Others - 27

GROSS SALES: No data.

PLANT SIZE: 20,000 sq ft

EQUIPMENT: Complete electronic, electrical, and mechanical design facility using Sun and IBM in-house computer systems. Test facilities include Watkins Johnson receiver and Rohde and Schwarz receivers, electrometrics non-tunable receiver, HP signal generators, Tektronix spectrum analyzer, full range of antennas, PLISNs, filters, coupling transformers, RF voltmeter, and Tektronix oscilloscopes.

EXPERIENCE: Present customers include various departments in the Canadian Government and industries in both Canada and the US. A partial list of customers includes Department of National Defence, Royal Canadian Mounted Police, Canadian Security Intelligence Service, Communications Security Exchange, Sun Microsystems Computer Corp, External Affairs, IBM, DEC, Northern Telecom, Newbridge Networks, Timeplex, MITEL Rockwell, ESL/TRW, Computing Devices Company, Macdonald Dettwiler, NCR, UNYSIS, and Emergency Preparedness Canada.

EPIC DATA Inc

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

CONTACT: Ms Frenny Bawa, Market Development Manager
Tel: (604) 273-9146
Fax: (604) 273-1830

KEYWORDS: Component/System Testing; Consulting; Control Systems; Custom Hardware; Custom Software; Data Acquisition; Education; Microprocessors; Modular Design; Portable Terminals; Security Systems; Service and Support; Site Preparation; Software Services; Solid State Devices; Standard Products; Systems Analysis and Design; Terminals; Testing/Test Equipment; Turnkey Data Collection Systems.

HISTORY: Epic Data Inc is a member of the Canadian-owned Ebco group of companies. Epic Data was incorporated in 1975 to design, manufacture, and fully integrate data collection systems.

CAPABILITY: Epic Data designs and manufactures fully integrated microprocessor-based data collection systems used for gathering and manipulating real-time data on business operations and assisting in critical decision making. Terminals and controllers are incorporated in modular hardware and software design and ensure both reliability and flexibility. Terminal users on the factory floor, in the office, and in other environments find the terminals easy and straight forward to operate.

Epic Data offers a family of multipurpose data collection terminals (MPT). The classic MPT has modular architecture meaning every data collection need can be met by these terminals. It accepts bar code, magnetic stripe, laser scanner, and keyboard input. It has radio frequency (RF) capabilities and can be used as either a fixed or portable unit. User-installable software cartridges can be interchanged to meet any data collection application. Fully user-programmable, the multitasking MPT runs its own application programs from simple to complex and has expandable memory capabilities to accommodate complex, growing applications.

Epic also manufactures the 1648 series of system controllers to interface between the collection terminals and the system's host computer. Epic Data's line of controllers ranges from the Host Programmable Control Unit with a minimum configuration capable of managing a network of up to 24 terminals on 2 party lines, to the Network Control Unit, capable of managing a network of up to 1536 terminals on 16 party lines. It combines 386 technology, the UNIX operating system, and Epic's unique controller software offering price, performance, and versatility in one package.

Epic's expertise lies in adapting microprocessor technology to the broad field of data collection. 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. 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 and die making.

In addition to the manufacture of data collection hardware and operating software, Epic Data is able to offer complementary application software products customized to meet specific customer requirements. Applications vary widely and include time and attendance, maintenance scheduling, security management, work-in-process, inventory control, job costing, labor tracking, and payroll.

PERSONNEL: Total - 220

GROSS SALES: 1990 - $26.1M
1991 - $27.2M

PLANT SIZE: 10,000 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, analyzers, and debugging testers.

EXPERIENCE: Epic Data is a pioneer and leader in the design and manufacture of data collection equipment and software. Epic's base of nearly 800 customers worldwide includes the leading companies in aerospace, defense, government, ground transportation, manufacturing, electronics, engineering, airlines, and telecommunications. Aerospace customers include Bell Helicopter, Boeing, Fokker Aircraft, LTC Aerospace, SAAB-Scania, Bristol Aerospace, and Weber Aircraft. Military and defense customers include General Dynamics; Hughes Corp; Lockheed Corp; Martin Marietta; Northrop Corp; US Army, Navy, Marines; and Rockwell International.

ESNA FASTENERS Inc

(Les Attaches ESNA Inc)

ADDRESS: 2214 46th Ave
Lachine, Quebec
Canada H8T 2P3

CONTACT: Mr Walter Foster
Tel: (514) 631-9013
Fax: (514) 631-5641

KEYWORDS: Fasteners; Nuts (Metal).

HISTORY: ESNA Fasteners Inc is a Canadian corporation located in Lachine, Quebec, which is owned by Harvard Industries, Farmingdale, New Jersey.

CAPABILITY: ESNA Fasteners Inc acts basically as a Canadian distributor of fasteners for its US owner manufacturer. The company's basic strength is in marketing, sales, stocking, and distribution to the Canadian market. In addition, it has the technical, management, and manufacturing support of the rest of the division, which has two plants: Industrial Fasteners in Pocahontas, Arkansas, and Aerospace Products in Union, New Jersey. Also an extensive R&D facility is located in Union, New Jersey. ESNA is known throughout the world for its quality and special applications ability. The red nylon insert is an ESNA trademark in their industrial product line. All quality records are traced and documented throughout the process. All material is certified. Approximately 11% of US business is with the US Government.

PERSONNEL: No data.

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: Present customers include the Canadian Government, Pratt & Whitney, Canadair, Bombardier, Boeing deHavilland, Kenworth, Western Star, CNR, and CPR.

ETM INDUSTRIES Inc

ADDRESS: PO Box 610
266 Hall Avenue E
Renfrew, Ontario
Canada K7V 2E4

CONTACT: Mr Robert Graham, Vice President
Tel: (613) 432-6136
Fax: (613) 432-9547

KEYWORDS: Automotive Components; CAD/CAM; CNC Machining; Components (Aerospace); Components (Automotive); Electronics (Precision Parts); Fixtures (Machining); Machining; Moldings (Plastic); Nuclear Industry (Machining); Plastic Molds; Precision Machining; Structural Fitting (Helicopters); Turbine Engine Components.

HISTORY: Privately owned business started in 1977 as Ed's Tool & Machine. Primarily involved in tool and die operations, industrial service, and manufacturing plastic injection molds.

Expanded into CNC machining in 1986 and today operates on a two-shift basis.

Plastic injection molding operations started in-house in 1988 with molding capacities from 40 to 150 tons.

Company name changed to ETM Industries Inc in January 1989.

CAPABILITY: Broad range of machining services from one-of prototypes to multiyear contracts involving thousands of parts for automotive and aerospace customers demanding close tolerance workmanship. ETM specializes in:

- CNC machining of aerospace and automotive components.
- Custom mold design and manufacture.
- Custom injection molding and assembly.
- CAD/CAM programming, custom inspection service.

PERSONNEL: 40

GROSS SALES: 1990 - $1.6M
1991 - $2.2M

PLANT SIZE: 12,000 sq ft manufacturing

EQUIPMENT: Complete range of CNC machinery. Six vertical spindle machining centres--three with automatic pallet changers. Two CNC turning centres. Many programs involve statistical process control (SPC) inspection. Complete toolroom with lathes, milling machines with digital read out, grinders, EDM machine, heat treatment facilities. Plastic injection molding machines have 40 ton and 150 ton capacity. Inspection facility equipped with coordinate measuring machine. Established quality assurance program at AQAP-4 level, CSA Z299.3, ISO 9002, MIL-I-45208A, and BOEING D1-8000A.

EXPERIENCE: Customers include Boeing Canada, Atomic Energy of Canada, Haley Industries, Honeywell, Sperry Aerospace Division, Westinghouse Canada Inc - Turbine & Generator Division, Canada Post Corp, Newbridge, Grenville Castings Ltd, Bell Northern Research, Northern Telecom, Parker Hannafin, and Loro Corp.

EUROCOPTER CANADA Ltd

ADDRESS: Suite 1202
60 Queen Street
Ottawa, Ontario
Canada K1P 5Y7

CONTACT: Mr Ken Edmonds, Director
Government Programs and Eastern Region Sales Manager
Tel: (613) 232-1557
Fax: (613) 232-5454

KEYWORDS: Flight Testing (Helicopters); Helicopters; R&O (Helicopters).

HISTORY: MBB Helicopter Canada Limited, now known as Eurocopter Canada Limited, began operations as Canada's first helicopter manufacturer in April 1984. The company, located in Fort Erie, Ontario, operates from a 85,000 square foot manufacturing plant that encompasses all aspects of helicopter manufacturing.

In January of 1992, Eurocopter S A became a legal entity and financially accountable for sales and profit towards its shareholders, Aerospatiale's Helicopter Division and Deutsche Aerospace's MBB Helicopter Division.

As a result of this formation, the Aerospatiale and MBB helicopter organizations in North America were merged. They formed two new companies located in United States and Canada named American Eurocopter Corporation and Eurocopter Canada Limited, respectively.

Eurocopter Canada Limited has the world product mandate for the manufacture of the BO 105 LS helicopter and recently received complete design authority for the LS. Designed for high altitude and hot climate operations, the BO 105 LS is the

latest in MBB's highly successful series of light, twin-engine helicopters.

In addition to the production of the BO 105 LS for worldwide distribution, the company is also responsible for the sales, completion, and support of all MBB and Aerospatiale helicopter models in Canada--namely the BO 105 LS, CBS, BK 117, AS 315, AS 332, AS 350, AS 355, and AS 365.

CAPABILITY: The capabilities at the Fort Erie, Ontario, plant range from research and development, systems integration, and flight testing to full scale product support. The production facility will provide for up to 38 helicopters at various stages of completion at any one time and a quality assurance section monitors this production at each assembly stage through to final approval of the flight-tested helicopter.

The Product Development Group's capabilities include preliminary design and development schemes, detailed electrical and mechanical design, specification for materials and processes, final preparation of drawings, and load and stress analysis. There is a Writing Services Department that produces technical publications including maintenance, overhaul and repair manuals, and flight manuals.

PERSONNEL:
Corporate - 5
Marketing - 4
Finance - 12
Engineering - 35
Operations - 45
Quality Assurance - 6

GROSS SALES: No data.

PLANT SIZE: 85,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: Eurocopter Canada Limited, as a subsidiary of Eurocopter S A based in Paris, France, (which evolved from the merger of the helicopter divisions of Aerospatiale and Messerschmitt-Boelkow-Blohm) has access to a broad range of knowledge and expertise.

The company's Canadian customers include the Canadian Coast Guard, ALC Airlift Corporation of British Columbia, Ontario Ministry of Natural Resources, Canadian Helicopter Corporation, Department of National Defence, and many others.

EXCALIBUR SYSTEMS Ltd

ADDRESS: 215 Terrence Matthews Crescent
Kanata, Ontario
Canada K2M 1X5

CONTACT: Mr Maurice C Herbert, President
Tel: (613) 591-6000
Fax: (613) 591-6001

KEYWORDS: Automatic Test Equipment; Electronic Warfare; Microwave Systems; Millimetric Systems; Radar; Real-Time Systems; RF Simulation; RF Subsystems; Simulators; Software Engineering; System Definition; System Studies; Test Equipment; Training; Validation Equipment.

HISTORY: Excalibur is a wholly-owned, Canadian company founded in 1988 to design, develop, and manufacture very fast, real-time, modular ESM and radar simulators and automatic test equipment. Software development and the design and production of fast digital processing boards are an important part of Excalibur's manufacturing activities.

All research and development effort costs and operating expenses have been funded through contracting revenues, private venture capital, and bank financing.

CAPABILITY: Excalibur ESM simulators have gained recognition as high-fidelity, easily programmable, and versatile units. The systems are designed around an open architecture and can be modularly adapted to respond to individual customer's specifications. These features are shared by a recently developed and tested smaller sized compact range of simulators. Excalibur's capability includes the execution of a contract to produce a simulator for the synthetic aperture radar for a major spacecraft program.

During the design, development, procurement, and manufacturing phases, emphasis is placed upon the use of high-quality components and the second sourcing of critical parts. Priority is given to configuration control to ensure revision match and to strict quality control plans and procedures to maintain quality in all design and manufacturing phases.

Excalibur provides custom designed automatic test equipment to satisfy customers' particular requirements. Pre-designed generic software modules allow cost effective systems to be provided with a minimum of development effort.

PERSONNEL: 12

GROSS SALES: No data.

PLANT SIZE: 3500 sq ft

EQUIPMENT: General electronic laboratory test, validation, and simulation equipment.

EXPERIENCE: The principals at Excalibur have many years' combined experience in real-time, EW simulator systems. They bring together experience from the specialized disciplines of radar, microwave radiometry, and millimetric system design; remote sensing systems; airborne systems integration; space borne systems with particular reference to small satellite applications; aerospace systems engineering; systems definition; real-time processing; and multi-processor design.

EXPRO CHEMICAL PRODUCTS Inc

ADDRESS: PO Box 5520
Valleyfield, Quebec
Canada J6S 4V9

CONTACT: Mr R Jessup, Program Manager
Tel: (514) 377-7808
Fax: (514) 377-7801

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

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.

CAPABILITY: Expro is a fully integrated commercial and military propellant and explosives complex. It has its own capability to produce nitroglycerine, propellants, and RDX.

Expro uses 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 in 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. Nitroquanidine 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 and A-4, and Compositions C-4 and A-5. Demolition Block M5-A1 and M112 are also manufactured at the company's facilities.

PERSONNEL: Total - 550

GROSS SALES: No data.

PLANT SIZE: 1,100 acre site

EQUIPMENT: No data.

EXPERIENCE: Though it continues to be the prime supplier to the Canadian Department of National Defence, Expro is one of the two accredited suppliers of propellant for the US Air Force GAU-8/A weapon system and the US Army 25mm Bushmaster. With respect to the 120mm tank gun, Expro supplies Alliant Techsystems with both propellant and igniter composition and Olin Ordnance with igniter composition. Other major clients in the US include Remington Arms, Aerojet, DuPont, and IMR Powder Inc. HE distribution in the US is by direct sales. Expro has in the past received orders for its propellants and explosives from the Netherlands, Belgium, Portugal, Italy, France, Greece, Turkey, Brazil, and Venezuela.

EXTEC PRECISION MANUFACTURING

ADDRESS: 21 State Crown Blvd
Scarborough, Ontario
Canada M1V 4B1

CONTACT: Mr Jack Atkinson, Division Manager
Tel: (416) 297-1621
Fax: (416) 297-1885

KEYWORDS: CNC Machining; Machining; Precision Machining.

HISTORY: Extec is a division of Exco Technologies, which is in its 36th year of business.

CAPABILITY: Extec specializes in the precision machining of weldments, castings, and from solid material. They employ skilled personnel and have the latest CNC and CAD/CAM equipment. Extec services the military, aerospace, nuclear, and general machining markets and complies with the following quality programs: CSAZ299.3, AQAP-4/6, MIL-I-45208A, and MIL-STD-45662.

PERSONNEL: 14

GROSS SALES: 1990 - $2.7M
1991 - $3.3M

PLANT SIZE: 16,000 sq ft

EQUIPMENT: CNC and CAD/CAM equipment associated with precision machining.

EXPERIENCE: Present and previous customers include Unisys Corp, US; ISC Cardion Electronics, US; Indal Technologies Inc, Mississauga, Canada; and GE Canada, Peterborough, Canada.

FAG BEARINGS Ltd

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

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

KEYWORDS: Anti-Friction Bearings; Bearings; Waterpump Shaft Assemblies.

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, Mississauga, Montreal, and Truro. A US affiliate, FAG Bearings Corp, is located in Stamford, Connecticut.

CAPABILITY: FAG Bearings Ltd is involved in the manufacture of precision ground anti-friction bearings including water pump shaft assemblies and aerospace bearings.

PERSONNEL: Engineering - 21
Production - 700
Admin & others (Stratford) - 139 (including engineering)

GROSS SALES: No data.

PLANT SIZE: Manufacturing - 400,000 sq ft
Warehouse - 75,000 sq ft
Engineering - 3,800 sq ft
Laboratory - 6,400 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. Aerospace 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.), and complete clean room (Class IV) facilities. FAG Bearings also has:

- Materials Control Laboratory - Leitz Stereo Microscope and Microscope (mag 1250x); Vickers and Knoop Micro Hardness Tester; Rockwell Hardness Tester; and Eddy Current and Ultrasonic Devices; and temperature cycling chamber.

- Heat Treating Furnaces - Vacuum (computer controlled), Batch with Endo Thermic Generators, continuous type (Nitrogen/Methane), induction, salt, and carburizers (pack & gas).

- Sub-Zero Production Chilling Chamber.
- Acid (etching) Room - etching, passivating, and black-oxiding facilities.

- Mass Spectrometer - Leak detector.

EXPERIENCE: FAG Bearing has experience with many US and Canadian companies including Garrett (Airesearch) in Phoenix, Arizona; Pratt & Whitney Canada, Longueuil, Quebec; Pratt & Whitney, East Hartford, Connecticut; Pratt & Whitney Government Engine Business, West Palm Beach, Florida; Teledyne CAE, Toledo, Ohio; Textron Lycoming, Stratford, Connecticut, and Williamsport, Pennsylvania; Williams International, Walled Lake, Michigan; Spar Aerospace in Toronto, Ontario; Defense Industrial Supply Center in Philadelphia, Pennsylvania; Dept of National Defence in Downsview, Ontario; and US Army Aviation in Texarkana, Texas. Final destinations of some contracts include numerous US Air Force bases.

FELL-FAB PRODUCTS

ADDRESS: PO Box 3303, Sta C
Hamilton, Ontario
Canada L8H 7L6

CONTACT: Mr Bert Tufts, President
Tel: (416) 560-9230
Fax: (416) 56-9846

KEYWORDS: Aircraft Interiors; Aviation Seat Covers (Fire-Block); Cargo Restraint Systems; Collapsible Storage Containers; Fabrication (Fabrics); Fuel Storage; Interiors; Personal Webbing and Gear; Satellite Insulation; Sewing (Fabric); Sleeping Bags; Soft Armour; Storage Systems (Dry and Liquid); Tanks (Collapsible); Tents; Transportation Systems (Dry & Liquid); Water (Potable) Storage; Webbing; Welding (Fabric).

HISTORY: Fell-Fab was established in 1952 as a two-man company, manufacturing truck tarpaulins. It has evolved into a sophisticated manufacturing facility specializing in quality textile products with 130 employees, an engineering group, clean room facilities, advanced manufacturing equipment and quality assurance programs that satisfy both military and commercial aviation requirements. Fell-Fab has a wide range of proprietary products related to storage and transportation. Fell-Fab is a privately held Canadian company.

CAPABILITY: Fell-Fab's capabilities include:

- Thermal protection systems for spacecraft. Installations include the interleaves for solar array and multi-layered insulation for the satellite body on the European Olympus satellite program.

- Fire-block seat covers and interiors for aircraft. Fell-Fab equipped the Canadian Department of National Defence (DND) B707 fleet with passenger seat covers and is supplying crew fire-blocked seat covers for the complete Air Canada fleet. Canadair's CL-600 and CL-601 are using Fell-Fab's acoustical and thermal insulation.

- Cargo restraint systems for aircraft, naval vessels, and ground vehicles. Fell-Fab supplied the webbing system for DND's C-130 fleet.

- Custom covers. Fell-Fab supplies shipping wing covers to McDonnell Douglas Canada for the protection of the complete wing during transportation to California.

- Military webbing and equipment. Fell-Fab supplies the personal webbing to DND together with specialized equipment such as flight helmet bags, ammunition pouches, body bags, and water bottle containers.

- Tents, sleeping bags and ground sheets. Fell-Fab participates in DND's modular tentage system designed for arctic and tropical use. Most protective shelters used by Bell Canada and other public utility companies are provided by Fell-Fab.

- Soft Body Armour. Fell-Fab is an approved vendor to the Royal Canadian Mounted Police for bullet proof vests. Fragmentation jackets also form part of Fell-Fab's capability to DND.

- Antenna covers. Microwave antenna shields protect Andrew equipment around the world.

- Dry and liquid bulk transportation and storage. A range of patented systems allows the utilization of standard collapsible containers for efficient bulk transportation and facilitates the protection and storage of, for example, grains, resins, fuel, and potable water.

- Developed in cooperation with a Canadian defence research organization, an NBC protective hood for aircraft crews which was used and proven in Desert Storm.

PERSONNEL: Engineers - 4
Technicians - 4
Others - 122

GROSS SALES: No data.

PLANT SIZE: 60,000 sq ft

EQUIPMENT: Comprehensive range of manual and automatic machinery for cutting, sewing, welding and gluing fabric, specialized plastics, and composite material. CAD/CAM system with a computerized automatic cutting system. Clean room facilities.

EXPERIENCE: Over 60% of Fell-Fab's production is exported, primarily to government organizations or large companies, such as airlines in the US. Refer to the capabilities section for experience related to specific product lines.

FIELD AVIATION COMPANY Inc

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4230 Sherwoodtowne Blvd
Mississauga, Ontario
Canada L4Z 2G6

Government Liaison Office
*Standard Life Building
275 Slater St, Suite 320
Ottawa, Ontario
Canada K1P 5H9

CONTACT: * Mr C H Wilkinson, Manager, Government/Industry Relations
Tel: (613) 236-9577
Fax: (613) 236-3435

KEYWORDS: Aerial Fire Bombing; Aerial Survey; Aircraft Maintenance; Aircraft Parts; Aircraft Sales; Airframe Components; Hydraulics; Jig Fabrication (Airframe); Modification (Aircraft/Helicopters); Painting (Aircraft); R&O (Aircraft/Helicopters); R&O (Composite Structures); Seat Manufacture (Aircraft); Sensor Systems (Installations); Structural Analysis (Aircraft).

HISTORY: Field Aviation started in Canadian general aviation in 1947 in Oshawa, Ontario, and

expanded to include a western facility in Calgary, Alberta, in 1952. The eastern facility moved to the Toronto airport in 1960. Field Aviation is now Canadian-owned; however, they continue an association with the Hunting Group of Companies, in London, England, who retain a minority interest. Navair Limited (listed separately), included in the Field stable since December 1987, is Field Aviation's avionics arm incorporating their primary avionics sales, service, and installation capability. The company's aircraft parts distribution network was sold in Dec 89; however, it maintains a distribution capability for Beech aircraft parts, along with other related aircraft spares. The company has four operating arms with names and locations as follows (headquarters underlined):

- Field Aviation East Ltd - Toronto, Trenton
- Field Aviation West Ltd - Calgary
- Field Aviation Sales Ltd - Toronto, Calgary, Ottawa
- Navair Limited - Toronto, Vancouver, Montreal, Ottawa

CAPABILITY: Field Aviation provides a full range of aircraft sales, service, modification, and R&O services to general aviation, regional airlines, corporate aviation departments, and governments. The company is the exclusive Canadian distributor for Beech Aircraft Corporation and provides a full spectrum of Beech and other related aircraft parts from its Toronto facility. Field is also actively involved in the sale and brokering of pre-owned business, commercial, and military aircraft and helicopters in Canada and abroad.

Field West in Calgary has a high quality aircraft-painting facility that will accommodate aircraft up to Boeing 737 size.

Field West maintains a complete set of overhaul jigs for the deHavilland Twin Otter and Buffalo aircraft, and for a number of Bell helicopters. The shops have completed numerous conversions of Gulfstream G1s to commuter airliner configuration, and major structural modifications to Convair 580 passenger aircraft to convert them to freighters. A major hangar acquisition in Calgary has permitted an expansion of Field's R&O activities to include aircraft up to B707 size. In addition, Field West is now manufacturing and distributing all parts for the Boeing/deHavilland Buffalo and Caribou under license, and is overhauling airframe components for DND's Boeing 707s. It also manufactures and overhauls some Twin Otter components under license.

A seat manufacturing facility in Calgary has provided production seats for the Twin Otter and CASA 212, and has developed custom seats for a number of other aircraft types. It currently produces all seats for the deHavilland Dash-8 production line.

Field's engineering department specializes in custom modification of aircraft. Their custom designs of aerial survey installations and fire bombing systems are flying in many parts of the world, and include both fixed and rotary wing systems. The water pick-up and release system installed on the Canadair CL215 fire bomber is a Field Aviation design. Recent engineering projects include custom design and integration of radar, airways calibration, and highly specialized antenna/sensor installations in a variety of aircraft. Of special interest is the design and installation of a ski system on the deHavilland Dash 7.

Specialized expertise exists for maintenance, repair, and modification of all Beech aircraft, B707, B737, B727; Twin Otter; Buffalo; Dash 7 and 8; Convair 540/580, 600/640, CC109, SD3-30, SD3-60; Gulfstream G1; Fokker F27/F227; Lockheed Electra and C130; Mitsubishi M42, DH125, HS748; Bell Helicopters; and the full spectrum of general aviation aircraft.

PERSONNEL: Engineers - 26
Technologists/Design Spec - 28
Others - 595

GROSS SALES: 1990 - $48M (excluding Navair)
1991 - $55M (excluding Navair)

PLANT SIZE: 180,000 sq ft (Toronto)
370,000 sq ft (Calgary)

EQUIPMENT: Standard FBO (AVITAT) facilities at Toronto and Calgary for aircraft up to B737 size; manufacturing jigs for Buffalo and Caribou components; major overhaul jigs for Twin Otter, Buffalo, and Bell helicopters; hydraulic test facility; specialized test and repair equipment for composite structures; specialized aircraft salvage equipment; modern B737-sized paint shop; precision machine shop; airframe component (sheet metal and specialized welding) overhaul shop; aircraft seat manufacture assembly line.

EXPERIENCE: Field Aviation's regular customers include the Canadian Department of National Defense, Canadian Department of Transport, Royal Canadian Mounted Police, US Navy, US Army, Massachusetts Institute of Technology, numerous regional airlines, corporate flight departments, and numerous foreign governments.

FLEET INDUSTRIES

(A Fleet Aerospace Company)

ADDRESS: PO Box 400
Fort Erie, Ontario
Canada L2A 5N3

CONTACT: Mr Brian M Oakley, Manager Sales and Marketing
Tel: (416) 871-2100
Fax: (416) 871-2722

KEYWORDS: Advanced Composites; Airframe Components; Bonding Capabilities; Radar Antennas; Satellite Structures.

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 systems. Fleet was established in 1930 to design and manufacture aircraft for the world's civilian, transport, and military markets. Between 1930-1950, 4,000 complete aircraft were built at Fleet and flown from the company's 2,400-ft runway.

Today the company concentrates its expertise on the production of major components. Assembly and test methods meet the latest requirements of MIL-Q-9858A and NATO AQAP-1. 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.

- AIRCRAFT:

- Boeing - E3A/E6A fin and rudder; Boeing E3A TF33 engine nacelles; 757 APU doors; Boeing A6 Rewing - Flaperon.
- Boeing (deHavilland) - Dash 8 bonded wing and fuselage panels, inboard and outboard flap assembly, nacelle assembly.
- Grumman - A6 inboard and outboard flaps, and bonded honeycomb assemblies.
- McDonnell-Douglas - A4E speed brakes and flaps; F/A-18 graphite avionics and gunloader doors; DC-9/MD-80 flaps and ailerons (Canada); DC-10/MD-11 Flapvanes, spoilers, and access doors.

- 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.

PERSONNEL: Total - 700

GROSS SALES: 1990 - $74M
1991 - $64M

PLANT SIZE: 500,500 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: 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 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 reflects a confidence in craftsmanship and support that has lead to long-term relationships. Boeing, deHavilland, General Electric, Grumman, Hughes, Lockheed, McDonnell Douglas, SPAR, Raytheon, Sikorsky, Westinghouse, and many others have experienced the ability of Fleet Industries to produce quality components, on schedule, and within budget.

Fleet Industries' Quality Assurance Program meets the requirements of both Canadian Government specification DND-1015, NATO SPEC AQAP-1, and US MIL SPEC MIL-Q-9858A. The average ratio of inspection to direct labor is 1:8. To ensure 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.

FLEXIBULB PLASTICS Inc

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PO Box 635
Trois-Rivieres, Quebec
Canada G9A 5J3

CONTACT: Mr Pierre Tellier, President
Tel: (819) 374-9250
Fax: (819) 374-5143

KEYWORDS: Aircraft Cabin Interiors; High Vacuum Metallizing; Injection Molding; Plastic Extrusion; Self-Skinning Foam Products; Thermoforming; Thermoplastics; Vacuum Forming; Windsheilds.

HISTORY: Flexibulb is a Canadian-owned, plastics and composites parts manufacturing company founded in 1970. The company is a Canadian-owned plastics parts and composite parts manufacturer. It was acquired in May 1989 from Avcorp Industries Inc.

CAPABILITY: Flexibulb is primarily involved in the fabrication of plastic components as a subcontractor to the prime manufacturers in the aircraft and ground transportation industries and is approved by Transport Canada to supply plastic and composite parts for the interiors of civil aircraft.

Flexibulb is certified under USA DODD 5230.25 and Canada TDCR. Flexibulb is a member of AIAC and NBAA. The company's quality assurance system is AQAP-4 level.

PERSONNEL: Production - 25
Admin & Sales - 9

GROSS SALES: 1990 - $2.5M
1991 - $2.5M

PLANT SIZE: 28,000 sq ft

EQUIPMENT: Flexibulb's equipment includes 4 single-platen vacuum thermoformers (4x8, 2x6x10, 6x12), 125 ton self skinning foam injection equipment, and in-house machine shop for tool and die manufacture. The company also has two 6x10 vacuum metallizing machines with planetary racks.

EXPERIENCE: Flexibulb's principal customers include Canadair, Bombardier, Prevost Car, Via Rail, CAE Industries, Bell Helicopters (Textron Ind), MBB, Bendix/Avelex Inc, Aviatech, Innotech Inc, IMP Group, and deHavilland.

FMA CONSULTANTS

ADDRESS: 180 Metcalfe St, Suite 500
Ottawa, Ontario
Canada K2P 1P5

CONTACT: Mr A D Rackow, Vice President
Tel: (613) 563-0236
Fax: (613) 563-0253

KEYWORDS: Consulting; Government Relations; Industrial Benefits; International Trade Relations; Marketing; Procurement; Proposal Writing; Studies; Systems Planning; Training.

HISTORY: FMA Consultants is a Canadian-owned company founded in 1976 under the name Foottit-Mitchell and Associates with its office in Ottawa, Ontario. The objectives of the company are threefold:

- To provide an interface between industry and appropriate Canadian government departments and agencies.

- To provide advice to industry on establishing liaison on company-to-company and company-to-government bases.

- To carry out studies for industry and government.

CAPABILITY: Senior members of the firm have had extensive experience in both Canadian Federal Government and industry in the fields of research, development, production, and marketing. 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 facilitating government-industry relationships in the following areas: aerospace and aeronautical, electrical and electronics, avionics, simulation and training, shipbuilding, marine equipment, transportation, machinery, general manufacturing, and environmental systems, and in the fields of government organization, systems planning, economic analysis, and management evaluation.

FMA Consultants has, in addition to the professional staff of five, a number of associates with specialized knowledge who are called in for specific tasks and assignments.

PERSONNEL: Professional - 5
Support Staff - As required

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: FMA Consultants currently provides services to twenty manufacturing companies, several of which are located in the US. The provision of these services involves extensive familiarity and informed contact with Canadian Federal Government departments and agencies, particularly with the Departments of National Defence, Transport, Industry Science and Technology, Atlantic Canada Opportunities Agency, Supply and Services, Revenue Canada, and Canadian International Development Agency. The work with these agencies is conducted at all levels and has been concerned with policy, procurement, programs and program evaluation, industrial benefits planning and verification, customs issues, technology, marketing, industry sectoral studies, funding, and contracting. FMA Consultants has extensive experience to apply to clients' requirements in export marketing, international collaborative programs, and in US Department of Defense procurement policies and processes.

FOCAL TECHNOLOGIES Inc

ADDRESS: Unit 7
40 Thornhill Drive
Dartmouth, Nova Scotia
Canada B3B 1S1

CONTACT: Mr Graham Smith, President
Tel: (902) 468-2263
Fax: (902) 468-2249

KEYWORDS: Electro-Optics; Fiber Optics; Rotary Products; Smart Structures.

HISTORY: Focal Technologies Inc is a Canadian-owned, high technology manufacturer and R&D firm founded in 1983. The company sells through distributors in many countries and prides itself in the ability and willingness to customize products to meet new requirements.

CAPABILITY: Focal Technologies Inc is primarily involved in the design and manufacture of rotary products (slip rings, fiber optic rotary joints, and fluid rotary unions) for marine, defense, aerospace, and manufacturing industries. The company also manufactures electro-optical instruments and is active in the following areas of R&D: fiber optic telemetry, interferometric fiber optic sensors, smart structures (embedment of optical fibers in composites), and new rotary products.

PERSONNEL: MSc/M Engs - 4
Engs - 4
Others - 17

GROSS SALES: 1990 - $1.6M
1991 - $2.0M

PLANT SIZE: 7,500 sq ft

EQUIPMENT: Complete fiber optics and electronics laboratory; optical micropositioning and bonding station; mechanical inspection equipment; electrical testing (hi-pot, etc.); CAD.

EXPERIENCE: Over 90% of the company's products are exported worldwide. Focal Technologies Inc has a certified QA program as well as security clearance for the facility and staff.

FRE COMPOSITES Inc

ADDRESS: 64 Rue Wales
St André Est, Quebec
Canada J0V 1X0

*Ottawa Representative
Suite 350
1223 Michael Street North
Gloucester, Ontario
Canada K1J 7T1

CONTACT: *Terry Sutherland
Tel: (613) 745-4464
Fax: (613) 745-1598

KEYWORDS: Composite Materials; Filament Winding; Pultrusion; Rocket Launchers; Structural Components.

HISTORY: See Capability.

CAPABILITY: FRE Composites, an ex-GE business, with over 25 years' experience, designs and fabricates advanced polymer composites structural components utilizing high-quality, cost-effective automated filament winding, braiding, pultrusion, RTM, and autoclave molding. Materials processed include graphite, aramid, glass, and other continuous fibers in combination with a wide range of matrix systems including epoxy, phenolic, PEEK, and other thermoplastic matrices. FRE's ability to fabricate thermoplastic and phenolic tubular structures and panels is believed to be state-of-the-art. FRE's skilled team of engineers can successfully undertake routine, build-to-print jobs or complex, design-and-development-to-specification programs with equal competence.

PERSONNEL: Total - 150
PhDs - 4
MScs - 6
BScs - 20

GROSS SALES: 1991 - $15.0M
1992 - $18.0M

PLANT SIZE: 110,000 sq ft

EQUIPMENT: 5- and 6-axis automated winding lines, braider, pultrusion line with 4' x 2' pulling window, RTM line, 8' x 20' autoclave to 800°F and 350 psig, CNC machining, two SUN workstations for FEA and CAD with numerous Patran software packages.

EXPERIENCE: Customers include General Electric, Martin Marietta, General Dynamics, Boeing, Spar Aerospace, Raytheon, E Systems, Astro Aerospace, McDonnell Douglas, Bell Helicopter, Morton Thiokol, Bombardier, Bristol Aerospace.

FRONTEC

ADDRESS: Corporate Headquarters
10035 - 105 Street
Edmonton, Alberta
Canada T5J 2V6

NWS Contract Management Office
130 Slater St, Suite #1300
Ottawa, Ontario
Canada K1P 6E2

CONTACT: Mr George Paicu, President
Tel: (403) 420-7112

KEYWORDS: Communications (Networks); Environmental Services; Facilities Management; Logistics Support; O&M of Airports; Technical Installation Services.

HISTORY: Frontec is a Canadian technical services company jointly owned by ATCO Enterprises Ltd and Canadian Utilities Limited. It was founded in 1986 to capitalize on the combined expertise of the ATCO/CU group in the areas of facilities management, logistics support in remote regions, operation and maintenance, and power generation and transmission. The ATCO/CU group of companies employs 5,500 people and has assets of more than $3.5B and annual revenues in excess of $1.5B.

CAPABILITY: Frontec specializes in providing facilities management, technical installation services, training, and environmental services for industrial and government customers. Capabilities include airport management and the operation and maintenance of communications systems. Frontec also draws on the broad experience and expertise of its associated companies which are active in power generation and distribution, natural gas distribution, and mobile shelter manufacturing.

Frontec has offices in Edmonton, Ottawa, and Yellowknife in Canada and in Anchorage, Alaska.

Frontec's subsidiary, Narwhal Arctic Services, operates airports in the high arctic and a hotel in Resolute Bay, NWT. Narwhal provides construction and logistics support services across the North.

PERSONNEL: 550

GROSS SALES: $50.0M

PLANT SIZE: Not applicable

EQUIPMENT: Narwhal owns and operates earth moving equipment, all terrain vehicles, special aircraft handling equipment, portable generators, construction equipment, and portable camps.

EXPERIENCE: Under contract to the Canadian Department of National Defence, Frontec operates and maintains the Canadian portion of the long-range radar sites of the new North Warning System. The contract also includes operation and maintenance of the short-range radar sites now being constructed. Frontec also provides airside and groundside services at Southport Aerospace Centre, the site of the pilot training program for the Canadian Forces.

Frontec's training expertise and commitment to the environment come together in the company's initiative in fire suppression training. The technology used eliminates environmental hazards while improving training quality. The first application of this service is in training for airport firefighters. Other applications (e.g., airline attendant training) are now being developed.

GANDALF TECHNOLOGIES Inc

ADDRESS: 130 Colonnade Road South
Nepean, Ontario
Canada K2E 7M4

CONTACT: John Wandell, President, Gandalf Canada Ltd
Tel: (613) 723-6500
Fax: (613) 226-1717

KEYWORDS: Bridges; Data Switches; Data-Over-Voice Systems; Hubs; ISDN Terminal Adapters; LAN/WAN Interconnection Devices; Modems; Multiplexers; Network Management; Network Processors; PC Board Fabrication; Routers; Terminal Servers.

HISTORY: Gandalf Technologies Inc was established in Ottawa, Ontario, Canada, in 1970. It is a publicly-held company with operating subsidiaries worldwide. It has two highly-automated manufacturing plants, one at its headquarters campus in Nepean, and one in Warrington, UK.

Its US subsidiary, Gandalf Data, Inc, has headquarters in Cherry Hill, New Jersey.

CAPABILITY: Gandalf is a worldwide manufacturer and supplier of communications solutions encompassing a comprehensive array of products, systems, network design, and support services. By focussing on the integration and management of local and wide area networks and in partnership with users, the company protects customers' communications investments and optimizes their ability to use their evolving computer network for maximum advantage. Gandalf markets its range of communications solutions to organizations through subsidiaries and distributors in 65 countries.

PERSONNEL: 1,800 worldwide

GROSS SALES: 1990 - $161.7M
1991 - $148.6M

PLANT SIZE: Gandalf has a 60,000 sq ft electronic assembly plant, 18,000 sq ft printed circuit board manufacturing plant, and a 100,000 sq ft R&D center, all in Nepean, Ontario. The manufacturing facility in Warrington, UK, has 36,000 sq ft.

EQUIPMENT: Complete in-house R&D and production facilities. In-house computer systems include IBM and DEC VAX.

EXPERIENCE: Current customers include a number of government agencies and departments, business organizations of all sizes, and educational and financial institutions worldwide. Among the diverse customer base are Wood Gundy (Canadian investment bankers), Public Works Canada, France Telecom, British Telecom, the London Underground, the Dutch PTT (telecommunications authority), Hewlett-Packard, BellSouth, Pacific Bell, University of Chicago, Novell, and McDonnell-Douglas.

GARRETT CANADA

(Allied-Signal Aerospace Canada)

ADDRESS: 255 Attwell Drive
Rexdale, Ontario
Canada M9W 6L7

CONTACT: Mr Thomas E Mitchell, Vice President Sales & Marketing
Tel: (416) 675-1411
Fax: (416) 675-7568

KEYWORDS: Avionics; Beacons; Build-To-Print; Calibration; Communications; Control Systems; De-icing Applications; Emergency Locator Beacons; EMI; Environmental Control; Environmental Instruments; ILS; Power Supplies; R&O (Avionics); Software Services; Subcontract Manufacturing; Testing/Test Equipment; Window Heat Controls.

HISTORY: Garrett Canada is a unit of Allied-Signal Canada Inc. The company is supported by the Allied-Signal Aerospace worldwide network of field sales and services offices.

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's 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 by a facility with modern design, manufacturing, testing, and support capabilities, Garrett Canada markets electronic thermal management systems, communications systems, and support services and employs approximately 900 people of which 30% are engineering or engineering support staff. Garrett Canada now has four facilities in Rexdale, Ontario.

Garrett Canada:

- has developed electronic bleed air controls which regulate the air extracted from the aircraft engines for the cabin environment, anti-icing, and various other pneumatic systems.

- has developed an electro-impulse de-icing system for the leading edge surfaces of aircraft wings, stabilizers, engine cowls, and inlets.

- is in Phase 4 of a study of the ICECS (Integrated Closed Loop Environmental Control System) concept for the next generation of aircraft.

To augment its major product line of electronic environmental control and bleed air management systems, new developments are planned. One of these provides a unique ice protection system which will help eliminate present environmentally hazardous de-icing procedures. Others include improved windshield heat controls suited for a wider range of aircraft applications and smart actuators and sensors that will enable higher reliability, more rugged, smaller, and lighter control electronics for future aircraft and space applications.

Environmental and EMI qualification testing to military/aerospace standards is performed in the company's government-approved test facility. The facility includes a Canadian government TEMPEST test facility. This facility is staffed to perform tests for equipment accreditation based on compliance with NACSIM 5100. Garrett Canada conforms to NATO AQAP-1 and MIL-Q-9858.

Electronic Environmental Control Systems (EECS): Garrett Canada EECSs are a major subsystem of the 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.

Garrett Canada has been chosen by the Boeing Company to develop electronic bleed air control systems for the high bypass super engines for their 777 aircraft program. This follows a series of successful development programs for this highly specialized technology including Boeing's 767-300 and McDonnell Douglas' MD-11 and C-17 aircraft programs.

Garrett Canada is in Phase 4 of a contract sponsored by the Flight Dynamics Directorate, Aeronautical Systems Center at Wright-Patterson AFB. This program entailed the study and demonstration of life cycle costs related to advanced digitally controlled Integrated Closed-Loop Environmental Control Systems (ICECS). Research has involved analysis, simulation, and development of a full scale laboratory system. A 54% improvement in fuel consumption and a 20% improvement in life cycle costs are expected with the ICECS.

The company is internationally known for its expertise in digital control. The ICECS program further enhances 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: The RESCU 99 emergency locator transmitter is carried aboard more than 90% of the western world's aircraft making transoceanic flights. The company's latest emergency locator transmitter (ELT) development works in conjunction with the international search and rescue satellite system SARSAT/COSPAS.

Support Services: In addition to complete facilities for support of Garrett Canada products, a dedicated facility has been established to carry out the repair and overhaul of a wide range of products manufactured by other Allied-Signal divisions. Capabilities of Garrett Canada's customer support repair and overhaul facility include technical publications preparation, integrated logistics systems, 24-hour aircraft on ground (AOG) service, customer and field service, spare parts provisioning, warranty administration, and R&O engineering services.

The company's advanced systems capabilities have been recognized and proven in the NATO arena through the company's participation in a number of Canadian Government and multinational collaborative programs in the areas of flight control actuation, power supplies, mission electronics, and specialized test systems.

PERSONNEL: 950

GROSS SALES: 1990 - $112.3M
1991 - $117.0M

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: Garrett Canada customers are worldwide and include both the commercial and military sectors.

GasTOPS Ltd

ADDRESS: 1011 Polytek Street
Gloucester, Ontario
Canada K1J 9J3

CONTACT: Mr B D MacIsaac, President
Tel: (613) 744-3530
Fax: (613) 744-8846

KEYWORDS: Automatic Data Acquisition Systems; Control Systems; Data Acquisition; Engine Health Monitoring; Expert Systems; Gas Path Analysis; Gas Turbine Engines (R&D); Inflight Engine Monitoring; Simulation Consoles; Software Development; Systems Engineering Services.

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. Staff turnover has been extremely low which has provided continuity to the technical team.

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, engine test data systems, and propulsion system simula-

tions. GasTOPS Ltd has developed design/shop facilities to support prototype development. The company offers services in these fields to its customers. In the last several years, GasTOPS Ltd has introduced a number of unique products to the market. These include its on-line oil debris monitor, which was selected by Pratt & Whitney for the ATF (F-22) engine, as well as a range of engine health monitoring software products.

PERSONNEL: PhDs - 3
Engineers - 40
Support - 23

GROSS SALES: 1990 - $3.7M
1991 - $4.2M

PLANT SIZE: 28,000 sq ft (including 2,500 sq ft model shop)

EQUIPMENT: Complete mechanical model shop, electronics development laboratory, test equipment, and in-house computer systems and software including 3 MicroVAX systems and 11 PC systems.

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 devoted to the introduction and engineering development of new products. Strategic alliances with manufacturers are considered to be critical to continued growth.

GE CANADA Inc

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Mississauga, Ontario
Canada L5N 5P9

CONTACT: Mr H D (Howie) Byer, Manager-GE Aerospace Canada
Tel: (416) 858-5494
Fax: (416) 858-5612
Mr J R (John) Hawkes, Manager-GE Aircraft Engines Canada
Tel: (416) 858-5479
Fax: (416) 858-5612/5222

KEYWORDS: Aircraft Engines; ASW; Components (Engines); Correlative and Error Correcting Coding; Defense Electronics; Development and Manufacture; Digital Carrier Modulation; Digital Signal Processing; Industrial Benefits; Jet Engines; R&O (Electronics); R&O (Engines); RF Communications; Scrambling; Spread Spectrum; UHF; VHF; Voice and Signal Processing.

HISTORY: GE Canada Aerospace and Aircraft Related Operations includes four operating components and an affiliated component. These are Electronic Systems, Digital Acoustic Receiver Program, Electronic Services, Aircraft Engines and Aeroderivatives, and Industrial Benefits Management.

The Electronic Systems engineering laboratory is located at the GE Canada Inc corporate headquarters in Mississauga, Ontario. The lab was established in 1962 to investigate and develop methods of radar signal processing. By the late 60s, the focus had shifted to the study of spread spectrum communications, and since then has concentrated on special purpose, sophisticated communication equipment.

The GE Aerospace Canada Digital Acoustic Receiver Program facility is located in Winnipeg, Manitoba. Currently, engineering personnel at this facility are designing, developing, and qualification testing a Digital Acoustic Receiver System (DARS) for the receiving and processing of sonobuoy signals in ASW applications. GE Aerospace Canada has received a General Electric Company World Product Mandate for DARS. Following completion of the development phase, production will begin in a new facility in Winnipeg.

The Electronics Service operation is located close to a Canadian Forces Supply Depot in Toronto. The facility was established in 1967 as the GE Aerospace Electronics Service Depot (AESD), and over the years has become a recognized expert in field service and depot level maintenance. Organized as the wholly-owned GE Canada subsidiary, Genelcom, from 1974 to 1989, the operation is now formally known as GE Aerospace-Electronic Service Programs.

The Aircraft Engine operations began with the decision by the Canadian Government to purchase the McDonnell Douglas F-18 as the new fighter aircraft. Since then, GE Canada has supplied all of the engines and supported spare parts procurement through offices at GE Canada headquarters. In addition, a plant in Bromont, Quebec, was opened to manufacture blades and vanes for GE jet engines worldwide. The sale of aeroderivative marine and industrial engines in Canada began with compressor pumping stations in the oil and gas industry and more recently included the sale of LM2500 engines to the Canadian Navy for use in the Canadian Patrol Frigate.

The Industrial Benefits Management group was formed when GE Canada and McDonnell Douglas won the CF-18 order. The group has been involved with meeting the GE corporate commitment of over $1 billion in offsets. The group has expanded its expertise in the industrial benefits area by taking on management responsibility for offset commitments in medical systems, aero-

space, mobile communications, and a host of other fields both on behalf of GE and on behalf of third party interests.

CAPABILITY: The Electronic Systems group specializes in the design, development, and manufacture of special purpose communications equipment and systems. A major strength is in the area of digital carrier modulation designs, specifically custom built, direct sequence, spread spectrum work. Projects are performed in close liaison with the customer, and all aspects of the design process are provided, from the initial feasibility study and definition stage through development to small quantity production.

GE Aerospace Canada Digital Acoustic Receiver Program has been established to design and manufacture Sonobuoy Digital Acoustic Receiver Systems (DARS) for the world market. The replacing of analog with digital technology in DARS enables improved performance, smaller size, and lower weight to be achieved. The inclusion of a digital database enables dipping sonars and recorders to be connected to the acoustic data processing system.

GE Aerospace has a program management role on several major programs such as Canadian coastal radars.

The Electronics Service Program specializes in the repair, overhaul, and technical support of military electronic equipment for both domestic and international customers. Additional capabilities encompass the design, development, and custom manufacturing and modification of defense electronics, including the provision of technical investigations and studies. Quality assurance procedures used are approved by the Canadian Government to the requirements of NATO specification AQAP-1. A wide range of technical services including field service representatives, complete technical data support, training, in-house test and calibration, as well as installation, operations, and maintenance of radar equipment and facilities is also provided.

Electronic Systems, Digital Receiver Program, and Electronic Services are supported by dedicated integrated logistics support (ILS), contract, finance, and marketing staff. GE Aerospace Canada also markets the full range of GE Aerospace products and services to the Canadian Government.

The Aircraft Engine operations offer field service representatives, limited manufacturing capability, R&O by subcontract, parts procurement, program management, and a variety of assembly capabilities.

The Industrial Benefits group maintains an up-to-date database of Canadian suppliers in dozens of different product areas, cross-referenced by size, capability, and geographic region.

PERSONNEL: Engineers - 47
Technologists - 24
Technicians - 30
Others - 37

GROSS SALES: 1990 - $67M
1991 - $77M

PLANT SIZE: 4,000 sq ft (Electronic Systems)
20,000 sq ft (Electronic Service)
100,000 sq ft (Aircraft Engines)

EQUIPMENT: The lab is equipped with CAE/CAD, RF test and measurement instrumentation. Electronic Services has a wide variety of specialized equipment including an approved test equipment standards lab, automated test equipment, and a specialized custom manufacturing, assembly, and test facility.

The GE Aerospace Canada Digital Acoustic Receiver Program facility has computer workstations installed for the design of digital and analog electronic circuitry, mechanical design, modeling, and avionics packaging. An extensive inventory of electronic test equipment is capable of making all of the measurements required on Digital Acoustic Receiver Systems.

Aircraft Engines has supported ongoing M&I Build in Canada Program for the LM1600 engine and its application in the oil and gas industry.

The Bromont facility is a world class manufacturing plant, representing an investment of some $100 million, and is one of the first in the GE system to incorporate the latest in computer integrated manufacturing including robotics, computerized controllers, and multi-operation technology.

EXPERIENCE: Lab customers are predominantly Canadian federal and provincial governments. Electronics Services has performed repair and overhaul (R&O) and specialized MILSPEC manufacturing for over thirty-seven years. Major users have been DND, MOT, and the USAF. In addition, they have manufactured low volume, highly specialized products for Hughes Aircraft, Lockheed, and the governments of India, Chile, and Ecuador. Other specialized refurbishment of radar systems is being performed for the UN.

Aircraft Engines has mainly marketed to the Department of National Defence on the CF-18 and the Canadian Patrol Frigate Program. Additional customers have been in the oil and gas industry and in the power generation business.

GENAIRE Ltd

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St Catharines, Ontario
Canada L2R 6R4

CONTACT: Mr G R Wooll, President & Managing Director
Tel: (416) 684-1165
Fax: (416) 684-2412

KEYWORDS: Cargo Handling Equipment; R&O (Components); Radomes.

HISTORY: Genaire Limited is a Canadian-owned and managed company founded in 1951. The company operates out of two facilities in the Niagara region of southern Ontario.

CAPABILITY: Genaire Limited carries out repair and overhaul of a wide variety of aircraft components including radomes, flexible fuel cells, sheet metal components, wheels, engine mounts, brake assemblies, and cartridge-activated devices. In addition, they repair, overhaul, and modify a wide variety of ground-handling equipment including aircraft jacks, maintenance stands, and towbars. The company also manufactures aircraft skis and air cargo pallets utilizing a revolutionary new honeycomb aluminum core.

PERSONNEL: Skilled employees - 70

GROSS SALES: 1990 - $4.6M
1991 - $5.0M

PLANT SIZE: 35,000 sq ft

EQUIPMENT: Radar test range, environmentally controlled fuel cell repair facility.

EXPERIENCE: Present customers include the Department of National Defence and Department of Transport as well as various regional aircraft carriers.

GENERAL KINETICS

ADDRESS: 110 East Drive
Bramalea, Ontario
Canada L6T 1C1

CONTACT: Mr Eric Williams, Vice President Sales and Marketing
Tel: (416) 458-0888
Fax: (416) 458-7566

KEYWORDS: Shock Absorbers (Large Bore); Suspension Engineering.

HISTORY: General Kinetics was founded in 1981 as a private company. In 1986 it was purchased by and became a wholly owned subsidiary of Meridian Technologies of Toronto.

CAPABILITY: General Kinetics specializes in the design, development, and manufacture of large bore shock absorbers for military combat vehicles (tracked and wheeled) and for related support vehicles. This includes providing on-site ride development programs to produce the optimum performance for these off-road applications. R&D projects include off-road performance improvement and gun platform stabilization as related to shock absorbers.

PERSONNEL: Engs - 4
QA - 5
Others - 40

GROSS SALES: 1990 - $9.2M
1991 - $8.7M

PLANT SIZE: 56,000 sq ft

EQUIPMENT: Two servo hydraulic dynamometers. Impact test equipment with 6000 ft lbs capacity. Resistance welding and tube cut-off equipment related to shock absorber manufacture. 3D coordinate measuring machine. CAD system.

EXPERIENCE: Present customers include US Army, Canadian Army, Australian Army, US Marine Corps, FMC, BMY, Cadillac Gage, General Motors, and Stewart & Stevenson.

GENERAL MOTORS OF CANADA Ltd

(Diesel Division)

ADDRESS: PO Box 5160
1991 Oxford St East
London, Ontario
Canada N6A 4N5

CONTACT: Mr W L Claggett, Sales Manager, Defense Products
Tel: (519) 452-5184
Fax: (519) 452-5688

KEYWORDS: Air Defense Vehicle; Amphibious Vehicles; Anti-Tank Vehicle; Armoured Vehicles; Assault Gun Vehicle; Command and Control Vehicle; Fire Support Vehicle; GP Armoured Vehicles; Ground Transportation; Hybrid Mobile Protected Weapon System; Light Armoured Vehicles; Locomotives; Logistics Vehicle; LVTP7 Upgrades; M113 Upgrades; Maintenance Recovery Vehicle; Mine Clearance Systems; Mobile Electronic Warfare Support System;

Mortar Vehicle; Personnel Carrier; Recovery Vehicle; Transport System; Upgunned Weapon Station.

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 a wholly-owned subsidiary of General Motors Corporation.

CAPABILITY: Diesel Division is primarily involved in the engineering and manufacture of diesel-electric locomotives and military vehicles. They have advanced skills and techniques in shearing, forming, fabricating, and welding of large and complex steel components. They are fully qualified military vehicle prime contractors for the Canadian and US Air Forces and the US Army.

PERSONNEL: Engineers - 150
Others - 1850

GROSS SALES: No data.

PLANT SIZE: 1,400,000 sq ft (spread over 4 major plants)

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-Ray facilities for X-raying weld joints on the vehicle hull.
- Machining Centers - state-of-the-art, computer numerically controlled, used for machining entire hulls.

EXPERIENCE: Diesel Division was under contract with the US Marine Corps to deliver 759 8X8 wheeled Light Armored Vehicles (LAV). Of that number, 422 of these vehicles will carry a two-man, 25 MM turret; the remaining vehicles include logistics, recovery, mortar, command & control, and anti-tank. Under a separate contract, they have provided 12 Mobile Electronic Warfare Support System (MEWSS) variants of the LAV. An assault gun vehicle and an air defense vehicle are two additional variants on which the USMC have commenced R&D. Delivery of the LAV commenced in October, 1983, and was completed in 1988.

Diesel Division's 8x8 LAV has recently been selected by the Canadian Forces as the primary training vehicle to equip four new reserve training centres. Approximately 200 systems will be procured for deliveries in 1990/91.

In 1986, the USAF selected the logistics version of the USMC light armoured vehicle for the MARV/SMUD (Mobile Armoured Reconnaissance Vehicle/Stand off Munitions Disrupter). An R&D contract was let for two prototype MARV vehicles. Diesel Division teamed with SACO, the winning SMUD contractor, for the R&D phase of this program. The two R&D vehicles completed tests in 1990. Deliveries of production quantities are waiting funding approval.

The US Army 82nd Airborne is currently evaluating the 8x8 LAV for their use. Sixteen LAV vehicles have been leased from the USMC for this purpose. Four of the USMC LAVs were attached to the 82nd Airborne during Operation Just Cause. The 82nd Airborne and USMC LAVs participated in operations during Desert Storm.

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 has completed a contract to produce 75 Mine Clearance System Kits (MCSK) for interface onto the USMC's LVTP7's. Included were 55 additional kits.

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. They have produced the Midgetman carrier chassis for the USAF under a LORAL contract.

Diesel Division has designed an upgrade kit for the M113 engineer dozer vehicle adding an auger and a hydraulic tool system. They have received a contract to produce 55 units for the Canadian Forces.

Diesel Division is under contract (long lead) for an FMS case to the Saudi Arabian National Guard for 1117 LAVs in several variants. The production contract is expected in 1992.

Recently General Motors consolidated the final assembly of all locomotives into the Diesel

Division assembly plant, increasing production in the London plant from .5 per day to over 1 per day. More than 4000 locomotives have been delivered to 32 domestic customers, and over 1000 locomotives have been exported to 22 countries.

GEOVISION SYSTEMS Inc

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Ottawa, Ontario
Canada K1Z 8R7

CONTACT: Terry McInnis, Canadian Sales Manager
Tel: (613) 722-9518
Fax: (613) 722-5385

KEYWORDS: Automated Mapping; C3 Systems; Data Acquisition; Geographic Information Systems; Hydrographic Information Systems; Raster/Image Integration; Spatial Modeling; Telephone Outside Plant System; Utility Outside Plant System.

HISTORY: GeoVision Systems Incorporated is a privately-held software company specializing in geographic information systems. The company started in 1976 as the Graphics Division of SHL Systemhouse Inc. Based on the success and technological specialization of the division, the separate, privately-owned subsidiary of GeoVision was established by Kinburn in 1984. In 1991, employees joined with two Canadian high-technology capital firms, Ventures West and Noranda Enterprise, to acquire and independently operate GeoVision. The company has a US-based subsidiary, GeoVision System Inc, in Englewood, Colorado, and other offices in Washington, DC; Sydney, Australia; and London, UK.

CAPABILITY: GeoVision Systems Incorporated specializes in development and marketing of advanced software solutions for input, management, processing, and analysis of geographic-related information. The software meets the needs of local, state, and federal government (civilian and defense), and also the mapping and facilities management requirements of gas, electric, and telephone utilities. In addition, the company provides full implementation, training, support, and consulting services to customers.

PERSONNEL: Master - 40
Bachelors - 90
Others - 80

GROSS SALES: 1990 - $21.0M
1991 - $24.0M

PLANT SIZE: 50,803 sq ft

EQUIPMENT: Complete software development facility. In-house computer systems include hardware from Sun Microsystems Inc, Digital Equipment Corporation, and IBM Corporation, as well as peripherals from Hewlett-Packard and Calcomp. All software development is done in C programming language under UNIX operating system, using X Windows/Motif and Oracle Ingres and Sybase (1992) relational database management systems.

EXPERIENCE: Present customers include utilities companies (typically telephone, gas, and electric), federal government agencies (both civilian and defense), and city/country government.

GLOBAL THERMOELECTRIC Inc

ADDRESS: Manufacturing Plant
Box 400
Bassano, Alberta
Canada T05 0B0

Sales Office
333 50 Ave SE
Calgary, Alberta
Canada T2G 2B3

CONTACT: Mr Alan McNaughton, Sales Marketing Manager
Tel: (403) 253-3552
Fax: (403) 253-4607

KEYWORDS: Auxiliary Power Units; Combustion Research; Diesel Heaters; Generators; Portable Power Supplies; Power Sources; Remote Power Supplies; Self-Powered Heaters; Thermoelectric Generators; Thermoelectric Power Units; Thermoelectric Research; Unattended Power Supplies.

HISTORY: Global Thermoelectric Inc is a privately held Canadian corporation. It is the successor to the 3M Company in the manufacturing of thermoelectric products and in the research and development of thermoelectric science and technology. The 3M Company's involvement in thermoelectric dates from the early 1950s and culminated in a line of commercial generators, as well as radioisotope-fueled generators built for the Apollo moon missions.

Global's facilities opened in 1975, and since that time, the number of employees has grown to 52 and plant size has been enlarged to present 77,000 sq ft. In 1991 Global opened an additional R&D facility in Calgary.

Global's corporate mission is the continuing application of thermoelectric to industrial and military products. Global's industrial remote generator systems are operating in more than 53 countries around the world.

New thermoelectric products are being developed, and Global continues to specialize in the design and manufacture of thermoelectric power sources which meet unique demands reliably and cost effectively.

CAPABILITY: During the past decade Global has conducted an extensive number of research and development programs. The unique goals of these programs have enabled Global to develop an expertise in new multi-fuel burner systems, thermoelectric metallurgy, and thermoelectric converter design.

Specific development objectives include the development of liquid multi-fuel generators, thermoelectric-powered heaters with self-sustaining capabilities, thermoelectric converters ranging from 20 watts to 2000 watts, and large thermoelectric modules for waste heat utilization projects.

Recent projects include the development of portable diesel generators and thermoelectric powered heaters of various heat outputs from 20,000 BTU/hr to 60,000 BTH/hr. Both air and coolant heaters have been developed that require no external power.

Significant progress has been made in lowering the cost of thermoelectric devices making them economical to a wider variety of applications.

PERSONNEL: Engineers - 8
Others - 44

GROSS SALES: 1990 - $5.6M

PLANT SIZE: 77,000 sq ft

EQUIPMENT: Global maintains complete production facilities at its Bassano factory. The machine, sheet metal, and welding shops have full capabilities. Equipment includes CNC lathes, surface grinders, mills, CNC machining centers, NC shears and punches, and MIG/TIG welders. The semiconductor thermoelectric materials and hermetically-sealed power units are also manufactured entirely on site.

Global's Quality Assurance Department is equipped with the latest, computer-aided, three-axis coordinate measuring machine. The facilities are presently able to meet MIL-I-45208 (AQAP-4) quality assurance requirements. Global is currently implementing a quality assurance program to the ISO 9003 and CSA Z299.3 standards.

R&D facilities include the latest in electronic test and measurement equipment, two walk-in environmental chambers (-50°to +70°C), four combustion test rooms, and an outdoor test area.

EXPERIENCE: Global's products are currently in use with a number of defense agencies around the world including the US Air Force, the US Army, the US Navy, the US Coast Guard, Canadian DND, the UK Royal Navy, and the New Zealand Royal Navy.

GM ASSOCIATES

ADDRESS: 19 Victoria Crescent
Brampton, Ontario
Canada L6T 1E2

CONTACT: Mr M S Ozechowsky, Vice President
Tel: (416) 792-7527
Fax: (416) 792-8737

KEYWORDS: Containers; Equipment Shelters; Industrial Fabric; Tarpaulins.

HISTORY: GM Associates is a Canadian-owned company founded in 1974 and designs and manufactures products from industrial fabrics for the automotive, fast food delivery, and defense markets. A wholly owned subsidiary company, GMA, Inc, is located in Port Huron, Michigan, and has qualified under the Small Business Act.

CAPABILITY: GMA designs and manufactures products from industrial textiles, generally employing RF sealing of supported vinyls and composite versus metal fittings.

All commercial products have been developed in-house to meet customers' requirements.

Over several dozen variants of fitted cover and soft top designs have been developed and manufactured for the North American defense departments (currently producing the High Mobility Multi-purpose Wheeled Vehicle tops and support structure). National Defence continues to qualify GMA for the production of technical data packages (Level III) and lists the company as an approved vendor of development in the field of industrial fabrics.

Four years ago, GMA commenced manufacturing with proprietary technology consisting of formulations and application methodology meeting the specifications of gloss, near infrared, color, and pattern of Standard Camouflage Pattern Painting (SCAPP).

GMA operates a statistical process control quality assurance system which meets NATO AQAP-4 standards, MIL-Q-9858, and MIL-C-45662 (calibration).

PERSONNEL: Engs - 5
Technicians - 4

Other - 95

GROSS SALES: 1990 - $3.7M
1991 - $6.5M

PLANT SIZE: 33,000 sq ft (Guelph)
12,000 sq ft (Port Huron)

EQUIPMENT: Complete manufacturing facilities with automated fabric spreaders and cutting presses, one 35 KWH radio frequency sealer, automatic sewing centers, plus all the fast change jigs and dies for the current product lines. Design is accomplished by AUTO-CAD.

EXPERIENCE: With sales to over 700 customers annually, some of the major purchasers are Canadian Department of National Defence, US Department of Defense, AM General, Bombardier Inc, Ford Motor Company, General Motors of Canada, Mack Canada Inc, Navistar International, Toyota Canada Inc, Domino's Pizza, Pizza Hut, and KFC Inc.

GODFREY AEROSPACE Inc

ADDRESS: 480 Montreal-Toronto Blvd
Lachine, Quebec
Canada H8S 1B8

CONTACT: Mr A Dale Hunt, Executive Vice President
Tel: (514) 637-1122
Fax: (514) 636-0273

KEYWORDS: Aircraft Lighting; Galley Equipment; Ground Support Equipment; Heat Exchangers; Hydraulic Systems; Oil Coolers; Pneumatic Systems; R&O (Accessories).

HISTORY: Godfrey Aerospace (GA) is a private Canadian company incorporated in May 1989 following 40 years' affiliation with the Howden Group in Glasgow. The company's hydraulic, electrical, pneumatic, and heat transfer equipment skills expertly serve the civil aviation and defense markets throughout North America. Continued growth in these sectors fostered the establishment of production facilities in Piqua, Ohio, in May 1992.

CAPABILITY: GA's repair and overhaul capability covers a diversified range of both military and civil, land, sea, and airborne equipment, while design, manufacturing, and publications experience encompasses a variety of specialized ground support and galley insert equipment. Airborne accessory capabilities include ACMs/ATMs, CSDs/IDGs, oil coolers, fuel heaters, pneumatic valves, hydraulic pumps, and cooling fans. Proprietary GSE and GIE products include gasoline and diesel engine driven electrical generator sets, ground power units, high pressure breathing and service air compressors, hydraulic test stands, cabin pressure testers, munitions handling equipment, inflight trash compactors, waste management systems, coffee makers and water boilers, and potable water systems.

PERSONNEL: 130 collectively (Montreal, Toronto, and Dayton areas) including:
Engs - 10
Production - 60
Quality Assurance - 10

GROSS SALES: $10-12M annually

PLANT SIZE: 100,000 sq ft combined

EQUIPMENT: The company maintains extensive pneumatic, electrical, and hydraulic test facilities which are certified to NATO AQAP-1 and Transport Canada AMO 570/573 and holds OEM approvals for stainless steel and aluminum welding processes.

EXPERIENCE: The company's customers include Air Wisconsin, American Airlines, Beech Aircraft, the Department of National Defence, Gulfstream, Oerlikon Aerospace, Saint John Shipbuilding, Tinker AFB, and Transport Canada.

GOVERNMENT CONSULTANTS INTERNATIONAL

ADDRESS: Suite 1300
50 O'Connor Street
Ottawa, Ontario
Canada K1P 6L2

CONTACT: Mr Robert Bolduc, Senior Consultant
Tel: (613) 236-7001
Fax: (613) 236-3496

KEYWORDS: Consulting; Government Relations; Procurement; Sales Representation.

HISTORY: Government Consultants International (GCI) was established in 1985 and is a private Canadian corporation.

CAPABILITY: GCI is Canada's leading government relations consulting firm, advising both domestic and international clients on government defence procurement and on the procedures and practices of government departments and agencies.

Professional services provided by GCI include lobbying, drawing on the experience of GCI members to provide clients with effective advocacy

with government; client-specific analysis to identify business opportunities and regulatory obstacles in the government environment; and monitoring public policy changes and assessing their impact on clients.

PERSONNEL: Professional Staff - 10
Research & Support Staff - 10

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: In-house equipment includes publishing capability, defence research library, and telecommunications center.

EXPERIENCE: No data.

THE H I THOMPSON Co

(Division of Indal Technologies Inc)

ADDRESS: 10 Kingsmill Ave, Box 906
Guelph, Ontario
Canada N1H 6M6

CONTACT: Mr D E Roberts, Vice President and General Manager
Tel: (519) 822-6630
Fax: (519) 822-7806

KEYWORDS: Blankets; Foil Heat Shields; Forming (Sheet Metal); Forming (Stainless Foils); Heat Shields; Insulation (Blankets); Insulation Systems; Sewing (Insulation); Sheet Metal Heat Shields; Welding (Sheet Metal); Welding (Stainless Foils).

HISTORY: The H I Thompson Company was founded in 1952 as a subsidiary of a US company to supply high and low temperature insulation to the aerospace industry. In 1965, the company became solely Canadian-owned and in 1989 became part of Indal Technologies Inc. Most of the raw materials consumed are purchased from the US, and after fabrication, are sold to Canadian and US customers in the aerospace industry.

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 also has the capability of producing sheet metal weldments, bracketry, and assemblies and is qualified for TIG welding to the leading aircraft engine company specifications.

PERSONNEL: Engineers - 4
Others - 38

GROSS SALES: No data.

PLANT SIZE: 31,000 sq ft

EQUIPMENT: Spot welders - 5 to 50 KVA, seam welders - 5 to 100 KVA, form dies to customer part numbers, 50 to 300 ton presses, various sheet metal fabricating equipment, MIG and TIG welding equipment. High level CAD system (SDRC I-DEAS) capable of 3D solid and surface representation.

EXPERIENCE: Customers include US and Canadian companies such as Pratt & Whitney Aircraft, deHavilland Aircraft, General Electric, Lockheed, Allison, and Canadair. Services are also provided to US and Canadian Governments such as Oklahoma City Air Logistics Center, San Antonio Air Logistics Center, DISC in Philadelphia, and Department of Supply and Services and Canadian Commercial Corp in Canada.

H&S HEAT TREATING

(Division of Phil Dennis Enterprises Limited)

ADDRESS: PO Box 160
South Street North
Port Robinson, Ontario
Canada L0S 1K0

CONTACT: Mr Chris Dennis, Vice President, Marketing and Sales
Tel: (416) 384-9355
Fax: (416) 384-9110

KEYWORDS: Heat Treating.

HISTORY: H&S Heat Treating commenced operations in Welland, Ontario, in 1965. The original company was purchased in 1969 by Phil Dennis Enterprises Limited, and operations were consolidated in Port Robinson a few years later.

CAPABILITY: H&S Heat Treating is primarily involved with the heat treatment and cleaning of metal products, both ferrous and non-ferrous, used in such industries as automotive, agricultural, mining, and transportation. Processes include annealing, stress relieving, normalizing, quench and tempering carburizing, carbo-nitriding, carbon-restoration, fluid bed operations, marquenching, press quenching, cryogenic treatment, etc. Statistical process control techniques are employed throughout

operations and quality control programs are in place to meet requirements such as AMS 2750, CSA Z299, and MIL-H-6875.

PERSONNEL: Metallurgists (P Eng) - 2
Metallurgical Technologists - 2
Mechanical Technologist - 1
Junior Systems Analyst - 1
Others - 30

GROSS SALES: 1990 - $4.1M

PLANT SIZE: 56,000 sq ft

EQUIPMENT: Various high-volume continuous quench and temper lines, both open fire and controlled atmosphere, up to 4000 lbs/hr capacity. Numerous integral quench controlled atmosphere furnaces and fluidized bed furnaces certified for MIL-H-6875. Large volume cryogenic capacity of parts up to 2000 lbs. Complete laboratory facilities and qualified personnel to support in-house quality control programs and metallurgical consultation services.

EXPERIENCE: The company's customers include Brunner Manufacturing, Port Colborne Drop Forge, Sandco Automotive, Seneca Manufacturing, TFI, Welland Forge Limited, General Drop Forge, and Haun Drop Forge.

HALEY INDUSTRIES Ltd

ADDRESS: Haley, Ontario
Canada K0J 1Y0

CONTACT: Mr H W Murray, Senior Vice President, Marketing
Tel: (613) 432-8841
Fax: (613) 432-9456

KEYWORDS: Aerospace Sand Castings; Aluminum Sand Castings; Castings; Light Alloy; Magnesium Sand Castings; Precision Sand Castings; Sand Castings.

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 and 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 aluminum sand castings by means of a low pressure pouring system. On 1 April 1984, Haley Industries purchased Presto Casting Company, located in Glendale, Arizona. During 1986/87, an additional $8.0M plant expansion was completed increasing the plant production area by 45,000 sq ft. This expansion will enable Haley to produce larger castings as well as participate in a larger way in the airframe structural market.

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 treating, 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.

PERSONNEL: Staff - 92
Hourly - 260
Engineers - 18

GROSS SALES: 1990 - $35.2M
1991 - $41.4M

PLANT SIZE: 165,000 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 40 years in operation serving the following customers: Garrett Engine Division, Garrett Auxiliary Power Division, Avco Lycoming, Boeing Vertol, Bell Helicopter, Allison Gas Turbine Division, General Electric (Engine Group), Klockner-Humboldt-Deutz

(Germany), Kaman Aerospace, Litton Precision, Moteren-Und Turbinen-Union (Germany), Pratt & Whitney Aircraft (Hartford, Connecticut), Pratt & Whitney Aircraft of Canada Ltd, Sikorsky Aircraft, Spar Aerospace, Sundstrand Aviation, Westinghouse, Westland Helicopter (England), Fiat Avio (Italy), Agusta SpA (Italy), Aircraft Gear Corp, Hamilton Standard, and Northrop Corp.

HALPEN ENGINEERING

ADDRESS: 925 Lakefront Promenade
Mississauga, Ontario
Canada L5E 2C3

CONTACT: Mr Arthur S Halpenny, General Manager
Tel: (416) 278-8777
Fax: (416) 278-9780

KEYWORDS: Cables; Relay and Control Boxes.

HISTORY: Halpen Engineering Inc was established in April 1971 as a manufacturer's agent and distributor for pumps, nuclear-welded components, and specialized industrial lubricants. In 1972, the company added centrifuges, vacuum filters, pressure filters, and electric surface heating systems to their product line.

In 1973, Halpen was awarded a large contract for Ontario Hydro (Lennox GS) and moved to a small plant in Weston, Ontario. The company warehoused and assembled electric tracing cables and control apparatus. In 1975, the company was awarded a $2 million contract by Canadian Bechtel (agents for Syncrude Canada Limited). In 1978, the company commenced the manufacture of the electric tracing and controls and expanded into the US market by forming a subsidiary (Delaware Corp). In 1979, Halpen commenced the manufacture of pressure filters and vacuum filters under license in Canada. In 1986, Raychem Canada Limited introduced Halpen to the military and aerospace cable harness business. In 1991 Halpen merged with Lakefront Mfg Inc.

CAPABILITY: Halpen Engineering manufactures integrated cable harnesses for military and aerospace applications. These range from the simplest light-weight wiring assembly to the most complex engineered multi-conductor harness.

Halpen uses wiring components that are specifically oriented to the requirements of the service for which the harness is designed. For simpler industrial applications, lower cost-effective materials are used. For harnesses which are subjected to arduous service conditions, Halpen features RAYCHEM products. RAYCHEM is the world leader in radiation cross-linked materials and components for cable harnessing systems. RAYCHEM's specialty wire and cable, shrink-to-fit tubing, molded parts, and components combine to make a total harnessing system unbeatable in quality and efficiency.

From rough sketches to engineering drawings, Halpen can quickly provide custom designed state-of-the-art interconnect systems, giving the client optimal performance. Halpen field sales engineers offer professional assistance in setting up systems and production requirements. The cable harnesses are tested using the most modern computer driven test equipment which provides hard copy for inspection authorities.

The company also manufactures relay and control boxes made to military and aerospace applications for the NATO forces.

PERSONNEL: Engineers - 3
Others - 27

GROSS SALES: No data.

PLANT SIZE: 37,000 sq ft

EQUIPMENT: The company maintains a comprehensive set of equipment necessary for the production and test of integrated cable harnesses for military and aerospace applications, and for the manufacture of a unique multi-conductor helix cable which expands and contracts like a "Slinky".

EXPERIENCE: The company's customers include the Canadian Forces, US Army, US Air Force, US Navy, as well as major prime contractors to the governments.

HANDS FIREWORKS Inc

ADDRESS: 221 Nipissing Road
Milton, Ontario
Canada L9T 1R3

*Ottawa Representative
18 Parkland Crescent
Nepean, Ontario
Canada K2H 7W4

CONTACT: *Mr J C Bond, Ottawa Representative
Tel: (613) 820-0190
Fax: (613) 235-0784

KEYWORDS: Ammunition Smoke; Armament; Chemical Airburst Simulators; Chemical Groundburst Simulators; Explosives; Flares; Green Signal; Grenades Smoke; Hand Grenades Smoke; HC Smoke; High Volume Smoke Pot; Igniters; Illumination Signals; Markers; Orange Smoke;

Ordnance; Practice Bomb Signal Cartridges; Pyrotechnics; Red Signal; Rocket Igniters; Signal Cartridges; Smoke Pots; Spotting Charges; Yellow Signal.

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 primary pyrotechnics and fireworks producer in Canada. During WW II, a wide range of pyrotechnics were manufactured for most of the allied countries.

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 an 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. 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.

PERSONNEL: Professionals - 15
Others - 120

GROSS SALES: No data.

PLANT SIZE: 100,000 sq ft (Total at all locations - 120 buildings)

EQUIPMENT: No data.

EXPERIENCE: HANDS Fireworks Inc has worked very closely with the Department of National Defence (DND) and various Canadian design and development facilities such as the National Research Council; the Defence 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), C1A1.

- The design and development of the smoke pot, SC39 and SC390. This long-burning (11 to 18 minutes), high-volume smoke pot was tested by the US Army at Dugway, Utah, and considered to be an acceptable replacement for the M4A2 smoke pot.

- The design and development of training aids such as the disperser chemical simulant groundburst and disperser chemical simulant airburst, both of which are currently being used by DND.

- The manufacture of the igniter for the Black Brant Rocket.

- The design, development, and production of the signal, illumination 1 1/2" (plastic case) red, yellow, green, etc., for 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.

HARBOUR INDUSTRIES (Canada) Ltd

ADDRESS: 1365 Boul Industriel
Farnham, Quebec
Canada J2N 2X3

CONTACT: Mr Mark D Beauchamp, Marketing Manager
Tel: (514) 293-5304
Fax: (514) 293-2421

KEYWORDS: Aerospace Wire; Cables; Coaxial Cable; Communication Cable; CSA Wire; Custom Made Cable; Fire Proof Wire; Flame Proof Wire; Heat Tracer Cable; High Temperature Wire; Hologene Free Wire; Low Hologene Wire; Plenum Cable; QPL Listed Wire; Radiation Resistant Wire; Thermocouple Wire; UL Wire; Wire.

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 wire and cable to standards such as 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 and MIL-Q-9858A as well as the NATO AQAP-4 requirement. The quality program is registered under CSA quality management registration program and audited regularly by CSA.

PERSONNEL: Engineers - 1
Quality Control - 3
Others - 25

GROSS SALES: No data.

PLANT SIZE: 25,000 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.

HAVLIK TECHNOLOGIES Inc

ADDRESS: 695 Bishop Street
Cambridge, Ontario
Canada N3H 4V2

CONTACT: Mr David M Gee, President
Tel: (519) 653-5774
Fax: (519) 653-5774, Ext 269

KEYWORDS: Fabrication/Assembly/Test; Machining; Metalworking; Non-Destructive Testing.

HISTORY: Havlik Technologies owns (100%) and operates three divisions in the Canadian aerospace industry. Williams Machines is a supplier of production airframe components, assemblies, and ground support equipment; Material Processing is the largest metal processor in Canada; and Vis-U-Ray Testing is an aerospace non-destructive testing facility. The company is owned by Derlan Industries Ltd, a Canadian public company with aerospace interests in both Canada and the US.

CAPABILITY: Williams Machines has 3-, 4-, and 5-axes multi-spindle machining capacity producing production airframe components for Boeing, McDonnell Douglas, etc. In addition, Williams fabricates and assembles tooling and ground support equipment. Williams is qualified to Boeing's D1-9000, MIL-I-45208, and AQAP-4.

Material Processing provides a full range of plating, painting, heat treating, and stress relieving services to approvals from a broad range of aerospace clients.

Vis-U-Ray Testing has complete radiography, ultrasonic, magnetic particle, penetrant, and eddy current facilities.

Collectively, the three Havlik Divisions provide single source accountability for completed components and assemblies.

PERSONNEL: Total - 200

GROSS SALES: 1990 - $18.5M
1991 - $18.5M

PLANT SIZE: 140,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: Customers include Boeing and McDonnell Douglas.

HAWKER SIDDELEY CANADA Inc

(Orenda Division)

ADDRESS: 3160 Derry Road East
Mississauga, Ontario
Canada L4T 1A9

CONTACT: Mr John Armstrong, Manager, Contracts and Administration
Tel: (416) 677-3250
Fax: (416) 678-1538

KEYWORDS: Advanced Materials; Engine Components; Engine Test; Forming; Gas Turbine Components; Heat Treating; Machining; Manuals; Metalworking; Nuclear Reactor Components; Plating; Precision Machining; R&O (Engines); Stamping; Welding.

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 subcontract 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 AQAP-1, and a comprehensive non-destructive testing department.

- Repair & Overhaul - Orenda Division has contracts for the repair and overhaul of aircraft gas turbine engines, J85-15, J85-CAN-40, and 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.

- Advanced Materials and Energy Systems (AMES) - The efforts of the AMES group center around improving the durability of expensive and critical components in the F404-GE-400 engine, the J85-CAN-15, and the J85-CAN-40 engines. This activity includes research and development on life assessment techniques for fan, compressor, and turbine blades and discs of gas turbine engines; development of safe and reliable means of extending the life of low cycle fatigue life limited gas turbine discs; development of state-of-the-art NDI techniques for reliable detection of small but dangerous defects in gas turbine blades and discs; enhancing the high cycle fatigue, wear, and fretting fatigue resistance of titanium alloys through ion beam techniques; enhancing the performance of high temperature coatings; development of advanced innovative repair techniques; assessment of alternate fuels; and improving existing component manufacturing processes. The R&D group cooperates with a number of government laboratories, universities, and other corporations. A national and international network of cooperative research has been created, the benefits of which are passed on to engine operators in the form of high quality solutions to advanced engineering problems.

- 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 Defence and performs chemical, metallurgical, and mechanical testing and analysis in support of other departments and also for other customers.

PERSONNEL: Technical Staff - 70
Total - 500

GROSS SALES: In excess of $60M

PLANT SIZE: 440,000 sq ft

EQUIPMENT: Machine Shop facilities include turning up to 10 ft dia, NC and CNC machining centers, and EDM broaches. NC programming using access to GE and Sundstrand time-sharing computers. Sheet metal fabricating with 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 is accomplished with atmospheric, inert gas, and vacuum furnaces. There are plating and coating facilities. Non-destructive testing by means of infrared, fluorescent penetrant, magnetic particle, X-ray, and ultrasonic equipment. Additionally, there are 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 Defence; NAMSA; the air forces of the Netherlands, Germany, Norway, Belgium, Pakistan, Italy, Turkey, Thailand, Venezuela, and the US; and the US Army.

HERMES ELECTRONICS Ltd

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Dartmouth, Nova Scotia
Canada B2Y 4A1

CONTACT: Mr G Jeffery, Director of US Business
Tel: (902) 466-7491
Fax: (902) 463-6098

KEYWORDS: Antennas; ASW; Beacons; Communications; Environmental Laboratory; HF Antennas; Sonobuoys.

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 ocean/environmental data systems products.

CAPABILITY: The company's products include:

- Sonobuoys for ASW Application - production types include AN/SSQ-53D. Buoys under development include the AN/SSQ-77B, AN/SSQ-53E, and AN/SSQ-36A. In addition, towed array sensors are produced.

- Ionospheric Sounding Equipment - 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 latest 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. A compact system, designated as the OE-316A/TSC-99 Antenna Group, is produced for tactical applications.

- 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.

PERSONNEL: 400 (including 65 engineers, technicians, draftsmen, and engineering support staff)

GROSS SALES: 1990 - $36.0M

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, as well as high pressure testing tanks. The equipment meets the requirements of MIL-STD-810 for environmental test methods. The manufacturing facility is oriented to the high volume production, testing, and integration of electro-mechanical subassemblies. The plant is also equipped with machining facilities to support prototype development manufacturing.

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 and to military standard. A quality assurance manual in accordance with NATO QA standards and with AQAP-1 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. It is the first company to qualify for production of the United States Navy's AN/SSQ-53D DIFAR Sonobuoy. Advanced development programs are continuing in both sonobuoy and towed array products.

HÉROUX Inc

ADDRESS: 755 Thurber Street
Longueuil, Quebec
Canada J4H 3N2

CONTACT: Mr Émile L. Desnoyers, Vice-President Marketing
Tel: (514) 679-5450
Fax: (514) 679-4554

KEYWORDS: Hydraulics; Landing Gear; R&O (Hydraulics); R&O (Landing Gear).

HISTORY: HÉROUX Inc was founded in 1942.

CAPABILITY: HÉROUX Inc is a fully integrated company involved in the design, manufacturing, repair and overhaul, assembly, and testing of aircraft landing gear and hydraulic systems for the military and commercial markets. This latter R&O facility handles such aircraft as the KC-135, KC-135R, C-130, P-3, L-100, DHC-6, DHC-5, DC-8, B-707, B-727K, B-737, DC-9, MD-80, and L-

1011. Plating to size is one of HÉROUX's many specialties.

PERSONNEL: Total - 500

GROSS SALES: 1991 - $46.0M

PLANT SIZE: 172,000 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, South America, New Zealand, and Australia on both military and commercial bases. Major customers include the US Air Force, Canadian Forces, Canadair Inc, de Havilland, McDonnell Douglas, Boeing, Lockheed, Grumman, and airlines such as Air Canada, Avianca, Southern Air, US Air, ATA, Emery, Evergreen, and Northwest Territorials, as well as Canadian Airlines International, BC and US Heliparts, Boeing, Garrett, General Electric, Lycoming, Pratt & Whitney, and Sikorsky Helicopters.

HILTAP FITTINGS Ltd

ADDRESS: 107, 2750 22nd Street NE
Calgary, Alberta
Canada T2E 7L9

CONTACT: Mr Lee A Krywitsky
Tel: (403) 250-2986
(800) 661-6150
Fax: (403) 291-3592

KEYWORDS: CAD/CAM; Couplings; Cryogenic (LN_2/LOX) Components; Fluid Couplings; Quick Connect Coupling.

HISTORY: The HILTAP or High Low Temperature And Pressure coupling had its origins in reactor cooling systems in nuclear reactors where a dynamic, metal-to-metal safety coupling was needed. Since 1984 the HILTAP couplings have been accepted as a standard in the following industries: petrochemical, pharmaceutical, oil/gas, nuclear, and aerospace/defense.

HILTAP has custom engineered a variety of problem solving coupling technologies for both civil and military applications.

CAPABILITY: HILTAP Fittings Ltd is primarily involved in the design and manufacture of high-performance couplings that can withstand high/low temperatures and pressures. The couplings can function from ultra-low cryogenic temperature of -320°F to over 1200°F. The couplings offer dead-tight, gasket-free, metal-to-metal sealing (vacuum 29.1" Hg/less than 1x10-9 std ccHc/S). HILTAP couplings have been used in autoclaves for high-temperature composite cures on the B-2 and C-17 programs. HILTAP cryogenic couplings have been tested on Air Force military transport aircraft on LNe fire suppression systems. HILTAP has developed specialized couplings for various hazardous media transfer systems including petrochemicals, chemicals, oxidizers high pressure, hydrocarbons, etc.

The computer aided designs allow rapid prototype generation for specific high/low temperature and pressure (HILTAP) applications. HILTAP is currently developing a quick connect liquid oxygen and nitrogen coupling for NATO.

PERSONNEL: Production - 3
Administrative - 2
Marketing - 1
Engineering - 3
Technicians - 2

GROSS SALES: 1992 - $600K

PLANT SIZE: 8200 sq ft

EQUIPMENT: In addition to full laboratory equipment, HILTAP has CNC Mazak Quick Turn 15 machines, a CNC Mazak Vertical Milling Center, and Mitutoyo FJ805 coordinate measuring machine.

EXPERIENCE: HILTAP's customer base includes Boeing Commercial Airplane Company, Boeing Advanced Systems, LTV Aircraft Products Group, McDonnell Douglas, Sikorsky, Pratt & Whitney, Grumman, Lockheed, and the Canadian Department of National Defence.

A capability video is available by calling toll free 1-800-661-6150.

HOCHELAGA AEROSPACE Inc

ADDRESS: 3675 Industrial Blvd
Laval, Quebec
Canada H7L 4S3

CONTACT: Mr Helge Wittholz, General Manager
Tel: (514) 629-3454
Fax: (514) 629-1655

KEYWORDS: Aircraft Components; Flight Control Actuation Systems; Hydraulic Actuators; Machining; R&O (Hydraulics).

HISTORY: Hochelaga Aerospace Inc was founded in 1954 as a precision tool and die manufacturer. It developed into a manufacturer of aircraft structural and hydraulic system components. It was purchased by Devtek Corporation, a Canadian-owned corporation, in 1986 and moved to a new facility in Laval, Quebec.

CAPABILITY: Hochelaga Aerospace Inc has developed the capability to manufacture, assemble, and test primary flight control system actuators. As well, Hochelaga has the ability to manufacture precision aircraft control components such as match ground spool and sleeve valves.

In addition, flight safety critical components are manufactured and assembled, e.g., helicopter main and tail rotor hub assemblies.

Current capabilities include manufacture and assembly of ram air turbine deployment actuators, landing gears uplock actuators, retract actuators, shock absorbers, and flutter dampers.

The engineering department is a blend of experience and academically qualified engineers and support staff. Extensive design experience in aircraft hydraulic systems and components in conjunction with experienced program management permit low-risk, low-cost solutions to aircraft design requirements.

Capability is in place for qualification testing to military and civil specifications and analysis for performance including system modelling and simulating and stress analysis (static and fatigue) using finite element analysis.

PERSONNEL: Engs - 9
Others - 120

GROSS SALES: 1991 - $10.7M

PLANT SIZE: 40,000 sq ft - Manufacture
10,000 sq ft - R&O

EQUIPMENT: Complete NC and conventional machine shop. Capabilities include honing to precise dimensions, match grinding for spool and sleeve valves, broaching, test facilities including hydraulic test stand in Skydrol and MIL-H-5606 (Red Oil) and MIL-H-83282 up to 8000 psi, CAE system Apollo workstations using SDRC I-DEAS integrated package, and equipment for qualification and environmental testing.

EXPERIENCE: Customers include McDonnell Douglas, Bell Textron Helicopter, Canadair Inc, Dowty Aerospace, Menasco Aerospace, Cleveland Pneumatic Company, Boeing Vertol, and Messier Bugatti.

HONEYWELL Ltd

(Aerospace Division)

ADDRESS: Highway 17, PO Box 1300
Rockland, Ontario
Canada K1A 3A0

CONTACT: Mr Ron Muir, General Manager
Tel: (613) 446-6011
Fax: (613) 446-5905

KEYWORDS: ATC; Horizon Reference Systems; Integrated Logistics Support; Modular Aeronautical Comm Switch; Multiplexers; R&O (Avionics); R&O (Radar); Training.

HISTORY: Aerospace Division of Honeywell Ltd Canada started design, development and manufacturing in Canada in 1951.

CAPABILITY: Honeywell Aerospace Division is primarily involved in the design, development, and manufacture of horizon reference systems, air traffic control systems, and time division multiplexers.

Aerospace Division is also engaged in the logistic support, modification, and repair and overhaul of airborne radar and all types of avionic systems including air data computers, flight directors, and gyros. The Division provides a technical publications management service to its customers, particularly the Government of Canada.

The Division'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 USN for use on the LAMPS III Program.

Honeywell's facilities are approved under Canadian Department of National Defence Quality Assurance, and staff resources permit Honeywell to cover the broad areas of integrated logistic support (ILS) systems management, software design, reliability and maintainability analysis, configuration control, and training.

PERSONNEL: Engineers - 40
Assembly - 140
Quality Assurance - 15
Field Service & Support - 30
Others - 100

GROSS SALES: 1990 - $25.0M
1991 - $25.0M

PLANT SIZE: 39,000 sq ft (Product Support Facility)
53,000 sq ft (Manufacturing Facility)

EQUIPMENT: Complete electronic assembly including semi-automatic printed wiring assembly capability.

EXPERIENCE: Honeywell Aerospace Division's present customers include the Canadian Government (National Defence, Ministry of Transport/Coast Guard, and Royal Canadian Mounted Police), the US Government (DOD - Navair), Canadian National Telecommunications, Aeritalia (Italy), and other Canadian and US industries.

HOWLAND RUSSELL

ADDRESS: 9 Davidson Drive
Gloucester, Ontario
Canada K1J 6I7

CONTACT: Mr Howland S Russell (Col USAF Ret), President
Tel: (613) 747-0007
Fax: (613) 747-0142

KEYWORDS: Airspace Management; ATC; Planning; Proposal Writing; Strategic Planning; Subcontractor Search.

HISTORY: Howland Russell Consultants (HRC) was formed and incorporated in 1985 subsequent to a 30-year USAF career. Col Russell is now in business as a sole proprietor. The period from 1976-85 was spent as the Defense and Air Attache to Belgium and then to Canada.

CAPABILITY: Offered are consultant services in the aerospace market to assist clients in proposals, project research, and strategic planning. Col Russell's expertise results from both education and practical experience inside and outside the government. Contracted affiliations in both the US and Canada assure the availability of requisite technical skill and the use of tightly focused project manning.

PERSONNEL: MA - 1

GROSS SALES: 1990 - $50K

PLANT SIZE: No data.

EQUIPMENT: Computerized data banking, word-processing, spreadsheet analysis, and project accounting equipment are available.

EXPERIENCE: Col Russell has successfully assisted Canadian and US contractors in establishing corporate capabilities; organizing proposals and successfully bidding on the North Warning Operations and Maintenance contract; and researching, writing, coordinating, and negotiating the air carrier industry's positions on a Canadian Government proposal to establish a cost recovery system for air traffic control services. Assisted with the establishment of a corporation offering evaluation and training in all aspects of industrial security.

HUGHES AIRCRAFT OF CANADA Ltd

ADDRESS: Suite 320
6715 8 Street NE
Calgary, Alberta
Canada T2E 7H7

CONTACT: Mr Terry Westley, Director, Administration
Tel: (403) 295-6600
Fax: (403) 295-6607

KEYWORDS: Airspace Management; ATC; Avionics; Geographic Information Systems; Information Systems; Radar Systems; Simulators; Systems Integration.

HISTORY: Hughes Aircraft of Canada Limited was established in 1989 as a wholly owned subsidiary of the Hughes Aircraft Company, which is itself a unit of General Motors Hughes Electronics. The company provides a comprehensive range of products and services for the high technology market.

CAPABILITY: Hughes Aircraft of Canada Limited is building on its parent company's record of achievement, offering leading edge solutions in airspace management systems, spatial data information systems, geographic information systems, microwave transmission, optics based technologies, computer systems integration, and radar and avionics service and support.

- Systems Division
  13951 Bridgeport Road
  Richmond, British Columbia
  Canada V6V 1J6

This division is involved primarily in the design, development, and implementation of air traffic control systems and airspace management systems.

- Spatial Data Systems Division
  6715 8 Street NE
  Calgary, Alberta
  Canada T2E 7H7

This division designs and develops automated systems to integrate diverse data sources into geographic information systems enabling organi-

zations involved in such fields as urban land management, natural resource exploitation, utilities, environmental monitoring, emergency response, and fire and safety services to correlate and analyze vast amounts of data to meet their specific information needs.

- Calgary Electronic Facility
  919 72 Avenue NE
  Calgary, Alberta
  Canada

This facility is designed to provide test, repair, and engineering support services for the Canadian Forces CF-18 aircraft radar systems, and will provide hardware and software support for a variety of other military and commercial electronics systems.

- Winnipeg Division
  260 Salteaux Crescent
  Winnipeg, Manitoba
  Canada R3J 3T2

This division designs, develops, and manufactures microwave equipment for the cable television industry. Operating in the 12 GHz or 18 GHz microwave bands, the Amplitude Modulated Links (AML) transmit up to 80 television channels to remote hubs where the signals are distributed to subscribers.

The division also engineers, assembles, and integrates high-technology electronic systems to high quality standards.

- Services and Support Division
  202 Brownlow Avenue
  Suite 203 Cambridge One
  Dartmouth, Nova Scotia
  Canada B3B 1T5

This division provides hardware, software, and administrative service and support to high level training facilities (defense and commercial) for simulator flight training, advanced avionics systems, and naval propulsion and control systems.

- Hughes Leitz Optical Technologies Ltd (see separate listing)

PERSONNEL: Exceeds 660

GROSS SALES: Exceeds $95M

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: No data.

HUGHES LEITZ OPTICAL TECHNOLOGIES

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

CONTACT: Mr John Klie, Manager, Instruments Group
Tel: (705) 526-5401
Fax: (705) 526-5831

KEYWORDS: Electro-Optics; Fire Control Optics; Image Intensification; Laser Optics; Laser Radar; Lenses (Reconnaissance); Lenses (Underwater); Multi-Wave Band Imaging; Muzzle Reference Systems; Night Vision; Optical Coatings; Optical Research & Development; Optics Infrared; Optics Visual; Opto-Mechanical Precision Assemblies; Photography; Remote Sensing; Sights.

HISTORY: Hughes Leitz 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 electro-optical instruments and systems

In 1990 Hughes Aircraft Inc of El Segundo CA purchased 100% of Ernst Leitz (Canada) Limited.

CAPABILITY: Hughes Leitz 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 Hughes Leitz and ELCAN trade names. 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; diamond machining of optical components 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, weight reduction techniques using plastics, and binary optics.

Special capabilities exist in the fields of glass and optical materials, optical lenses, seekers, night vision, helicopter sighting systems, target acquisition equipment, and gun alignment and control systems.

PERSONNEL: Professionals - 50
Total - 425

GROSS SALES: 1991 - $60.0M

PLANT SIZE: 150,000 sq ft

EQUIPMENT: Hughes Leitz' equipment includes in-house IBM and HP computing hardware, Eros Modulation Transfer Function measuring benches, 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, seven diamond machining centers (flycutters, aspheric generators, and four-axis flat generators.)

EXPERIENCE: Hughes 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 applications 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 systems for guidance and fire control applications including tank fire control and muzzle reference systems, binoculars, rifle sights, weapon sights, range finders (optical and laser), HUD and HDD optics, and night vision products, both image intensification and far infrared.

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

HUMBER SHEET METAL Ltd

ADDRESS: 700 Kipling Ave
Toronto, Ontario
Canada M8Z 5G3

CONTACT: Mr Joseph Vital, Vice President
Tel: (416) 252-5918
Fax: (416) 252-0771

KEYWORDS: Airframe Components; Sheet Metal Fabrication.

HISTORY: Humber Sheet Metal is a Canadian-owned, high technology, precision fabrication company founded in 1962. The company is privately owned and located in southern Ontario.

CAPABILITY: Humber Sheet Metal has the capability to process a wide range of materials including armor plate, composites, titanium alloys, stainless steel, aluminum, steel, etc., with material thicknesses ranging from 2.4ga to 1"thick. Other capabilities include laser cutting and welding in 2D or 3D envelopes, CAD/CAM capabilities for surface modelling and wire-frames, electronic drawing transfers and EDI capabilities, optimization of existing designs, and designs for manufacturing experience.

PERSONNEL: Engs - 4
Technicians - 9
Others - 60

GROSS SALES: 1990 - $9.5M
1991 - $8.6M

PLANT SIZE: 75,000 sq ft

EQUIPMENT: 5-axes 5Kw laser machining center, special CNC laser and punchpress equipment, complete in-house CAD/CAM hardware and software for surface modelling and/or wire frames component design and manufacturing.

EXPERIENCE: Present customers are General Motors (Civil and Military divisions), Westinghouse, ASEA Brown-Bovery Inc, Mack Trucks, and Motor Coach Ind.

HYPERNETICS Ltd

ADDRESS: 110 DeCosta Street
PO Box 236
Arnprior, Ontario
Canada K7S 3H4

CONTACT: Mr Jack Mulvey, President
Tel: (613) 623-4225
Fax: (613) 623-8603

KEYWORDS: Display Components; Electromagnetic Display; Laminar Flow Valves; Transducers (Wheel Speed); Valves (Laminar Flow); Wheel Speed Transducers.

HISTORY: Hypernetics Limited is a Canadian-owned company founded in 1972.

CAPABILITY: Hypernetics has two divisions. The main division, Aerospace, designs and manufactures electromagnetic display components for use in flight and engine instruments on a number of military and commercial aircraft programs. Hypernetics also designs and manufactures fiber optic and electromagnetic wheel speed transducers for anti-skid functions. These are used in many military and commercial aircraft braking systems.

The Linflo Technologies Division develops and manufactures a range of precision laminar flow control valves. These patented valves allow for manual, pneumatic, or digital electric actuation. An interface module allows for microprocessor control. They allow gentler handling of fluids and precise linear control with negligible hysteresis and wide rangeability. They are well suited for high purity applications.

PROFILES CONTINUE FOLLOWING SECTION IV

PERSONNEL: Engs - 3
Technicians - 3
Others - 30

GROSS SALES: 1990 - $2.0M
1991 - $2.0M

PLANT SIZE: 6,400 sq ft

EQUIPMENT: Well equipped precision machine and model shop. Assembly includes transfer molding, screen making, screen printing, spray painting, coil winding, soldering, electrical test and laminar flow assembly stations. A well equipped quality assurance area and an R&D lab complete the facility.

EXPERIENCE: Present customers include Aircraft Braking Systems, Ametek Aerospace Products, Astronautics Corp of America, Boeing Canada Technology Ltd, Eldec Corporation, Litton Industries, Honeywell Inc Commercial Flight Systems Division, and Ragen Data Systems Inc.

Section III
KEYWORD INDEX

KEYWORD	COMPANY
1553 Data Buss	COMPUTING DEVICES COMPANY
1553 Data Buss	DY-4 SYSTEMS
3D Geostatistical Modelling	LYNX GEOSYSTEMS
A-3	EXPRO CHEMICAL PRODUCTS
A-4	EXPRO CHEMICAL PRODUCTS
A-5	EXPRO CHEMICAL PRODUCTS
Abradable Seals	SHERRITT GORDON Ltd
Accident Analysis	CSI ENGINEERING MECHANICS
Acoustic	B M HI-TECH
Acoustic Chambers	DSMA-BABCOCK,
Acoustic Sensing	COMPUTING DEVICES COMPANY
Acoustic Sensing	DEVTEK AEROSPACE COMPANY
Acoustic Sensing	MACDONALD DETTWILER AND ASSOCIATES Ltd
Acoustic Sensing	SPARTON OF CANADA Ltd
Acoustic Signal Detection	ARRAY SYSTEMS COMPUTING
Acoustics	LOCKHEED CANADA
Actuators	AERO MACHINING Ltd
Actuators	DEVTEK AEROSPACE COMPANY
Actuators	DOWTY AEROSPACE TORONTO
Ada Software	ARRAY SYSTEMS COMPUTING
Ada Software	SED SYSTEMS
Ada Software	SOFTWARE KINETICS Ltd
Adapters	CANADIAN MARCONI COMPANY
Adaptive Receivers	CALIAN COMMUNICATIONS SYSTEMS Ltd
Adhesives	CIBA-GEIGY CANADA Ltd
Adhesives	TIMMINCO Ltd
Advanced Composites	CIBA-GEIGY CANADA Ltd
Advanced Composites	FLEET INDUSTRIES
Advanced Materials	DOWTY AEROSPACE TORONTO
Advanced Materials	HAWKER SIDDELEY CANADA
Advanced Materials	SHERRITT GORDON Ltd
Advanced Materials	WELDING INSTITUTE OF CANADA
Aerial Delivery Systems	CONAIR AVIATION Ltd
Aerial Delivery Systems	IRVIN INDUSTRIES CANADA Ltd
Aerial Fire Bombing	FIELD AVIATION COMPANY
Aerial Ladders	NOVA-QUINTECH Corp
Aerial Photography	CIRRUS AVIATION
Aerial Survey	FIELD AVIATION COMPANY
Aerial Target System	IMAGO MACHINE VISION
Aerial Targets	ATS AEROSPACE
Aerodynamic Test Facilities	DSMA-BABCOCK,
Aerodynamics	CANADAIR GROUP
Aeroengines	BRISTOL AEROSPACE Ltd
Aerospace Sand Castings	HALEY INDUSTRIES Ltd
Aerospace Wire	HARBOUR INDUSTRIES (Canada) Ltd
Aerostructures	BRISTOL AEROSPACE Ltd
AGE	AEROTECH INTERNATIONAL
Air Charter	KELOWNA FLIGHTCRAFT GROUP
Air Conditioning (Aircraft)	CASEY COPTER ACCESSORIES Ltd
Air Defense Display	ORACLE TELECOMPUTING
Air Defense Vehicle	GENERAL MOTORS OF CANADA Ltd
Air Gas Separators	3-L FILTERS Ltd
Air/Ground Data Links	SKYWAVE ELECTRONICS Ltd
Air Traffic Control	See ATC
Airborne Camera Platforms	ISTEC
Airborne Reconnaissance	CIRRUS AVIATION
Airborne Sensors	ISTEC
Aircraft	CANADAIR GROUP
Aircraft	PROMAVIA INTERNATIONAL Corp
Aircraft Air Conditioning	CASEY COPTER ACCESSORIES Ltd
Aircraft Armor	BARRDAY
Aircraft Cabin Interiors	FLEXIBULB PLASTICS
Aircraft Component Design and Analysis	CSI ENGINEERING MECHANICS
Aircraft Components	HOCHELAGA AEROSPACE
Aircraft Conversions	PLANE AVIONIC ENTERPRISES
Aircraft Engine and Accessory Overhaul	STANDARD AERO Ltd
Aircraft Engine Components	TRECO MACHINE & TOOL Ltd
Aircraft Engines	GE CANADA
Aircraft Handling Systems	INDAL TECHNOLOGIES
Aircraft Heating	AEROTECH INTERNATIONAL
Aircraft Heating	CASEY COPTER ACCESSORIES Ltd
Aircraft Landing Gears	DOWTY AEROSPACE TORONTO
Aircraft Leasing	AVIATION PLANNING SERVICES Ltd
Aircraft Lighting	GODFREY AEROSPACE
Aircraft Maintenance	FIELD AVIATION COMPANY
Aircraft Maintenance	WESTEC AEROSPACE
Aircraft Manufacturing Facilities	THE AUSTIN COMPANY Ltd
Aircraft Parts	COORDINATE INDUSTRIES Ltd
Aircraft Parts	FIELD AVIATION COMPANY
Aircraft Parts	LEAVENS AVIATION
Aircraft Parts	PATLON AIRCRAFT & INDUSTRIES Ltd
Aircraft Performance Analysis	AVIATION RESEARCH Corp
Aircraft Performance Analysis	AVIATION PLANNING SERVICES Ltd
Aircraft Performance Analysis	BLAIR CONSULTING SERVICES
Aircraft Sales	FIELD AVIATION COMPANY
Aircraft Satellite Communications Antenna	CANADIAN MARCONI COMPANY
Aircraft Systems Certification	PLANE AVIONIC ENTERPRISES
Aircraft Systems Installation Design	PLANE AVIONIC ENTERPRISES
Aircraft Systems Integration	PLANE AVIONIC ENTERPRISES
Airfield Services	SOUTHPORT AEROSPACE CENTRE
Airframe Components	AERO MACHINING Ltd
Airframe Components	AIRTECH CANADA
Airframe Components	BRISTOL AEROSPACE Ltd
Airframe Components	CANADAIR GROUP
Airframe Components	CANADIAN COMPONENT SERVICES

KEYWORD	COMPANY
Airframe Components	CANADIAN AIRCRAFT PRODUCTS
Airframe Components	CELLPACK AEROSPACE Ltd
Airframe Components	DEVTEK AEROSPACE COMPANY
Airframe Components	FIELD AVIATION COMPANY
Airframe Components	FLEET INDUSTRIES
Airframe Components	HUMBER SHEET METAL Ltd
Airframe Components	IMP GROUP Ltd
Airframe Components	KAYCOM
Airframe Components	METRO MACHINING Corp
Airframe Components	NORTHWEST INDUSTRIES Ltd
Airframe Components	SPAR AEROSPACE Ltd
Airframe Components	SPECIALIZED WELDING & FABRICATION Ltd
Airport	SOUTHPORT AEROSPACE CENTRE
Airport Equipment	MICRONAV INTERNATIONAL Ltd
Airport Flight Display Systems	CompEngServ Ltd
Airport Status	ORACLE TELECOMPUTING
Airport Status	WESTINGHOUSE CANADA
Airspace Management	AVIATION RESEARCH Corp
Airspace Management	HOWLAND RUSSELL
Airspace Management	HUGHES AIRCRAFT OF CANADA Ltd
Alarm Systems	CON-SPACE COMMUNICATIONS Ltd
Alarm Systems	SENSTAR Corp
Alloys	DELORO STELLITE
Alloys	SHERRITT GORDON Ltd
Alloys	TIMMINCO Ltd
Alphanumeric Display	MATROX ELECTRONIC SYSTEMS Ltd
Alternate Fuels Research	ONTARIO HYDRO
Altimeter Subsystems	ITS ELECTRONICS
Alum Dip Brazed Heat Exchangers	DEVTEK AEROSPACE COMPANY
Aluminum	EBCO AEROSPACE INDUSTRIES
Aluminum Alloys	CHICOPEE MANUFACTURING Ltd
Aluminum Components	ROLLS-ROYCE (CANADA) Ltee
Aluminum Fabrication	INDAL TECHNOLOGIES
Aluminum Oxide (High Purity)	CRYSTAR RESEARCH
Aluminum Sand Castings	HALEY INDUSTRIES Ltd
Ammunition	BOFORS CANADA Ltd
Ammunition Design and Testing	ATS AEROSPACE
Ammunition Smoke	HANDS FIREWORKS
Amphibious Vehicles	GENERAL MOTORS OF CANADA Ltd
Amplifiers	LUCAS AEROSPACE
Amplifiers	VARIAN CANADA
Analog/Digital Steer by Wire	DOWTY AEROSPACE PETERBOROUGH
Analysis	BRUCE D VALLILLEE ELECTRONICS Ltd
Analysis	INNIS TECHNOLOGY
Analysis	ONTARIO HYDRO
Analysis and Design Tools	CHERNIAK GIBLON
Anechoic Facilities	THE AUSTIN COMPANY Ltd
Animated System Trainers	ATLANTIS AEROSPACE Corp
Anodizing	CAMETOID Ltd
Antenna Support Structures	INDAL TECHNOLOGIES
Antennas	THE AEROSPACE CONSORTIUM
Antennas	ANDREW CANADA
Antennas	CAL Corp
Antennas	COM DEV Ltd
Antennas	DOMINIS ENGINEERING Ltd
Antennas	HERMES ELECTRONICS Ltd
Antennas	MPB TECHNOLOGIES
Antennas	ROHDE & SCHWARZ CANADA
Antennas	SPAR AEROSPACE Ltd
Antennas	SPILSBURY COMMUNICATIONS Ltd
Anti-Friction Bearings	FAG BEARINGS Ltd
Anti-Tank Vehicle	GENERAL MOTORS OF CANADA Ltd
Anti-Submarine Warfare	See ASW
APT Processing	ICAM TECHNOLOGIES Corp
Armament	BOFORS CANADA Ltd
Armament	EXPRO CHEMICAL PRODUCTS
Armament	HANDS FIREWORKS
Armament (Cases)	ZARGES AFC CANADA Ltd
Armor	BARRDAY
Armoured Vehicles	GENERAL MOTORS OF CANADA Ltd
Artificial Intelligence	CompEngServ Ltd
Artificial Intelligence	DYNAMIC SIGNAL ANALYSIS Corp
Artificial Intelligence	ORA CANADA
Artillery Alignment & Control System	BENDIX AVELEX
Artillery Battery Communication Systems	EDA INSTRUMENTS
Assault Gun Vehicle	GENERAL MOTORS OF CANADA Ltd
Astronautics	OERLIKON AEROSPACE
ASW	ARRAY SYSTEMS COMPUTING
ASW	COMPUTING DEVICES COMPANY
ASW	DEVTEK AEROSPACE COMPANY
ASW	GE CANADA
ASW	HERMES ELECTRONICS Ltd
ASW	PRIOR DATA SCIENCES Ltd
ASW	SPARTON OF CANADA Ltd
ATC	ADGA GROUP
ATC	ANDREW CANADA
ATC	AVIATION RESEARCH Corp
ATC	BLAIR CONSULTING SERVICES
ATC	CompEngServ Ltd
ATC	DY-4 SYSTEMS
ATC	HONEYWELL Ltd
ATC	HOWLAND RUSSELL
ATC	HUGHES AIRCRAFT OF CANADA Ltd
ATC	LITTON SYSTEMS CANADA Ltd
ATC	LNS SYSTEMS
ATC	MACDONALD DETTWILER AND ASSOCIATES Ltd
ATC	MICRONAV INTERNATIONAL Ltd
ATC	ORACLE TELECOMPUTING
ATC	PELORUS NAVIGATION SYSTEMS
ATC	PRIOR DATA SCIENCES Ltd
ATC	QUESTECH NORTH AMERICAN Ltd
ATC	RAYTHEON CANADA Ltd
ATC	SOFTWARE KINETICS Ltd
ATC	THOMPSON-HICKLING AVIATION
ATC	WESTINGHOUSE CANADA
ATC (Systems Integration)	MARTIN MARIETTA CANADA Ltd
ATC Analysis	AVIATION PLANNING SERVICES Ltd

KEYWORD	COMPANY
ATC Display Systems	RAYTHEON CANADA Ltd
ATC Simulators	AIT ADVANCED INFORMATION TECH Corp
ATC Simulators	ATS AEROSPACE
ATC Simulators	CAE INDUSTRIES Ltd
ATC Simulators	LITTON SYSTEMS CANADA Ltd
ATC Simulators	LNS SYSTEMS
Atmospheric Monitoring	AIT ADVANCED INFORMATION TECH Corp
Atmospheric Research	ONTARIO HYDRO
Atomic Absorption Spectrophotometers	SCINTREX Ltd
Audio Control Panel	TEAM
Audio Visuals	BRUCE D VALLILLEE ELECTRONICS Ltd
Autochanger	KOM
Autoclaving	CELLPACK AEROSPACE Ltd
Automated Deduction	ORA CANADA
Automated Mapping	GEOVISION SYSTEMS
Automated Monitoring and Control	CALIAN COMMUNICATIONS SYSTEMS Ltd
Automated Monitoring and Control	ROHDE & SCHWARZ CANADA
Automated Reasoning	ORA CANADA
Automated Real-Time Detection	ARRAY SYSTEMS COMPUTING
Automated Systems	WARDROP ENGINEERING
Automated Theorem Proving	ORA CANADA
Automated Weather Observation	PELORUS NAVIGATION SYSTEMS
Automatic Data Acquisition Systems	GasTOPS Ltd
Automatic Induction	ORA CANADA
Automatic Test Equipment	EXCALIBUR SYSTEMS Ltd
Automotive Components	ETM INDUSTRIES
Auxiliary Power Units	GLOBAL THERMOELECTRIC
Auxiliary Power Units	PRATT & WHITNEY CANADA
Aviation Briefing	ORACLE TELECOMPUTING
Aviation Seat Covers (Fire-Block)	FELL-FAB PRODUCTS
Aviation Software	TRACKER INDUSTRIES Ltd
Aviation Software (Maintenance)	WESTEC AEROSPACE
Avionics	THE AEROSPACE CONSORTIUM
Avionics	ATLANTIS AEROSPACE Corp
Avionics	BENDIX AVELEX
Avionics	BLAIR CONSULTING SERVICES
Avionics	CAE INDUSTRIES Ltd
Avionics	CANADIAN MARCONI COMPANY
Avionics	CANADIAN COMPONENT SERVICES
Avionics	COMPUTING DEVICES COMPANY
Avionics	GARRETT CANADA
Avionics	HUGHES AIRCRAFT OF CANADA Ltd
Avionics	IMP GROUP Ltd
Avionics	INNOTECH AVIATION Ltd
Avionics	LITTON SYSTEMS CANADA Ltd
Avionics Components	STRITE INDUSTRIES Ltd
Avionics Computers	DY-4 SYSTEMS
Avionics Design Engineering	DOWTY AEROSPACE PETERBOROUGH
Avionics Design Engineering	OCEANROUTES SEIMAC
Avionics Testing	PLANE AVIONIC ENTERPRISES
Avionics Training	NAVAIR Ltd

KEYWORD	COMPANY
Ballistic Computer Systems	COMPUTING DEVICES COMPANY
Bathythemographs	SPARTON OF CANADA Ltd
Batteries (Lithium)	BALLARD BATTERY SYSTEMS Corp
Battery Chargers	CTS OF CANADA Ltd
Battery Chargers	KB ELECTRONICS (1989) Ltd
Battery Management Systems	CAL Corp
Beacon Antennas	LEBLANC & ROYLE TELCOM
Beacons	GARRETT CANADA
Beacons	HERMES ELECTRONICS Ltd
Beacons	SPILSBURY COMMUNICATIONS Ltd
Bearings	FAG BEARINGS Ltd
Beta Ray Monitors	SCINTREX Ltd
Bias Insertion Units	AVTECH ELECTROSYSTEMS Ltd
Biological Research	ONTARIO HYDRO
Biomass	ONTARIO HYDRO
Blankets	THE H I THOMPSON CO
Board-Level Video Products	MATROX ELECTRONIC SYSTEMS Ltd
Bolts	MECAIR
Bolts	MILLS/STERLING AEROSPACE
Bonded Enclosures	DEVTEK AEROSPACE COMPANY
Bonding Capabilities	FLEET INDUSTRIES
Boots PVC	THE ACTON RUBBER Ltd
Boring	DONLEE PRECISION
Brake Parts	BENDIX AVELEX
Brazed Aluminum Heat Sinks	VAC-AERO INTERNATIONAL
Brazing	VAC-AERO INTERNATIONAL
Brazing	WELDING INSTITUTE OF CANADA
Bridges	GANDALF TECHNOLOGIES
Broadcast Antennas	ANDREW CANADA
Broadcasting	ROHDE & SCHWARZ CANADA
Broadcasting (Audio and Video)	TELESAT CANADA
BT Sonobuoys	SPARTON OF CANADA Ltd
Bubble Memory	TARGA ELECTRONICS SYSTEMS
Build-To-Print	THE AEROSPACE CONSORTIUM
Build-To-Print	ANDREW CANADA
Build-To-Print	CALIAN COMMUNICATIONS SYSTEMS Ltd
Build-To-Print	DOWTY AEROSPACE PETERBOROUGH
Build-To-Print	GARRETT CANADA
Build-To-Print	LITTON SYSTEMS CANADA Ltd
Build-To-Print	NEWTECH INSTRUMENTS Ltd
Build-To-Print	TRACKER INDUSTRIES Ltd
Build-To-Print	VAC-AERO INTERNATIONAL
Business Planning	AVIATION PLANNING SERVICES Ltd
Business Planning	BELANGER, GUY & ASSOC
Business Planning	BRUCE D VALLILLEE ELECTRONICS Ltd
C-4	EXPRO CHEMICAL PRODUCTS
C3 Systems	COMPUTING DEVICES COMPANY
C3 Systems	DY-4 SYSTEMS
C3 Systems	GEOVISION SYSTEMS
C3 Systems	PRIOR DATA SCIENCES Ltd
C3 Systems	THOMSON-CSF SYSTEMS CANADA
Cabinet Testing	DOWTY AEROSPACE PETERBOROUGH
Cabinets	DOWTY AEROSPACE PETERBOROUGH

KEYWORD	COMPANY
Cabinets	NORANCO MANUFACTURING Ltd
Cables	HALPEN ENGINEERING
Cables	HARBOUR INDUSTRIES (Canada) Ltd
Cables	IMP GROUP Ltd
Cables	INDAL TECHNOLOGIES
Cables	ITT CANNON
Cables (Splice Closure)	NEWTECH INSTRUMENTS Ltd
CAD/CAM	CANADIAN AIRCRAFT PRODUCTS
CAD/CAM	ETM INDUSTRIES
CAD/CAM	HILTAP FITTINGS Ltd
CAD/CAM	ICAM TECHNOLOGIES Corp
CAD/CAM	INVAR MANUFACTURING Ltd
CAD/CAM	STEVESTED MACHINERY & ENGINEERING Ltd
CAD/CAM	STRITE INDUSTRIES Ltd
CAE	INTEGRATED ENGINEERING SOFTWARE
Calibration	THE ARMSTRONG MONITORING Corp
Calibration	CANADIAN MARCONI COMPANY
Calibration	DSMA-BABCOCK,
Calibration	GARRETT CANADA
Calibration	PYLON ELECTRONICS
Calibration	QUANTUM INSPECTION AND TESTING Ltd
Calibration	ROLLS-ROYCE (CANADA) Ltee
Cameras	ISTEC
CANDU	ATOMIC ENERGY OF CANADA Ltd
Carbon Monoxide Gas Detection	THE ARMSTRONG MONITORING Corp
Cargo Handling Equipment	CANAM TOOL & ENGINEERING
Cargo Handling Equipment	GENAIRE Ltd
Cargo Restraint Systems	FELL-FAB PRODUCTS
Cartridges	3-L FILTERS Ltd
Cases (Custom)	SJM PACKAGING
Cases (Custom)	ZARGES AFC CANADA Ltd
Casting Alloys	TIMMINCO Ltd
Castings	CANADAIR GROUP
Castings	CERCAST
Castings	DELORO STELLITE
Castings	DESIGNED PRECISION CASTINGS
Castings	HALEY INDUSTRIES Ltd
Castings	VESTSHELL
Catalytic Sensors	THE ARMSTRONG MONITORING Corp
Cathode Ray Tube Displays	LITTON SYSTEMS CANADA Ltd
Cavitation Tunnels	DOMINIS ENGINEERING Ltd
CCD Image Sensors	DALSA
CCD Imaging Cameras	DALSA
Centralized Control Units	TEAM
Ceramics	ATOMIC ENERGY OF CANADA Ltd
Certification Testing	DOWTY AEROSPACE TORONTO
Chemical Agent Detector Kits	ANACHEMIA CANADA
Chemical Agent Liquid Simulator Airburst	ANACHEMIA CANADA
Chemical Agent Protective Apparel	THE ACTON RUBBER Ltd
Chemical Airburst Simulators	HANDS FIREWORKS
Chemical Analysis	ATOMIC ENERGY OF CANADA Ltd
Chemical Films	CAMETOID Ltd
Chemical Groundburst Simulators	HANDS FIREWORKS
Chemical Warfare Defense Equipment	ANACHEMIA CANADA
Chemistry	EXPRO CHEMICAL PRODUCTS
Chlorine Gas Detection	THE ARMSTRONG MONITORING Corp
Circuit Packaging	CANADIAN MARCONI COMPANY
Circulators	LUCAS AEROSPACE
CL File	ICAM TECHNOLOGIES Corp
Climatic Test Facilities	DSMA-BABCOCK,
CNC Machining	THE AEROSPACE CONSORTIUM
CNC Machining	CHICOPEE MANUFACTURING Ltd
CNC Machining	ETM INDUSTRIES
CNC Machining	EXTEC PRECISION MANUFACTURING
CNC Machining	METRO MACHINING CorpORATION
CNC Machining	STEVESTED MACHINERY & ENGINEERING Ltd
CNC Machining	T R COX AEROFOILS Ltd
CNC Machining	TRECO MACHINE & TOOL Ltd
CNC Machining	UDT INDUSTRIES
CNC Machining	WINDSOR AEROSPACE
CNC Programming	ICAM TECHNOLOGIES Corp
CO2 Lasers	ULTRA LASERTECH
CO2 Opto-acoustic Detector	ULTRA LASERTECH
Coalescing Filters	3-L FILTERS Ltd
Coalescing Filters	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Coastal Patrol Sensors	ISTEC
Coatings	CAMETOID Ltd
Coatings	CANADAIR GROUP
Coatings	EBCO AEROSPACE INDUSTRIES
Coatings	NATIONAL COATING TECHNOLOGIES
Coatings	SHERRITT GORDON Ltd
Coatings (CODEP)	VAC-AERO INTERNATIONAL
Coatings (Nitreg®)	NITREX METAL TECHNOLOGIES
Coatings (Plasma Spray)	VAC-AERO INTERNATIONAL
Coaxial Cable	HARBOUR INDUSTRIES (Canada) Ltd
Coaxial Cable	LEBLANC & ROYLE TELCOM
Cobalt-Samarium Magnets	SHERRITT GORDON Ltd
Cockpit Displays	CANADIAN MARCONI COMPANY
Cockpit Displays	COMPUTING DEVICES COMPANY
Cockpit Displays	LITTON SYSTEMS CANADA Ltd
Cockpit Displays	OPTOTEK Ltd
Collapsible Storage Containers	FELL-FAB PRODUCTS
Combustible Gas Monitors	THE ARMSTRONG MONITORING Corp
Combustion Research	GLOBAL THERMOELECTRIC
Combustion Research	ONTARIO HYDRO
Combustion Research	PRATT & WHITNEY CANADA
Combustion Research	ROLLS-ROYCE (CANADA) Ltee
Command and Control Centers	MACDONALD DETTWILER AND ASSOCIATES Ltd
Command and Control Centers	SED SYSTEMS
Command and Control Vehicle	GENERAL MOTORS OF CANADA Ltd
Command, Control,	See C3

KEYWORD	COMPANY
Communications	
Communication Cable	HARBOUR INDUSTRIES (Canada) Ltd
Communication Systems Consulting	EDA INSTRUMENTS
Communication Systems Design	EDA INSTRUMENTS
Communication Systems Integrator	SHL SYSTEMHOUSE
Communications	ADGA GROUP
Communications	THE AEROSPACE CONSORTIUM
Communications	CALIAN COMMUNICATIONS SYSTEMS Ltd
Communications	CANADIAN MARCONI COMPANY
Communications	CON-SPACE COMMUNICATIONS Ltd
Communications	GARRETT CANADA
Communications	HERMES ELECTRONICS Ltd
Communications	LOCKHEED CANADA
Communications	MITEC ELECTRONICS Ltd
Communications	MPB TECHNOLOGIES
Communications	MPR TELTECH Ltd
Communications	PRIOR DATA SCIENCES Ltd
Communications	QUESTECH NORTH AMERICAN Ltd
Communications	ROHDE & SCHWARZ CANADA
Communications	SED SYSTEMS
Communications	SPAR AEROSPACE Ltd
Communications	SPILSBURY COMMUNICATIONS Ltd
Communications	TELESAT CANADA
Communications	WESTINGHOUSE CANADA
Communications (Consultants)	MPR TELTECH Ltd
Communications (Microwave)	LAPP-HANCOCK ASSOCIATES Ltd
Communications (Microwave)	TRL MICROWAVE TECHNOLOGY
Communications (Mobile)	LAPP-HANCOCK ASSOCIATES Ltd
Communications (Network Controllers)	ULTIMATEAST DATA COMMUNICATIONS Ltd
Communications (Networks)	FRONTEC
Communications (Simulators)	CALIAN COMMUNICATIONS SYSTEMS Ltd
Communications (Software)	SED SYSTEMS
Communications (Software)	ULTIMATEAST DATA COMMUNICATIONS Ltd
Communications (Telephone)	LAPP-HANCOCK ASSOCIATES Ltd
Communications (Telephone)	MITEL Corp
Communications (Towers)	LEBLANC & ROYLE TELCOM
Compass Systems	BENDIX AVELEX
Component Fabrication	THE AEROSPACE CONSORTIUM
Component Militarization	W R DAVIS ENGINEERING Ltd
Component Structural and Dynamic Research	PRATT & WHITNEY CANADA
Component/System Testing	EPIC DATA
Components (Aerospace)	ETM INDUSTRIES
Components (Airframe)	CANADAIR GROUP
Components (Airframe)	METRO MACHINING Corp
Components (Airframe)	NORTHWEST INDUSTRIES Ltd
Components (Aluminum)	METRO MACHINING Corp
Components (Automotive)	ETM INDUSTRIES
Components (Avionics)	CANADIAN MARCONI COMPANY
Components (Avionics)	STRITE INDUSTRIES Ltd
Components (Engines)	GE CANADA
Components (Engines)	ROLLS-ROYCE (CANADA) Ltee
Components (Engines)	T R COX AEROFOILS Ltd
Components (Landing Gear)	METRO MACHINING Corp
Components (Machined)	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Components (Machined)	MECAIR
Components (Titanium)	METRO MACHINING Corp
Composite Components	CANADAIR GROUP
Composite Components	CANADIAN AIRCRAFT PRODUCTS
Composite Components	CELLPACK AEROSPACE Ltd
Composite Components	CIBA-GEIGY CANADA Ltd
Composite Components	EDO CANADA Ltd
Composite Fiberglass Components	THE AEROSPACE CONSORTIUM
Composite Materials	EDO CANADA Ltd
Composite Materials	FRE COMPOSITES
Composite Powders	SHERRITT GORDON Ltd
Composition B	EXPRO CHEMICAL PRODUCTS
Compressor Blade Tip Grinding	ROLLS-ROYCE (CANADA) Ltee
Computational Design	CANADAIR GROUP
Computational Fluid Dynamics	PRATT & WHITNEY CANADA
Computer Aided Design	THE AUSTIN COMPANY Ltd
Computer Aided Learning	ATS AEROSPACE
Computer Aided Learning	BENDIX AVELEX
Computer Aided Learning	ICAM TECHNOLOGIES Corp
Computer Aided Software Engineering	CHERNIAK GIBLON
Computer Analysis	WARDROP ENGINEERING
Computer Engineers	CompEngServ Ltd
Computer Graphics	CAE INDUSTRIES Ltd
Computer Graphics	PRIOR DATA SCIENCES Ltd
Computer Mass Memory	TARGA ELECTRONICS SYSTEMS
Computer Modelling Software	LYNX GEOSYSTEMS
Computer Security	ORA CANADA
Computer Simulation	ADGA GROUP
Computer Simulation	PRIOR DATA SCIENCES Ltd
Computer Simulation	QUESTECH NORTH AMERICAN Ltd
Computer Simulation	THOMSON-CSF SYSTEMS CANADA
Computer Software Development	CHERNIAK GIBLON
Computer Software Verification	ORA CANADA
Computer Systems Integrator	SHL SYSTEMHOUSE
Computer Vision	ARRAY SYSTEMS COMPUTING
Computers	ATLANTIS AEROSPACE Corp
Computers	CAE INDUSTRIES Ltd
Computers	CAL Corp
Computers	COMPUTING DEVICES COMPANY
Computers	DY-4 SYSTEMS
Computers	PRIOR DATA SCIENCES Ltd
Computers	TRACKER INDUSTRIES Ltd
Concrete Technology	ONTARIO HYDRO
Conductivity Sensors	APPLIED MICROSYSTEMS Ltd
Conductivity Testing	CAMETOID Ltd
Configuration Management	THE AEROSPACE CONSORTIUM
Configuration Management	LANSDOWNE INTEGRATED SYSTEMS
Connectors	ITT CANNON
Connectors	MILLS/STERLING AEROSPACE

KEYWORD	COMPANY
Constructors	THE AUSTIN COMPANY Ltd
Consulting	BELANGER, GUY & ASSOC
Consulting	CHERNIAK GIBLON
Consulting	CSI ENGINEERING MECHANICS
Consulting	EPIC DATA
Consulting	FMA CONSULTANTS
Consulting	GOVERNMENT CONSULTANTS INTERNATIONAL
Consulting	LAPP-HANCOCK ASSOCIATES Ltd
Consulting	MARTIN MARIETTA CANADA Ltd
Consulting	PRIOR DATA SCIENCES Ltd
Consulting	THOMPSON-HICKLING AVIATION
Consulting	TRACKER INDUSTRIES Ltd
Consulting	TRILINK TECHNOLOGIES GROUP
Consulting (Aerospace)	AVIATION RESEARCH Corp
Consulting (Aerospace)	INTERCON CONSULTANTS
Consulting (Aviation)	AVIATION PLANNING SERVICES Ltd
Consulting (Aviation)	AVIATION RESEARCH Corp
Consulting (CAD/CAM)	ICAM TECHNOLOGIES Corp
Consulting (Canadian Government)	INTERCON CONSULTANTS
Consulting (Engineering)	THE AUSTIN COMPANY Ltd
Consulting (Engineering)	INTEGRATED ENGINEERING SOFTWARE
Consulting (Engineering)	PLANE AVIONIC ENTERPRISES
Consulting (Engineering)	TRILINK TECHNOLOGIES GROUP
Consulting (Management)	PLANE AVIONIC ENTERPRISES
Consulting (Management)	TRILINK TECHNOLOGIES GROUP
Consulting (Marketing)	BLAIR CONSULTING SERVICES
Consulting (Marketing)	BRUCE D VALLILLEE ELECTRONICS Ltd
Consulting (Nav/Comm)	ADGA GROUP
Consulting (Reliability Analysis)	PLANE AVIONIC ENTERPRISES
Consulting (Telecommunications)	PLANE AVIONIC ENTERPRISES
Consulting (TEMPEST)	EMCON EMANATION CONTROL Ltd
Containers	GM ASSOCIATES
Continuous Wave CO2	ULTRA LASERTECH
Control Cables (Aircraft)	LEAVENS AVIATION
Control Cables (Aircraft)	NORTHWEST INDUSTRIES Ltd
Control Systems	CAE INDUSTRIES Ltd
Control Systems	DYNACON ENTERPRISES Ltd
Control Systems	EPIC DATA
Control Systems	GARRETT CANADA
Control Systems	GasTOPS Ltd
Control Systems	INDAL TECHNOLOGIES
Control Systems	SPAR AEROSPACE Ltd
Control Systems	TRACKER INDUSTRIES Ltd
Control Systems	VARIAN CANADA
Converters (Power)	CTS OF CANADA Ltd
Converters (Power)	KB ELECTRONICS (1989) Ltd
Converters (Power)	PYLON ELECTRONICS
Correlative Correcting Coding	GE CANADA Incand Error
Corrosion Control	IMP GROUP Ltd
Corrosion Control	INNOTECH AVIATION Ltd
Corrosion Control	ROLLS-ROYCE (CANADA) Ltee
Corrosion Science	ONTARIO HYDRO
Cost Allocation	ORACLE TELECOMPUTING
Cost Schedule Control System	LANSDOWNE INTEGRATED SYSTEMS
Coupler Systems	THE AEROSPACE CONSORTIUM
Couplings	HILTAP FITTINGS Ltd
Cryogenic (LN_2/LOX) Components	HILTAP FITTINGS Ltd
Crystals	CROVEN CRYSTALS Ltd
Crystals	CRYSTAR RESEARCH
CSA Wire	HARBOUR INDUSTRIES (Canada) Ltd
Current Meter Systems	APPLIED MICROSYSTEMS Ltd
Custom Hardware	EPIC DATA
Custom Made Cable	HARBOUR INDUSTRIES (Canada) Ltd
Custom Packaging	ZARGES AFC CANADA Ltd
Custom Software	EPIC DATA
Custom Software	LANSDOWNE INTEGRATED SYSTEMS
Cylinders	DONLEE PRECISION
Damping	DOWTY AEROSPACE TORONTO
Data Acquisition	AIT ADVANCED INFORMATION TECH Corp
Data Acquisition	APPENDIX PUBLISHING
Data Acquisition	APPLIED MICROSYSTEMS Ltd
Data Acquisition	ARRAY SYSTEMS COMPUTING
Data Acquisition	ATS AEROSPACE
Data Acquisition	CAE INDUSTRIES Ltd
Data Acquisition	CALIAN COMMUNICATIONS SYSTEMS Ltd
Data Acquisition	CEL AEROSPACE TEST EQUIPMENT Ltd
Data Acquisition	CompEngServ Ltd
Data Acquisition	COMPUTING DEVICES COMPANY
Data Acquisition	EPIC DATA
Data Acquisition	GasTOPS Ltd
Data Acquisition	GEOVISION SYSTEMS
Data Acquisition	INTERA INFORMATION TECHNOLOGIES
Data Acquisition	INTERACTIVE CIRCUITS & SYSTEMS Ltd
Data Acquisition	LITTON SYSTEMS CANADA Ltd
Data Acquisition	MDS AERO SUPPORT Corp
Data Acquisition	OCEANROUTES SEIMAC
Data Acquisition	PRIOR DATA SCIENCES Ltd
Data Acquisition	SCIEMETRIC INSTRUMENTS
Data Acquisition	SOFTWARE KINETICS Ltd
Data Acquisition	TEAM
Data Acquisition	TRACKER INDUSTRIES Ltd
Data Analysis	COMPUTING DEVICES COMPANY
Data Analysis	INTERA INFORMATION TECHNOLOGIES
Data Analysis	LITTON SYSTEMS CANADA Ltd
Data Annotation Displays	OPTOTEK Ltd
Data Command and Control	SOFTWARE KINETICS Ltd
Data Communications	CANADIAN MARCONI COMPANY
Data Communications	OERLIKON AEROSPACE
Data Communications	RELTEK
Data Control Systems	CAE INDUSTRIES Ltd
Data Control Systems	SCIEMETRIC INSTRUMENTS
Data Conversion	INTERA INFORMATION TECHNOLOGIES
Data Handling	COMPUTING DEVICES COMPANY
Data Handling	MACDONALD DETTWILER AND ASSOCIATES Ltd
Data Integration	INTERA INFORMATION TECHNOLOGIES

KEYWORD	COMPANY
Data Loggers	TARGA ELECTRONICS SYSTEMS
Data Logging	APPLIED MICROSYSTEMS Ltd
Data Processing	AIT ADVANCED INFORMATION TECH Corp
Data Processing	ARRAY SYSTEMS COMPUTING
Data Processing	CALIAN COMMUNICATIONS SYSTEMS Ltd
Data Processing	SOFTWARE KINETICS Ltd
Data Processing	TEAM
Data Recorders	TARGA ELECTRONICS SYSTEMS
Data Reduction	CAL Corp
Data Switches	GANDALF TECHNOLOGIES
Data-Over-Voice Systems	GANDALF TECHNOLOGIES
DC Power Supplies	CTS OF CANADA Ltd
DC Powered Modules	AVTECH ELECTROSYSTEMS Ltd
DC Rectifiers	CTS OF CANADA Ltd
De-icing Applications	GARRETT CANADA
Deceleration Systems	IRVIN INDUSTRIES CANADA Ltd
Decommissioning	ATOMIC ENERGY OF CANADA Ltd
Decontamination Systems	DEW ENGINEERING AND DEVELOPMENT Ltd
Defense Electronics	GE CANADA
Degaussing Systems	CTS OF CANADA Ltd
Degaussing Systems	KB ELECTRONICS (1989) Ltd
Dehydrators	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Demineralizers	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Demolition Block	EXPRO CHEMICAL PRODUCTS
Depth Sounders	KNUDSEN ENGINEERING Ltd
Depth Systems	APPLIED MICROSYSTEMS Ltd
Desalination Systems	ZENON ENVIRONMENTAL
Design Analysis Reports	SEMICONDUCTOR INSIGHTS
Design Engineering	BURNDY
Design Engineering	OERLIKON AEROSPACE
Design Services	THE AUSTIN COMPANY Ltd
Design Services	DSMA-BABCOCK,
Desk Top Publishing	RE:ACTION MARKETING SERVICES Ltd
Desktop Video Production Systems	MATROX ELECTRONIC SYSTEMS Ltd
Detectors	PYLON ELECTRONICS
Detectors (Chemical Agents)	ANACHEMIA CANADA
Development and Manufacture	GE CANADA
Die Casting (Aluminum/Zinc)	AMPTECH Corp
Die Fabrication	AERO MACHINING Ltd
Die Fabrication	NORTHWEST INDUSTRIES Ltd
Dielectric Resonator Oscillators	ITS ELECTRONICS
Diesel Heaters	GLOBAL THERMOELECTRIC
Diffusion Coatings (CODEP)	VAC-AERO INTERNATIONAL
Diffusion Coatings (Nitreg®)	NITREX METAL TECHNOLOGIES
Digital Carrier Modulation	GE CANADA
Digital Communications	CALIAN COMMUNICATIONS SYSTEMS Ltd
Digital Communications	MPR TELTECH Ltd
Digital Image Analysis	DIPIX TECHNOLOGIES
Digital Modems	CALIAN COMMUNICATIONS SYSTEMS Ltd
Digital Order Wire	CANADIAN MARCONI COMPANY
Digital Printing	RE:ACTION MARKETING SERVICES Ltd
Digital Recorders	ATS AEROSPACE
Digital Scanning	M&T MANAGEMENT SALES
Digital Signal Processing	DY-4 SYSTEMS
Digital Signal Processing	GE CANADA
Digital Signal Processing	INTERACTIVE CIRCUITS & SYSTEMS Ltd
Digital Signal Processing	KNUDSEN ENGINEERING Ltd
Digital Signal Processing	LOCKHEED CANADA
Digital Signal Processing	MPR TELTECH Ltd
Digital Signal Processing	SED SYSTEMS
Digital Signal Processing	SKYWAVE ELECTRONICS Ltd
Digital Signal Processing	SPECTRUM SIGNAL PROCESSING
Digital Signal Processing	SPECTRUM SIGNAL PROCESSING
Digital Signal Processing	ULTIMATEAST DATA COMMUNICATIONS Ltd
Digital Voice Repeaters	SPILSBURY COMMUNICATIONS Ltd
Digital Warning Systems	TEAM
Direct Mail	RE:ACTION MARKETING SERVICES Ltd
Direction Finders	ROHDE & SCHWARZ CANADA
Disk Emulation	KOM
Dispersion Strengthened Alloys	SHERRITT GORDON Ltd
Display Components	HYPERNETICS Ltd
Display Systems	SOFTWARE KINETICS Ltd
Displays	CAE INDUSTRIES Ltd
Displays	CANADIAN MARCONI COMPANY
Displays	OPTOTEK Ltd
Distance Measuring	PELORUS NAVIGATION SYSTEMS
Distance-To-Go Markers	DAVIS AIRFIELD FIBEROPTEK Ltd
Distribution (Aircraft Parts)	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Distribution Research	ONTARIO HYDRO
DME	CANADIAN MARCONI COMPANY
DME	MICRONAV INTERNATIONAL Ltd
Documentation	APPENDIX PUBLISHING
Documentation	IOTEK
Documentation	RE:ACTION MARKETING SERVICES Ltd
Domes (Missile)	CRYSTAR RESEARCH
Doppler Navigation Systems	CANADIAN MARCONI COMPANY
Dosimeters	SCINTREX Ltd
Double Base	EXPRO CHEMICAL PRODUCTS
Drive Sprockets	QUIMPEX Ltd
Drone Alignment Systems	BENDIX AVELEX
Drone Recovery Systems	IRVIN INDUSTRIES CANADA Ltd
Drug Detection	SCINTREX Ltd
Dry Film Lubricants	CAMETOID Ltd
Earth Stations	ANDREW CANADA
ECCM Antenna	CANADIAN MARCONI COMPANY
ECCM Radio	CANADIAN MARCONI COMPANY
ECM	CAL Corp
ECM	LOCKHEED CANADA
Economic Analysis	AVIATION RESEARCH Corp
Economic Analysis	AVIATION PLANNING SERVICES Ltd
Economic Analysis	CHERNIAK GIBLON
Economic Analysis	THOMPSON-HICKLING AVIATION
Education	EPIC DATA

KEYWORD	COMPANY
Effectiveness Evaluation	THOMSON-CSF SYSTEMS CANADA
EHF Synthesizer	RAYTHEON CANADA Ltd
Electonics	ASCENT POWER TECHNOLOGY
Electrical Engineering	INNOTECH AVIATION Ltd
Electro Mechanical Systems	DIEMACO (1984)
Electro-Optics	ATLANTIS AEROSPACE Corp
Electro-Optics	ATOMIC ENERGY OF CANADA Ltd
Electro-Optics	BENDIX AVELEX
Electro-Optics	CAL Corp
Electro-Optics	EG&G CANADA Ltd
Electro-Optics	FOCAL TECHNOLOGIES
Electro-Optics	HUGHES LEITZ OPTICAL TECHNOLOGIES
Electro-Optics	SPAR AEROSPACE Ltd
Electro-Optics and Laser Technology	OERLIKON AEROSPACE
Electrochemical Devices	THE ARMSTRONG MONITORING Corp
Electroforming	LUCAS AEROSPACE
Electromagnetic Compatibility	IMP GROUP Ltd
Electromagnetic Compatibility	ROHDE & SCHWARZ CANADA
Electromagnetic Display	HYPERNETICS Ltd
Electromagnetics	SCINTREX Ltd
Electromechanical Design	CAL Corp
Electromechanical Design	DOWTY AEROSPACE TORONTO
Electron Beam Welding	VAC-AERO INTERNATIONAL
Electronic and Mechanical Fabrication	W R DAVIS ENGINEERING Ltd
Electronic Connectors	BURNDY
Electronic Controls	CASEY COPTER ACCESSORIES Ltd
Electronic Design	INTERACTIVE CIRCUITS & SYSTEMS Ltd
Electronic Gas Detectors	THE ARMSTRONG MONITORING Corp
Electronic Publishing	APPENDIX PUBLISHING
Electronic Receptors	NEWTECH INSTRUMENTS Ltd
Electronic Support Measures	LOCKHEED CANADA
Electronic Support Measures	ROHDE & SCHWARZ CANADA
Electronic Systems Design	PARAMAX SYSTEMS CANADA
Electronic Test Equipment	OPTOTEK Ltd
Electronic Warfare	CAL Corp
Electronic Warfare	CALIAN COMMUNICATIONS SYSTEMS Ltd
Electronic Warfare	CANADIAN MARCONI COMPANY
Electronic Warfare	EXCALIBUR SYSTEMS Ltd
Electronic Warfare	INNOTECH AVIATION Ltd
Electronic Warfare	ITS ELECTRONICS
Electronic Warfare	LOCKHEED CANADA
Electronic Warfare	PRIOR DATA SCIENCES Ltd
Electronic Warfare	ROHDE & SCHWARZ CANADA
Electronic Warfare	SOFTWARE KINETICS Ltd
Electronic Warfare Subsystems	COM DEV Ltd
Electronics	EG&G CANADA Ltd
Electronics (Precision Parts)	ETM INDUSTRIES
Electronics Assembly	THE AEROSPACE CONSORTIUM
Electronics Research	ONTARIO HYDRO
Electroplating	CAMETOID Ltd
Electroplating	SHERRITT GORDON Ltd
Electrotechnology Research	ONTARIO HYDRO
ELINT/SIGINT	CAL Corp
Elliptical Waveguides	ANDREW CANADA

KEYWORD	COMPANY
EMC	NATIONAL ENG & SCIENCE ASSOCIATES
Emergency Locator Beacons	GARRETT CANADA
Emergency Locator Beacons	MPR TELTECH Ltd
Emergency Restoration Service	LEBLANC & ROYLE TELCOM
EMI	GARRETT CANADA
EMI/RFI Cabinetry	DEVTEK AEROSPACE COMPANY
EMI/RFI Shielding	NATIONAL ENG & SCIENCE ASSOCIATES
EMI-NEMP-EMP Shielding	THE AUSTIN COMPANY Ltd
Emission Control	ONTARIO HYDRO
Emitters and Detectors	EG&G CANADA Ltd
Enclosures (Electronic)	NORANCO MANUFACTURING Ltd
Encryption	UNITED MARINE ELEC & COMMUNICATIONS
Energy Conversion	ONTARIO HYDRO
Engine Adaptors	MDS AERO SUPPORT Corp
Engine Component Simulator	ATLANTIS AEROSPACE Corp
Engine Components	BRISTOL AEROSPACE Ltd
Engine Components	DEVTEK AEROSPACE COMPANY
Engine Components	HAWKER SIDDELEY CANADA
Engine Components	KAYCOM
Engine Components	ROLLS-ROYCE (CANADA) Ltee
Engine Components	SPAR AEROSPACE Ltd
Engine Components	SPECIALIZED WELDING & FABRICATION Ltd
Engine Components	T R COX AEROFOILS Ltd
Engine Components	WALBAR CANADA
Engine Control Valve Bodies	DEVTEK AEROSPACE COMPANY
Engine Emission Research	PRATT & WHITNEY CANADA
Engine Fuel Control Systems	BENDIX AVELEX
Engine Health Monitoring	GasTOPS Ltd
Engine Health Monitoring	WESTEC AEROSPACE
Engine Instruments	CANADIAN MARCONI COMPANY
Engine Rotating Components	DEVTEK AEROSPACE COMPANY
Engine Systems	ROLLS-ROYCE (CANADA) Ltee
Engine Test	CEL AEROSPACE TEST EQUIPMENT Ltd
Engine Test	HAWKER SIDDELEY CANADA
Engine Test	MDS AERO SUPPORT Corp
Engine Weldments	DEVTEK AEROSPACE COMPANY
Engineering and Construction	THE AUSTIN COMPANY Ltd
Engineering and Construction	KELOWNA FLIGHTCRAFT GROUP
Engineering Services	THE AEROSPACE CONSORTIUM
Engineering Services	AIRTECH CANADA
Engineering Services	ATOMIC ENERGY OF CANADA Ltd
Engineering Services	THE AUSTIN COMPANY Ltd
Engineering Services	DEW ENGINEERING AND DEVELOPMENT Ltd
Engineering Services	DSMA-BABCOCK,
Engineering Services	ONTARIO HYDRO
Engineering Services	QUESTECH NORTH AMERICAN Ltd
Engineering Services	THOMSON-CSF SYSTEMS CANADA
Engineering Services	TRILINK TECHNOLOGIES GROUP
Engineering Services	W R DAVIS ENGINEERING Ltd
Engineering Services	WARDROP ENGINEERING
Engines	ROLLS-ROYCE (CANADA) Ltee
Enhanced Blast Technology	THOMSON-CSF SYSTEMS CANADA
Environment	THE ARMSTRONG MONITORING Corp

KEYWORD	COMPANY
Environment	OERLIKON AEROSPACE
Environmental Assessment	LYNX GEOSYSTEMS
Environmental Assessment	ONTARIO HYDRO
Environmental Control	ATOMIC ENERGY OF CANADA Ltd
Environmental Control	GARRETT CANADA
Environmental Data Management	CompEngServ Ltd
Environmental Instruments	GARRETT CANADA
Environmental Laboratory	DEVTEK AEROSPACE COMPANY
Environmental Laboratory	HERMES ELECTRONICS Ltd
Environmental Laboratory	ZENON ENVIRONMENTAL
Environmental Sensors	SPARTON OF CANADA Ltd
Environmental Services	FRONTEC
Environmental Testing	CAL Corp
Equipment Procurement	AVIATION PLANNING SERVICES Ltd
Equipment Selection	AVIATION PLANNING SERVICES Ltd
Equipment Shelters	ANDREW CANADA
Equipment Shelters	GM ASSOCIATES
Expert Systems	AIT ADVANCED INFORMATION TECH Corp
Expert Systems	CompEngServ Ltd
Expert Systems	DYNACON ENTERPRISES Ltd
Expert Systems	DYNAMIC SIGNAL ANALYSIS Corp
Expert Systems	GasTOPS Ltd
Expert Systems	MPR TELTECH Ltd
Explosives	EXPRO CHEMICAL PRODUCTS
Explosives	HANDS FIREWORKS
Explosives	MINING RESOURCE ENGINEERING (1988) Ltd
Explosives (Underwater Testing)	ATS AEROSPACE
Explosives Detection	SCINTREX Ltd
Explosives Disposal Equipment	TERRA AEROSPACE Corp
Extended Interaction Klystrons	VARIAN CANADA
Extended Length Machining	CANADAIR GROUP
Extended Length Machining	EBCO AEROSPACE INDUSTRIES
Fabricated Aluminum Structures	ANDREW CANADA
Fabrication	CUSTOM STEEL MANUFACTURING Ltd
Fabrication (Fabrics)	FELL-FAB PRODUCTS
Fabrication/Assembly/Test	THE AEROSPACE CONSORTIUM
Fabrication/Assembly/Test	HAVLIK TECHNOLOGIES
Fabrication Procedures	QUANTUM INSPECTION AND TESTING Ltd
Fabrics (Composite)	CIBA-GEIGY CANADA Ltd
Facilities Construction	MDS AERO SUPPORT Corp
Facilities Design	THE AUSTIN COMPANY Ltd
Facilities Design	MDS AERO SUPPORT Corp
Facilities Management	FRONTEC
Facilities Management	SHL SYSTEMHOUSE
Facsimile	M&T MANAGEMENT SALES
Failure Analysis	ONTARIO HYDRO
Failure Analysis	QUANTUM INSPECTION AND TESTING Ltd
Failure Analysis	WARDROP ENGINEERING
Failure Indicators	TEAM
Fasteners	DEVTEK AEROSPACE COMPANY
Fasteners	ESNA FASTENERS
Fasteners	MECAIR
Fasteners	MILLS/STERLING AEROSPACE
Fasteners (Precision)	INTERFAST
Fault-Tolerant Systems	SHL SYSTEMHOUSE
Feasibility and Requirement Studies	ARRAY SYSTEMS COMPUTING
Feasibility Studies	THE AUSTIN COMPANY Ltd
Feasibility Studies	CHERNIAK GIBLON
Feasibility Studies	PRIOR DATA SCIENCES Ltd
Feasibility Studies	W R DAVIS ENGINEERING Ltd
Feasibility Studies	WARDROP ENGINEERING
Fiber Optic Cable Systems	BURNDY
Fiber Optic Communications	MPB TECHNOLOGIES
Fiber Optics	FOCAL TECHNOLOGIES
Fiberoptic Airside Guidance Signs	DAVIS AIRFIELD FIBEROPTEK Ltd
Field Service	IOTEK
Field Service	MDS AERO SUPPORT Corp
Filament Winding	CELLPACK AEROSPACE Ltd
Filament Winding	EDO CANADA Ltd
Filament Winding	FRE COMPOSITES
Filter Separators	3-L FILTERS Ltd
Filters	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Financial Information Display	MATROX ELECTRONIC SYSTEMS Ltd
Finite Element Analysis	W R DAVIS ENGINEERING Ltd
Fire Control	ADGA GROUP
Fire Control	COMPUTING DEVICES COMPANY
Fire Control	CONAIR AVIATION Ltd
Fire Control Optics	HUGHES LEITZ OPTICAL TECHNOLOGIES
Fire Control Systems	OERLIKON AEROSPACE
Fire Detection and Mapping	CONAIR AVIATION Ltd
Fire Fighting Equipment	NOVA-QUINTECH Corp
Fire Proof Wire	HARBOUR INDUSTRIES (Canada) Ltd
Fire Support Vehicle	GENERAL MOTORS OF CANADA Ltd
Fire Suppression Systems	THE AEROSPACE CONSORTIUM
Fixtures (Machining)	ETM INDUSTRIES
Flame Proof Wire	HARBOUR INDUSTRIES (Canada) Ltd
Flares	HANDS FIREWORKS
Flat Panel Displays	LITTON SYSTEMS CANADA Ltd
Flat Panel Displays	OPTOTEK Ltd
Flexible Automated Manufacturing	ICAM TECHNOLOGIES Corp
Flexible Structures	DYNACON ENTERPRISES Ltd
Flight Control Actuation Systems	HOCHELAGA AEROSPACE
Flight Control Actuation Systems	MENASCO AEROSPACE Ltd
Flight Controls	DEVTEK AEROSPACE COMPANY
Flight Data Processing	LNS SYSTEMS
Flight Data Processing	ORACLE TELECOMPUTING
Flight Data Processing	RAYTHEON CANADA Ltd
Flight Data Recorder Playback	SOFTWARE KINETICS Ltd
Flight Hardware	WARDROP ENGINEERING
Flight Management Systems	AVIATION RESEARCH Corp
Flight Plan Handling	ORACLE TELECOMPUTING
Flight Simulators	CAE INDUSTRIES Ltd
Flight Surface Manufacture	NORTHWEST INDUSTRIES Ltd
Flight Testing (Helicopters)	EUROCOPTER CANADA Ltd
Flight Training Devices	ATLANTIS AEROSPACE Corp
FLIRs	SPAR AEROSPACE Ltd
Floppy Disk Emulators	TARGA ELECTRONICS SYSTEMS
Fluid Couplings	HILTAP FITTINGS Ltd

KEYWORD	COMPANY
Fluorescent Penetrant Inspection	SPECIALIZED WELDING & FABRICATION Ltd
Flutter Analysis	CANADAIR GROUP
Flux Crystal Growth	CRYSTAR RESEARCH
Foil Heat Shields	THE H I THOMPSON CO
Footwear	THE ACTON RUBBER Ltd
Forgings	CANADA FORGINGS
Forgings	CANADAIR GROUP
Formal Specification	ORA CANADA
Forming	HAWKER SIDDELEY CANADA
Forming (Sheet Metal)	THE H I THOMPSON CO
Forming (Stainless Foils)	THE H I THOMPSON CO
Fracture Analysis	CANADAIR GROUP
Fracture Mechanics	ONTARIO HYDRO
Frequency Sources (High Power)	ITS ELECTRONICS
Frequency Stabilizers	ULTRA LASERTECH
Fuel Control	BENDIX AVELEX
Fuel Control	MDS AERO SUPPORT Corp
Fuel Control	WESTEC AEROSPACE
Fuel Filters	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Fuel Monitors	3-L FILTERS Ltd
Fuel Sensors (LAV)	NEWTECH INSTRUMENTS Ltd
Fuel Storage	FELL-FAB PRODUCTS
Fuel Systems	CEL AEROSPACE TEST EQUIPMENT Ltd
Fuses	3-L FILTERS Ltd
Fuses	OERLIKON AEROSPACE
GaAs FET Amplifiers	LUCAS AEROSPACE
GaAs MMICs	OPTOTEK Ltd
Galley Equipment	GODFREY AEROSPACE
Gamma Ray Monitors	SCINTREX Ltd
Gas Detectors	THE ARMSTRONG MONITORING Corp
Gas Path Analysis	GasTOPS Ltd
Gas Turbine Blades	WALBAR CANADA
Gas Turbine Components	BRISTOL AEROSPACE Ltd
Gas Turbine Components	HAWKER SIDDELEY CANADA
Gas Turbine Engines	ROLLS-ROYCE (CANADA) Ltee
Gas Turbine Engines (R&D)	GasTOPS Ltd
Gear Boxes	SPAR AEROSPACE Ltd
Gear Boxes	WINDSOR AEROSPACE
Gears	DONLEE PRECISION
Gears	WINDSOR AEROSPACE
Generators	GLOBAL THERMOELECTRIC
Geochemical Equipment	SCINTREX Ltd
Geographic Information Systems	DIPIX TECHNOLOGIES
Geographic Information Systems	GEOVISION SYSTEMS
Geographic Information Systems	HUGHES AIRCRAFT OF CANADA Ltd
Geographic Information Systems	INTERA INFORMATION TECHNOLOGIES
Geologic Characterization and Interpretation	LYNX GEOSYSTEMS
Geophysical Equipment	SCINTREX Ltd
Geophysical Instrumentation	APPLIED MICROSYSTEMS Ltd
Geotechnical Engineering	ONTARIO HYDRO
Gimbals	ISTEC
Glass-to-Metal Hermetic Connectors	ITT CANNON
Government Relations	AVIATION RESEARCH Corp
Government Relations	BELANGER, GUY & ASSOC
Government Relations	BRUCE D VALLILLEE ELECTRONICS Ltd
Government Relations	FMA CONSULTANTS
Government Relations	GOVERNMENT CONSULTANTS INTERNATIONAL
GP Armoured Vehicles	GENERAL MOTORS OF CANADA Ltd
Graphics	CAE INDUSTRIES Ltd
Graphics	MATROX ELECTRONIC SYSTEMS Ltd
Graphics	PRIOR DATA SCIENCES Ltd
Graphics Subsystems	DY-4 SYSTEMS
Gravity Sensors	SCINTREX Ltd
Green Signal	HANDS FIREWORKS
Grenades Smoke	HANDS FIREWORKS
Grinding	DONLEE PRECISION
Ground Control Approach Radar	RAYTHEON CANADA Ltd
Ground Plane Antennas	VICTRIX Ltd
Ground Stations	CALIAN COMMUNICATIONS SYSTEMS Ltd
Ground Stations	MACDONALD DETTWILER AND ASSOCIATES Ltd
Ground Stations	SPAR AEROSPACE Ltd
Ground Steering Systems	MENASCO AEROSPACE Ltd
Ground Support Equipment	GODFREY AEROSPACE
Ground Support Equipment	MDS AERO SUPPORT Corp
Ground Support Equipment	PAW SPECIALTIES
Ground Support Equipment	WARDROP ENGINEERING
Ground Transportation	GENERAL MOTORS OF CANADA Ltd
Guidance System Components	TRECO MACHINE & TOOL Ltd
Gyros	STRITE INDUSTRIES Ltd
Gyrostabilization	ISTEC
Hand Grenades Smoke	HANDS FIREWORKS
Hand Lay-Up Aerospace Components	EDO CANADA Ltd
Handling Systems	INDAL TECHNOLOGIES
Hangars	THE AUSTIN COMPANY Ltd
Hangars	INDAL TECHNOLOGIES
Hangars	SOUTHPORT AEROSPACE CENTRE
Hardness Testing	CAMETOID Ltd
Harnesses	FELL-FAB PRODUCTS
Hazardous Gas Detection	THE ARMSTRONG MONITORING Corp
Hazardous Gas Detection	SCINTREX Ltd
HC Smoke	HANDS FIREWORKS
Heads Up Display (LAV)	NEWTECH INSTRUMENTS Ltd
Health and Usage Monitor	DYNAMIC SIGNAL ANALYSIS Corp
Heat Energy	ATOMIC ENERGY OF CANADA Ltd
Heat Exchangers	GODFREY AEROSPACE
Heat Shielding Products	INDAL TECHNOLOGIES
Heat Shields	THE H I THOMPSON CO
Heat Tracer Cable	HARBOUR INDUSTRIES (Canada) Ltd
Heat Treating	CANADAIR GROUP
Heat Treating	EBCO AEROSPACE INDUSTRIES
Heat Treating	H&S HEAT TREATING
Heat Treating	HAWKER SIDDELEY CANADA
Heat Treating	ROLLS-ROYCE (CANADA) Ltee
Heat Treating	UDT INDUSTRIES

KEYWORD	COMPANY
Heat Treating	VAC-AERO INTERNATIONAL
Heat Treating	VESTSHELL
Heating (Aircraft)	AEROTECH INTERNATIONAL
Heating (Aircraft)	CASEY COPTER ACCESSORIES Ltd
Heating (High Intensity Light)	VORTEK INDUSTRIES Ltd
HELIAX Coaxial Cable	ANDREW CANADA
Helicopter Hubs	CHICOPEE MANUFACTURING Ltd
Helicopter Landing Gear	DOWTY AEROSPACE TORONTO
Helicopter Modifications	CANADIAN HELICOPTERS Ltd
Helicopter Operations	CANADIAN HELICOPTERS Ltd
Helicopter Recovery Assist	INDAL TECHNOLOGIES
Helicopter Retentions	CHICOPEE MANUFACTURING Ltd
Helicopter Rotors	DEVTEK AEROSPACE COMPANY
Helicopter Subsystems	SPAR AEROSPACE Ltd
Helicopter Wire Strike Protection	BRISTOL AEROSPACE Ltd
Helicopters	EUROCOPTER CANADA Ltd
Helmet Mounted Displays	CAE INDUSTRIES Ltd
HF Antennas	ANDREW CANADA
HF Antennas	CALIAN COMMUNICATIONS SYSTEMS Ltd
HF Antennas	DEVTEK AEROSPACE COMPANY
HF Antennas	HERMES ELECTRONICS Ltd
HF Antennas	LEBLANC & ROYLE TELCOM
HF Antennas	SPILSBURY COMMUNICATIONS Ltd
HF Communications	THE AEROSPACE CONSORTIUM
HF Communications	CALIAN COMMUNICATIONS SYSTEMS Ltd
HF Communications	DEVTEK AEROSPACE COMPANY
HF Modems	CALIAN COMMUNICATIONS SYSTEMS Ltd
HF Radios	SKYWAVE ELECTRONICS Ltd
HF Radios	SPILSBURY COMMUNICATIONS Ltd
HF Whip Antennas	SPILSBURY COMMUNICATIONS Ltd
High Explosives	EXPRO CHEMICAL PRODUCTS
High Intensity Light Source	VORTEK INDUSTRIES Ltd
High Power Amplifiers	LUCAS AEROSPACE
High Pressure (Connectors)	ITT CANNON
High Q Crystals	CROVEN CRYSTALS Ltd
High Speed Pulsers	AVTECH ELECTROSYSTEMS Ltd
High Strength Steels	CHICOPEE MANUFACTURING Ltd
High Strength Steels	EBCO AEROSPACE INDUSTRIES
High Temperature and Aircraft Firewall (Connectors)	ITT CANNON
High Temperature Wire	HARBOUR INDUSTRIES (Canada) Ltd
High Vacuum Metallizing	FLEXIBULB PLASTICS
High Voltage	VARIAN CANADA
High Voltage Enginaering	ONTARID HYDRO
High Volume Smoke Pot	HANDS FIREWORKS
Higher Order Language	ORA CANADA
Hinges	AERO MACHINING Ltd
Hologene Free Wire	HARBOUR INDUSTRIES (Canada) Ltd
Honeycomb Materials	CIBA-GEIGY CANADA Ltd
Horizon Reference Systems	HONEYWELL Ltd
Hubs	GANDALF TECHNOLOGIES
Human Engineering	W R DAVIS ENGINEERING Ltd
Human Factors Design	THOMPSON-HICKLING AVIATION
Hush Houses	MDS AERO SUPPORT Corp
Hybrid Circuits	CANADIAN MARCONI COMPANY
Hybrid Mobile Protected Weapon System	GENERAL MOTORS OF CANADA Ltd
Hydraulic Actuators	CHICOPEE MANUFACTURING Ltd
Hydraulic Actuators	DEVTEK AEROSPACE COMPANY
Hydraulic Actuators	HOCHELAGA AEROSPACE
Hydraulic Engineering	OERLIKON AEROSPACE
Hydraulic Hose	LEAVENS AVIATION
Hydraulic Servos	AERO MACHINING Ltd
Hydraulic Systems	GODFREY AEROSPACE
Hydraulics	CAE INDUSTRIES Ltd
Hydraulics	CANADIAN COMPONENT SERVICES
Hydraulics	DOWTY AEROSPACE TORONTO
Hydraulics	EBCO AEROSPACE INDUSTRIES
Hydraulics	FIELD AVIATION COMPANY
Hydraulics	HÉROUX
Hydraulics	NORTHWEST INDUSTRIES Ltd
Hydrogen Embrittlement	CAMETOID Ltd
Hydrogen Fuel Research	PRATT & WHITNEY CANADA
Hydrogen Sulfide Sensors	THE ARMSTRONG MONITORING Corp
Hydrogeological Investigation	LYNX GEOSYSTEMS
Hydrographic Information Systems	GEOVISION SYSTEMS
Hydrographic Information Systems	KNUDSEN ENGINEERING Ltd
Hydromechanical	DOWTY AEROSPACE TORONTO
Hydrophones	B M HI-TECH
Hydrophones	SPARTON OF CANADA Ltd
Ice Penetration	SPARTON OF CANADA Ltd
Ice Skates	THE ACTON RUBBER Ltd
Igniters	HANDS FIREWORKS
Illuminated Panels	CANADIAN MARCONI COMPANY
Illumination Signals	HANDS FIREWORKS
ILS	See also Integrated Logistics Support
ILS	CANADIAN MARCONI COMPANY
ILS	GARRETT CANADA
ILS Structures	INDAL TECHNOLOGIES
Image Intensification	BENDIX AVELEX
Image Intensification	HUGHES LEITZ OPTICAL TECHNOLOGIES
Image Processing	ARRAY SYSTEMS COMPUTING
Image Processing	CAL Corp
Image Processing	CANADIAN MARCONI COMPANY
Image Processing	DIPIX TECHNOLOGIES
Image Processing	MACDONALD DETTWILER AND ASSOCIATES Ltd
Image Recorder	MACDONALD DETTWILER AND ASSOCIATES Ltd
Imaging	MATROX ELECTRONIC SYSTEMS Ltd
Imaging Arrays	DALSA
Imaging Technology	SHL SYSTEMHOUSE
Impedance Transformers	AVTECH ELECTROSYSTEMS Ltd
Impulse Generators	AVTECH ELECTROSYSTEMS Ltd
In-Orbit Real-Time Test Systems	SED SYSTEMS
Independent Verification/ Validation	CompEngServ Ltd
Independent Verification/	QUESTECH NORTH AMERICAN

KEYWORD	COMPANY
Validation	Ltd
Industrial Benefits	THE AEROSPACE CONSORTIUM
Industrial Benefits	BELANGER, GUY & ASSOC
Industrial Benefits	EG&G CANADA Ltd
Industrial Benefits	FMA CONSULTANTS
Industrial Benefits	GE CANADA
Industrial Benefits	INTERCON CONSULTANTS
Industrial Fabric	GM ASSOCIATES
Industrial Imaging Cameras	DALSA
Industrial Imaging Sensors	DALSA
Inertial Navigation	LITTON SYSTEMS CANADA Ltd
Inertial Navigation Components	STRITE INDUSTRIES Ltd
Inflatable Life Support Systems	IRVIN INDUSTRIES CANADA Ltd
Inflight Engine Monitoring	GasTOPS Ltd
Information Systems	HUGHES AIRCRAFT OF CANADA Ltd
Information Systems	RE:ACTION MARKETING SERVICES Ltd
Information Systems	SHL SYSTEMHOUSE
Infrared Coatings	CAMETOID Ltd
Infrared Detectors	OPTOTEK Ltd
Infrared Glass	B M HI-TECH
Infrared Imager	ISTEC
Infrared Instrumentation	OPTOTEK Ltd
Infrared Instrumentation	SPAR AEROSPACE Ltd
Infrared Optics	CRYSTAR RESEARCH
Infrared Signature Suppression	W R DAVIS ENGINEERING Ltd
Infrared Systems	CANADIAN MARCONI COMPANY
Infrared Systems	SPAR AEROSPACE Ltd
Injection Molding	CANADIAN MARCONI COMPANY
Injection Molding	FLEXIBULB PLASTICS
Injection Molding	IMP GROUP Ltd
Inspection	DIFFRACTO Ltd
Inspection	QUANTUM INSPECTION AND TESTING Ltd
Inspection	SPECIALIZED WELDING & FABRICATION Ltd
Inspection Systems	DIPIX TECHNOLOGIES
Inspection Systems (Remote)	DIFFRACTO Ltd
Instrument Landing Systems	See ILS
Instrument Panels (LAV)	NEWTECH INSTRUMENTS Ltd
Instrument Repair	CANADIAN MARCONI COMPANY
Instrument Repair	NORTHWEST INDUSTRIES Ltd
Instrumentation	CEL AEROSPACE TEST EQUIPMENT Ltd
Instrumentation	DSMA-BABCOCK,
Instrumentation	OCEANROUTES SEIMAC
Instrumentation	ONTARIO HYDRO
Instrumentation (Cases)	SJM PACKAGING
Instrumentation (Cases)	ZARGES AFC CANADA Ltd
Instrumentation (Components)	STRITE INDUSTRIES Ltd
Instruments	BENDIX AVELEX
Instruments	COMPUTING DEVICES COMPANY
Instruments	LITTON SYSTEMS CANADA Ltd
Insulation (Blankets)	THE H I THOMPSON CO
Insulation Systems	THE H I THOMPSON CO
Insurance	JOHNSON & HIGGINS Ltd
Integrated CAD/CAM Systems	ICAM TECHNOLOGIES Corp
Integrated Circuits	MITEC ELECTRONICS Ltd
Integrated Circuits	SEMICONDUCTOR INSIGHTS
Integrated High Density LED Displays	OPTOTEK Ltd
Integrated Logistics Support	ADGA GROUP
Integrated Logistics Support	THE AEROSPACE CONSORTIUM
Integrated Logistics Support	BENDIX AVELEX
Integrated Logistics Support	CANADIAN MARCONI COMPANY
Integrated Logistics Support	HONEYWELL Ltd
Integrated Logistics Support	INNIS TECHNOLOGY
Integrated Logistics Support	LANSDOWNE INTEGRATED SYSTEMS
Integrated Logistics Support	MARTIN MARIETTA CANADA Ltd
Integrated Logistics Support	THOMPSON-HICKLING AVIATION
Integrated Logistics Support	THOMSON-CSF SYSTEMS CANADA
Integrated Receiver Front Ends	ITS ELECTRONICS
Integrated Surveys	INTERA INFORMATION TECHNOLOGIES
Integrated Systems Management	DOWTY AEROSPACE TORONTO
Integration	CompEngServ Ltd
Integration and Test Facilities	WARDROP ENGINEERING
Intelligent Instruments	CANADIAN MARCONI COMPANY
Interactive Analysis	MACDONALD DETTWILER AND ASSOCIATES Ltd
Intercom	CON-SPACE COMMUNICATIONS Ltd
Intercom (Digital Analog)	TEAM
Interface Devices	ULTIMATEAST DATA COMMUNICATIONS Ltd
Interference/Crosspolarization Cancelers	ITS ELECTRONICS
Interiors	FELL-FAB PRODUCTS
International Trade Relations	FMA CONSULTANTS
Intrusion Detection	LITTON SYSTEMS CANADA Ltd
Intrusion Detection	SENSTAR Corp
Intrusion Detection	UNITED MARINE ELEC & COMMUNICATIONS
Invar	EBCO AEROSPACE INDUSTRIES
Inventory Control Systems	CANADIAN MARCONI COMPANY
Inventory Control Systems	CHERNIAK GIBLON
Inventory Control Systems	WESTEC AEROSPACE
Inverters	CTS OF CANADA Ltd
Inverters	KB ELECTRONICS (1989) Ltd
Inverters	PYLON ELECTRONICS
Inverting Transformers	AVTECH ELECTROSYSTEMS Ltd
Investment Castings	CERCAST
Investment Castings	DESIGNED PRECISION CASTINGS
Investment Castings	VESTSHELL
Ion Plating	CAMETOID Ltd
Ion Vapor Deposition	CAMETOID Ltd
IR	See Infrared
ISDN	RELTEK
ISDN Terminal Adapters	GANDALF TECHNOLOGIES
Isodapters	LUCAS AEROSPACE
Isolators	LUCAS AEROSPACE
Isotopic CO2	ULTRA LASERTECH
Ivadizing™	CAMETOID Ltd
Jamming	CALIAN COMMUNICATIONS SYSTEMS Ltd

KEYWORD	COMPANY
Jet Engine (Components)	DONLEE PRECISION
Jet Engines	GE CANADA
Jig Fabrication (Airframe)	FIELD AVIATION COMPANY
Joint Ventures	INTERCON CONSULTANTS
Jukebox	KOM
Klystrons	VARIAN CANADA
Laboratory Chemicals	ANACHEMIA CANADA
Laminar Flow Valves	HYPERNETICS Ltd
Laminates	CIBA-GEIGY CANADA Ltd
Lamps (High Power)	VORTEK INDUSTRIES Ltd
LAN/WAN Interconnection Devices	GANDALF TECHNOLOGIES
Landing Aids	CANADIAN MARCONI COMPANY
Landing Gear	DOWTY AEROSPACE TORONTO
Landing Gear	HÉROUX
Landing Gear	MENASCO AEROSPACE Ltd
Landing Gear Components	AERO MACHINING Ltd
Landing Gear Components	CHICOPEE MANUFACTURING Ltd
Landing Gear Components	DEVTEK AEROSPACE COMPANY
Landing Gear Components	DONLEE PRECISION
Landing Gear Components	STRITE INDUSTRIES Ltd
Landing Gear Components	TRECO MACHINE & TOOL Ltd
Landing Gear Components	WINDSOR AEROSPACE
Landing Gear Control Unit	DOWTY AEROSPACE PETERBOROUGH
Landsat	MACDONALD DETTWILER AND ASSOCIATES Ltd
Landsat Data	DIPIX TECHNOLOGIES
LANs	LAPP-HANCOCK ASSOCIATES Ltd
Laser Communications	TRACKER INDUSTRIES Ltd
Laser Controllers	ULTRA LASERTECH
Laser Diode Drivers	AVTECH ELECTROSYSTEMS Ltd
Laser Materials	B M HI-TECH
Laser Optics	HUGHES LEITZ OPTICAL TECHNOLOGIES
Laser Optics	INTEROPTICS, DIVISION OF LUMONICS
Laser Printing	RE:ACTION MARKETING SERVICES Ltd
Laser Radar	HUGHES LEITZ OPTICAL TECHNOLOGIES
Laser Rods	CRYSTAR RESEARCH
Laser Simulation	VORTEK INDUSTRIES Ltd
Lasers	MPB TECHNOLOGIES
Lasers	ULTRA LASERTECH
LED Arrays	OPTOTEK Ltd
LED Displays	LITTON SYSTEMS CANADA Ltd
LED Materials	OPTOTEK Ltd
Legal Support	SEMICONDUCTOR INSIGHTS
Lenses (Reconnaissance)	HUGHES LEITZ OPTICAL TECHNOLOGIES
Lenses (Underwater)	HUGHES LEITZ OPTICAL TECHNOLOGIES
Library (Aircraft Parts)	PATLON AIRCRAFT & INDUSTRIES Ltd
Life Cycle Costing	INNIS TECHNOLOGY
Life Cycle Material Management	THE AEROSPACE CONSORTIUM
Life Cycle Support	PRIOR DATA SCIENCES Ltd
Life Cycle Support	ROLLS-ROYCE (CANADA) Ltee
Life Support Equipment	TUL SAFETY EQUIPMENT Ltd
Lifejackets	TUL SAFETY EQUIPMENT Ltd
Light Alloy	HALEY INDUSTRIES Ltd
Light Armoured Vehicles	GENERAL MOTORS OF CANADA Ltd
Lighted Panels	CANADIAN MARCONI COMPANY
Line Terminating Unit	CANADIAN MARCONI COMPANY
Linear Pulse Amplifiers	AVTECH ELECTROSYSTEMS Ltd
Liquid Crystal Displays	LITTON SYSTEMS CANADA Ltd
Liquid Springs	DOWTY AEROSPACE TORONTO
Lithium Batteries	BALLARD BATTERY SYSTEMS Corp
Lithium Triborate Crystals	CRYSTAR RESEARCH
Locomotives	GENERAL MOTORS OF CANADA Ltd
Logic of Programs	ORA CANADA
Logistic Support	KAYCOM
Logistics Engineering	THOMSON-CSF SYSTEMS CANADA
Logistics Support	FRONTEC
Logistics Vehicle	GENERAL MOTORS OF CANADA Ltd
Low Frequency Beacon Systems	SPILSBURY COMMUNICATIONS Ltd
Low Hologene Wire	HARBOUR INDUSTRIES (Canada) Ltd
Low Light Level Television	ISTEC
Low Noise Amplifiers	LUCAS AEROSPACE
LVTP7 Upgrades	GENERAL MOTORS OF CANADA Ltd
M113 Upgrades	GENERAL MOTORS OF CANADA Ltd
Machine Vision	DALSA
Machine Vision	DIPIX TECHNOLOGIES
Machine Vision	MATROX ELECTRONIC SYSTEMS Ltd
Machining	AERO MACHINING Ltd
Machining	THE AEROSPACE CONSORTIUM
Machining	BENDIX AVELEX
Machining	CANADA FORGINGS
Machining	CANADAIR GROUP
Machining	CANADIAN MARCONI COMPANY
Machining	CHICOPEE MANUFACTURING Ltd
Machining	COORDINATE INDUSTRIES Ltd
Machining	DEVTEK AEROSPACE COMPANY
Machining	DOMINIS ENGINEERING Ltd
Machining	DONLEE PRECISION
Machining	DOWTY AEROSPACE TORONTO
Machining	ETM INDUSTRIES
Machining	EXTEC PRECISION MANUFACTURING
Machining	HAVLIK TECHNOLOGIES
Machining	HAWKER SIDDELEY CANADA
Machining	HOCHELAGA AEROSPACE
Machining	IMP GROUP Ltd
Machining	INDAL TECHNOLOGIES
Machining	INVAR MANUFACTURING Ltd
Machining	METRO MACHINING Corp
Machining	MILLS/STERLING AEROSPACE
Machining	NORANCO MANUFACTURING Ltd
Machining	STEVESTED MACHINERY & ENGINEERING Ltd
Machining	STRITE INDUSTRIES Ltd
Machining	T R COX AEROFOILS Ltd
Machining	TERRA AEROSPACE Corp
Machining	TUBE-FAB Ltd

KEYWORD	COMPANY
Machining	UDT INDUSTRIES
Machining	VAC-AERO INTERNATIONAL
Machining	VICTRIX Ltd
Machining	WINDSOR AEROSPACE
Magnesium	ROLLS-ROYCE (CANADA) Ltee
Magnesium	TIMMINCO Ltd
Magnesium Fluoride Crystals	CRYSTAR RESEARCH
Magnesium Sand Castings	HALEY INDUSTRIES Ltd
Magnetic Anomaly Detection	CAE INDUSTRIES Ltd
Magnetic Devices	CANADIAN MARCONI COMPANY
Magnetic Particle Inspection	SPECIALIZED WELDING & FABRICATION Ltd
Magnetic Sensors	SCINTREX Ltd
Magnetometers	CAE INDUSTRIES Ltd
Maintainability Analysis	WARDROP ENGINEERING
Maintenance (Predictive)	DYNAMIC SIGNAL ANALYSIS Corp
Maintenance and Overhaul Facility Planning	THE AUSTIN COMPANY Ltd
Maintenance and Overhaul Facility Planning	AVIATION PLANNING SERVICES Ltd
Maintenance Recovery Vehicle	GENERAL MOTORS OF CANADA Ltd
Maintenance Simulators	ATLANTIS AEROSPACE Corp
Man-Machine Interface	CAE INDUSTRIES Ltd
Man-Machine Interface	IOTEK
Management Consulting	DMR GROUP
Manuals	HAWKER SIDDELEY CANADA
Manuals	INNIS TECHNOLOGY
Manufacturing	THE AEROSPACE CONSORTIUM
Manufacturing	W R DAVIS ENGINEERING Ltd
Manufacturing Research	PRATT & WHITNEY CANADA
Marine Communications	ULTIMATEAST DATA COMMUNICATIONS Ltd
Marine Surveillance System	ISTEC
Markers	HANDS FIREWORKS
Market Surveys	AVIATION PLANNING SERVICES Ltd
Marketing	BRUCE D VALLILLEE ELECTRONICS Ltd
Marketing	FMA CONSULTANTS
Marketing	RE:ACTION MARKETING SERVICES Ltd
Mass Storage	KOM
Mass Storage Systems	TARGA ELECTRONICS SYSTEMS
Master Planning	THE AUSTIN COMPANY Ltd
Master Planning	AVIATION PLANNING SERVICES Ltd
Materials (Piezoelectric)	B M HI-TECH
Materials Processing	CAMETOID Ltd
Materials R&D (Connectors)	ITT CANNON
Materials Sciences	ONTARIO HYDRO
Mechanical Assembly	THE AEROSPACE CONSORTIUM
Mechanical Assembly	EBCO AEROSPACE INDUSTRIES
Mechanical Components	CANADIAN COMPONENT SERVICES
Mechanical Diagnostics	DYNAMIC SIGNAL ANALYSIS Corp
Mechanical Testing	WELDING INSTITUTE OF CANADA
Medical Equipment (Cases)	SJM PACKAGING
Medical Equipment (Cases)	ZARGES AFC CANADA Ltd
Medium Power Amplifiers	LUCAS AEROSPACE
Memory	SEMICONDUCTOR INSIGHTS
Memory	TARGA ELECTRONICS SYSTEMS
Message Switching	ORACLE TELECOMPUTING

KEYWORD	COMPANY
Metal Coatings	CAMETOID Ltd
Metal Coatings	NATIONAL COATING TECHNOLOGIES
Metal Coatings	NITREX METAL TECHNOLOGIES
Metal Coatings	VAC-AERO INTERNATIONAL
Metal Finishing	CAMETOID Ltd
Metal Plating	ROLLS-ROYCE (CANADA) Ltee
Metal Powders	SHERRITT GORDON Ltd
Metals	TIMMINCO Ltd
Metalworking	CANADAIR GROUP
Metalworking	HAVLIK TECHNOLOGIES
Metalworking	HAWKER SIDDELEY CANADA
Metalworking	NORANCO MANUFACTURING Ltd
Metalworking	QUIMPEX Ltd
Meteorological Information Handling	ORACLE TELECOMPUTING
Meteorological Instruments	THE AEROSPACE CONSORTIUM
Meteorological Instruments	APPLIED MICROSYSTEMS Ltd
Meteorological Satellite Ground Stations	ARRAY SYSTEMS COMPUTING
Meteorological Satellite Processing	MACDONALD DETTWILER AND ASSOCIATES Ltd
Meteorological Stations	PELORUS NAVIGATION SYSTEMS
Meterology	THE AEROSPACE CONSORTIUM
Metrology	QUANTUM INSPECTION AND TESTING Ltd
MHMICs	MPR TELTECH Ltd
MHMICs	TRL MICROWAVE TECHNOLOGY
Microcircuits	CANADIAN MARCONI COMPANY
Microcomputers	TRACKER INDUSTRIES Ltd
Microelectronics	COM DEV Ltd
Microelectronics	MPR TELTECH Ltd
Microgravity Equipment	WARDROP ENGINEERING
Micronic Filters	3-L FILTERS Ltd
Microprocessor Control Units	DOWTY AEROSPACE TORONTO
Microprocessors	EPIC DATA
Microscopic Imaging	DIPIX TECHNOLOGIES
Microwave	VARIAN CANADA
Microwave Amplifiers	LUCAS AEROSPACE
Microwave Analysis and Design Software	OPTOTEK Ltd
Microwave Antennas and Waveguide	LEBLANC & ROYLE TELCOM
Microwave Components	LUCAS AEROSPACE
Microwave Components	MITEC ELECTRONICS Ltd
Microwave Hybrids (MHMIC)	ITS ELECTRONICS
Microwave Instruments	MPB TECHNOLOGIES
Microwave Landing System	See MLS
Microwave Subsystems	COM DEV Ltd
Microwave Subsystems	LUCAS AEROSPACE
Microwave Subsystems	MITEC ELECTRONICS Ltd
Microwave Subsystems	MPR TELTECH Ltd
Microwave Switches	COM DEV Ltd
Microwave Systems	EXCALIBUR SYSTEMS Ltd
Microwave Systems	LOCKHEED CANADA
Military Flight Training	SOUTHPORT AEROSPACE CENTRE
Military Message Handling	SOFTWARE KINETICS Ltd
Military Vehicle Engineering	W R DAVIS ENGINEERING Ltd
Millimeter Wave Subsystems	MPR TELTECH Ltd
Millimeter Wave Subsystems	VARIAN CANADA
Millimeter Wave Systems	COM DEV Ltd
Millimeter Wave Systems	LOCKHEED CANADA

KEYWORD	COMPANY
Millimetric Systems	EXCALIBUR SYSTEMS Ltd
Milling	COORDINATE INDUSTRIES Ltd
Milling	DOMINIS ENGINEERING Ltd
Mine Clearance Systems	GENERAL MOTORS OF CANADA Ltd
Mine Clearance Systems	THOMSON-CSF SYSTEMS CANADA
Mine Detection	KNUDSEN ENGINEERING Ltd
Mirror Mounts	ULTRA LASERTECH
Missile and Munitions Technology	OERLIKON AEROSPACE
Missile Components	AERO MACHINING Ltd
Missile Components	WINDSOR AEROSPACE
Missile Domes	CRYSTAR RESEARCH
Missile Guidance Systems	OERLIKON AEROSPACE
Mission Planning	INTERA INFORMATION TECHNOLOGIES
MLS	CANADIAN MARCONI COMPANY
MLS	MICRONAV INTERNATIONAL Ltd
MLS	PELORUS NAVIGATION SYSTEMS
MLS Structures	INDAL TECHNOLOGIES
MMICs	MPR TELTECH Ltd
MMICs	OPTOTEK Ltd
Mobile Electronic Warfare Support System	GENERAL MOTORS OF CANADA Ltd
Mobile Radios	SPILSBURY COMMUNICATIONS Ltd
Mobile Runway Lighting Systems	LNS SYSTEMS
Mobile Satellite Subsystems	ITS ELECTRONICS
Models and Simulations	OERLIKON AEROSPACE
Modems	CALIAN COMMUNICATIONS SYSTEMS Ltd
Modems	GANDALF TECHNOLOGIES
Modems	SKYWAVE ELECTRONICS Ltd
Modification (Aircraft/ Avionics)	NAVAIR Ltd
Modification (Aircraft/ Helicopters)	FIELD AVIATION COMPANY
Modification (Aircraft)	AIRTECH CANADA
Modification (Aircraft)	CONAIR AVIATION Ltd
Modification (Aircraft)	IMP GROUP Ltd
Modification (Aircraft)	INNOTECH AVIATION Ltd
Modification (Aircraft)	KELOWNA FLIGHTCRAFT GROUP
Modification (Design and Supply)	CSI ENGINEERING MECHANICS
Modification (Helicopters)	AIRTECH CANADA
Modification (Helicopters)	CANADIAN HELICOPTERS Ltd
Modular Aeronautical Comm Switch	HONEYWELL Ltd
Modular Buildings	WEATHERHAVEN
Modular Design	EPIC DATA
Modular Practice Bombs	VICTRIX Ltd
Module Design	PRIOR DATA SCIENCES Ltd
Moldings (Plastic)	ETM INDUSTRIES
Monitoring and Control	SCIEMETRIC INSTRUMENTS
Monitors (Gas)	THE ARMSTRONG MONITORING Corp
Monocycle Generators	AVTECH ELECTROSYSTEMS Ltd
Mortar Vehicle	GENERAL MOTORS OF CANADA Ltd
Motions Compensation	DOWTY AEROSPACE TORONTO
Motor Speed Control	CASEY COPTER ACCESSORIES Ltd

KEYWORD	COMPANY
Multi-Layer Coatings	CAMETOID Ltd
Multi-Wave Band Imaging	HUGHES LEITZ OPTICAL TECHNOLOGIES
Multicolor LED Displays	OPTOTEK Ltd
Multimedia Systems	MPR TELTECH Ltd
Multiplexers	CANADIAN MARCONI COMPANY
Multiplexers	GANDALF TECHNOLOGIES
Multiplexers	HONEYWELL Ltd
Multipurpose Information Displays	LNS SYSTEMS
Muzzle Reference Systems	HUGHES LEITZ OPTICAL TECHNOLOGIES
Nanosecond Devices	AVTECH ELECTROSYSTEMS Ltd
Naval Cabinetry (EMI/RFI)	DEVTEK AEROSPACE COMPANY
Naval Combat Systems	PARAMAX SYSTEMS CANADA
Navigation Systems	BENDIX AVELEX
Navigation Systems	CAL Corp
Navigation Systems	CANADIAN MARCONI COMPANY
Navigation Systems	ITS ELECTRONICS
Navigation Systems	LITTON SYSTEMS CANADA Ltd
Navigation Systems	PELORUS NAVIGATION SYSTEMS
Navigation Systems	QUESTECH NORTH AMERICAN Ltd
Navigation Systems	SPILSBURY COMMUNICATIONS Ltd
Navigation Systems	TRL MICROWAVE TECHNOLOGY
Navigational Aids	AVIATION PLANNING SERVICES Ltd
Navstar GPS	CANADIAN MARCONI COMPANY
NC/CNC Equipment	INVAR MANUFACTURING Ltd
NC Programming	ICAM TECHNOLOGIES Corp
Nerve Agent Vapor Detector	ANACHEMIA CANADA
Network Management	AIT ADVANCED INFORMATION TECH Corp
Network Management	EDA INSTRUMENTS
Network Management	GANDALF TECHNOLOGIES
Network Management	WESTINGHOUSE CANADA
Network Processors	GANDALF TECHNOLOGIES
Neural Networks	ARRAY SYSTEMS COMPUTING
Neural Networks	CompEngServ Ltd
Neutron Activation Analysis	ONTARIO HYDRO
New Product Development	AVIATION PLANNING SERVICES Ltd
Nickel (Coinage, Powders, Strip)	SHERRITT GORDON Ltd
Night Vision	BENDIX AVELEX
Night Vision	HUGHES LEITZ OPTICAL TECHNOLOGIES
Nitreg® Process	NITREX METAL TECHNOLOGIES
Nitrocellulose	EXPRO CHEMICAL PRODUCTS
Noise Abatement Products	INDAL TECHNOLOGIES
Non-Destructive Testing	CANADA FORGINGS
Non Destructive Testing	DIFFRACTO Ltd
Non-Destructive Testing	DONLEE PRECISION
Non-Destructive Testing	HAVLIK TECHNOLOGIES
Non-Destructive Testing	IMP GROUP Ltd
Non-Destructive Testing	INNOTECH AVIATION Ltd
Non-Destructive Testing	NORTHWEST INDUSTRIES Ltd
Non-Destructive Testing	ONTARIO HYDRO
Non-Destructive Testing	QUANTUM INSPECTION AND TESTING Ltd
Non-Destructive Testing	ROLLS-ROYCE (CANADA) Ltee
Non-Directional Beacon	MICRONAV INTERNATIONAL Ltd

KEYWORD	COMPANY
Non-Directional Beacon	SPILSBURY COMMUNICATIONS Ltd
Non-Ferrous Metals	TIMMINCO Ltd
Nonlinear Optic Materials	CRYSTAR RESEARCH
NOTAM Handling	ORACLE TELECOMPUTING
Nozzles	3-L FILTERS Ltd
Nuclear	ATOMIC ENERGY OF CANADA Ltd
Nuclear Engineering	ONTARIO HYDRO
Nuclear Industry (Machining)	ETM INDUSTRIES
Nuclear Reactor Components	HAWKER SIDDELEY CANADA
Nuclear Reactor Components	TRECO MACHINE & TOOL Ltd
Nuclear Simulation	CAE INDUSTRIES Ltd
Nuclear Waste Management	ONTARIO HYDRO
Nuts	MILLS/STERLING AEROSPACE
Nuts (Metal)	ESNA FASTENERS
O&M of Airports	FRONTEC
O&M Planning	WARDROP ENGINEERING
Oceanographic Instrumentation	APPLIED MICROSYSTEMS Ltd
Oceanographic Products	SPARTON OF CANADA Ltd
Offsets	BELANGER, GUY & ASSOC
Offsets	INTERCON CONSULTANTS
Oil Coolers	DEVTEK AEROSPACE COMPANY
Oil Coolers	GODFREY AEROSPACE
Oil Spill Control	CONAIR AVIATION Ltd
Omega Navigation Systems	CANADIAN MARCONI COMPANY
Operational Studies	AVIATION PLANNING SERVICES Ltd
Operations Research and Statistics	ONTARIO HYDRO
Operator Simulators	ATLANTIS AEROSPACE Corp
Optic Housings	DEVTEK AEROSPACE COMPANY
Optical Character Recognition	AIT ADVANCED INFORMATION TECH Corp
Optical Coatings	CAMETOID Ltd
Optical Coatings	HUGHES LEITZ OPTICAL TECHNOLOGIES
Optical Disk	KOM
Optical Filters	CAMETOID Ltd
Optical Instruments	MPB TECHNOLOGIES
Optical Materials	CRYSTAR RESEARCH
Optical Research & Development	HUGHES LEITZ OPTICAL TECHNOLOGIES
Optical Sighting and Ranging Equipment	OERLIKON AEROSPACE
Optical Storage Archive	KOM
Optical Storage Technology	SHL SYSTEMHOUSE
Optics	ATOMIC ENERGY OF CANADA Ltd
Optics	INTEROPTICS, DIVISION OF LUMONICS
Optics Infrared	HUGHES LEITZ OPTICAL TECHNOLOGIES
Optics Visual	HUGHES LEITZ OPTICAL TECHNOLOGIES
Opto-Acoustic Trace Gas Analyzer	ULTRA LASERTECH
Opto-Mechanical Precision Assemblies	HUGHES LEITZ OPTICAL TECHNOLOGIES
Orange Smoke	HANDS FIREWORKS
Ordnance	HANDS FIREWORKS
Ordnance	MINING RESOURCE ENGINEERING (1988) Ltd
Ordnance Detectors	PYLON ELECTRONICS
Ordnance Detectors	SCINTREX Ltd
Organic Materials Research	ONTARIO HYDRO
Oscillators and Oscillator Subsystems	ITS ELECTRONICS
Packaging (Custom)	SJM PACKAGING
Packaging (Custom)	ZARGES AFC CANADA Ltd
Packaging (Transportation)	INTERNATIONAL CUSTOM PRODUCTS
Packet Switching Multiplexors	EDA INSTRUMENTS
Painting	CUSTOM STEEL MANUFACTURING Ltd
Painting (Aircraft)	FIELD AVIATION COMPANY
Painting (Aircraft)	IMP GROUP Ltd
Painting (Aircraft)	INNOTECH AVIATION Ltd
Paper (Chemical Agent Detector)	ANACHEMIA CANADA
Parachutes	IRVIN INDUSTRIES CANADA Ltd
Paraglider	CIRRUS AVIATION
Parts (Aircraft)	COORDINATE INDUSTRIES Ltd
Parts (Aircraft)	PATLON AIRCRAFT & INDUSTRIES Ltd
Payload Design	SED SYSTEMS
Payload Test Services	SED SYSTEMS
PC Board Design and Fabrication	CAE INDUSTRIES Ltd
PC Board Design and Fabrication	CANADIAN MARCONI COMPANY
PC Board Fabrication	DOWTY AEROSPACE PETERBOROUGH
PC Board Fabrication	GANDALF TECHNOLOGIES
PC/XT/AT Bus	SPECTRUM SIGNAL PROCESSING
Peripheral Mass Storage	TARGA ELECTRONICS SYSTEMS
Personal Webbing and Gear	FELL-FAB PRODUCTS
Personnel Carrier	GENERAL MOTORS OF CANADA Ltd
Personnel Restraint Equipment	IRVIN INDUSTRIES CANADA Ltd
Personnel Survival Equipment	IRVIN INDUSTRIES CANADA Ltd
Pest Control Devices (Electronic)	NEWTECH INSTRUMENTS Ltd
Petroleum Leak Detectors	THE ARMSTRONG MONITORING Corp
Phase Locked Loop Oscillators	ITS ELECTRONICS
Phased Array	CAL Corp
Photo-acoustics	ULTRA LASERTECH
Photography	HUGHES LEITZ OPTICAL TECHNOLOGIES
Photoplating	CANADIAN MARCONI COMPANY
Physical Metallurgy	ONTARIO HYDRO
Piezoelectric Materials	B M HI-TECH
Planar Array	CAL Corp
Planning	HOWLAND RUSSELL
Planning (Airport)	AVIATION RESEARCH Corp
Planning (Airport)	BLAIR CONSULTING SERVICES
Plasma Spray Coating	VAC-AERO INTERNATIONAL
Plasma Spraying	NATIONAL COATING TECHNOLOGIES
Plastic Extrusion	FLEXIBULB PLASTICS
Plastic Fabrication	VICTRIX Ltd
Plastic Injection Molding	AMPTECH Corp
Plastic Molds	ETM INDUSTRIES
Plastic Sprockets	QUIMPEX Ltd
Plastics	CIBA-GEIGY CANADA Ltd

KEYWORD	COMPANY
Plate and Sheet Metal Fabrication	INVAR MANUFACTURING Ltd
Plating	HAWKER SIDDELEY CANADA
Plenum Cable	HARBOUR INDUSTRIES (Canada) Ltd
Plotting Package (Postprocessed)	ICAM TECHNOLOGIES Corp
Plug-in Computer Boards	SPECTRUM SIGNAL PROCESSING
Pneumatic Systems	GODFREY AEROSPACE
Pollution Control	ONTARIO HYDRO
Pollution Detection	ULTRA LASERTECH
Pollution Monitoring Equipment	THE ARMSTRONG MONITORING Corp
Portable Aircraft	CIRRUS AVIATION
Portable Buildings	WEATHERHAVEN
Portable Heaters	AEROTECH INTERNATIONAL
Portable Power Supplies	GLOBAL THERMOELECTRIC
Portable Protection Systems	INTERNATIONAL CUSTOM PRODUCTS
Portable Telescopic Antenna Masts (Surface)	VICTRIX Ltd
Portable Terminals	EPIC DATA
Postprocessor (Multi-Axis)	ICAM TECHNOLOGIES Corp
Powder Metallurgy	SHERRITT GORDON Ltd
Power Amplifiers	ITS ELECTRONICS
Power Amplifiers	VARIAN CANADA
Power Converters	ASCENT POWER TECHNOLOGY
Power Converters	CAL Corp
Power Dividers	ITS ELECTRONICS
Power Klystrons	VARIAN CANADA
Power Sources	GLOBAL THERMOELECTRIC
Power Splitters	AVTECH ELECTROSYSTEMS Ltd
Power Supplies	ASCENT POWER TECHNOLOGY
Power Supplies	CANADIAN MARCONI COMPANY
Power Supplies	GARRETT CANADA
Power Supplies	KB ELECTRONICS (1989) Ltd
Power Supplies	SPARTON OF CANADA Ltd
Power Supplies	ULTRA LASERTECH
Power Supplies	VARIAN CANADA
Power Supplies (Uninterruptible)	CTS OF CANADA Ltd
Power Supplies (Uninterruptible)	KB ELECTRONICS (1989) Ltd
Power Systems	ONTARIO HYDRO
Practice Bomb Signal Cartridges	HANDS FIREWORKS
Precision Approach Radar	RAYTHEON CANADA Ltd
Precision Approach System	MICRONAV INTERNATIONAL Ltd
Precision Machining	AERO MACHINING Ltd
Precision Machining	THE AEROSPACE CONSORTIUM
Precision Machining	BENDIX AVELEX
Precision Machining	CANADIAN MARCONI COMPANY
Precision Machining	CHICOPEE MANUFACTURING Ltd
Precision Machining	COORDINATE INDUSTRIES Ltd
Precision Machining	EBCO AEROSPACE INDUSTRIES
Precision Machining	ETM INDUSTRIES
Precision Machining	EXTEC PRECISION MANUFACTURING
Precision Machining	HAWKER SIDDELEY CANADA
Precision Machining	INVAR MANUFACTURING Ltd
Precision Machining	STEVESTED MACHINERY & ENGINEERING Ltd
Precision Machining	T R COX AEROFOILS Ltd
Precision Machining	TRECO MACHINE & TOOL Ltd
Precision Machining	UDT INDUSTRIES
Precision Machining	WINDSOR AEROSPACE
Precision Measurement	QUANTUM INSPECTION AND TESTING Ltd
Precision Opening Release Systems	IRVIN INDUSTRIES CANADA Ltd
Precision Parts	CHICOPEE MANUFACTURING Ltd
Precision Sand Castings	HALEY INDUSTRIES Ltd
Presentations	BRUCE D VALLILLEE ELECTRONICS Ltd
Pressure Vessel Filters	3-L FILTERS Ltd
Primary Surveillance Radar	RAYTHEON CANADA Ltd
Printer Components/ Assemblies	TRECO MACHINE & TOOL Ltd
Printheads (LED)	OPTOTEK Ltd
Process Control	ATOMIC ENERGY OF CANADA Ltd
Process Control	MATROX ELECTRONIC SYSTEMS Ltd
Process Control	QUESTECH NORTH AMERICAN Ltd
Process Metallurgy	ONTARIO HYDRO
Processing (EW)	INTERACTIVE CIRCUITS & SYSTEMS Ltd
Processing (Radar)	INTERACTIVE CIRCUITS & SYSTEMS Ltd
Processing (Sensor)	INTERACTIVE CIRCUITS & SYSTEMS Ltd
Processing (Signal)	INTERACTIVE CIRCUITS & SYSTEMS Ltd
Processing (Sonar)	INTERACTIVE CIRCUITS & SYSTEMS Ltd
Procurement	FMA CONSULTANTS
Procurement	GOVERNMENT CONSULTANTS INTERNATIONAL
Product Development	W R DAVIS ENGINEERING Ltd
Product Surveillance	QUANTUM INSPECTION AND TESTING Ltd
Program Verification	ORA CANADA
Programming (CNC/NC)	ICAM TECHNOLOGIES Corp
Project Management	THE AEROSPACE CONSORTIUM
Project Management	AIT ADVANCED INFORMATION TECH Corp
Project Management	THE AUSTIN COMPANY Ltd
Project Management	LANSDOWNE INTEGRATED SYSTEMS
Project Management	PARAMAX SYSTEMS CANADA
Project Management	PRIOR DATA SCIENCES Ltd
Project Management	RE:ACTION MARKETING SERVICES Ltd
Project Management	SED SYSTEMS
Project Management	THOMPSON-HICKLING AVIATION
Project Management	TRILINK TECHNOLOGIES GROUP
Project Management	W R DAVIS ENGINEERING Ltd
Project Management	WARDROP ENGINEERING
Propellant Motors	BRISTOL AEROSPACE Ltd
Propellants	EXPRO CHEMICAL PRODUCTS
Propellers	DOMINIS ENGINEERING Ltd
Proposal Writing	FMA CONSULTANTS
Proposal Writing	HOWLAND RUSSELL
Proposal Writing	LANSDOWNE INTEGRATED SYSTEMS
Protection Coverings	INTERNATIONAL CUSTOM PRODUCTS
Protective Clothing	BARRDAY

KEYWORD	COMPANY
Protective Clothing	IRVIN INDUSTRIES CANADA Ltd
Protective Coatings	CAMETOID Ltd
Protective Equipment	IRVIN INDUSTRIES CANADA Ltd
Prototyping	MILLS/STERLING AEROSPACE
Prototyping	W R DAVIS ENGINEERING Ltd
Prototyping	WARDROP ENGINEERING
Public Relations	RE:ACTION MARKETING SERVICES Ltd
Publication Service	APPENDIX PUBLISHING
Pulse Amplifiers	AVTECH ELECTROSYSTEMS Ltd
Pulse Generators	AVTECH ELECTROSYSTEMS Ltd
Pulsers	VARIAN CANADA
Pultrusion	FRE COMPOSITES
Pyrotechnics	HANDS FIREWORKS
Pyrotechnics	VICTRIX Ltd
QPL Listed Wire	HARBOUR INDUSTRIES (Canada) Ltd
Quality Assurance	THE AUSTIN COMPANY Ltd
Quality Assurance	BRUCE D VALLILLEE ELECTRONICS Ltd
Quality Assurance	QUANTUM INSPECTION AND TESTING Ltd
Quartz Crystals	CROVEN CRYSTALS Ltd
Quartz Crystals	CRYSTAR RESEARCH
Query Language	CHERNIAK GIBLON
Quick Connect Coupling	HILTAP FITTINGS Ltd
R&D (Electronics)	VICTRIX Ltd
R&O (Accessories)	CANADIAN HELICOPTERS Ltd
R&O (Accessories)	CANAM TOOL & ENGINEERING
R&O (Accessories)	GODFREY AEROSPACE
R&O (Accessories)	LEAVENS AVIATION
R&O (Aircraft Components)	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
R&O (Aircraft/Helicopters)	FIELD AVIATION COMPANY
R&O (Aircraft)	BRISTOL AEROSPACE Ltd
R&O (Aircraft)	CONAIR AVIATION Ltd
R&O (Aircraft)	IMP GROUP Ltd
R&O (Aircraft)	INNOTECH AVIATION Ltd
R&O (Aircraft)	KELOWNA FLIGHTCRAFT GROUP
R&O (Aircraft)	NORTHWEST INDUSTRIES Ltd
R&O (Aircraft)	SPAR AEROSPACE Ltd
R&O (Antenna Structures)	LEBLANC & ROYLE TELCOM
R&O (Avionics, Communications, Electronics)	CANADIAN MARCONI COMPANY
R&O (Avionics)	THE AEROSPACE CONSORTIUM
R&O (Avionics)	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
R&O (Avionics)	BENDIX AVELEX
R&O (Avionics)	CAE INDUSTRIES Ltd
R&O (Avionics)	CANADIAN HELICOPTERS Ltd
R&O (Avionics)	GARRETT CANADA
R&O (Avionics)	HONEYWELL Ltd
R&O (Avionics)	LITTON SYSTEMS CANADA Ltd
R&O (Avionics)	LNS SYSTEMS
R&O (Avionics)	NAVAIR Ltd
R&O (Avionics)	NORTHWEST INDUSTRIES Ltd
R&O (Avionics)	SPAR AEROSPACE Ltd
R&O (Coatings)	CAMETOID Ltd
R&O (Communications)	EDA INSTRUMENTS
R&O (Components)	A-R TECHNOLOGIES
R&O (Components)	BENDIX AVELEX
R&O (Components)	CANADIAN HELICOPTERS Ltd
R&O (Components)	GENAIRE Ltd
R&O (Components)	SPECIALIZED WELDING & FABRICATION Ltd
R&O (Composite Structures)	FIELD AVIATION COMPANY
R&O (Electronics)	THE AEROSPACE CONSORTIUM
R&O (Electronics)	CALIAN COMMUNICATIONS SYSTEMS Ltd
R&O (Electronics)	GE CANADA
R&O (Engine Components)	CANADIAN HELICOPTERS Ltd
R&O (Engine Components)	VAC-AERO INTERNATIONAL
R&O (Engine Test Facilities)	MDS AERO SUPPORT Corp
R&O (Engines)	A-R TECHNOLOGIES
R&O (Engines)	BRISTOL AEROSPACE Ltd
R&O (Engines)	CANADIAN HELICOPTERS Ltd
R&O (Engines)	GE CANADA
R&O (Engines)	HAWKER SIDDELEY CANADA
R&O (Engines)	LEAVENS AVIATION
R&O (Engines)	ROLLS-ROYCE (CANADA) Ltee
R&O (Engines)	STANDARD AERO Ltd
R&O (Facility Plan)	CEL AEROSPACE TEST EQUIPMENT Ltd
R&O (Fuel Controls)	BENDIX AVELEX
R&O (Generators)	ROYAL AEROSPACE
R&O (Ground Power)	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
R&O (Helicopters)	BRISTOL AEROSPACE Ltd
R&O (Helicopters)	CANADIAN HELICOPTERS Ltd
R&O (Helicopters)	CANADIAN COMPONENT SERVICES
R&O (Helicopters)	EUROCOPTER CANADA Ltd
R&O (Helicopters)	IMP GROUP Ltd
R&O (Helicopters)	INNOTECH AVIATION Ltd
R&O (Hydraulics)	CANADIAN HELICOPTERS Ltd
R&O (Hydraulics)	HÉROUX
R&O (Hydraulics)	HOCHELAGA AEROSPACE
R&O (Landing Gear)	HÉROUX
R&O (Lifejackets)	TUL SAFETY EQUIPMENT Ltd
R&O (Motors)	ROYAL AEROSPACE
R&O (Parts)	KAYCOM
R&O (Propellers)	LEAVENS AVIATION
R&O (Radar)	HONEYWELL Ltd
R&O (Rafts)	TUL SAFETY EQUIPMENT Ltd
R&O (Small Arms)	DEVTEK AEROSPACE COMPANY
R&O (Small Arms)	DIEMACO (1984)
R&O (Stabilization System)	DIEMACO (1984)
Radar	ADGA GROUP
Radar	BENDIX AVELEX
Radar	CAL Corp
Radar	CANADIAN MARCONI COMPANY
Radar	COM DEV Ltd
Radar	EXCALIBUR SYSTEMS Ltd
Radar	INDAL TECHNOLOGIES
Radar	LITTON SYSTEMS CANADA Ltd
Radar	PRIOR DATA SCIENCES Ltd
Radar	RAYTHEON CANADA Ltd
Radar Antennas	FLEET INDUSTRIES
Radar Augmentation Devices	ATS AEROSPACE
Radar Defense Systems	OERLIKON AEROSPACE
Radar Drives	WINDSOR AEROSPACE
Radar Navigation Aids	ANDREW CANADA
Radar Processing	DIPIX TECHNOLOGIES
Radar Processing	DY-4 SYSTEMS
Radar Processing	ORACLE TELECOMPUTING
Radar Processing	RAYTHEON CANADA Ltd
Radar Processing	SOFTWARE KINETICS Ltd
Radar Processing and Display	LNS SYSTEMS
Radar Reflectors	INDAL TECHNOLOGIES
Radar Signature Analysis	AIT ADVANCED INFORMATION TECH Corp

KEYWORD	COMPANY
Radar Simulation	CAE INDUSTRIES Ltd
Radar Subsystems	ITS ELECTRONICS
Radar Systems	HUGHES AIRCRAFT OF CANADA Ltd
Radar Systems	MPB TECHNOLOGIES
Radar Systems Analysis	AIT ADVANCED INFORMATION TECH Corp
Radar Weather	ANDREW CANADA
Radar Weather Stations	ARRAY SYSTEMS COMPUTING
Radiation Monitoring Systems	PYLON ELECTRONICS
Radiation Monitoring Systems	SCINTREX Ltd
Radiation Resistant Wire	HARBOUR INDUSTRIES (Canada) Ltd
Radio Ancillaries	CANADIAN MARCONI COMPANY
Radio Communications	ADGA GROUP
Radio Communications	CALIAN COMMUNICATIONS SYSTEMS Ltd
Radio Communications	CANADIAN MARCONI COMPANY
Radio Communications	LOCKHEED CANADA
Radio Management Panel	TEAM
Radio/Radar Altimeters	ATLANTIS AEROSPACE Corp
Radio Spectrum Monitoring Systems	LNS SYSTEMS
Radio Wire Integrator	CANADIAN MARCONI COMPANY
Radiographic Penetrant Inspection	SPECIALIZED WELDING & FABRICATION Ltd
Radiometer	COM DEV Ltd
Radiosondes	THE AEROSPACE CONSORTIUM
Radiotelephone Equipment	SPILSBURY COMMUNICATIONS Ltd
Radomes	GENAIRE Ltd
Radomes	INDAL TECHNOLOGIES
Rafts	TUL SAFETY EQUIPMENT Ltd
RAPCON	LNS SYSTEMS
Raster Graphics Display Systems	IOTEK
Raster/Image Integration	GEOVISION SYSTEMS
RDX	EXPRO CHEMICAL PRODUCTS
Real-Time Systems	CAE INDUSTRIES Ltd
Real-Time Systems	CompEngServ Ltd
Real-Time Systems	DEDICATED TECHNOLOGIES Corp
Real-Time Systems	EXCALIBUR SYSTEMS Ltd
Real-Time Systems	PRECISE SOFTWARE TECHNOLOGIES
Real-Time Systems	SOFTWARE KINETICS Ltd
Real-Time Systems	SPECTRUM SIGNAL PROCESSING
Recovery Systems	IRVIN INDUSTRIES CANADA Ltd
Recovery Vehicle	GENERAL MOTORS OF CANADA Ltd
Red Signal	HANDS FIREWORKS
Reference Library (Aircraft Parts)	PATLON AIRCRAFT & INDUSTRIES Ltd
Reflex Klystrons	VARIAN CANADA
Refueling Hose	3-L FILTERS Ltd
Refueling Systems	3-L FILTERS Ltd
Relay and Control Boxes	HALPEN ENGINEERING
Reliability Analysis	INNIS TECHNOLOGY
Reliability Analysis	WARDROP ENGINEERING
Remote Communications Terminals	ULTIMATEAST DATA COMMUNICATIONS Ltd
Remote Handling	WARDROP ENGINEERING
Remote Manipulator Systems	SPAR AEROSPACE Ltd
Remote Power Supplies	GLOBAL THERMOELECTRIC
Remote Sensing	AIT ADVANCED INFORMATION TECH Corp
Remote Sensing	CAL Corp
Remote Sensing	HUGHES LEITZ OPTICAL TECHNOLOGIES
Remote Sensing	INTERA INFORMATION TECHNOLOGIES
Remote Sensing	ITS ELECTRONICS
Remote Sensing	KNUDSEN ENGINEERING Ltd
Remote Sensing	LAPP-HANCOCK ASSOCIATES Ltd
Remote Sensing	MACDONALD DETTWILER AND ASSOCIATES Ltd
Remote Sensing	MPB TECHNOLOGIES
Remote Sensing	SCINTREX Ltd
Remote Sensing	SPAR AEROSPACE Ltd
Removable Media Mass Storage Systems	TARGA ELECTRONICS SYSTEMS Inc
Repair Capability Machining	EBCO AEROSPACE INDUSTRIES
Requirements Analysis	PRIOR DATA SCIENCES Ltd
Requirements Analysis	THOMPSON-HICKLING AVIATION
Resource Management	INTERA INFORMATION TECHNOLOGIES
Restraint Systems	INTERNATIONAL CUSTOM PRODUCTS
Retrofit Solid State Components	ITS ELECTRONICS
Reverse Engineering	SEMICONDUCTOR INSIGHTS
Reverse Osmosis Units	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Rewind Rotors	ROYAL AEROSPACE
Rewrite Rules	ORA CANADA
RF Communications	GE CANADA
RF Communications	MPR TELTECH Ltd
RF Communications	ROHDE & SCHWARZ CANADA
RF Communications	SKYWAVE ELECTRONICS Ltd
RF Simulation	EXCALIBUR SYSTEMS Ltd
RF Subsystems	CAL Corp
RF Subsystems	EXCALIBUR SYSTEMS Ltd
RF Testing	LEBLANC & ROYLE TELCOM
RFP Response	RE:ACTION MARKETING SERVICES Ltd
Ring Laser Gyros	LITTON SYSTEMS CANADA Ltd
Risk Management Analysis	JOHNSON & HIGGINS Ltd
Road Wheels	QUIMPEX Ltd
Robotic Vision	DIPIX TECHNOLOGIES
Robotic Vision	IMAGO MACHINE VISION
Robotics	ATOMIC ENERGY OF CANADA Ltd
Robotics	DYNACON ENTERPRISES Ltd
Robotics	MPB TECHNOLOGIES
Robotics	SPAR AEROSPACE Ltd
Robotics	THOMSON-CSF SYSTEMS CANADA
Robotics	WARDROP ENGINEERING
Rock Sciences	ONTARIO HYDRO
Rocket Igniters	HANDS FIREWORKS
Rocket Launchers	BRISTOL AEROSPACE Ltd
Rocket Launchers	CELLPACK AEROSPACE Ltd
Rocket Launchers	FRE COMPOSITES
Rockets	BRISTOL AEROSPACE Ltd
Rotary Products	FOCAL TECHNOLOGIES
Route Analysis	AVIATION PLANNING SERVICES Ltd
Routers	GANDALF TECHNOLOGIES

KEYWORD	COMPANY
RPV	CANADAIR GROUP
Rubber Custom Mixing	THE ACTON RUBBER Ltd
Rubber Molded Parts	THE ACTON RUBBER Ltd
Rubber Retreading	THE ACTON RUBBER Ltd
Ruggedized Mass Storage Systems	TARGA ELECTRONICS SYSTEMS
Safety Equipment	THE ARMSTRONG MONITORING Corp
Safety Equipment	NOVA-QUINTECH Corp
Safety Harnesses	TUL SAFETY EQUIPMENT Ltd
Sales Representation	GOVERNMENT CONSULTANTS INTERNATIONAL
Sales Representation	M&T MANAGEMENT SALES
Salinity Measurement	NEWTECH INSTRUMENTS Ltd
Salt Spray (Fog) Testing	CAMETOID Ltd
Sand Castings	HALEY INDUSTRIES Ltd
Sapphire Crystals and Materials	CRYSTAR RESEARCH
SAR	ARRAY SYSTEMS COMPUTING
SAR	CAL Corp
SAR	INTERA INFORMATION TECHNOLOGIES
SAR	MACDONALD DETTWILER AND ASSOCIATES Ltd
Satellite Aided Search and Rescue	ARRAY SYSTEMS COMPUTING
Satellite Carrier Monitoring	CALIAN COMMUNICATIONS SYSTEMS Ltd
Satellite Communications	ADGA GROUP
Satellite Communications	CAL Corp
Satellite Communications	CALIAN COMMUNICATIONS SYSTEMS Ltd
Satellite Communications	CANADIAN MARCONI COMPANY
Satellite Communications	COM DEV Ltd
Satellite Communications	LAPP-HANCOCK ASSOCIATES Ltd
Satellite Communications	MPR TELTECH Ltd
Satellite Communications	SKYWAVE ELECTRONICS Ltd
Satellite Communications	TELESAT CANADA
Satellite Communications	ULTIMATEAST DATA COMMUNICATIONS Ltd
Satellite Communications Power Amp	VARIAN CANADA
Satellite Electronics	CAL Corp
Satellite Ground Control Equipment	SED SYSTEMS
Satellite Ground Stations	CAL Corp
Satellite Ground Stations	MACDONALD DETTWILER AND ASSOCIATES Ltd
Satellite Ground Stations	RAYTHEON CANADA Ltd
Satellite Ground Stations	SED SYSTEMS
Satellite Information Distribution	ORACLE TELECOMPUTING
Satellite Insulation	FELL-FAB PRODUCTS
Satellite Platforms	DEVTEK AEROSPACE COMPANY
Satellite Reconnaissance Sensors	DALSA
Satellite Structures	FLEET INDUSTRIES
Satellite Subsystems	AIT ADVANCED INFORMATION TECH Corp
Satellite Subsystems	COM DEV Ltd
Satellite Subsystems	ITS ELECTRONICS
Satellite Subsystems	PRECISE SOFTWARE TECHNOLOGIES
Satellite Subsystems	SPAR AEROSPACE Ltd
Satellite Telemetry Stations	SED SYSTEMS
Satellite Terminals	SKYWAVE ELECTRONICS Ltd
Satellite Weather Distribution	LNS SYSTEMS
Satellites	SPAR AEROSPACE Ltd
Scanning Electron Microscopy	CAMETOID Ltd
Scheduling (Crew, Aircraft)	WESTEC AEROSPACE
Scope Probes	AVTECH ELECTROSYSTEMS Ltd
Scrambling	GE CANADA
Screws	MECAIR
Screws	MILLS/STERLING AEROSPACE
SCSI Host Adaptor	KOM
Sealed CO2	ULTRA LASERTECH
Search and Rescue Equipment	CAL Corp
Search and Rescue Equipment	NOVA-QUINTECH Corp
Search Radar	LITTON SYSTEMS CANADA Ltd
Seat Manufacture (Aircraft)	FIELD AVIATION COMPANY
Secure Communications	ADGA GROUP
Secure Communications	COMPUTING DEVICES COMPANY
Secure Identity Documents	AIT ADVANCED INFORMATION TECH Corp
Security Systems	THE AUSTIN COMPANY Ltd
Security Systems	EPIC DATA
Security Systems	IMAGO MACHINE VISION
Security Systems	SENSTAR Corp
Security Systems	UNITED MARINE ELEC & COMMUNICATIONS
Selective Calling Systems	TEAM
Self-Powered Heaters	GLOBAL THERMOELECTRIC
Self-Skinning Foam Products	FLEXIBULB PLASTICS
Semiconductor Processing	VORTEK INDUSTRIES Ltd
Semiconductors	OPTOTEK Ltd
Semiconductors	SEMICONDUCTOR INSIGHTS
Sensor Data Fusion	SOFTWARE KINETICS Ltd
Sensor Integration	SOFTWARE KINETICS Ltd
Sensor Systems (Installations)	FIELD AVIATION COMPANY
Sensors	THE ARMSTRONG MONITORING Corp
Sensors	ISTEC
Sensors	OERLIKON AEROSPACE
Separators	3-L FILTERS Ltd
Separators (Oily Water)	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Service and Support	EPIC DATA
Servo Control Engineering	ISTEC
Sewing (Fabric)	FELL-FAB PRODUCTS
Sewing (Insulation)	THE H I THOMPSON CO
Shaft Assemblies	WINDSOR AEROSPACE
Shafts	DONLEE PRECISION
Shafts (Machined)	MECAIR
Sheet Metal Fabrication	CUSTOM STEEL MANUFACTURING Ltd
Sheet Metal Fabrication	HUMBER SHEET METAL Ltd
Sheet Metal Fabrication	INNOTECH AVIATION Ltd
Sheet Metal Fabrication	NATIONAL ENG & SCIENCE ASSOCIATES
Sheet Metal Fabrication	NORANCO MANUFACTURING Ltd
Sheet Metal Fabrication	NORTHWEST INDUSTRIES Ltd
Sheet Metal Heat Shields	THE H I THOMPSON CO
Shelters	LNS SYSTEMS
Shelters	WEATHERHAVEN
Shielded Cabinets	EMCON EMANATION CONTROL Ltd

KEYWORD	COMPANY
Shielded Racking Cabinets	NATIONAL ENG & SCIENCE ASSOCIATES
Shielded Rooms	NATIONAL ENG & SCIENCE ASSOCIATES
Shielded Rooms (RF)	THE AUSTIN COMPANY Ltd
Shipboard Support Systems	INDAL TECHNOLOGIES
Shock Absorbers (Large Bore)	GENERAL KINETICS
Shock Mitigation	DOWTY AEROSPACE TORONTO
Shock/Vibration Analysis	W R DAVIS ENGINEERING Ltd
Side-Looking Airborne Radar	CAL Corp
Sights	HUGHES LEITZ OPTICAL TECHNOLOGIES
Signal Cartridges	HANDS FIREWORKS
Signal Identification Systems	CALIAN COMMUNICATIONS SYSTEMS Ltd
Signal Processing	ARRAY SYSTEMS COMPUTING
Signal Processing	CAL Corp
Signal Processing	CALIAN COMMUNICATIONS SYSTEMS Ltd
Signal Processing	COM DEV Ltd
Signal Processing	COMPUTING DEVICES COMPANY
Signal Processing	IOTEK
Signal Processing	SPECTRUM SIGNAL PROCESSING
Simulation	AVIATION PLANNING SERVICES Ltd
Simulation	AVIATION RESEARCH Corp
Simulation	CAE INDUSTRIES Ltd
Simulation	CHERNIAK GIBLON
Simulation	DYNACON ENTERPRISES Ltd
Simulation	LOCKHEED CANADA
Simulation	PRIOR DATA SCIENCES Ltd
Simulation	THOMPSON-HICKLING AVIATION
Simulation Consoles	GasTOPS Ltd
Simulation Programs	CAE INDUSTRIES Ltd
Simulation Programs	INTEGRATED ENGINEERING SOFTWARE
Simulation Programs	SED SYSTEMS
Simulators	ATLANTIS AEROSPACE Corp
Simulators	CAE INDUSTRIES Ltd
Simulators	EXCALIBUR SYSTEMS Ltd
Simulators	HUGHES AIRCRAFT OF CANADA Ltd
Simulators	LITTON SYSTEMS CANADA Ltd
Simulators (ATC)	ORACLE TELECOMPUTING
Simulators (EW)	CAL Corp
Single Base	EXPRO CHEMICAL PRODUCTS
Single Sideband Radios	SPILSBURY COMMUNICATIONS Ltd
Site Development	LEBLANC & ROYLE TELCOM
Site Investigation	LYNX GEOSYSTEMS
Site Monitoring	DEDICATED TECHNOLOGIES Corp
Site Preparation	EPIC DATA
Site Selection	AVIATION PLANNING SERVICES Ltd
Sleeping Bags	FELL-FAB PRODUCTS
Small Arms	DIEMACO (1984)
Small Arms Components	DEVTEK AEROSPACE COMPANY
Small Gas Turbine Engines	PRATT & WHITNEY CANADA
Smart Structures	FOCAL TECHNOLOGIES
Smoke Markers	VICTRIX Ltd
Smoke Pots	HANDS FIREWORKS
Soft Armour	FELL-FAB PRODUCTS
Software (Microwave Analysis and Design)	OPTOTEK Ltd
Software Development	ATLANTIS AEROSPACE Corp
Software Development	ATS AEROSPACE
Software Development	CAE INDUSTRIES Ltd
Software Development	CompEngServ Ltd
Software Development	DIPIX TECHNOLOGIES
Software Development	DMR GROUP
Software Development	DYNACON ENTERPRISES Ltd
Software Development	GasTOPS Ltd
Software Development	INTEGRATED ENGINEERING SOFTWARE
Software Development	LOCKHEED CANADA
Software Development	MARTIN MARIETTA CANADA Ltd
Software Development	MPR TELTECH Ltd
Software Development	OCEANROUTES SEIMAC
Software Development	PRIOR DATA SCIENCES Ltd
Software Development	TRACKER INDUSTRIES Ltd
Software Development	TRILINK TECHNOLOGIES GROUP
Software Development	W R DAVIS ENGINEERING Ltd
Software Engineering	AVIATION RESEARCH Corp
Software Engineering	CHERNIAK GIBLON
Software Engineering	EXCALIBUR SYSTEMS Ltd
Software Engineering	INTEGRATED ENGINEERING SOFTWARE
Software Engineering	MACDONALD DETTWILER AND ASSOCIATES Ltd
Software Engineering	PRECISE SOFTWARE TECHNOLOGIES
Software Engineering	PRIOR DATA SCIENCES Ltd
Software Engineering	WARDROP ENGINEERING
Software Maintenance	ARRAY SYSTEMS COMPUTING
Software Services	ADGA GROUP
Software Services	ATLANTIS AEROSPACE Corp
Software Services	CAE INDUSTRIES Ltd
Software Services	CAL Corp
Software Services	CANADAIR GROUP
Software Services	DIPIX TECHNOLOGIES
Software Services	EPIC DATA
Software Services	GARRETT CANADA
Software Services	IMP GROUP Ltd
Software Services	PRIOR DATA SCIENCES Ltd
Software Services	TRACKER INDUSTRIES Ltd
Software Systems	MACDONALD DETTWILER AND ASSOCIATES Ltd
Software Verification	MARTIN MARIETTA CANADA Ltd
Soil Sciences	ONTARIO HYDRO
Solar Simulation	VORTEK INDUSTRIES Ltd
Solid State Devices	THE ARMSTRONG MONITORING Corp
Solid State Devices	AVTECH ELECTROSYSTEMS Ltd
Solid State Devices	EPIC DATA
Solid State Devices	LITTON SYSTEMS CANADA Ltd
Solid State Devices	OPTOTEK Ltd
Solid State Devices	VARIAN CANADA
Solid State Memory	TARGA ELECTRONICS SYSTEMS
Solid State Recording Heads	OPTOTEK Ltd
Sonar	KNUDSEN ENGINEERING Ltd
Sonar Domes	INDAL TECHNOLOGIES
Sonar Systems	IOTEK
Sonar Training Systems	CAE INDUSTRIES Ltd
Sonobuoys	DEVTEK AEROSPACE COMPANY
Sonobuoys	HERMES ELECTRONICS Ltd
Sonobuoys	SPARTON OF CANADA Ltd
Sound Equipment	TEAM
Sound Velocity Systems	APPLIED MICROSYSTEMS Ltd
Soundness	ORA CANADA

KEYWORD	COMPANY
Sourcing	BRUCE D VALLILLEE ELECTRONICS Ltd
Space	OERLIKON AEROSPACE
Space Based Radar	CAL Corp
Space Based Radar	SPAR AEROSPACE Ltd
Space Electronics	CANADIAN MARCONI COMPANY
Space Mission Planning	AIT ADVANCED INFORMATION TECH Corp
Space Science Instrumentation	SED SYSTEMS
Space Systems	CAE INDUSTRIES Ltd
Space Systems	CAL Corp
Space Systems	MACDONALD DETTWILER AND ASSOCIATES Ltd
Space Systems	SPAR AEROSPACE Ltd
Space Systems	THOMSON-CSF SYSTEMS CANADA
Spare Parts	MDS AERO SUPPORT Corp
Spare Parts (Aircraft)	KAYCOM
Spare Parts (Engines)	KAYCOM
Spatial Modeling	GEOVISION SYSTEMS
Special Purpose Antennas	ANDREW CANADA
Special Purpose Parachutes	IRVIN INDUSTRIES CANADA Ltd
Specialized Fabrication	INDAL TECHNOLOGIES
Specialized Test Equipment	DOWTY AEROSPACE PETERBOROUGH
Specialty Alloys	SHERRITT GORDON Ltd
Specialty Forgings	CANADA FORGINGS
Specifications Development	SHL SYSTEMHOUSE
Spectrometric Technology	ATOMIC ENERGY OF CANADA Ltd
Spectroscopy	ULTRA LASERTECH
Spectrum Analysis	CALIAN COMMUNICATIONS SYSTEMS Ltd
Spectrum Analysis	SED SYSTEMS
Spectrum Management	CALIAN COMMUNICATIONS SYSTEMS Ltd
SPOT	MACDONALD DETTWILER AND ASSOCIATES Ltd
Spotting Charges	HANDS FIREWORKS
Spread Spectrum	GE CANADA
Spread Spectrum Modems	CALIAN COMMUNICATIONS SYSTEMS Ltd
Sprockets (Drive)	QUIMPEX Ltd
Stabilization	DEVTEK AEROSPACE COMPANY
Stabilization	DIEMACO (1984)
Stabilization	ISTEC
Stamping	EBCO AEROSPACE INDUSTRIES
Stamping	HAWKER SIDDELEY CANADA
Standard Products	EPIC DATA
Stark Cell	ULTRA LASERTECH
Static Switches	CTS OF CANADA Ltd
Steam Quality Stack-Gas Scrubbing	ATOMIC ENERGY OF CANADA Ltd
Steering (Ground) Systems	DOWTY AEROSPACE TORONTO
Steering Systems	DOWTY AEROSPACE TORONTO
Storage of Digital Imagery	DIPIX TECHNOLOGIES
Storage of Digital Imagery	MPR TELTECH Ltd
Storage Systems (Dry and Liquid)	FELL-FAB PRODUCTS
Store and Forward Message Switching	LNS SYSTEMS
Strategic Planning	BELANGER, GUY & ASSOC
Strategic Planning	HOWLAND RUSSELL
Stress Analysis	CSI ENGINEERING MECHANICS
Stress Relieving	CAMETOID Ltd
Strobe Lighting	LEBLANC & ROYLE TELCOM
Strobe Lighting	SJM PACKAGING
Structural Analysis	CAL Corp
Structural Analysis	IMP GROUP Ltd
Structural Analysis (Aircraft)	FIELD AVIATION COMPANY
Structural Components	CHICOPEE MANUFACTURING Ltd
Structural Components	EBCO AEROSPACE INDUSTRIES
Structural Components	FRE COMPOSITES
Structural Components	NORTHWEST INDUSTRIES Ltd
Structural Design	AIRTECH CANADA
Structural Design	CAL Corp
Structural Design	INNOTECH AVIATION Ltd
Structural Dynamics	ATOMIC ENERGY OF CANADA Ltd
Structural Fitting (Helicopters)	ETM INDUSTRIES
Structural Integrity	ONTARIO HYDRO
Structural Modification	NORTHWEST INDUSTRIES Ltd
Structures	SPAR AEROSPACE Ltd
Studies	CSI ENGINEERING MECHANICS
Studies	FMA CONSULTANTS
Studs	MECAIR
Subcontract Management	QUANTUM INSPECTION AND TESTING Ltd
Subcontract Manufacturing	THE AEROSPACE CONSORTIUM
Subcontract Manufacturing	GARRETT CANADA
Subcontract Manufacturing	LITTON SYSTEMS CANADA Ltd
Subcontractor Search	HOWLAND RUSSELL
Surface Acoustic Wave Subsystems	COM DEV Ltd
Surface Finishing	CAMETOID Ltd
Surface Treating	NITREX METAL TECHNOLOGIES
Surveillance	CANADIAN MARCONI COMPANY
Surveillance	COMPUTING DEVICES COMPANY
Surveillance	IMAGO MACHINE VISION
Surveillance	ISTEC
Surveillance	PRIOR DATA SCIENCES Ltd
Survey (Satellite) Equipment	EDO CANADA Ltd
Surveys	BRUCE D VALLILLEE ELECTRONICS Ltd
Surveys	CHERNIAK GIBLON
Survival Kits	IRVIN INDUSTRIES CANADA Ltd
Suspension Engineering	GENERAL KINETICS
Switchable Oscillator Banks	ITS ELECTRONICS
Switches (X.25)	EDA INSTRUMENTS
Synthesizers	CALIAN COMMUNICATIONS SYSTEMS Ltd
Synthetic Aperture Radar	See SAR
Synthetic Voice	TEAM
System Definition	EXCALIBUR SYSTEMS Ltd
System Integration	ARRAY SYSTEMS COMPUTING
System Integration	THE AUSTIN COMPANY Ltd
System Integration	IOTEK
System Studies	EXCALIBUR SYSTEMS Ltd
System Studies	MARTIN MARIETTA CANADA Ltd
Systems Analysis	AIT ADVANCED INFORMATION TECH Corp
Systems Analysis	ARRAY SYSTEMS COMPUTING
Systems Analysis	LANSDOWNE INTEGRATED SYSTEMS
Systems Analysis	PRIOR DATA SCIENCES Ltd
Systems Analysis	SOFTWARE KINETICS Ltd
Systems Analysis and Design	EPIC DATA

KEYWORD	COMPANY
Systems Design	CALIAN COMMUNICATIONS SYSTEMS Ltd
Systems Design	CompEngServ Ltd
Systems Engineering	ISTEC
Systems Engineering	MDS AERO SUPPORT Corp
Systems Engineering	SED SYSTEMS
Systems Engineering	THOMPSON-HICKLING AVIATION
Systems Engineering	WARDROP ENGINEERING
Systems Engineering (Nav/Comm)	ADGA GROUP
Systems Engineering Services	GasTOPS Ltd
Systems Flight Testing	INNOTECH AVIATION Ltd
Systems Ground Testing	INNOTECH AVIATION Ltd
Systems Installation Design	INNOTECH AVIATION Ltd
Systems Integration	AIT ADVANCED INFORMATION TECH Corp
Systems Integration	CompEngServ Ltd
Systems Integration	COMPUTING DEVICES COMPANY
Systems Integration	DMR GROUP
Systems Integration	DY-4 SYSTEMS
Systems Integration	HUGHES AIRCRAFT OF CANADA Ltd
Systems Integration	IMP GROUP Ltd
Systems Integration	INNOTECH AVIATION Ltd
Systems Integration	LOCKHEED CANADA
Systems Integration	MARTIN MARIETTA CANADA Ltd
Systems Integration	PARAMAX SYSTEMS CANADA
Systems Integration	SHL SYSTEMHOUSE
Systems Integration	THOMPSON-HICKLING AVIATION
Systems Integration	THOMSON-CSF SYSTEMS CANADA
Systems Integration	TRACKER INDUSTRIES Ltd
Systems Integration	WARDROP ENGINEERING
Systems Management	MARTIN MARIETTA CANADA Ltd
Systems Planning	FMA CONSULTANTS
Systems Simulation	ATLANTIS AEROSPACE Corp
Systems Studies	CAL Corp
Systems Support	SHL SYSTEMHOUSE
Systems Testing	IMP GROUP Ltd
Taber Abrasion Testing	CAMETOID Ltd
Tachometer Generators	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Tactical Communications	ANDREW CANADA
Tactical Network Communications	SOFTWARE KINETICS Ltd
Tactical Radio Relay	CANADIAN MARCONI COMPANY
Tactical Signal Simulator	CAL Corp
Tactical Switchboards	CANADIAN MARCONI COMPANY
Tactical Team Trainers	CAE INDUSTRIES Ltd
Tactical Towed Line Array	INDAL TECHNOLOGIES
Tactical Training Systems	CAE INDUSTRIES Ltd
Tanks (Collapsible)	FELL-FAB PRODUCTS
Tape Punch System	ICAM TECHNOLOGIES Corp
Target Detection	IMAGO MACHINE VISION
Target Systems (Infantry and Armored)	VICTRIX Ltd
Tarpaulins	GM ASSOCIATES
Technical Installation Services	FRONTEC
Technical Publications	THE AEROSPACE CONSORTIUM
Technical Publications	APPENDIX PUBLISHING
Technical Publications	DIEMACO (1984)
Technical Publications	NORTHWEST INDUSTRIES Ltd
Technical Support	DMR GROUP
Technical Writing	APPENDIX PUBLISHING
Technical Writing	NORTHWEST INDUSTRIES Ltd
Technical Writing	OERLIKON AEROSPACE
Technical Writing	RE:ACTION MARKETING SERVICES Ltd
Technology Assessment	W R DAVIS ENGINEERING Ltd
Technology Development	DMR GROUP
Technology Reviews	SEMICONDUCTOR INSIGHTS
Teflon™ Coatings	CAMETOID Ltd
Telecommunications	CALIAN COMMUNICATIONS SYSTEMS Ltd
Telecommunications Test Equipment	NAVAIR Ltd
Telecommunications Test Equipment	ROHDE & SCHWARZ CANADA
Telephone Communications	SKYWAVE ELECTRONICS Ltd
Telephone Outside Plant System	GEOVISION SYSTEMS
Telerobotic Products	SPAR AEROSPACE Ltd
Temperature Control	CASEY COPTER ACCESSORIES Ltd
Temperature Sensors	APPLIED MICROSYSTEMS Ltd
TEMPEST	MITEL Corp
TEMPEST Enclosures	THE AUSTIN COMPANY Ltd
TEMPEST Enclosures	NATIONAL ENG & SCIENCE ASSOCIATES
TEMPEST Engineering	EMCON EMANATION CONTROL Ltd
TEMPEST Manufacturing	EMCON EMANATION CONTROL Ltd
TEMPEST Testing (NACSIM)	EMCON EMANATION CONTROL Ltd
TEMPEST Workstations	NATIONAL ENG & SCIENCE ASSOCIATES
Tents	FELL-FAB PRODUCTS
Tents	WEATHERHAVEN
Terminal Servers	GANDALF TECHNOLOGIES
Terminals	CALIAN COMMUNICATIONS SYSTEMS Ltd
Terminals	EPIC DATA
Terrestrial Microwave Antennas	ANDREW CANADA
Test Equipment	DOWTY AEROSPACE PETERBOROUGH
Test Equipment	EXCALIBUR SYSTEMS Ltd
Test Equipment (Cases)	SJM PACKAGING
Test Equipment (Cases)	ZARGES AFC CANADA Ltd
Test Equipment (Digital 1553)	ATLANTIS AEROSPACE Corp
Test Facilities	DSMA-BABCOCK,
Test Instrumentation	CALIAN COMMUNICATIONS SYSTEMS Ltd
Test Instrumentation	ROHDE & SCHWARZ CANADA
Test Management	DSMA-BABCOCK,
Test Rigs	CAL Corp
Testing (High Pressure)	ITT CANNON
Testing/Test Equipment	ATLANTIS AEROSPACE Corp
Testing/Test Equipment	ATOMIC ENERGY OF CANADA Ltd
Testing/Test Equipment	CAL Corp
Testing/Test Equipment	CALIAN COMMUNICATIONS SYSTEMS Ltd
Testing/Test Equipment	CANADAIR GROUP
Testing/Test Equipment	CANADIAN MARCONI COMPANY

KEYWORD	COMPANY
Testing/Test Equipment	CEL AEROSPACE TEST EQUIPMENT Ltd
Testing/Test Equipment	CSI ENGINEERING MECHANICS
Testing/Test Equipment	EPIC DATA
Testing/Test Equipment	GARRETT CANADA
Testing/Test Equipment	IMP GROUP Ltd
Testing/Test Equipment	QUANTUM INSPECTION AND TESTING Ltd
Testing/Test Equipment	ROHDE & SCHWARZ CANADA
Testing/Test Equipment	W R DAVIS ENGINEERING Ltd
Thermal Barrier Coatings	CAMETOID Ltd
Thermal Imager	ISTEC
Thermal Imaging	BENDIX AVELEX
Thermal Imaging	M&T MANAGEMENT SALES
Thermal Spraying	NATIONAL COATING TECHNOLOGIES
Thermal Spraying	SHERRITT GORDON Ltd
Thermal Testing	VORTEK INDUSTRIES Ltd
Thermocouple Wire	HARBOUR INDUSTRIES (Canada) Ltd
Thermodynamics Analysis	W R DAVIS ENGINEERING Ltd
Thermoelectric Generators	GLOBAL THERMOELECTRIC
Thermoelectric Power Units	GLOBAL THERMOELECTRIC
Thermoelectric Research	GLOBAL THERMOELECTRIC
Thermofluids and Tribology Research	ONTARIO HYDRO
Thermoforming	FLEXIBULB PLASTICS
Thermoplastics	FLEXIBULB PLASTICS
Thick Film Hybrid Microcircuits	CANADIAN MARCONI COMPANY
Thickness Testing	CAMETOID Ltd
Thin Film Deposition	INTEROPTICS, DIVISION OF LUMONICS
Thin Film Hybrid Microcircuits	CANADIAN MARCONI COMPANY
Thin Film Services	LUCAS AEROSPACE
Thin Films	CAMETOID Ltd
Thixomolding (Magnesium Injection Molding)	AMPTECH Corp
Thread Grinding	STRITE INDUSTRIES Ltd
Thrust Frames	MDS AERO SUPPORT Corp
Titanium	AERO MACHINING Ltd
Titanium	CHICOPEE MANUFACTURING Ltd
Titanium	EBCO AEROSPACE INDUSTRIES
Titanium	MECAIR
Titanium Doped Sapphire	CRYSTAR RESEARCH
Tooling	AERO MACHINING Ltd
Tooling	AMPTECH Corp
Tooling	EBCO AEROSPACE INDUSTRIES
Tooling	NORTHWEST INDUSTRIES Ltd
Tooling	PAW SPECIALTIES
Tooling	ROLLS-ROYCE (CANADA) Ltee
Tooling	T R COX AEROFOILS Ltd
Towed Arrays	DEVTEK AEROSPACE COMPANY
Towers (Antenna)	ANDREW CANADA
Towers, Mobile or Fixed	LNS SYSTEMS
Toxic Gas Detectors	THE ARMSTRONG MONITORING Corp
Toxic Gas Detectors	SCINTREX Ltd
Trace Gas Detection	SCINTREX Ltd
Tracks (Molded Rubber)	QUIMPEX Ltd
Traffic Forecast	AVIATION PLANNING SERVICES Ltd
Training	ATLANTIS AEROSPACE Corp
Training	BENDIX AVELEX
Training	BRUCE D VALLILLEE ELECTRONICS Ltd
Training	CAE INDUSTRIES Ltd
Training	CompEngServ Ltd
Training	DEW ENGINEERING AND DEVELOPMENT Ltd
Training	DMR GROUP
Training	EXCALIBUR SYSTEMS Ltd
Training	FMA CONSULTANTS
Training	HONEYWELL Ltd
Training	ISTEC
Training	LITTON SYSTEMS CANADA Ltd
Training	LOCKHEED CANADA
Training	MATROX ELECTRONIC SYSTEMS Ltd
Training	OERLIKON AEROSPACE
Training	PARAMAX SYSTEMS CANADA
Training	PROMAVIA INTERNATIONAL Corp
Training	QUANTUM INSPECTION AND TESTING Ltd
Training	SEMICONDUCTOR INSIGHTS
Training	THOMSON-CSF SYSTEMS CANADA
Training (Flight and Maintenance)	SOUTHPORT AEROSPACE CENTRE
Training Simulators	ATLANTIS AEROSPACE Corp
Training Simulators	CAE INDUSTRIES Ltd
Training Simulators	CompEngServ Ltd
Training Simulators	SOFTWARE KINETICS Ltd
Transducers (Wheel Speed)	HYPERNETICS Ltd
Transformers	AVTECH ELECTROSYSTEMS Ltd
Transformers	CANADIAN MARCONI COMPANY
Transmission of Digital Imagery	DIPIX TECHNOLOGIES
Transmission Research	ONTARIO HYDRO
Transmissions	SPAR AEROSPACE Ltd
Transmitters	VARIAN CANADA
Transport System	GENERAL MOTORS OF CANADA Ltd
Transportation Packaging	INTERNATIONAL CUSTOM PRODUCTS
Transportation Systems (Dry & Liquid)	FELL-FAB PRODUCTS
Travelling Wave Tubes	VARIAN CANADA
Triple Base	EXPRO CHEMICAL PRODUCTS
Tritium Monitors	SCINTREX Ltd
Tritium Technology	ONTARIO HYDRO
Tubing	TUBE-FAB Ltd
Tubing Assembly Fabrication	NORTHWEST INDUSTRIES Ltd
Tubing Assembly Fabrication	TUBE-FAB Ltd
Tuneable CO2	ULTRA LASERTECH
Turbine Blade Inspection	ROLLS-ROYCE (CANADA) Ltee
Turbine Cooling Research	PRATT & WHITNEY CANADA
Turbine Engine Components	ETM INDUSTRIES
Turbine Engines	ROLLS-ROYCE (CANADA) Ltee
Turbomachinery Aerodynamic Research	PRATT & WHITNEY CANADA
Turnkey Computer Systems	PRIOR DATA SCIENCES Ltd
Turnkey Data Collection Systems	EPIC DATA
Turnkey Image Processing Systems	DEDICATED TECHNOLOGIES Corp
Turnkey Image Processing Systems	DIPIX TECHNOLOGIES
UHF	GE CANADA

KEYWORD	COMPANY
UHF and S-Band Telemetry Trans	CALIAN COMMUNICATIONS SYSTEMS Ltd
UL Wire	HARBOUR INDUSTRIES (Canada) Ltd
Ultraviolet Imagers	CAL Corp
Ultraviolet Coatings	CAMETOID Ltd
Ultraviolet Fluorescence Systems	SCINTREX Ltd
Unattended Power Supplies	GLOBAL THERMOELECTRIC
Underground Remediation Engineering Design	LYNX GEOSYSTEMS
Underwater Acoustics	APPLIED MICROSYSTEMS Ltd
Underwater Acoustics	KNUDSEN ENGINEERING Ltd
Underwater Instrumentation	APPLIED MICROSYSTEMS Ltd
UNIX Optical Disk	KOM
Unmanned Parachutes	INTERNATIONAL CUSTOM PRODUCTS
Unmanned Vehicle Support Systems	INDAL TECHNOLOGIES
Up/Down Converters	ITS ELECTRONICS
Upgunned Weapon Station	GENERAL MOTORS OF CANADA Ltd
Utility Outside Plant System	GEOVISION SYSTEMS
Vacuum Brazing	VAC-AERO INTERNATIONAL
Vacuum Coatings	CAMETOID Ltd
Vacuum Forming	FLEXIBULB PLASTICS
Vacuum Furnaces	VAC-AERO INTERNATIONAL
Vacuum Heat Treating	VAC-AERO INTERNATIONAL
Validation Equipment	EXCALIBUR SYSTEMS Ltd
Valves	AIRCRAFT APPLIANCES AND EQUIPMENT Ltd
Valves (Laminar Flow)	HYPERNETICS Ltd
Variable Depth Sonar	INDAL TECHNOLOGIES
Variable Tuned Antennas	SPILSBURY COMMUNICATIONS Ltd
Vendor Surveillance	QUANTUM INSPECTION AND TESTING Ltd
Verification of Software	ORA CANADA
Vertical Axis Wind Turbines	INDAL TECHNOLOGIES
VHF	GE CANADA
VHF/FM	SPILSBURY COMMUNICATIONS Ltd
Vibration Analysis	DYNAMIC SIGNAL ANALYSIS Corp
Vibration Test Fixtures	CSI ENGINEERING MECHANICS
Video Display Systems	CAE INDUSTRIES Ltd
Video Display Systems	COMPUTING DEVICES COMPANY
Video Display Systems	DEDICATED TECHNOLOGIES Corp
Video Display Systems	ISTEC
Video Products	MATROX ELECTRONIC SYSTEMS Ltd
Video Training (Thru-Site) Systems	ATLANTIS AEROSPACE Corp
Video Transmission	ISTEC
VME Bus	NEWBRIDGE MICROSYSTEMS
VME Bus	SPECTRUM SIGNAL PROCESSING
VME Computer Modules	DY-4 SYSTEMS
Voice and Data Communications	SKYWAVE ELECTRONICS Ltd
Voice and Data Communications	TELESAT CANADA
Voice and Data Integration	SHL SYSTEMHOUSE
Voice and Data Switches	LNS SYSTEMS
Voice and Signal Processing	GE CANADA
Voice Privacy Communications	CALIAN COMMUNICATIONS SYSTEMS Ltd
Voice Switching	LNS SYSTEMS
Voice Switching	ORACLE TELECOMPUTING
VOR	CANADIAN MARCONI COMPANY
Wastewater Treatment	ZENON ENVIRONMENTAL
Water (Potable) Storage	FELL-FAB PRODUCTS
Water Purification Systems	3-L FILTERS Ltd
Water Purification Systems	ZENON ENVIRONMENTAL
Water Quality Measurement	APPLIED MICROSYSTEMS Ltd
Waterpump Shaft Assemblies	FAG BEARINGS Ltd
Waveform Generators	AVTECH ELECTROSYSTEMS Ltd
Waveform Instrumentation	AVTECH ELECTROSYSTEMS Ltd
Waveguides	VARIAN CANADA
Weapon System Controls	VICTRIX Ltd
Weapons	DIEMACO (1984)
Wear Resistant Materials	DELORO STELLITE
Wear Resistant Materials	SHERRITT GORDON Ltd
Weather Forecasting	BLAIR CONSULTING SERVICES
Weather Forecasting	MACDONALD DETTWILER AND ASSOCIATES Ltd
Weather Image Processor	MACDONALD DETTWILER AND ASSOCIATES Ltd
Weather Map Displays	LNS SYSTEMS
Weather Radar	SOFTWARE KINETICS Ltd
Weather Stations	DEVTEK AEROSPACE COMPANY
Webbing	FELL-FAB PRODUCTS
Webbing	INTERNATIONAL CUSTOM PRODUCTS
Webbing Straps	TUL SAFETY EQUIPMENT Ltd
Weight and Balance	INNOTECH AVIATION Ltd
Welding	CANADIAN MARCONI COMPANY
Welding	CUSTOM STEEL MANUFACTURING Ltd
Welding	DEVTEK AEROSPACE COMPANY
Welding	HAWKER SIDDELEY CANADA
Welding	INNOTECH AVIATION Ltd
Welding	NORANCO MANUFACTURING Ltd
Welding	ROLLS-ROYCE (CANADA) Ltee
Welding	SPECIALIZED WELDING & FABRICATION Ltd
Welding	WELDING INSTITUTE OF CANADA
Welding (Advanced)	STEVESTED MACHINERY & ENGINEERING Ltd
Welding (Fabric)	FELL-FAB PRODUCTS
Welding (Sheet Metal)	CUSTOM STEEL MANUFACTURING Ltd
Welding (Sheet Metal)	THE H I THOMPSON CO
Welding (Stainless Foils)	THE H I THOMPSON CO
Welding Procedures	QUANTUM INSPECTION AND TESTING Ltd
Welding Technology	ONTARIO HYDRO
Wheel Parts	BENDIX AVELEX
Wheel Speed Transducers	HYPERNETICS Ltd
Wheels (Road)	QUIMPEX Ltd
Whip Antennas	THE AEROSPACE CONSORTIUM
Wide Area Networks	NEWBRIDGE MICROSYSTEMS
Wide Area Networks	RELTEK
Winches	INDAL TECHNOLOGIES
Wind Tunnels	DOMINIS ENGINEERING Ltd
Wind Tunnels	DSMA-BABCOCK,
Window Heat Controls	GARRETT CANADA
Windsheilds	FLEXIBULB PLASTICS

KEYWORD	COMPANY
Wire	HARBOUR INDUSTRIES (Canada) Ltd
Wire and Cable (Aircraft/ Military)	INTERFAST
Wire Harnesses	NEWTECH INSTRUMENTS Ltd
Wiring	ITT CANNON
Wiring and Tubing	IMP GROUP Ltd
Wiring Harness Fabrication	THE AEROSPACE CONSORTIUM
Wiring Harness Fabrication	DOWTY AEROSPACE PETERBOROUGH
Wiring Harness Fabrication	NORTHWEST INDUSTRIES Ltd
Workstations	WESTINGHOUSE CANADA
Workstations (TEMPEST)	EMCON EMANATION CONTROL Ltd
X-Ray Inspection	SPECIALIZED WELDING & FABRICATION Ltd
X-Ray Power Supplies	VARIAN CANADA
Yellow Signal	HANDS FIREWORKS
Zoom Lens	ISTEC Inc

Section IV
COMPANY INDEX

Section II
COMPANY PROFILES
(Continued)

ICAM TECHNOLOGIES Corp

ADDRESS: 1900 Boul des Sources
Pointe Claire, Quebec
Canada H9R 4Z3

CONTACT: Mr John J Nassr, Jr, Vice President
Tel: (514) 697-8033
Fax: (514) 697-8621

KEYWORDS: APT Processing; CAD/CAM; CL File; CNC Programming; Computer Aided Learning; Consulting (CAD/CAM); Flexible Automated Manufacturing; Integrated CAD/CAM Systems; NC Programming; Plotting Package (Postprocessed); Postprocessor (Multi-Axis); Programming (CNC/NC); Tape Punch System.

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 worldwide.

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 color graphic NC part programming; multiaxis postprocessing for all CAD/CAM systems (custom or generic on PCs to mainframes); APT processing (with sculptured surfaces); plotting and tape punching; and integrated CAD/CAM systems as well as flexible manufacturing systems. ICAM is currently a supplier to Pratt and Whitney of Palm City, Florida, and was Boeing's largest supplier of NC programs and fixture designs for their 767 and 757 airframe programs. ICAM software developments are available in mainframe, mini, and micro computer configurations and allow all manufacturing institutions to increase their productivity to new levels.

PERSONNEL: Engineers and Scientists - 15
Others - 15

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: In-house computer system includes DEC VAX 11/785, VAX 11/730, HP 9000, Sun Sparcstation, Silicon Graphics, CDC, Apollo, Data General, and various microcomputer configurations. ICAM software is also available for IBM mainframe and mini computers.

EXPERIENCE: ICAM has 20 years experience in software development, NC programming, and consulting services. ICAM's participation in numerous aerospace projects includes the Canadair Challenger, Mecure II, DHC7, DC-9 Super 80, DC-10, L-1011, 707, 747, 757, 767, F-15, and NASA Space Shuttle. ICAM is a current supplier to the US DOE, McDonnell Douglas, and General Motors.

IMAGO MACHINE VISION Inc

ADDRESS: 300 - 1750 Courtwood Crescent
Ottawa, Ontario
Canada K2C 2B5

CONTACT: Mr Roy Ball, President
Tel: (613) 226-7890
Fax: (613) 226-7743

KEYWORDS: Aerial Target System; Robotic Vision; Security Systems; Surveillance; Target Detection.

HISTORY: IMAGO was incorporated in 1987 to develop products and perform R&D in video target detection/tracking and robotics vision for military and commercial markets.

CAPABILITY: IMAGO has developed a product line of high performance video target trackers for military target tracking, perimeter protection, electronic sentry, and videotape analysis. IMAGO's algorithms are much more sophisticated and effective than those found in most trackers, and this first-class performance is packaged in cost-effective PC-based systems using imaging hardware from Matrox, one of the world leaders in high speed in aging technology.

IMAGO performs contract R&D for military and commercial machine vision applications including

video and combined radar/video tracking, robotic automobile assembly, robotic vision for Space Station Freedom, perimeter video recall, behind armor effects analysis, bomb and weapon recognition, and synthetic aperture radar pattern recognition.

PERSONNEL: PhDs - 2
Engs - 3
Support - 1

GROSS SALES: 1991 - $411K
1992 - $510K

PLANT SIZE: 2,000 sq ft

EQUIPMENT: Several in-house machine vision development systems based on 486 with Matrox Imaging hardware.

EXPERIENCE: Customers include Department of National Defence, Canadian Space Agency, Correctional Service of Canada, and SAMI/Diffracto.

IMP GROUP Ltd

(Aerospace Division)

ADDRESS: (Mailing-Head Office)
IMP Group Ltd
2651 Dutch Village Road, Suite 400
Halifax, Nova Scotia
Canada B3L 4T1

(*Point of Contact)
IMP Group Ltd
Suite 102
6 Gurdwara Road
Nepean, Ontario
Canada K2E 8A3

CONTACT: *Mr H L Conner, Marketing Director
Tel: (613) 727-1989
Fax: (613) 727-9738

KEYWORDS: Airframe Components; Avionics; Cables; Corrosion Control; Electromagnetic Compatibility; Injection Molding; Machining; Modification (Aircraft); Non-Destructive Testing; Painting (Aircraft); R&O (Aircraft); R&O (Helicopters); Software Services; Structural Analysis; Systems Integration; Systems Testing; Testing/Test Equipment; Wiring and Tubing.

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
- Aerospace Engineering Services
- Aircraft Repair and Overhaul
- General Aviation Services
- Foundry
- Steel Fabrication & Machine Shop
- Marine
- Offshore Services
- Hotel
- Properties and Investments
- Research and Development

CAPABILITY: IMP Group's aerospace-related capabilities are described in the seven divisions listed below:

- Aerospace Manufacturing Division - manufactures electronic wiring assemblies for various aircraft and electronics 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, 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, and crew and passenger lounges for large and small commercial aircraft.

- 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 the offshore oil industry.

• 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.

PERSONNEL: 1400

GROSS SALES: 1990 - $200M
1991 - $200M

PLANT SIZE: Aircraft Repair & Overhaul Division - 200,000 sq ft (4 hangars)
Steel Fabrication & Machine Shop - 14,000 sq ft

EXPERIENCE: IMP Group's aerospace clients include the US Navy (P-3 aircraft), Canadian Department of National Defence, Canadair, USAF, and McDonnell Douglas Canada.

INDAL TECHNOLOGIES Inc

ADDRESS: 3570 Hawkestone Road
Mississauga, Ontario
Canada L5C 2V8

CONTACT: Mr Roger Travis, Vice President, Marketing
Tel: (416) 275-5300
(In US call 1-800-263-7340)
Fax: (416) 273-7004

KEYWORDS: Aircraft Handling Systems; Aluminum Fabrication; Antenna Support Structures; Cables; Control Systems; Handling Systems; Hangars; Heat Shielding Products; Helicopter Recovery Assist; ILS Structures; Machining; MLS Structures; Noise Abatement Products; Radar; Radar Reflectors; Radomes; Shipboard Support Systems; Sonar Domes; Specialized Fabrication; Tactical Towed Line Array; Unmanned Vehicle Support Systems; Variable Depth Sonar; Vertical Axis Wind Turbines; Winches.

HISTORY: Indal Technologies Inc (ITI) 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. In November of 1989, Indal Technologies acquired Fathom Oceanology Limited and the H I Thompson Company to further strengthen and enhance its overall capabilities. Indal Limited is a diversified industrial holding company with 28 operating subsidiaries and divisions in Canada and the US.

CAPABILITY: Since its incorporation, Indal Technologies has grown steadily through the development of facilities which provide a specialty range of engineered products. Indal Technologies maintains a large engineering department staffed by professional engineers of many disciplines including mechanical, electrical, structural, aerodynamics, hydraulic, electro-optics, electronic, hydro-dynamic, maintainability, reliability, safety software, and systems 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 is 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. Indal Technologies built a prototype enclosure for the new MLS antenna system scheduled to replace ILS antennas across Canada by the year 2000. 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 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 worldwide. Variants of the Indal helicopter recovery assist systems are now employed on vessels operated by the navies of Argentina, Australia, India, Japan, Spain, Taiwan, and the US. These systems include any or all of the following: helicopter recovery assist and securing transversing systems, and telescopic hangars and hangar doors. The Indal Technologies RAST (Recovery Assist, Securing, and Traversing) system is a key element of the US Navy's LAMPS MK III program. Over 100 ships will be fitted with this system. A prototype system of a new configuration called ASIST, an acronym for Aircraft Ship Integrated Secure and Traverse System, has been assembled and tested at Indal Technologies' plant. This new system will revolutionize helicopter ship operations in such

areas as cost, weight, space, complexity, integrated logistics support, reliability and maintainability, and mission time requirements. 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. About 200 hangars and 400 hangar doors supplied by the company 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 (VAWT) for over 10 years. The Indal Technologies 50 kW unit is the most technically advanced and proven VAWT in the world today. 500 kW machines are now also in operation.

- Cable Handling Systems - ITI's Fathom Oceanology product line includes lightweight dipping sonar winches, torpedo decoy handling systems, and integrated systems such as tactical towed line array and variable depth sonar handling systems used by the navies of Italy, Norway, Singapore, and Sweden. ITI is now the world's leading supplier of handling systems for active towed sonars. In conjunction with Plessey Naval Systems and the Canadian Government, the company has developed a lightweight and high performance dipping sonar winch for the airborne Cormorant sonar. The system has undergone extensive testing by the Canadian and United States navies. ITI also manufactures the "Nixie" torpedo decoy handling system for the Canadian Navy.

- Unmanned Vehicle Support Systems - ITI developed artificial vision systems to enable accurate landing of unmanned air vehicles (UAV) on naval vessels at sea, as well as vision systems launch/recovery platforms, system pre-flight checking, and vehicle transporting by remote control. ITI is participating with US Joint Program Offices and NATO to establish standards for precise UAV recovery and handling. ITI has provided launch/recovery equipment for testing by the US Navy with Canadair's CC 227 UAV.

- Aerospace Components - ITI produces the H I Thompson product line of components for thermal, acoustic, and personnel shielding applications in the aerospace, defence, power generating, heavy equipment, and marine equipment fields.

- 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. Quality assurance procedures are maintained in accordance with CSA Standard Z.299.2, and AQAP-1 requirements (equivalent to MIL-Q-9858A) are also met. There is a resident DND inspector staff based at the Indal Technologies' plant. 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.

PERSONNEL: Engineering - 52
Production - 146
Administration - 97

GROSS SALES: 1990 - $55.0M

Export sales represent more than 80% of Indal Technologies' annual sales of which a large percentage is for the US military, principally the US Navy.

PLANT SIZE: 200,000 sq ft (manufacturing plant)
50,000 sq ft (office complex) (at 2 locations)

EXPERIENCE: The majority of Indal Technologies' sales are made to government customers, either directly or through a third party subcontract. Principal customers include the navies and coast guards of Canada, Finland, India, Japan, Singapore, Spain, Sweden, the US, Australia, and other allied nations in Europe and Latin America.

INNIS TECHNOLOGY Inc

ADDRESS: 17 Homeland Court
Brampton, Ontario
Canada L6S 1R8

CONTACT: Mr Quentin G. Innis, President & CEO
Tel: (416) 793-2610
Fax: (416) 793-2610 - 5 rings

KEYWORDS: Analysis; Integrated Logistics Support; Life Cycle Costing; Manuals; Reliability Analysis.

HISTORY: No data.

CAPABILITY: Innis Technology Inc is primarily involved in efforts to maximize the availability of aerospace and groundbased systems throughout the designed life cycle. This is accomplished by active participation in the right phase of each project, by conducting trade-off studies and analyses relative to new technology, producibility, supportability, and life-cycle cost. The company uses appropriate computer-aided tools.

PERSONNEL: Engs - 3
MD - 1
Secretary - 1

GROSS SALES: 1990 - $100K
1991 - $92K

PLANT SIZE: 1000 sq ft

EQUIPMENT: 3 PCs (80486 CPU), 2 printers, FAX, modems, copying machine, scanner, software library.

EXPERIENCE: Customers served by the company include Indal Ltd, AECL, Spar Aerospace, Raytheon Ltd, Garrett Ltd, DSMA Engineers, DSS Canada, and Zenon Env Inc.

INNOTECH AVIATION Ltd

ADDRESS: (Head Office)
595 Stuart Graham Blvd
Dorval, Quebec
Canada H4Y 1E3

CONTACT: Mr W Robert Price, Senior Vice President Marketing and Sales
Tel: (514) 636-8484
Fax: (514) 636-8887

KEYWORDS: Avionics; Corrosion Control; Electrical Engineering; Electronic Warfare; Modification (Aircraft); Non-Destructive Testing; Painting (Aircraft); R&O (Aircraft); R&O (Helicopters); Sheet Metal Fabrication; Structural Design; Systems Flight Testing; Systems Ground Testing; Systems Installation Design; Systems Integration; Weight and Balance; Welding.

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 was sold in 1988 to IMP Aerospace Limited. The company has offices and aircraft service facilities in 4 Canadian cities: Vancouver, Toronto, Montreal, and Ottawa.

CAPABILITY: The current operating divisions of Innotech Aviation Ltd include Aircraft Sales and Brokerage, Technical Services, and Airborne Remote Sensing. This profile describes only the Technical Services Division which consists of:

- Engineering and 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 twin engine aircraft, multi-engine turboprops, 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. As well, this department installs the avionics systems, electronic warfare systems, and auxiliary power units described in "Engineering and Design".

- Quality Assurance - Innotech's quality assurance personnel hold Canadian Department of Transport (DOT) and the Department of National Defence (DND) AQAP-1 shop approvals. 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.

PERSONNEL: Total - 600

GROSS SALES: 1990 - $65M

PLANT SIZE: 500,000 sq ft

EXPERIENCE: Innotech Aviation customers include the US Coast Guard (Falcon Aircraft), Canadian Department of National Defence (and other departments of the Canadian Government), Canadair, deHavilland Aircraft of Canada, Government of Malaysia, Royal Norwegian Air Force, and many other corporate operators.

INTEGRATED ENGINEERING SOFTWARE

ADDRESS: 46-1313 Border Place
Winnipeg, Manitoba
Canada R3H 0X4

CONTACT: Ms Bennetta Benson, Sales and Marketing Manager
Tel: (204) 632-5636
Fax: (204) 633-7780

KEYWORDS: CAE; Consulting (Engineering); Simulation Programs; Software Development; Software Engineering.

HISTORY: Integrated Engineering Software (IES), incorporated in 1984, is a Canadian research and development company specializing in the development and marketing of computer-aided engineering software for electromagnetic field analysis. IES has an exclusive distributor in Japan and a limited distributor arrangement in Switzerland. A number of cooperative hardware/ software supply arrangements are in place between IES and various workstation hardware manufacturers. Corporate R&D and Sales and Marketing headquarters are located in Winnipeg.

CAPABILITY: IES software is used for the design and analysis of electromagnetic field analysis problems which shortens the product design cycle and eliminates the need for costly prototype development. Each program combines the Boundary Element Method (BEM), now recognized as the most powerful field solution algorithm available, advanced technical capability, ease of use, and comprehensive customer support.

The electrostatic field solvers are used in the design and analysis of electrical and electronic equipment including insulators, bushings, grounding electrodes, transmission lines, telecommunication cables, microstrips, and integrated circuits. The magnetostatic field solvers are used in the design and analysis of magnetic devices and components such as magnetizing fixtures, motors, cyclotrons, solenoids and transformers, recording heads, magnetic shielding, and permanent magnet assemblies. The time-harmonic field solvers are used for magnetic design applications which require eddy current analysis. This allows for calculation of losses in devices such as electric (AC/DC) motors, solenoids and transformers, crack or fault detection, and bus bars.

Programs provide smooth, accurate results and cater to open region problems. No finite element mesh is required. Fully integrated around a convenient user-interface, each package includes geometric modelers and static and quasi-static field solvers. Simple modifications facilitate streamlined problem solving. Unattended analysis of multiple "what-if" scenarios is possible through the time-saving BATCH function. The graphics translator enables easy exchange of geometry files with CAD packages, eliminating repetitive modelling. The short learning curve means that productive time is not wasted in lengthy training sessions.

IES also provides engineering consulting services for EM design applications.

PERSONNEL: R&D Engs - 8
Others - 9

GROSS SALES: 1991 - $0.8M
1992 - $1.2M

PLANT SIZE: No data.

EQUIPMENT: Integrated Engineering Software CAE-EM software packages are available on a variety of PC (DOS) and workstation (UNIX/AIX) platforms.

EXPERIENCE: Present customers include a wide range of national and international corporations, government agencies, national laboratories, educational and research institutions in Canada, the USA, Europe, and the Pacific. IES software also has specific applicability to aerospace and defense-related industries.

Users include Xerox Corporation, 3M, Asea Brown Boveri, Philips Industrial Electronics, Rockwell International, IBM Corporation, MIT Lincoln Laboratory, Mitsubishi, Tektronix, British Aerospace, Lawrence-Berkeley Labs, Pacific Scientific, Siemens Corporation, and Toshiba.

INTERA INFORMATION TECHNOLOGIES

ADDRESS: Suite 200
2 Gurdwara Road
Ottawa, Ontario
Canada K2E 1A2

CONTACT: Mr Garth Lawrence, Vice President Business Development
Tel: (613) 226-5442
Fax: (613) 226-5529

KEYWORDS: Data Acquisition; Data Analysis; Data Conversion; Data Integration; Geographic Information System; Integrated Surveys; Mission Planning; Remote Sensing; Resource Management; SAR.

HISTORY: Intera Information Technologies (Canada) Inc is an integrated multi-disciplinary company providing information-based solutions to customers around the world. The Geographic Information Solutions (GIS) Division of Intera has its foundations in the very root of the surveys and mapping industry in Canada. Companies such as Kenting Earth Sciences and Aero Surveys have been combined with Intera's remote sensing applications expertise and all now operate as Intera: GIS Division.

CAPABILITY: The company's capabilities combine state-of-the-art technology in data conversion, digital mapping, and data integration together with sound spatial information management and analysis practices. The GIS Division

provides products and services for the design, building, and maintenance of spatial databases, as well as full GIS-based remote sensing applications and training. Extensive experience in the acquisition and processing of remotely sensed data together with a strong background in GIS places the firm in an excellent position to lead the development of the integration of the technologies. The scope of services offered by Intera GIS Division is broad and is expanding with the continuing evolution of information technologies. The division is primarily involved in spatial data acquisition, processing, analysis, and presentation.

Intera operates its own fleet of data acquisition aircraft. Services include sensor calibration, collection of thermal airphoto infrared (TIR), SAR, SLAR, multispectral scanner data, real-time data processing display, downlinking, and hard copy output. Intera has both national and international experience in all aspects of data acquisition campaigns, including planning, coordination, and management.

Intera is equipped with computer facilities to accommodate all data processing requirements for digital planimetric and topographic map data, satellite and airborne multispectral imagery, radar, and thermal infrared imagery.

Services related to data analysis include system design and integration, software development and installations (including acceptance testing), radiometric and geometric correction, data integration, and GIS applications. In addition, Intera provides image analysis for a variety of sensors including Landsat MSS and TM, SPOT, NOAA AVHRR, SAR, SEASAT, Airborne MSS, MEIS, and FLI.

Mapping services include photogrammetric mapping, data conversion and drafting, high quality raster and vector plotting, cadastral mapping, digital orthoimaging and automated mapping, and facilities management (AM/FM).

Intera provides consulting services in remote sensing program design, evaluation, and monitoring for government and aid agencies; installation, integration, and commissioning of image analysis and geographic information systems; and training and provision of specialists for briefing consultation to planning and review committees.

PERSONNEL:
PhD - 3
MAs - 31
Bachelor - 29
Ontario Land Surveyor - 4
Technologist - 8
Technician - 20
Licensed Pilot - 2
Licensed Aircraft Mechanic - 1
Other - 27

GROSS SALES: 1990 - $52.28M US (corporate)
1991 - $73.62M US (corporate)

PLANT SIZE: 30,000 sq ft

EQUIPMENT: Data processing subsystems (STAR 1 and 2, SLAR, IR, laser, digital video processor,and SAR 580 transcription system). Image processing and analysis systems (DIPIX ARIES III, MAGIC, IMAVISION, MIDAS, IPPS, DMAS, STARVUE, ARC/INFO, AUTOCAD, INTERGRAPH, SPANS). Sensors include single and dual channel linescanner, laser profilometer, thermal IR scanner, synthetic aperture radar (SAR) STAR system, aerial photography cameras, and sophisticated navigation systems. Data acquisition equipment includes photogrammetric WILD A8 stereoplotter and a WILD PUG 4 precision point transfer device. A complete photographic laboratory includes film processors, printer, contact frames, reproduction cameras, and enlargers.

EXPERIENCE: Present customers include the Canadian Department of National Defence, Canada Centre for Remote Sensing, Defence Research Establishment Ottawa, the UK, and other academic, commercial, and government organizations throughout the world.

INTERACTIVE CIRCUITS & SYSTEMS Ltd

ADDRESS: 5430 Canotek Road
Gloucester, Ontario
Canada K1J 9G2

CONTACT: Dr D Roy, President
Tel: (613) 749-9241
Fax: (613) 749-9461

KEYWORDS: Data Acquisition; Digital Signal Processing; Electronic Design; Processing (EW); Processing (Radar); Processing (Sensor); Processing (Signal); Processing (Sonar).

HISTORY: Interactive Circuits and Systems (ICS) is a Canadian-owned, high-technology electronics company founded in 1980.

CAPABILITY: ICS offers unique expertise in the design and manufacture of high-speed digital signal processing and data acquisition equipment for applications in sonar, radar, EW, and off-the-shelf and custom products. At present, the standard products include a family of VMEbus real-time digital signal processing and data acquisition boards. ICS also offers a complete line of sonar signal processing equipment as standard products. The company's SBF-256 system, which performs in excess of 2 billion arithmetic operations/sec is considered to be the

world's most powerful sonar beamformer. ICS also provides custom R&D services to government and defense industries in the development of advanced systems in radar, sonar, EW, space, and other areas. In the past, the company has successfully developed such sophisticated systems as a digital EW receiver, phased array radar beamformer, star-tracker for satellite navigation, space-mirror calibration system, 3-D sound system for aircraft cockpit applications, etc.

PERSONNEL: PhD - 1
MEng - 1
BEng - 4
Others - 10

GROSS SALES: 1992 - $2.5M (est)

PLANT SIZE: 7,000 sq ft

EQUIPMENT: All required test and measurement equipment.

EXPERIENCE: ICS has a highly diversified international customer base including - NATO (Italy), DREO (Canada), DREA (Canada), DREV (Canada), NADC (US), NOSC (US), NUSC (US), NSA (US), NASA (US), Lockheed (US), TRW/ESL (US), GTE (US), Ford Aero (US), GM (US), and Unisys (US), etc.

INTERCON CONSULTANTS

ADDRESS: 275 Slater Street, Suite 1003
Ottawa, Ontario
Canada K1P 5H9

CONTACT: Mr R Campbell, Partner
Tel: (613) 236-4451
Fax: (613) 230-8707

KEYWORDS: Consulting (Aerospace); Consulting (Canadian Government); Industrial Benefits; Joint Ventures; Offsets.

HISTORY: InterCon Consultants is an Ottawa-based consulting firm. The partnership was founded in 1983 to assist and advise companies, domestic and foreign, in doing business in Canada.

CAPABILITY: InterCon Consultants' clients are primarily defence, communications, and energy companies seeking contracts with the Federal Government and, in the case of foreign companies, with the Canadian private sector. The latter may be in the form of purchases, sales, or joint ventures, licensing arrangements, or takeovers. The partners and associates of the company are experienced in government and industry.

PERSONNEL: No data.

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: InterCon Consultants' clients include large foreign and Canadian aerospace and defense companies, a large space industry company, and a nuclear industry company. The company has associate firms in Europe and the US.

INTERFAST Inc

ADDRESS: Toronto
Head Office
21 Constellation Court
Rexdale, Ontario
Canada M9W 1K4

Montreal
191B Avenue Labrosse
Pointe-Claire, Quebec
Canada H9R 1A3

Vancouver
7-3691 Viking Way
Richmond, British Columbia
Canada V6V 1N6

CONTACT: Mr S Douglas Woollings, President
Mr Dean Allen, Marketing Manager
Tel: (416) 674-0770
Fax: (416) 674-5804

KEYWORDS: Fasteners (Precision); Wire and Cable (Aircraft/Military).

HISTORY: Since inception in 1966, Interfast has been the leading Canadian supplier for aerospace precision fastener systems representing and/or distributing for such recognized manufacturers as Allfast Fastening Systems Inc, Briles Rivet Corp, Deutsch Fastener Corp, Deutsch Metal Components, Hi-Shear Corp, Mercury Aerospace, Monogram Aerospace Fasteners, Rexnord Aerospace Mechanisms (RAM), Rexnord Specialty Fasteners Division with Camloc and Tridair products, TA Mfg Corp, TFI Aerospace, BFM Transport Dynamics, and Western Sky Industries. They also supply custom engineered systems representing Kaiser Electroprecision, Kaiser-Roylyn, Stainless Steel Products Inc, and Teledyne Thermatics. The company supplies aerospace and industrial tooling representing Air Tuf Products Inc, CompTool, Deutsch Metal Components, Hemco Corporation, L&F Industries,

Lok-Fast Inc, Monogram Aerospace Fasteners, P V Tool Inc, Schaefer Machine Company, E A Selzer & Associates, Superior Carbide Tools, and Zephyr Manufacturing Co. They also supply high tech wire and cable to Teledyne Thermatics.

PERSONNEL: Technical Sales Reps - 13
Quality Assurance - 3
Inside Sales Support Staff - 24
Other Support Staff - 29

GROSS SALES: 1991 - $22M

PLANT SIZE: 35,000 sq ft (warehouse)
15,000 sq ft (offices)

EQUIPMENT: Computerized inventory and order systems, bar coding, specialized quantity packaging, Telex, TWX, and FAX.

EXPERIENCE: Since 1966, Interfast has been serving customers including Government of Canada (DND), McDonnell Douglas, Canadair, Boeing Aircraft, Pratt & Whitney Canada, Swiss Federal Air Force, Bell Helicopter, Raytheon Canada, Aerospatiale, MBB Helicopter Canada, Spar Aerospace, IBM, Garrett, Textron, and Litton Systems Canada.

INTERNATIONAL CUSTOM PRODUCTS Inc

ADDRESS: 51 Lucy Avenue
Scarborough, Ontario
Canada M1L 1A1

CONTACT: Mr Robert Harper, President
Tel: (416) 694-2619
Fax: (416) 494-9835

KEYWORDS: Packaging (Transportation); Portable Protection Systems; Protection Coverings; Restraint Systems; Transportation Packaging; Unmanned Parachutes; Webbing.

HISTORY: International Custom Products (ICP) was founded in 1985. It is a privately owned company and the owners participate fully in the day-to-day operation of the business.

CAPABILITY: ICP is one of North America's leading designers and manufacturers of systems for protection, transportation, storage, and deployment of valuable military and aerospace assets. ICP products are engineered from advanced materials to Military Standards including MIL-I-45208 for maximum durability, utility, and performance. ICP's skilled craftsmen work with the latest computer-assisted design and manufacturing equipment to maintain exacting quality over long production runs. However, this same computerized flexibility and precision ensures maximum cost effectiveness even in low-volume, special-purpose applications. ICP is committed to customer satisfaction. Responsive service, ongoing product support, and reliable contract performance build customer confidence. A close working relationship between every customer and ICP's engineered support product team ensures that each ICP product meets or exceeds specification.

PERSONNEL: Production - 100
Engs - 2
Sales - 5
Marketing - 3
Administration - 4

GROSS SALES: 1991 - $1.9M
1992 - $3.0M

PLANT SIZE: 18,000 sq ft

EQUIPMENT: ICP has installed the latest computer-assisted design and manufacturing equipment. Equipment consists of sheeters, slitters, swagers, radio frequency welders, tackers, and stitchers. This automatic equipment allows maximum cost-effectiveness even for low-volume, special-purpose applications.

EXPERIENCE: By being both designers and manufacturers, ICP is able to offer both engineering service and manufacturing service to accounts such as Aerojet Ordnance, Alliant Techsystems, Canadian Department of National Defence, Hermes Electronics, RCMP, Senstar Corporation, and Spar Aerospace Limited.

INTEROPTICS

(A division of Lumonics Inc)

ADDRESS: 14 Capella Court
Nepean, Ontario
Canada K2E 7V6

CONTACT: Mr Brian W Creber, Operations Manager
Tel: (613) 224-4868
Fax: (613) 224-2105

KEYWORDS: Laser Optics; Optics; Thin Film Deposition.

HISTORY: Interoptics was founded in 1973 specializing in precision optical components for the OEM instrument, aerospace, and laser markets. In 1990, the company was purchased by Lumonics Inc of Kanata, Ontario, Canada, a manufacturer of lasers and laser systems.

CAPABILITY: Interoptics is primarily involved in the manufacture of precision optical components of various optical materials. Capability extends to materials used in the ultraviolet, visible, and infrared. Optical surfaces are manufactured using conventional grinding and polishing, along with single point diamond turning. Interoptics has a particular specialty in the manufacture of very high precision interferometer components for instrument and intercavity laser use. Interoptics designs and vacuum deposits thin films of dielectric materials and metals.

PERSONNEL: Engs - 2
Others - 27

GROSS SALES: 1990 - $3.4M
1991 - $4.2M

PLANT SIZE: 11,000 sq ft

EQUIPMENT: Complete optical component fabrication facility. Surface, spherical, and cylindrical grinding machines. Lapping and polishing machines. Pneumo precision single point diamond lathe (2 axis). Vacuum coating machines ranging from 24 inch Bell jar to 30 inch box coater. Test equipment including a Zygo Mark 4 interferometer, Zygo Maxim 3D surface profilometer, Perkin-Elmer Lambda 9 spectrophotometer.

EXPERIENCE: Some of the company's current customers are Lockheed Missiles and Space, Boeing Aircraft, Canadian Astronautics Limited, United States Air Force, Oerlikon Aerospace, Defence Research Establishments Ottawa and Valcartier, MDS Aero Support Corp, SED Systems Inc, and Spar Aerospace.

INVAR MANUFACTURING Ltd

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

CONTACT: Mr C Nardocollio, Regional Sales Manager Precision Machined Products and Systems
Tel: (613) 398-6106
Fax: (613) 966-7932

KEYWORDS: CAD/CAM; Machining; NC/CNC Equipment; Plate and Sheet Metal Fabrication; Precision Machining.

HISTORY: Effective 5 Jan 87, the assets of Bata Engineering Division were purchased by Invar Manufacturing Ltd. Invar Manufacturing Ltd is a newly formed company owned by Haspear Holding Inc which is a subsidiary of Linamar Machine Ltd, Guelph, Ontario, Canada. Invar Manufacturing Ltd operates with the same experienced management team that was instrumental in achieving the high standards for which Bata Engineering Division was well known.

Based on their ongoing capital equipment acquisition program which includes a heavy concentration of NC/CNC machines, they intend to broaden their base of activities to include aircraft/aerospace, military/defense, and nuclear/CANDU industries; commercial/off-road equipment; and transportation/light rapid transit systems.

CAPABILITY: Invar Manufacturing Ltd is primarily involved in the manufacture of precision-machined products and systems using the latest state-of-the-art manufacturing technology. Complimenting this capability is a high-quality, sophisticated, plate and sheet metal fabrication facility.

- Aircraft - Invar Manufacturing continues to supply flap fittings, splice fittings, carriers, kick fittings, and jack fittings for the DC-9, MD-80, DC-10, and MD-11 aircraft as well as engine components (impellers, covers, and discs) and hubs and spacers (landing gear components and inner and outer piston cylinders).

- Military - Invar's military production for US ground support vehicles includes a complete range of military hydraulic cylinders, power assist assemblies, gear boxes, and individual components. In addition, they fabricate ammo racks, ammo conveyors, and ammo stackers for the M109/FAASV support vehicle. Invar is the manufacturer of the Tow-Armoured Launching Turret (ALT) Tow Missile Systems.

- Nuclear - Working in cooperation with AECL, major equipment is machined, assembled, and tested at their Batawa facility for the Canadian CANDU Reactors.

- Commercial - Commercial production meets the rigid demands required in the construction, forestry, and mining industries and off-road equipment. This production includes ride struts and steer and hoist cylinders ranging in size from 2 to 14 in inside diam with lengths from 12 in to 20 ft. Other commercial products include machining of V-4, V-6, and V-8 engine blocks and flywheel 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, Vancouver, and Detroit, Michigan.

PERSONNEL: Engineering - 10
Marketing - 8
Accounting - 6

Production (direct & indirect) - 146
QA/QC - 12

GROSS SALES: 1990 - $30.0M
1991 - $21.0M

PLANT SIZE: 150,000 sq ft

EXPERIENCE: Invar Manufacturing Ltd does business with an extensive list of contractors associated with the defense, aerospace, nuclear energy, commercial, and transportation community.

IOTEK Inc

ADDRESS: 1127 Barrington Street
Halifax, Nova Scotia
Canada B3H 2P8

CONTACT: Mr James L Hanlon, Director of Marketing
Tel: (902) 420-1890
Fax: (902) 420-0674

KEYWORDS: Documentation; Field Service; Man-Machine Interface; Raster Graphics Display Systems; Signal Processing; Sonar Systems; System Integration.

HISTORY: Iotek was incorporated in Nova Scotia, Canada, in April 1986 as a spin-off from a local university-owned research organization. The company has experienced steady growth out of its own resources to reach its current size.

CAPABILITY: Iotek designs, manufactures, and services specialized hardware and software for application in advanced sonar and radar systems. The company has demonstrated capabilities in high-speed signal processing. At the present time, the company manufactures a commercial version of the AN/UYS-501 signal processor. In addition, it provides full support capabilities, including applications programming assistance. High resolution (2048x2048) graphics display systems are utilized in the implementation of the man-machine interface for various sonar systems. The company maintains an intensive internal research and development program in the area of high-speed digital electro-optic circuits with specific emphasis on gallium arsenide-based devices. Recently, a new production facility has been established. This is capable of producing through-hole and surface-mount electronic assemblies to AQAP-4 level quality assurance standard. Finally, the company maintains a customer service and support capability. This includes repair, maintenance, documentation, and training services. Iotek maintains a current industrial security clearance to the SECRET level. In addition, all Iotek staff have current security clearances.

PERSONNEL: Technical - 28
Others - 9

GROSS SALES: 1991 - $2.6M
1992 - $4.2M

PLANT SIZE: 15,000 sq ft

EQUIPMENT: In addition to conventional electronic laboratory equipment, the company operates a specialized, high-speed, digital signals laboratory. This lab is located in an electrically isolated TEMPEST-qualified, shielded room. Specialized test equipment includes a Tektronics 20 GHz digital sampling oscilloscope, 5 GHz Colby Instrument Pulse Generator, and additional specialized test equipment for working with digital and optical circuits at microwave frequencies. The company maintains an extensive in-house computer system based on Sun workstations. Computer-aided design software tools are in place as are software development tools. The production department incorporates a drag soldering machine, vapor degreaser with solvent recovery still, IR reflow surface mount soldering machine, and a variety of assembly rework and test equipment. Quality control is assisted through a variety of specialized inspection equipment. Iotek maintains a 56K baud synchronous data line into a local defense research establishment in support of the company's development activities.

EXPERIENCE: The major customer for Iotek's products and services has been the Canadian Department of National Defence. Within DND, client groups include Naval Engineering Unit; Defence Research Establishment Atlantic; Defence Research Establishment Ottawa; Directorate Maritime Combat Systems; and Chief, Research and Development. The company also has major contracts with the Canadian Centre for Remote Sensing, MIT Lincoln Laboratories, and the Royal Australian Navy.

IRVIN INDUSTRIES CANADA Ltd

ADDRESS: PO Box 280
Fort Erie, Ontario
Canada L2A 5M9

CONTACT: Mr Mark A Warland, Chief Executive Officer
Tel: (416) 871-6510
Fax: (416) 871-6534

KEYWORDS: Aerial Delivery Systems; Deceleration Systems; Drone Recovery Systems; Inflatable Life Support Systems; Parachutes;

Personnel Restraint Equipment; Personnel Survival Equipment; Precision Opening Release Systems; Protective Clothing; Protective Equipment; Recovery Systems; Special Purpose Parachutes; Survival Kits.

HISTORY: Irvin Industries was incorporated in Canada in 1925 and is a subsidiary of Irvin Aerospace Ltd of Ampthill, UK. The parent company not only operates many facilities in the US and one in Canada, but also in the UK and Italy, and licensees in Germany and Japan.

CAPABILITY: Irvin Industries produces personnel parachutes (back and seat-type for ejection seats, military search and rescue units and paratroopers and military freefall, including High Glide Tactical Parachute systems), precision opening release systems, aerial delivery systems, and inflatable life support systems. Irvin has also designed and manufactured special-purpose parachutes including sophisticated recovery systems for supersonic jet transports and multi-use, high-reliability, and patented deceleration systems for fighter aircraft.

Recent new product developments from Irvin Canada include air droppable, sea rescue systems; military freefall parachutist's altimeter; mechanical dereefers for cargo parachute applications; and personnel equipment lowering systems for military parachutists.

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 vests and jackets, impact attenuation bags, anti-g 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 NATO/Canadian Forces Specification AQAP-1 requirements. The quality audits conducted by independently assigned specialists, as well as full-time, in-house quality assurance representatives assigned by the Department of National Defence, provide for the surveillance of Irvin's quality control program. Irvin Industries Canada Limited has been listed by the military as an "approved" company since December 1938.

Irvin's Engineering Department is responsible for all projects from the proposal stage to production. This encompasses design, development, static testing, aerial and dynamic testing, drawing approval, preparation of procedures and 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 and 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 and release systems), air cargo delivery systems, and other miscellaneous items such as harnesses, belts, protective clothing, special suits/clothing, life rafts, and survival kits.

PERSONNEL: 200

GROSS SALES: 1991 - $15M

PLANT SIZE: 66,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: Irvin's customers include the USAF (FF-2 Hitefinder Automatic Parachute Release Mechanism, Vacuum Test Chamber), US Army (FF-2 Hitefinder), the Canadian Department of National Defence, Canadair, Fleet Industries, MBB Helicopter Canada Ltd, and many other offshore customers (primarily military).

ISTEC Inc

ADDRESS: 1810 Hwy 6 North
Hamilton, Ontario
Canada L9J 1H2

CONTACT: Mr Lee Bieman, or Mr Michael Wlodek
Tel: (416) 529-5132
Fax: (416) 529-5311

KEYWORDS: Airborne Camera Platforms; Airborne Sensors; Cameras; Coastal Patrol Sensors; Gimbals; Gyrostabilization; Infrared Imager; Low Light Level Television; Marine Surveillance System; Sensors; Servo Control Engineering; Stabilization; Surveillance; Systems Engineering; Thermal Imager; Training; Video Display Systems; Video Transmission; Zoom Lens.

HISTORY: Istec is a Canadian-owned corporation located in Hamilton, Ontario, approximately 40 miles west of Toronto.

Originally formed in 1974, Istec was created after patents and inventory for the "Wescam" gyrostabilized sensor platform were purchased from Westinghouse, Canada. Istec continues to develop and refine stabilization techniques for moving vehicles (land, sea, and air) while incorporating new imaging products into systems as they evolve.

Wescam International is a technical support, service, and rental operation for Istec's airborne systems with facilities in both California and Florida.

CAPABILITY: Istec is the world's leading manufacturer of gyrostabilized platforms for all types of sensor packages. The product line includes platforms that are suitable for a wide range of cameras and lenses. Selection from the product line is made depending on the degree of stabilization required and weight/volume requirements. Istec currently manufactures four standard stabilized gymbals product lines. These products are the 12DL (14" outside diameter), 24DL (24" OD), 32DL (32" OD) and the 36DL (36" OD) series of stabilized sensor platforms. Istec offers complete turnkey surveillance systems for both airborne and maritime applications.

PERSONNEL: PhD - 2
Engs - 15
Others - 35

GROSS SALES: 1991 - $8.0M

PLANT SIZE: 22,000 sq ft

EQUIPMENT: The company's equipment includes a full complement of manufacturing and inspection equipment and a full complement of electrical and mechanical CAD systems.

EXPERIENCE: The company has sold over 100 systems worldwide to government and commercial organizations including the US Navy and the US Air Force.

ITS ELECTRONICS Inc

ADDRESS: Microwave Components and Subsystems
200 Edgeley Blvd Unit 24
Concord, Ontario
Canada L4K 3Y8

CONTACT: Mr Ilya Tchaplia, President
Tel: (416) 660-0405
Fax: (416) 660-0406

KEYWORDS: Altimeter Subsystems; Dielectric Resonator Oscillators; Electronic Warfare; Frequency Sources (High Power); Integrated Receiver Front Ends; Interference/ Crosspolarization Cancelers; Microwave Hybrids (MHMIC); Mobile Satellite Subsystems; Navigation Systems; Oscillators and Oscillator Subsystems; Phase Locked Loop Oscillators; Power Amplifiers; Power Dividers; Radar Subsystems; Remote Sensing; Retrofit Solid State Components; Satellite Subsystems; Switchable Oscillator Banks; Up/Down Converters.

HISTORY: ITS Electronics Inc is a Canadian microwave technology company founded in 1986.

CAPABILITY: ITS Electronics Inc has the design, manufacturing, and test capabilities spanning the frequency spectrum from 0.4 to 40 GHz to satisfy the most demanding requirements. Their facility houses microwave design and test laboratories, substrate etching facility, controlled environment manufacturing facility, a CNC-equipped machine shop, and administrative and sales offices. Their industrial quality control system is being established in accordance with the latest edition of AQAP-1. It is being maintained to control management, design, procurement, fabrication, assembly, test, and inspection.

ITS Electronics Inc draws its strength from the in-depth knowledge and understanding of the technologies critical to the application of RF, microwave, and millimeter wave systems.

PERSONNEL: PhD - 2
Engs - 4
Others - 6

GROSS SALES: No data.

PLANT SIZE: 4122 sq ft

EQUIPMENT: Complete microwave component and subsystem design and manufacturing facility including full HMIC capability. In-house computer systems equipped with the latest in microwave and mechanical CAD software.

EXPERIENCE: The company's RF and microwave-based systems are used by both commercial and defense establishments in Canada, Europe, and the US. Their customers include Leigh Instruments Ltd, Ontario Hydro, Telesat Canada, Canadian Astronautics Ltd, Northern Telecom, Com Dev Ltd, Mel Dsl Ltd, British Aerospace, Valmet, Maclean Hunter Cable, Canadian Broadcasting Corporation, Amtech Technology Corporation, Sciex Inc, Iris Systems Ltd, Williams Communications Services Ltd, Department of National Defence, General Electric-Plessy Telecom, Wavemat Inc, Comlink Inc, and Anorad Inc.

ITT CANNON

(A Division of ITT Industries of Canada Ltd)

ADDRESS: 4 Cannon Court
Whitby, Ontario
Canada L1N 5V8

CONTACT: Mr R W Small, Manager of Marketing and Sales
Tel: (416) 668-8881
Fax: (416) 668-4152

KEYWORDS: Cables; Connectors; Glass-to-Metal Hermetic Connectors; Harnesses; High Pressure (Connectors); High Temperature and Aircraft Firewall (Connectors); Materials R&D (Connectors); Testing (High Pressure); Wiring.

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, Ottawa, and Vancouver.

CAPABILITY: ITT Cannon is engaged in R&D, manufacture, and sales of electrical and electronic connectors, cable harnesses, and interconnect devices for the hostile environment and aircraft market. Cannon connectors are in virtually every passenger jet aircraft in the free world, deep in the earth and ocean, in space, in nuclear reactors, and in oil and gas drilling rigs--in other words, in the hostile environment.

Their manufacturing capability features both manufacturing and industrial engineering, tool design (plastic and metallic components), machining fabrication and assembly operations, machine and model shops, molding facilities, and electroplating. They have worldwide 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 and panel DRA series, (k) geophysical-seismic, (l) cryogenic connector series, (m) sonar underwater tow connectors, and (n) glass-to-metal hermetically sealed 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-C-28840 for seaboard applications (QPL); (c) the MIL-C-83723 series III connector designed for high performance aero applications; (d) the "Downhole" connector designed for high pressure usage (hermetically sealed); (e) the MR series connector--rugged, heavy duty, and waterproof (designed to withstand severe environmental conditions); and (f) a geophysical hermaphroditic connector designed for the seismic exploration industry.

PERSONNEL: 220

GROSS SALES: 1990 - $25M
1991 - $25M

PLANT SIZE: Production - 55,000 sq ft
Office - 15,000 sq ft

EXPERIENCE: Cannon connectors are designed to the specification of the electronic industry, and meet the requirements of the Canadian Department of National Defence, the US DOD, Canadian Ministry of Transport, and the Canadian Standards Association. Cannon plugs are used worldwide.

JOHNSON & HIGGINS Ltd

ADDRESS: 1700 - 200 Granville Street
Vancouver, British Columbia
Canada V6C 2S2

CONTACT: Mr John Sorel, Vice President
Canadian Aviation
Tel: (604) 681-6141
Fax: (604) 681-9846

KEYWORDS: Insurance; Risk Management Analysis.

HISTORY: Established in New York in 1845, J&H is the largest, privately held insurance brokerage and employee benefit consulting firm in the world. A full service broker, J&H offers risk management expertise in all lines of insurance.

CAPABILITY: Our North American offices have aviation departments that provide a network of expertise which is without peer in the insurance community. Included among our personnel are former aviation underwriters, civilian and military fixed and rotor-wing pilots, and an aviation claims attorney who offer unique and invaluable experience to our clients. Our Aviation Insurance Services include risk analysis, property and casualty loss control and actuarial services, certificate and contract analysis, as well as claims consulting. In addition to aviation, J&H has special expertise in serving the space and telecommunications industries, construction, health care, energy, financial institutions, and government entities.

PERSONNEL: 8100 worldwide
55 Aviation & Space

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: Johnson & Higgins serves a wide range of clients in aviation, aerospace, and related industries. These include international, domestic, and regional airlines; airports, aircraft, and aviation component manufacturing companies; fixed base operators; aviation fueling and serving companies; corporate aviation fleets; airport construction firms; telecommunications and information technology providers and users; and aircraft equipment financing and leasing firms.

KAYCOM Inc

ADDRESS: 5800 Thiemens Blvd
Ville St Laurent, Quebec
Canada H4S 1S5

CONTACT: Mr Brian March, President
Mr Peter Kallas, Senior Administrator
Tel: (514) 745-5000
Fax: (514) 336-5810

KEYWORDS: Airframe Components; Engine Componens; Logistic Support; R&O (Parts); Spare Parts (Aircraft); Spare Parts (Engines).

HISTORY: Kaycom Inc is primarily involved in the supply and manufacturing and overhaul 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 total support of all military-type equipment.

PERSONNEL: Engineers - 1
Management - 4
QA - 2
Sales - 5
Others - 6

GROSS SALES: No data.

PLANT SIZE: 15,000 sq ft (including warehouse)

EQUIPMENT: No data.

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).

KB ELECTRONICS (1989) Ltd

ADDRESS: 150 Bluewater Road
Bedford, Nova Scotia
Canada B4B 1G9

CONTACT: Mr S Barnhill, Senior Vice President
Tel: (902) 835-7268
Fax: (902) 835-6026

KEYWORDS: Battery Chargers; Converters (Power); Degaussing Systems; Inverters; Power Supplies; Power Supplies (Uninterruptible).

HISTORY: KB Electronics (1989) Limited is a Canadian-owned, integrated high technology company founded in 1979.

CAPABILITY: KBE is a manufacturer of high reliability power electronic equipment for land, marine, and aviation applications. KB Electronics designs and manufactures state-of-the-art, high performance static power conversion equipment in its 30,000 sq ft facility located in the suburbs of Halifax, Nova Scotia. Its quality system complies with the NATO requirements and is recognized by major North American contractors in the defence industry. The product development, design, prototyping, testing, qualification, and manufacturing phases are carried out in a Total Quality Management (TQM) framework.

KBE's military products (fully hardened and ruggedized) are designed specifically to provide superior performance in a demanding environment with high reliability. With the application of advanced, solid-state technology and the use of high quality standards, KBE's military products are designed to surpass the stringent requirements of most military standards with optimal size and weight. All military products are qualified by extensive testing and demonstration. With proven reliability of KBE's military products currently in operation continent-wide, KBE has been established as a leader in medium-power static power converters.

PERSONNEL: Finance/Admin - 8
Quality Assurance - 5
Manufacturing - 16
Engineering - 15
Total - 44

GROSS SALES: 1991 - $6.8M
1992 - $6.0M

PLANT SIZE: 30,000 sq ft

EQUIPMENT: Our facilities include CAD systems, computer-based environment test stations, a light metal fabrication shop with painting and plating capability, and a modern assembly section.

EXPERIENCE: Present customers include Naval Sea Systems, Bath Iron Works, Ingalls Shipbuilding, Teledyne Inet, Saint John Shipbuilding, and Pratt and Whitney. Present programs are CVN, CG47, DDG51, CPF, and TRUMP.

KELOWNA FLIGHTCRAFT GROUP

ADDRESS: 1-5655 Kelowna Airport
Kelowna, British Columbia
Canada V1V 1S1

CONTACT: Mr Jim Rogers, General Manager/Secretary Treasurer
Tel: (604) 765-1481
Fax: (604) 765-1489

KEYWORDS: Air Charter; Engineering and Construction; Modification (Aircraft); R&O (Aircraft).

HISTORY: Kelowna Flightcraft Group consists of four Canadian, privately owned companies: Kelowna Flightcraft Ltd, founded in 1970; Kelowna Flightcraft Air Charter Ltd, founded in 1974; Kelowna FlightComm Avionics Inc, founded in 1976 and purchased by Kelowna Flightcraft Ltd in 1988; and Kelowna Flightcraft R&D Ltd, founded in 1989. All companies are owned by the same officers and directors.

CAPABILITY: Kelowna Flightcraft Air Charter (KFAC) operates nightly courier service using Boeing 727s, Convair 580s, Grummon G-1, Douglas DC-3, Cessna 402s, plus KFAC has a leasing department which leases out 10 Convair 580 aircraft. KFAC also operates Beech 60, Cessna 340, Cessna 310, Cessna 210, and PA28-161 on charter. KFAC has bases in Kelowna, Vancouver, Calgary, Saskatoon, Montreal, Ottawa, and St Johns.

Kelowna Flightcraft Ltd (KFL) is a Transport Canada-approved shop for all aircraft maintenance plus manufacturing approval. KFL has in-house machining, manufacturing, and NDT capabilities. KFL has full engineering capabilities including CAD.

Kelowna FlightComm is a full service avionics facility.

Kelowna Flightcraft R&D Ltd has developed 122 inch cargo door system for Convair 580 plus developed the Convair 5800--Convair stretched 15 feet with all new components and systems, capable of lifting 20,000 pounds 1000 nautical miles at 350 mph.

PERSONNEL: 260

GROSS SALES: 1990 - $30M
1991 - $26M

PLANT SIZE: 60,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: Customers include Canadian DND, the US FAA, plus operators in Bahrain, Sweden, Norway, Canada, and the United States.

KNUDSEN ENGINEERING Ltd

ADDRESS: 77 Gore Street East
Perth, Ontario
Canada K7H 1H8

CONTACT: Ms Judith Knudsen, Vice President Operations/Marketing
Tel: (613) 267-1165
Fax: (613) 267-7085

KEYWORDS: Depth Sounders; Digital Signal Processing; Hydrographic Information Systems; Mine Detection; Remote Sensing; Sonar; Underwater Acoustics.

HISTORY: Knudsen Engineering is a privately held, Canadian company incorporated in March 1981 located in Perth, Ontario. The company has a distinguished record of producing image processing and remote sensing instruments for airborne and underwater applications.

CAPABILITY: Knudsen Engineering has focused on the design and manufacture of an innovative digital sonar with the acronym DAISY (for Digital Acoustic Imaging SYstem) to be used with moving platforms and underwater vehicles in a wide variety of defence and commercial applications including mine countermeasures, search and identification, obstacle avoidance, and salvage/ dredging operations. Other underwater acoustic products include a new high performance echo-sounder capable of measuring water depths even under demanding through-ice Arctic conditions. Development of a new general purpose, dual frequency hydrographic sounder is currently underway. Major activity during initial corporate years included development of a series of ALICE airborne remote sensing systems for the Canadian Government.

PERSONNEL: Engs - 5
Other - 5

GROSS SALES: 1990 - $0.5M
1991 - $0.5M

PLANT SIZE: 2,000 sq ft

EQUIPMENT: Complete digital electronics production facility. In-house computer systems include 7 PCs, CAD systems, one plotter, and surface mount.

EXPERIENCE: Present customers include various departments in the Canadian Government including the Canadian Hydrographic Department, Canada Centre for Remote Sensing, and Department of National Defence.

KOM Inc

ADDRESS: 127 Walgreen Road
Carp, Ontario
Canada K0A 1L0

CONTACT: Mr Marwan Zayed, General Manager
Tel: (613) 831-8350
Fax: (613) 831-8353

KEYWORDS: Autochanger; Disk Emulation; Jukebox; Mass Storage; Optical Disk; Optical Storage Archive; SCSI Host Adaptor; UNIX Optical Disk.

HISTORY: KOM Inc is a high technology company leading in the development and application of solutions in the areas of optical disk storage and image processing. Founded in 1969, the organization initially catered to servicing computer and peripheral equipment and later in 1986, embarked upon its own development program to interface optical disk drives to DEC/VMS and SUN Microsystems/UNIX environments. A sales office is located in Nashua, New Hampshire.

CAPABILITY: KOM offers a broad range of products and services including Optifile II - a special technique developed by KOM Inc that allows a write-once, read many (WORM) optical disk drive to emulate standard magnetic disk drives despite the write once nature of the optical media; and Optiserver - a versatile interface based on Optifile II that integrates optical disk jukeboxes and serves VMS and UNIX host computers, delivering magnetic disk emulation. Optiserver manages the functioning of the jukebox through a SCSI host adaptor without interfering with the operating system or application programs. The company also boasts the capability of providing customized software applications, specifically addressing the area of optical storage technology and imaging systems.

In order to address the growing demand of our clientele, both domestically and internationally, KOM Inc officially opened a new 11,000 sq ft corporate center just outside the nation's capital in Carp, Ontario. This new facility permits the integration of various talented groups including marketing and sales, software support center, research and development, training, service, and administration - all under one roof to ensure that the customer is provided the best solution for his needs.

PERSONNEL: PhDs - 1
Engineers - 7
Others - 8

GROSS SALES: 1990 - $2.4M
1991 - $2.0M

PLANT SIZE: 11,000 sq ft

EQUIPMENT: Systems: DEC workstation 3000 and 5000, SUN Sparc and IBM RS 6000. Optical Devices: LMSI, Kodak, ATG, Sony, Pioneer, Mitsubishi, Panasonic.

EXPERIENCE: See above.

LANSDOWNE INTEGRATED SYSTEMS Inc

ADDRESS: 1800 275 Slater Street
Ottawa, Ontario
Canada K1P 5H9

CONTACT: Mr J. Faulkner, Director of Sales and Marketing
Tel: (613) 236-3333
Fax: (613) 236-4440

KEYWORDS: Configuration Management; Cost Schedule Control System; Custom Software; Integrated Logistic Support; Project Management; Proposal Writing; Systems Analysis.

HISTORY: Lansdowne Integrated Systems Inc is a Canadian-owned, high-technology service company founded in 1976. It was originally owned by its founder, Mr M B Darch, and is now controlled by Canadian Shipbuilding & Engineering Ltd of St Catharines, Ontario. It is presently active in the Canadian, the US, and western European markets from its sole operating location in Ottawa, Ontario.

CAPABILITY: Lansdowne's primary business focus is the front-end definition of technology-related projects. This activity includes proposal writing; development of WBS, OBS, and cost structures; definition of technology strategies; and definition and development of information systems to support technical management.

Typical recent assignments include the development of the management structures to support Canadian utilization of Space Station Freedom, development of the program to support the evolution of the technology related to the Canadian components contained in the baseline of Space Station Freedom, management of the project definition phase from a mine countermeasures vessel for Canadian Shipbuilding and Engineering, and proposal management for British Aerospace on a bid to contract out Canadian Forces basic pilot training.

PERSONNEL: Professionals - 16

GROSS SALES: 1992 - $1.5M

PLANT SIZE: No data.

EQUIPMENT: Lansdowne owns and operates IBM compatible, DOS- and UNIX-based computer systems. Software tools currently in use include ZIM, ORACLE, Artemis, DEVELOPER, MODUS, dBase, Windows, Timeline, and various graphics software.

EXPERIENCE: Present and recent customers include the Canadian Department of National Defence, Health and Welfare Canada, Correctional Services Canada, Canadian Shipbuilding & Engineering Ltd, Canadair Ltd, Vulcan Equipment Company Ltd, Canadian Kenworth Company, Canadian Space Agency, British Aerospace, and Marconi Underwater Systems Ltd (MUSL).

LAPP-HANCOCK ASSOCIATES Ltd

ADDRESS: Suite 904
280 Albert Street
Ottawa, Ontario
Canada K1P 5G8

CONTACT: Mr Kenneth E Hancock, President
Tel: (613) 238-2483
Fax: (613) 238-1734

KEYWORDS: Communications (Microwave); Communications (Mobile); Communications (Telephone); Consulting; LANs; Remote Sensing; Satellite Communications.

HISTORY: Lapp-Hancock Associates Limited is a scientific and technological consulting company specializing in telecommunications and remote sensing. Incorporated in 1985 as a wholly Canadian-owned, federally incorporated, private company carrying out business under the laws of Canada, it was the result of a spinoff from Philip A. Lapp Limited.

CAPABILITY: Lapp-Hancock Associates Limited is a high-tech consulting company specializing in telecommunications, satellite communications, data communications, mobile communications, and remote sensing. The company offers a range of scientific and technological consulting services that can generally be categorized under the following headings: strategic planning and studies, planning and policy services, systems engineering, network design, research and development studies, market studies, feasibility studies, technical audits, and evaluations.

PERSONNEL: PhDs - 5
Engs - 15
Others - 6

GROSS SALES: 1990 - $910K
1991 - $1.2M

PLANT SIZE: 4,900 sq ft

EQUIPMENT: The offices of Lapp-Hancock Associates Limited are located in the core of Canada's capital, Ottawa. The facilities, in a

modern office building, include a technical library, complete modern telecommunications facilities, a range of up-to-date computers and peripherals, and all other equipment required to support its professional consulting staff. Its computer systems are IBM-based, using DOS, WordPerfect 5.1, Lotus 123, FreeLance, Current, and a number of other scientific and graphics tools.

EXPERIENCE: Major clients include the Canadian Atmospheric Environment Service; Bezeq (telecommunications authority of Israel); the Canadian Centre for Marine Communications; the Canadian Space Agency; the Canadian Department of Communications; the Canadian Department of Energy, Mines, and Resources; the European Space Agency; the International Telecommunications Satellite Organization (INTELSAT); MPR Teltech Limited; SPAR Aerospace Limited; and Transport Canada.

LEAVENS AVIATION Inc

ADDRESS: 2555 Derry Road East
Mississauga, Ontario
Canada L4T 1A1

CONTACT: Mr C D Leavens, General Manager
Tel: (416) 678-1234
Fax: (416) 678-7028

KEYWORDS: Aircraft Parts; Control Cables (Aircraft); Hydraulic Hose; R&O (Accessories); R&O (Engines); R&O (Propellers).

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 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 overhaul of piston engines, propellers, and accessories.

PERSONNEL: 40

GROSS SALES: No data.

PLANT SIZE: 30,000 sq ft

EQUIPMENT: Equipment for assembly and test facilities.

EXPERIENCE: Leavens Aviation Inc provide their customers with hydraulic hose and aircraft control cable assembly and test facilities and overhaul of aircraft engines, propellers, and accessories.

LEBLANC & ROYLE TELCOM Inc

ADDRESS: 514 Chartwell Road
PO Box 880
Oakville, Ontario
Canada L6J 5C5

CONTACT: Mr Robert Mitchell, National Account Executive
Tel: (416) 844-1242
Fax: (416) 844-8837

KEYWORDS: Beacon Antennas; Coaxial Cable; Communications (Towers); Emergency Restoration Service; HF Antennas; Microwave Antennas and Waveguide; R&O (Antenna Structures); RF Testing; Site Development; Strobe Lighting.

HISTORY: LeBlanc & Royle Telcom Inc is a closely held, private company founded in 1962 by Federal Charter. Originally a light communications tower manufacturer and installer, LeBlanc has become a major tower contractor having designed and supplied antenna support structures of over 2000' and completed large turnkey projects. They have expanded their horizons to include manufacturing plants in Sioux City, Iowa; Perth, Australia; and Singapore.

CAPABILITY: LeBlanc & Royle Telcom Inc is primarily engaged in the design, supply, and installation of antenna support and radiating towers as well as turnkey site development. Through the RF Technical Services Division, the company is able not only to install, but also to test antenna systems. The engineering department maintains files on supplied towers and can perform structural analyses in the event loads are altered. In addition to the above, LeBlanc is a distributor for the following:

- Cablewave Systems Inc - Coaxial cables, waveguide, and microwave antennas
- TCI - HF antenna systems
- Celwave - Land mobile, marine and cellular antennas, combiners, and multicouplers
- The Will-Burt Co - Telescopic pneumatic masts
- Lightning Master Corp - Static dissipation arrays

PERSONNEL: Engs - 10

Others - 250

GROSS SALES: No data.

PLANT SIZE: 57,000 sq ft

EQUIPMENT: HP CAD system, HP computer system, steel fabricating equipment, paint shop, HP network and spectrum analyzers.

EXPERIENCE: Present customers include Department of National Defence, Ontario Provincial Police, Canadian Broadcasting Corporation, Roger's Cantel Inc, Bell Cellular, Novatel, and Raytheon.

LITTON SYSTEMS CANADA Ltd

ADDRESS: 25 Cityview Drive
Etobicoke, Ontario
Canada M9W 5A7

CONTACT: Mr T Liang, Marketing Manager
Tel: (416) 249-1231
Fax: (416) 246-2955

KEYWORDS: ATC; ATC Simulators; Avionics; Build-To-Print; Cathode Ray Tube Displays; Cockpit Displays; Data Acquisition; Data Analysis; Flat Panel Displays; Inertial Navigation; Instruments; Intrusion Detection; LED Displays; Liquid Crystal Displays; Navigation Systems; R&O (Avionics); Radar; Ring Laser Gyros; Search Radar; Simulators; Solid State Devices; Subcontract Manufacturing; Training.

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 worldwide market. LSL was launched 30 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 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, Canadair, deHavilland, McDonnell, and General Dynamics. A Litton guidance system, the LN35, was the one chosen for the USAF Cruise Missile.

CAPABILITY: LSL has become a dominant force in the INS marketplace, providing both spinning wheel and ring laser gyros for the military and commercial 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, worldwide navigation system that is totally independent of ground-based navigation aids. In 1982, LSL underwent a major expansion and upgraded its INS capabilities to allow the manufacture of ring laser gyro-based inertial systems. Litton Canada has a world product mandate to build commercial RLGs for Litton Industries. These systems, the LTN-90, LTN-90-100, and the LTN-92, are now on board aircraft such as the A310, A300-600, P-3C, C-130, E-6A, Dash 7 and 8, 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 used on board 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), is 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 and other modern aircraft and helicopters. The Expanded Litton Automated Test Set (ELATS) is used as a depot test station in support of new aircraft programs. ELATS and RF ELATS (for testing RF systems) has been purchased by the Canadian Air Force, the Royal Australian Air Force, the Royal Australian Navy, 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.

Twenty-one years later, LSL headed up a team of Canadian industrial firms to reconstruct Canada's four tribal class destroyers. The Tribal Update and Modernization Project (TRUMP) has seen LSL chosen as the prime contractor in the refurbishment of the four ships the company helped build. Litton Canada is now one of the largest marine systems houses in Canada.

LSL's expertise in the marine environment includes the Automatic Data Link Plotting System (ADLIPS). 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.

Previous in-depth 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 (DIAC) for the Maritime

Command of the Canadian Forces. The DIAC correlates current and historical data enhancing mission planning and control.

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. Canada systems have been installed in maximum security penitentiaries and nuclear power generating stations.

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. This effort, combined with assistance from a joint Canadian/US development contract, resulted in the development of a solid-state, multi-colored modular, flat panel display system using light emitting diode technology for use in the military and commercial environments. This system has been selected by General Dynamics for implementation in the F-16 aircraft, by Boeing for use on the EC-135, by McDonnell-Douglas for the C-17 and Apache aircraft, and by a number of simulator manufacturing companies.

The company has also embarked upon a major R&D program to establish the liquid crystal display (LCD) as the new technology for the cockpit display requirements of the next generation of advanced military and commercial aircraft, scheduled for production in the mid-90s.

Another successful R&D program that has also progressed to production is the Inertial Referenced Flight Inspection System (IRFIS). IRFIS is a self-contained en route 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 it 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 16 different types of aircraft in 18 countries around the world. The company is also building X-band radar for the Canadian LLADs and the US FAD-LOS programs. In the summer of 1988, the company established a radar manufacturing facility in Halifax, Nova Scotia, to produce these radars and to support the CP-140 aircraft.

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.

PERSONNEL: Engineers - 600
Mfg/Admin/Techs - 1,200

GROSS SALES: 1990 - $367M
1991 - $367M

PLANT SIZE: 700,000 sq ft

EQUIPMENT: LSL is fully equipped to perform R&D, production, and extensive test and evaluation in all areas discussed above. Their electronic and electromechanical laboratories, which are in a controlled environment, are amply equipped with the most modern test and development equipment including a VAX VT100 and other digital computers.

EXPERIENCE: See Capability.

LNS SYSTEMS Inc

ADDRESS: 7 Bovis Avenue
Pointe-Claire, Quebec
Canada H9R 4W3

CONTACT: Mr George Sinoyannis, Executive Vice President
Tel: (514) 695-8130
Fax: (514) 695-8135

KEYWORDS: ATC; ATC Simulators; Flight Data Processing; Mobile Runway Lighting Systems; Multipurpose Information Displays; R&O (Avionics); Radar Processing and Display; Radio Spectrum Monitoring Systems; RAPCON; Satellite Weather Distribution; Shelters; Store and Forward Message Switching; Towers, Mobile or Fixed; Voice and Data Switches; Voice Switching; Weather Map Displays.

HISTORY: LNS Systems Inc was originally founded in 1971 as Air Vision Industries. It was acquired by ITP in 1973 when ITP Canada Ltd won the terminal radar and control system contract for the Canadian Department of National Defence. In 1979 the company was bought by Leigh Instruments and renamed Leigh Navigation Systems. In 1982 the company was sold back to senior management as LNS Systems. In 1987 the company acquired METCAN Fabricators Inc of Ottawa and established a cooperative relationship with Oracle Telecomputing of Carleton Place, Ontario, in 1989.

CAPABILITY: LNS Systems is primarily involved in providing air traffic control related systems. These range in scope from two-position mobile control towers to the nationwide capability of the TRACS program. The range of technology is from mobile runway lighting systems to radio spectrum monitoring, and from manually operated voice switches to meteorological information processing and display. Radar processing systems can process and display up to 500 targets with an update rate of 6-12 seconds. Flight data processing systems can handle up to 2000 flight plans with 250 active in any mix of IFR/VFR; jurisdiction handoff and automatic routing changes are also provided. Message switches can operate in AFTN, TELEX, and similar networks with up to 192 multi-protocol lines at 30,000 messages per hour. Radio spectrum monitoring systems can provide security surveillance and communication monitoring functions in either manual- or computer-controlled configurations. Computer-controlled systems can be supplied in fault tolerant dual processor configurations. Fabrication methods meet or exceed AQAP-4.

Software design and implementation is in accordance with DOD-STD-2167A using Ada as the PDL. LNS provides consulting, program management, hardware and software design and development, product assurance (including reliability and maintainability analysis), production (including R&O), quality assurance, documentation, and training.

PERSONNEL: Engineers - 18
Technologists - 8
Production - 20
Administration - 27

GROSS SALES: 1990 - $4.0M
1991 - $4.5M

PLANT SIZE: 60,000 sq ft

EQUIPMENT: Aluminum, machine shop, electronic test, computers.

EXPERIENCE: Customers include the US Navy, FAA, DND Canada, and Transport Canada. Sales to other countries have included Algeria, Saudi Arabia, Kuwait, Barbados, Uganda, Brazil, Libya, Taiwan, China, Qatar, Malaysia, Yugoslavia, Canada, Venezuela, Bahamas, and the UAE.

LOCKHEED CANADA Inc

ADDRESS: 2421 Lancaster Road
Ottawa, Ontario
Canada K1B 4L5

1 Iber Road
Stittsville, Ontario
Canada K2S 1E6

CONTACT: Mr George Hendry, Director Business Development
Tel: (613) 738-4514
Fax: (613) 738-4510

KEYWORDS: Acoustics; Communications; Digital Signal Processing; ECM; Electronic Support Measures; Electronic Warfare; Microwave Systems; Millimeter Wave Systems; Radio Communications; Simulation; Software Development; Systems Integration; Training.

HISTORY: Lockheed's activities in Canada began with the delivery of a Vega transport aircraft to Canada's Commercial Airways Ltd in 1929. In an age where competitors employed box-like fuselages with cruising speeds that barely exceeded 100 mph, Lockheed patented a new method of fuselage construction and offered a more streamlined design to increase the operator's range and speed.

Since then, Canadian commercial aircraft operators and the Canadian Forces have grown with the development of many more innovative aircraft. Canadians now benefit from Lockheed innovation in a wide range of services from Trillium Terminal Three constructions and operations at Lester B. Pearson Airport to CC-130 Hercules and CP-140 Aurora aircraft performing a variety of missions with the Canadian Forces.

In 1985 Lockheed acquired Sanders Canada and in 1991 MEL Defence Systems. Sanders began operations in Ottawa to fulfill an industrial benefit requirement and began servicing the EW needs of Canada's Air Force. MEL Defence Systems was established in 1982 for similar reasons and began servicing the needs of Canada's Navy.

Today Lockheed Canada Inc is the nation's only full service EW house capable of the design, development, manufacture, and support of electronic warfare equipment and related systems for land, airborne, and naval applications. Lockheed Canada is developing lines of business in electronic countermeasures, electronic support measures, electronic warfare training and simulation, airborne communications equipment, flight line test and reprogramming equipment, air defence systems, and acoustics processing.

CAPABILITY: Lockheed Canada's core technologies include systems engineering, software design, and digital signal processing. Emerging strengths include radio frequency, microwave, and millimeter wave technologies.

These technologies were developed through technology transfer, company funded R&D, and participation in major government procurement programs. Canadian government funded development programs and technical investigation and engineering services contracts have also contributed towards the company's growth in technology and products.

The company's knowledge of software engineering, use of CASE tools, and experience with the object-oriented approach to programming-using Small Talk, Ada, and C++ languages-provides for more system design benefits, lower software costs, and improved maintainability.

Experience in this field continues to grow through the development of advanced electronic support measures (ESM) processors, in-house ESM, and electronic countermeasures (ECM) simulation capabilities, and expert systems for electronic warfare system.

Lockheed Canada has been awarded a contract to lead an industrial team defining a mid-life upgrade for the AN/SLQ-50A CANEWS. CANEWS II will feature important improvements to the existing system's signal processor and receivers and may incorporate the capability to receive and analyze millimeter wave signals.

The company's strong background in systems engineering is also being applied to develop an ESM system for installation on small ships such as offshore patrol and landing craft, fast attack craft, and mine countermeasures vessels. Lockheed Canada's system promises impressive performance, light weight, low cost, a modular design, and easy installation.

Lockheed Canada Inc is under contract to define the electronic support and training (EST) system for the Canadian Forces. EST will provide individual and tactical crew training in air, maritime, and land scenarios. The systems' real-time capability permits changing tactics as training situations unfold.

Through such development programs Lockheed Canada continues to expand its electronic warfare and system integration capability.

Lockheed Canada is developing a family of integrated support stations designed to maintain the emitter libraries stored in electronic warfare systems. These systems also postulate, create, and validate jamming programs for ECM systems. The company's EW experience will be put to good use in developing EW databases, conducting threat analysis, and in developing new operational programs for the equipment built and supported by Lockheed Canada. Lockheed Canada's experience will also be applied to the development and support of mathematical models and simulations of threats.

Lockheed Canada is responsible for supporting and manufacturing the Product Improved Vulcan Air Defence System. PIVADS is designed to reduce the gunner's workload and enhance the accuracy of the Vulcan Air Defence System.

PERSONNEL: Engineers - 80
Others - 220

GROSS SALES: No data.

PLANT SIZE: 110,000 sq ft

EQUIPMENT: Automated and semiautomatic assembly and test equipment for the development, manufacture, and support of sophisticated electronic equipment; comprehensive environmental testing capability; computer aided design; and digital hardware, microwave and software development laboratories.

EXPERIENCE: See Capability.

LUCAS AEROSPACE Inc

(Microwave Technologies Division)

ADDRESS: 3135 Universal Drive
Mississauga, Ontario
Canada L4X 2E7

CONTACT: Mr Peter Balodis, Sales and Marketing Manager
Tel: (416) 625-4605
Fax: (416) 625-4274

KEYWORDS: Amplifiers; Circulators; Electroforming; GaAs FET Amplifiers; High Power Amplifiers; Isodapters; Isolators; Low Noise Amplifiers; Medium Power Amplifiers; Microwave Amplifiers; Microwave Components; Microwave Subsystems; Thin Film Services.

HISTORY: Lucas Microwave Technologies Division (MTD) has been designing and manufacturing microwave components and subassemblies since it was founded in 1962 as Desitron. In 1977, the business was acquired by M/A COM and was known as MA Electronics Canada. In 1988, it became part of Lucas Aerospace Inc and a member of the Communications and Electronics Division, which includes Lucas AUL Inc, Lucas Epsco Inc, Lucas Weinschel Inc, and Lucas Zeta

Inc. The member companies design and manufacture a wide variety of high-quality RF and microwave components and subsystems for defense and commercial applications. As a part of Lucas Industries plc, Lucas MTD is backed by a company with over $3.5 billion in sales and more than 56,000 employees worldwide. Lucas Aerospace's North American presence now involves more than 4300 employees with annual sales of more than $400 million.

CAPABILITY: Lucas MTD is a major supplier of GaAs FET amplifiers and related microwave components for commercial and military markets. The Mississauga facility houses a hybrid microwave integrated circuit clean room manufacturing area, 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 0.5 to 40 GHz.

Lucas MTD has two product groups:

- Passive Microwave Components - coaxial and waveguide circulators, isolators, and isodapters and precision electroformed components.

- Active Microwave Components

  - Commercial: Low noise communication band amplifiers, solid state power amplifiers, and integrated subsystems containing up and down conversion.

  - Military: Hybrid Microwave Integrated Circuit (HMIC) Components - multioctave wide band amplifiers over .5 to 40 GHz; small signal to 2.5 watts. Custom integrated subassemblies incorporating amplification, switching, filtering, attenuation, limiting, frequency conversion, and digital control. Produced to MIL-Q-9858A (AQAP-1).

PERSONNEL: 55 (Total)

GROSS SALES: 1991 - $5.0M

PLANT SIZE: 22,000 sq ft

EQUIPMENT: Equipment includes thin film sputtering and deposition systems in a class 10,000 clean room and a class 100,000 manufacturing area for HMIC products, laser welder for hermetic packages, and electroforming capability.

EXPERIENCE: Lucas MTD's product market is worldwide.

LYNX GEOSYSTEMS Inc

ADDRESS: 400 1199 West Pender Street
Vancouver, British Columbia
Canada V6E 2R1

CONTACT: Mr Simon Houlding, Director of Technical Services
Tel: (604) 682-5484
Fax: (604) 669-3659

KEYWORDS: 3D Geostatistical Modelling; Computer Modelling Software; Environmental Assessment; Geologic Characterization and Interpretation; Hydrogeological Investigation; Site Investigation; Underground Remediation Engineering Design.

HISTORY: LYNX Geosystems Inc is a privately owned Canadian corporation. The company, formerly known as Geomin Computer Services, has specialized in the development and licensing of computer modelling technology for the geosciences since 1979. LYNX software systems are supported by an international client base of more than 200 installations worldwide in a diverse range of mining and environmental applications.

CAPABILITY: LYNX develops and licenses interactive graphics modelling software technology. The 3D Geoscience Modelling System (GMS) has been developed for environmental engineering applications involving complex geologies and subsurface soil/rock contamination. The company also licenses and supports computer software for a complete range of mining applications and functions. The systems utilize proprietary 3D component modelling technology developed by LYNX and are offered on IBM, HP, and SUN UNIX workstations (an SGI platform will be supported by the end of 1992.)

The GMS is project-oriented and completely three dimensional in application. It utilizes advanced data management, volume modelling, and integrated geostatistics to predict distributions of properties and contaminants, quantify contamination plumes, and assess the uncertainty or probability associated with the results. GMS application also provides the basis for more precise numerical modelling of groundwater and contaminant movement via comprehensive interfacing capabilities to external technologies (i.e., GTS). 3D visualization is a key feature of the GMS. An enhanced visualization capability allows for the production of presentation-quality images of data, geology, physical characteristics, and contamination. Key GMS applications include geologic characterization for waste storage sites, assessment of soil and groundwater contamination, hydrogeologic studies, design of remediation alternatives, and assessment of contaminant risk and probability.

The GMS is being used by the USAF at the McClellan Air Force Base (Sacramento) for geologic site characterization and prediction of contaminated soil and groundwater volumes.

GMS deliverables include single, multiple, and network licenses on UNIX workstation platforms, installation, training and support services, user documentation and tutorials, and applications consulting.

PERSONNEL: No data.

GROSS SALES: 1990 - $1.3M
1991 - $1.5M

PLANT SIZE: No data.

EQUIPMENT: GMS software is provided on magnetic tape cartridges accompanied by user documentation. Hardware requirements include IBM, HP, SUN UNIX workstations, 16-32 Mb RAM, 640+ Mb fixed disk drive, high-resolution color graphics monitor, and peripherals - tape cartridge drive, mouse, plotter, digitizer, graphics printer.

EXPERIENCE: GMS customers include International Groundwater Modelling Centre, Golden, Colorado; Klohn Leonoff Consultants, Vancouver, BC; Csiro Geomechanics Division, Brisbane, Australia; Central Computer Systems, Tokyo, Japan; Freie University of Berlin, Berlin, Germany; Sandia National Laboratory, Albuquerque, New Mexico; Mitre Corporation, McLean, Virginia; the USAF, McClellan Air Force Base; Jacobs Engineering, California; International Institute for Aerospace Survey & Earth Sciences, Euschede, The Netherlands; University of British Columbia, Vancouver, BC; the US Geological Survey, Golden, Colorado; and Norecol Environmental Management, Vancouver, BC. Installation/user information for mining systems is available on request.

M&T MANAGEMENT SALES

ADDRESS: 36 Trawley Crescent
Ajax, Ontario
Canada L1S 5X8

CONTACT: Mr Shawn D. Vallillee, Vice President
Tel: (416) 427-7968
Fax: (416) 427-1828

KEYWORDS: Digital Scanning; Facsimile; Sales Representation; Thermal Imaging.

HISTORY: M&T Management was established in 1989 as the sales representative division of Bruce D Vallillee Electronics Limited. The division handles sales of military products in the US and Canadian marketplace. M&T Management personnel have extensive background in selling to the military market with over 125 years of combined experience. Sales offices are located throughout both the US and Canada.

CAPABILITY: The primary product focus for sale to the US military is the Canadian designed and manufactured WIDEfax for which M&T Management Sales is the exclusive representative for military sales. The WIDEfax is the world's first wide-format facsimile, thermal copier, digital scanner, and thermal plotter incorporated into one piece of equipment. WIDEfax is completely compatible with any standard fax machine and can send in either 8½ x 11" or in strip form to a small fax with no loss of the document being faxed. The WIDEfax will send in wide format to another WIDEfax at 14,400 bps. The copy feature allows for enlargement up to 300% or reductions down to 33%. As the unit is a thermal system, it makes for an excellent field copier as it does not have to be completely level to operate to maximum performance and there are no toners, chemicals, or ammonia used. The RS232 interface and software provides direct communication link with CAD systems for scanning and thermal plotting of drawing, blueprints, maps, etc. Output can be to a variety of media: plain paper, standard fax paper, vellum, mylar, and clear film. The latest product enhancement is the addition of a memory board for sequential fax transmissions and predetermined number of copies.

M&T Management Sales is currently working with the Canadian Army, DND Headquarters, Ottawa; DND St Hubert, DND Division Headquarters, Kingston; US Army, ATCCS Experimentation Site, Ft Lewis WA; and PM-OHS, Ft Monmouth NJ to automate the completion of map traces.

The company is listed with over 40 US military locations through the Canadian Commercial Corporation. They wish to expose this equipment to the US forces to provide a cost-effective, time-saving, large-format communication system to reduce man-hours and increase capability and reliability.

PERSONNEL: Engs - 1
Management - 1
Administrative - 2
Sales - 6

GROSS SALES: 1991 - $400K
1992 - $700K (estimate)

PLANT SIZE: 2,500 sq ft

EQUIPMENT: All necessary related computer equipment and office equipment to support our function. A 24" WIDEfax on site available for demonstrations.

EXPERIENCE: M&T Management currently represents The WideCom Group Inc (WIDEfax), Ontario, Canada; Econ Optics (Night Vision Equipment), Alimos, Greece; Aselsan Military Electronics (Electrical Equipment), Ankara, Turkey; Jupiter Connectors (Underwater Connectors), Saint-Maur Cedex, France; EEI (Military HVAC Products), West Chester, Ohio; US Products (Military Gloves), Amsterdam, New York; and Brentronics (Military Batteries), Comack, New York.

MACDONALD DETTWILER AND ASSOCIATES Ltd

ADDRESS: 13800 Commerce Parkway
Richmond, British Columbia
Canada V6V 2J3

CONTACT: Mr Richard Swann, Director, Space and Defence Systems
Mr Bernie S Clark, Director of Sales
Tel: (604) 278-3411
Fax: (604) 278-2117

KEYWORDS: Acoustic Sensing; ATC; Command and Control Centers; Data Handling; Ground Stations; Image Processing; Image Recorder; Interactive Analysis; Landsat; Meteorological Satellite Processing; Remote Sensing; SAR; Satellite Ground Stations; Software Engineering; Software Systems; Space Systems; SPOT; Weather Forecasting; Weather Image Processor.

HISTORY: MacDonald Dettwiler is a private, Canadian-controlled corporation with its head office in Vancouver, Canada, and sales, service, and engineering offices in Ottawa, Canada; the US; Europe; Asia; and Australia.

CAPABILITY: MacDonald Dettwiler is an international leader in advanced systems development for aerospace, defence, and electronics manufacturing industries. They are the world's largest supplier of turnkey remote sensing satellite ground stations, as well as air traffic control and flight data management systems, weather information processing and distribution systems, surveillance systems, and systems for the acquisition and processing of optical, radar, and sonar images from spaceborne, airborne, and shipborne sensors.

The company offers design and development to MIL-SPEC including DOD-STD-2167A and European Space Agency standards, advanced software engineering techniques, high-reliability and distributed systems, large-scale systems integration, and full integrated logistics support.

Since incorporation, MacDonald Dettwiler has grown to over 600 employees, of whom about 65% have university degrees, mainly in electrical engineering, computer science, and physics. The company counts NASA, the European Space Agency, General Electric's Space Division, the US Jet Propulsion Laboratory, the USAF, and the Canadian Government among its clients. It exports 80% of its products and maintains a network of sales, service, and engineering offices throughout the world.

As a result of its experience and track record, MacDonald Dettwiler is recognized worldwide as the leading supplier of ground receiving and processing systems for remote-sensing satellites. The company has been prime contractor for 15 turnkey remote sensing satellite ground stations worldwide and major subcontractor for another 10. Full turnkey services, including training and support, were provided for most of these installations. MacDonald Dettwiler is the prime contractor for both the ground segment of the ERS-1 radar satellite and Canada's Radarsat satellite ground station system.

The company is also a leading developer of space-qualified systems and associated artificial intelligence technology. As a major partner in Canada's Mobile Servicing System for the international Space Station Program, the company is contributing towards development of complex software, data processing subsystems, and artificial intelligence applications.

MacDonald Dettwiler's projects in the space and defence market areas draw upon the company's abilities in command and control systems, signal processing, image analysis, data integration, and human-machine interface (HMI) development. These skills provide a solid platform for furthering development in radar, optical, and sonar surveillance techniques, in any environment ranging from the ocean floor to outer space.

In 1985 MacDonald Dettwiler undertook studies on processing algorithms and signal processing implementations for a space based radar (SBR) system. The SBR system is intended to enhance the North American Air Defence System and provide NORAD with a 360-degree defence perimeter designed to meet the threat from manned aircraft and atmospheric missiles. The work was carried out in a consortium of companies led by Spar Aerospace Limited. The MacDonald Dettwiler contribution consisted of a high-level design of the on-board and on-ground signal processing architecture.

MacDonald Dettwiler is currently working on development of detection algorithms and the associated on-board signal processing architecture. A study now underway will examine how SAR technology can help fulfill SBR mission requirements.

The company is currently heading a joint initiative along with three leading western aerospace firms for the Earth Environment Space Initiative (EESI). EESI is a program which will use remote sensing to monitor Canada's environment from space. MacDonald Dettwiler is also a major participant in DND's Space Based Radar and Naval Reserve Mine Countermeasures programs together with Transport Canada's Canadian Automated Air Traffic Systems (CAATS). Other clients include the United States Naval Research Laboratory, the Ocean Research Institute, NASA, the European Space Agency, the civil aviation authorities of Australia and the United Kingdom, and the United States Jet Propulsion Laboratory. The company exports 80 percent of its products and maintains a network of sales and service offices throughout the world.

MacDonald Dettwiler is pioneering application-specific software which can integrate and "fuse" multi-source data into meaningful information. This, combined with the latest human-machine interface technology and equipment, ensures rapid, easy-to-use systems for effective command and control under any circumstances.

The company has also played a leading role supplying meteorological satellite ground systems and components for all commercial weather satellites. MacDonald Dettwiler has been the prime contractor for 14 turnkey weather satellite ground stations. In the broader field of weather data processing and distribution, MacDonald Dettwiler has developed an Automated Weather Distribution System (AWDS) for the USAF. AWDS will eventually provide a global weather information network connecting several thousand mini/microcomputers distributed over 166 sites worldwide.

MacDonald Dettwiler has always been at the forefront of digital synthetic aperture radar (SAR) processing. The company was first to digitally process data from the Seasat A satellite, and first to develop a commercial digital SAR processor. It now manufactures a complete airborne SAR system--IRIS--in both remote-sensing and defense versions. The defense IRIS produces three meter resolution imagery and performs both moving and static target imaging in real time, on board the aircraft. Images are downlinked, also in real time, to tactical mobile ground stations and to central processing and analysis facilities.

MacDonald Dettwiler's Aviation Systems Group specializes in developing high-reliability, advanced computer systems for flight operations and air traffic control. Systems and services are provided in airspace management, flight plan filing and validation, flight progress tracking, conflict detection and resolution, aeronautical data communications, simulation and training, radar data processing, flight data processing, and weather data processing.

PERSONNEL: PhDs - 27
MAs - 127
University Degrees - 398
Engineering/Science Degrees - 239

GROSS SALES: 1990 - $47M
1991 - $55M

PLANT SIZE: 17,000 sq m

EQUIPMENT: MacDonald Dettwiler's systems engineering facilities include an extensive VAX- and SUN-based development environment. The hardware manufacturing plant includes full assembly, integration, and test facilities for both custom and production units. Electronic assembly techniques include computer-guided stitch wiring. High precision electro-optical test equipment is used to ensure machined surfaces and electro-optical assemblies adhere to exacting tolerances.

EXPERIENCE: MacDonald Dettwiler has served as prime contractor on large-scale systems for the US Air Force, Swedish Space Corp, Australia Center for Remote Sensing, National Research Council of Thailand, Indonesian Space Agency, German Space Agency, European Space Agency, Swissair Transport Co Ltd, Canada Center for Remote Sensing, and Atmospheric Environment Service Canada. The company has also served as subcontractor to Bendix, TRW Systems, General Electric Co, Jet Propulsion Laboratories, NASA, Messerschmitt-Bolkow-Blohm (Germany), National Space Development Agency of Japan, Hitachi, and Hughes Aircraft.

MARTIN MARIETTA CANADA Ltd

ADDRESS: 1450 - 50 O'Connor Street
Ottawa, Ontario
Canada K1P 6L2

CONTACT: W Neil Russell, Director Business Development
Tel: (613) 232-6430
Fax: (613) 232-6698

KEYWORDS: ATC (Systems Integration); Consulting; Integrated Logistics Support; Software Development; Software Verification; System Studies; Systems Integration; Systems Management.

HISTORY: Martin Marietta Canada Ltd (MMCL) was established by the Martin Marietta Corporation to pursue high-technology business opportunities from a base in Canada.

CAPABILITY: MMCL's line of business is systems engineering, systems integration, and project management support for large scale aerospace, defense, electronics, and information management systems. The company's initial success was the winning of a $42M four-year contract to lead a team of other Canadian companies to supply systems engineering, systems integration, and project management support (SEIP) for the modernization of Canada's air traffic control system. Subsequent contracts involved civil and military automated air traffic contol. Building on that success, company growth is anticipated through other aspects of air traffic modernization, defense logistics projects, space programs, and other government and corporate management information systems.

PERSONNEL: 130

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: No data.

MATROX ELECTRONIC SYSTEMS Ltd

ADDRESS: 1055 St Regis Blvd
Dorval, Quebec
Canada H9P 2T4

CONTACT: Mr Edward Dwyer, Vice President of Sales and Marketing
Ms Andree Des Lauriers, Manager Marketing Communications
Tel: (514) 685-2630
Fax: (514) 685-2853

KEYWORDS: Alphanumeric Display; Board-Level Video Products; Desktop Video Production Systems; Financial Information Display; Graphics; Imaging; Machine Vision; Process Control; Training; Video Products.

HISTORY: Matrox Electronic Systems Ltd is a Canadian-owned company, founded by two electrical engineers in May 1976. For more than 15 years, the company has been designing and manufacturing state-of-the-art plug-in graphics/display processors, image processors, and enriched software drivers for the microcomputer marketplace.

CAPABILITY: Matrox designs and manufactures video controllers targeted to several distinct markets: graphics, Windows, imaging, interactive videodisc, and videographics. Each market encompasses a large variety of applications, including CAD, true color Windows desktop publishing, interactive videodisc workstations, desktop video production, medical electronics, robotics, presentation graphics, machine vision, and process control.

PERSONNEL: Engineers - 140
Marketing/Sales - 65
Others - 348

GROSS SALES: No data.

PLANT SIZE: 220,000 sq ft

EQUIPMENT: Complete digital electronics production facility. In-house computer systems include DEC and IBM.

EXPERIENCE: Present customers include various departments in the Canadian government and industries in Canada, the US, Europe, and Asia.

MDS AERO SUPPORT Corp

ADDRESS: Suite 200
1220 Old Innes Road
Ottawa, Ontario
Canada K1B 3V3

CONTACT: Mr T E Miller, Senior Vice President
Tel: (613) 744-7257
Fax: (613) 744-8016

KEYWORDS: Data Acquisition; Engine Adaptors; Engine Test; Facilities Construction; Facilities Design; Field Service; Fuel Control; Ground Support Equipment; Hush Houses; R&O (Engine Test Facilities); Spare Parts; Systems Engineering; Thrust Frames.

HISTORY: MDS Aero Support Corporation is a Canadian-owned company providing systems engineering support for gas turbine engine test facilities. The company has its corporate office in Montreal, Quebec, and its marketing, engineering, and manufacturing offices in Ottawa, Ontario.

CAPABILITY: MDS Aero Support Corporation is primarily involved in the design, engineering, construction, maintenance, and operational support requirements for aircraft engine test facilities. MDS's capabilities cover specialized engineering services for complete engine test facility design and construction, as well as individual systems design, fabrication and installations, including data acquisition and processing systems, fuel control measurement systems, thrust frames, engine adaptors, test stands, and prototype systems. MDS provides operational configuration

management support for engine test facilities through the provision of field service representatives, documentation control, technical publications, training, engineering support, acoustical and vibration analysis, gas turbine engine-related performance studies, and repair and overhaul services.

PERSONNEL: Engineers - 60
Others - 40

GROSS SALES: 1990 - $15.0M
1991 - $20.0M

PLANT SIZE: 25,000 sq ft

EXPERIENCE: MDS Aero Support Corporation's present customers include various departments in the Canadian government, aerospace industries in both Canada, the Netherlands, Germany, Morocco, Italy, Russia and the US for both military and commercial engine test facility applications. The company is interested in doing business with the US military and commercial engine operators.

MECAIR Inc

ADDRESS: 2250 Cohen
St Laurent, Quebec
Canada H4R 9Z7

CONTACT: Mr Farrell Campbell, Vice President
Tel: (514) 333-1235
Fax: (514) 745-7694

KEYWORDS: Bolts; Components (Machined); Fasteners; Screws; Shafts (Machined); Studs; Titanium.

HISTORY: Mecair Inc commenced operation in November 1987. The company has been successful in transferring the technology and technical expertise from the facilities in France to the Canadian operation. Currently Mecair Inc is manufacturing components for the aerospace/defense industry.

CAPABILITY: Mecair Inc utilizes state-of-the-art equipment to manufacture specialized fasteners for the most demanding customers. With complete in-house capability, Mecair manufactures a range of parts from .164" through 3.00" diameter. Mecair Inc conforms to AQAP-4 and MIL-I-45208 standards.

PERSONNEL: Total - 85
Engs - 5
Quality - 6

GROSS SALES: No data.

PLANT SIZE: 32,000 sq ft

EQUIPMENT: Vertical and horizontal forging presses, centerless grinders, thread rolling, CNC lathes, and CNC milling.

EXPERIENCE: Boeing, Canadair, DISC, DSS, McDonnell Douglas, Pratt & Whitney, Rolls-Royce, Textron Lycoming, Sundstrand Turbomach.

MENASCO AEROSPACE Ltd

ADDRESS: 1400 South Service Road West
Oakville, Ontario
Canada L6L 5Y7

CONTACT: Mr Eric Eriksmoen, Vice President Marketing
Tel: (416) 827-7777
Fax: (416) 825-1583

KEYWORDS: Flight Control Actuation Systems; Ground Steering Systems; Landing Gear.

HISTORY: Menasco is a wholly owned subsidiary of Coltec Inc (US) and was organized in 1971.

CAPABILITY: Menasco designs, develops, tests, 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, and AQAP-1. Physical and environmental testing is accomplished with, among other facilities, three drop test towers which can also measure landing gear shimmy and steering characteristics. Brochures available upon request.

PERSONNEL: Engineers - 62
Manufacturing - 329
Others - 164

GROSS SALES: 1991 - $100M

PLANT SIZE: 250,000 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 design and engineering

system. Production control and inventory are computerized.

EXPERIENCE: Menasco Canada has produced equipment for the following manufacturers and aircraft - Boeing (727, 737, 757, 777, CH-47, CH-46, V-22); Bell (YAH-63, XV-15); Canadair (Regional Jet CL-41, CL-84); deHavilland (DHC-4, DHC-5, DHC-7); Fairchild Republic (A-10); Fokker (F-28, Fokker 100); General Dynamics (F-111); Lockheed (C-141, C-5A,B); McDonnell Douglas (C-17, DC-10, KC-10, MD-80); 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.

METRO MACHINING CORPORATION

ADDRESS: 7926 - 15th Avenue (St Michel)
Montreal, Quebec
Canada H1Z 3N6

CONTACT: Mr Bernard Coursimault, President
Tel: (514) 374-0791

KEYWORDS: Airframe Components; CNC Machining; Components (Airframe); Components (Aluminum); Components (Landing Gear); Components (Titanium); Machining.

HISTORY: Metro Machining Corporation is a high-technology, CNC machining center founded in October 1973. The company is Canadian owned.

CAPABILITY: Metro Machining Corporation is primarily involved in producing aluminum and titanium air frame components from small to medium size, using 3-to-5 axes equipment. The company also produces landing gear components, heat treated up to 300 PSI.

PERSONNEL: Management - 6
Others - 45

GROSS SALES: 1990 - $3.6M
1991 - $4.2M

PLANT SIZE: 21,000 sq ft

EQUIPMENT: Various CNC equipment, single and multi-spindle up to 5 axes including programming system NCL No. 501 APT.

EXPERIENCE: Present customers include McDonnell Douglas Canada Ltd, Heroux Inc, Canadair Ltd, Bell Helicopter, and Menasco.

MICRONAV INTERNATIONAL Ltd

ADDRESS: PO Box 1523
Sydport Industrial Park
Sydney, Nova Scotia
Canada B1P 6R7

CONTACT: Mr Nick Coyle, President
Tel: (902) 564-8833
Fax: (902) 564-8764

KEYWORDS: Airport Equipment; ATC; DME; MLS; Non-Directional Beacon; Precision Approach System.

HISTORY: Micronav is a Canadian-owned manufacturer of airport microwave landing systems (MLS) ground transmitting equipment. The company was founded in 1981, and in 1988 was acquired by Leigh Instruments Ltd, Ottawa, Ontario. Micronav International Inc was jointly acquired by IMP Group Limited of Halifax, Nova Scotia, and Canadian Marconi Company in September 1990.

CAPABILITY: Micronav has designed and is now manufacturing MLS equipment meeting International Civil Aviation Organization standards. The company's MLS has been installed at airports in Eastern and Western Canada. MLS design and manufacturing disciplines include microwave technology, hardware and software design and development, systems management, product assurance (including reliability and failure mode and criticality analysis), production, quality assurance, documentation, and training. Airport installation disciplines include site and soils surveys, foundation design, power and mechanical installation, general construction, on-site equipment test and checkout, and field service support. These disciplines can be applied to other products or projects on a contract basis.

PERSONNEL: Engineering - 45
Others - 30

GROSS SALES: No data.

PLANT SIZE: 30,000 sq ft

EQUIPMENT: Complete digital/analog and microwave production facility. Microprocessor software development systems. Temperature test chamber, Microstrip circuit fabrication shop. MLS production test range.

EXPERIENCE: Present customers include Transport Canada and regional airports. Specific installations include MLS-400T plus associated DME/N, Port Hawkesbury, NS; and MLS-400T plus associated DME/N and 1 non-directional

beacon, Pemberton, BC. Two MLS 400T systems will be installed at Toronto Island Airport in Aug 92 under a contract from Transport Canada. Micronav is currently negotiating a contract with Transport Canada to provide 11 MLS 400T and 31 Cat II/Cat III microwave landing systems.

MILLS/STERLING AEROSPACE Inc

ADDRESS: PO Box 64516
4721 Highway 7
Unionville, Ontario
Canada L3R 0M9

CONTACT: Mr G Mills, President
Tel: (416) 985-7607
Fax: (416) 985-0772

KEYWORDS: Bolts; Connectors; Fasteners; Machining; Nuts; Prototyping; Screws.

HISTORY: Mills/Sterling Aerospace Inc is a Canadian-owned, 100% private corporation since 1983 which is serving OEM and National Defence.

CAPABILITY: The company is capable of precision Swiss automatic CNC machining, serves as a MILSPEC plating facility per QQ-P-416, and does Class 3A thread inspection per MIL-S-8879, Method C. It is an OEM source for high quality, precision requirements, and close tolerance work. The company complies with AN, MS, NAS, and NSN standards and maintains over $4M in lot traceable AN, MS, and NAS inventory. Mills/Sterling Aerospace Inc is compliant with MIL-I-45208A, AQAP-4, AQAP-9, and MOT/DOT release Auth 36-87.

PERSONNEL: 12

GROSS SALES: 1990 - $2.0M
1991 - $2.0M

PLANT SIZE: 10,000 sq ft

EQUIPMENT: CNC Swiss auto screw machine, cadmium plating line, and inspection/laboratory equipment.

EXPERIENCE: Present customers include Pratt & Whitney Canada, McDonnell Douglas Canada, Bombardier-Canadair Division, Department of National Defence, and Hawker Siddeley-Orenda Division.

MINING RESOURCE ENGINEERING (1988) Ltd

ADDRESS: RR 8
1555 Sydenham Road
Kingston, Ontario
Canada K7L 4V4

CONTACT: Mr A W (Bill) Bauer, General Manager
Tel: (613) 545-0466
Fax: (613) 542-8029

KEYWORDS: Explosives; Ordnance.

HISTORY: Incorporated in 1973, Mining Resource Engineering (1988) Limited (MREL) specializes in ordnance-related projects and manufactures explosive foam systems for explosive ordnance disposal and covert operations. Research and development efforts and explosives testing services are supported by MREL's private, fully instrumented, 200 acre explosives testing and casting facility.

CAPABILITY: The company's products include LEXFOAM® - a patented, liquid explosive foam ideally suited for EOD and demolition/entry operations; BREACHCASE - a patented man-portable, wall breaching explosive devise; and F-SEF & R-SEF - flexible and rigid solid explosive foams for specialized applications.

PERSONNEL: No data.

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: MREL'S clients include the Canadian Department of National Defence, Royal Canadian Mounted Police, Peel Regional Police, the US Marine Corps, as well as companies involved in the clearing of minefields and unexploded ordnance in Kuwait and companies representing security organizations in the US such as Battelle Memorial Institute. MREL has also conducted insensitive munitions testing as part of the US IMAD Program under contract to Applied Ordnance Technology Inc.

MITEC ELECTRONICS Ltd

ADDRESS: 104 Gun Avenue
Pointe Claire, Quebec
Canada H9R 3X3

CONTACT: Mr M Bentob, President
Tel: (514) 694-6666
Fax: (514) 694-3814

KEYWORDS: Communications; Integrated Circuits; Microwave Components; Microwave Subsystems.

HISTORY: Mitec Electronics Ltd was incorporated in 1972 and established as a manufacturing facility for the design and manufacture of microwave waveguide components. In 1980, the company moved to its present location and expanded its product line to include waveguide subsystems and switching/combining networks. In 1984/85, the present production facility was expanded to 28,000 square feet. In 1988, they took over an additional 15,000 square feet in an adjacent building to house our research and development department as well as a recently established microwave integrated circuit facility for producing circuitry both in thin film and on ceramic substrates. They employ approximately 135 people in total.

In addition to their Pointe Claire, Quebec, facility, they have a manufacturing facility in Tampa, Florida, which serves for field support and quick response for their US customers.

MITEC's products are marketed through a network of regional offices and technical representatives. Four regional sales offices are located in the US, one in the UK, while the rest of the countries around the world are supported by exclusive technical representatives.

CAPABILITY: MITEC designs and manufactures microwave components and subsystems for telecommunications, satellite communicators, and military applications to MIL-I-45208A, AQAP-4, and EIA standards with frequency range and test equipment capabilities of 1-60 GHz. The company has developed microwave subsystems and networks for the following applications:

- Uplink and downlink networks for satellite earth stations c/w control and logic systems.
- Tx and Rx multiplexing for communications equipment.
- Transmit and receive front end for radar equipment.
- Remote and local monitoring and control systems.

PERSONNEL: Engs & Technicians - 27
Production - 80
Other - 28

GROSS SALES: 1991 - $12.0M
1992 - $10.0M

PLANT SIZE: 43,000 sq ft (Point Claire, Quebec)
10,000 sq ft (Tampa, Florida)

EQUIPMENT: NC machines, milling machines, lathe, arc welders, hydraulic presses, drilling presses, shear, network analyzers, network phase and magnitude measuring system sweep oscillators, Ku and C band high power amplifier, optical means for measuring in 3 dimensions with accuracy of ±.0002" with computer printout facility.

EXPERIENCE: The company's customer list includes Northern Telecom Canada Ltd, Raytheon Company, Teleglobe Canada Inc, Aydin Microwave, Litton Systems Canada Ltd, Hughes Aircraft Company, Paramax Electronics Inc (Unisys), GTE Spacenet, Spar Aerospace Ltd, and GE American, as well as the following departments of the US Government: Defense Electronics Supply Center, Dayton; Engineering Installation Division, Tinker AFB; DCASR Cleveland; Sacramento Army Depot; the US Coast Guard; and the Navy.

MITEL Corp

ADDRESS: 350 Legget Drive
Kanata, Ontario
Canada K2K 1X3

CONTACT: Mr Cliff Knowles, Canadian Government Sales
Tel: (613) 592-2122
Fax: (613) 591-2321

KEYWORDS: Communications (Telephone); TEMPEST.

HISTORY: Mitel Corporation was incorporated in Canada in 1971. The company is headquartered in Kanata, Ontario, Canada, with subsidiary operations in the US, the UK, continental Europe, and the Far East.

CAPABILITY: Mitel is an international manufacturer of business telecommunications products, public switching systems, network enhancement products, semiconductors, and thick film hybrid circuits with annual revenues of more than $400 million. Mitel has sold more than 150,000 PBX systems in over 80 countries. All of Mitel's products have earned a reputation for ease of use, reliability, advanced functionality, and cost effectiveness. Mitel's manufacturing facilities and R&D capability are certified to ISO quality management standards (International Standards Organization, Geneva, Switzerland).

Mitel Products are listed with the GSA schedule in the US and with the Supply and Services schedule in Canada. Customers can purchase products directly from Mitel or via indirect channels.

The Adaptive Systems Division is an international business unit dedicated to adapting Mitel's existing commercial products and services to meet the special environmental requirements of the military and commercial marine markets and other "harsh environment" markets. The division provides "direct from manufacturer" sales and service to these specialized markets, as well as product development and marketing support to Mitel's other divisions requiring similarly adapted products.

PERSONNEL: 4,000 worldwide

GROSS SALES: $400M worldwide

PLANT SIZE: Switching Products:
160,000 sq ft (Kanata, Ontario)
30,000 sq ft (Ogdensburg, NY)
281,000 sq ft (Caldicot, Wales)
15,000 sq ft (China-JV)
Semiconductor:
70,700 (Bromont)

EQUIPMENT: Telecommunications products and services, ruggedized telephone systems, TEMPEST telephone systems, automatic dialers, network enhancement products, semiconductor devices.

EXPERIENCE: Customers include the US Navy, the US Coast Guard, FBI, DEA, Department of Veteran Affairs, Department of Energy, Canadian Coast Guard, Agriculture Canada, and the Department of National Defence.

MPB TECHNOLOGIES Inc

ADDRESS: 1725 N Service Road, Trans Canada Highway
Dorval, Quebec
Canada H9P 1J1

Laboratories
151 Hymus Blvd
Pointe Claire, Quebec
Canada H9P 1J1

Electromagnetic Measurement Facility
NRC, Montreal Road
Bulding M-50
Ottawa, Ontario
Canada K1A 0R6

CONTACT: Dr M P Bachynski, President
George Earle, Director US Operations
Tel: (514) 683-1490
Fax: (514) 683-1727

KEYWORDS: Antennas; Communications; Fiber Optic Communications; Lasers; Microwave Instruments; Optical Instruments; Radar Systems; Remote Sensing; Robotics.

HISTORY: MPB is a Canadian-owned high-technology company that was incorporated in 1976. It is a spin-off from RCA Ltd.

CAPABILITY: MPB Technologies Inc specializes in high technology systems and products, and in contract R&D. Since its formation in 1976, the company has expanded into six technologically oriented divisions: Communications, Electromagnetics, Electronic Systems, Fusion Technology, Lasers & Electro-optics, and Space & Photonics. Products are sold worldwide including Japan, the United States, Western Europe, Israel, and Australia.

Among the more recent achievements of the company are:

- Winning a major international contract to develop the world's first undersea branching multiplexers ($70M). These were installed in the optical fiber Trans-Atlantic Telecommunications System (TAT-9) which will be in service in 1992.

- Designing and developing the control system, feedback system, data acquisition, and various measuring systems for Canada's only major facility for research in fusion energy located at the Canadian Centre for Magnetic Fusion in Varennes, Quebec.

- Leading a consortium of Quebec organizations in a five year Telerobotics Development Systems (TDS) program. This program aims at developing three complete advanced prototype telerobotic systems.

- Developing long-life sealed CO_2 lasers for scientific and industrial applications. MPB lasers have established an enviable reputation for their stability, mode quality, and long maintenance-free lifetime.

- LASERS - Laser work includes the design and development of CO_2 continuous wave lasers (1-20 watt range, >10,000 hours lifetime, sealed off) and CO_2 waveguide lasers with wide bandwidth and good tunability (sealed off, 10,000 hours lifetime). MPB has been involved with heterodyne detection techniques in conjunction with optical fiber hydrophones that can measure 1/500 of a fringe (phase shift: 360/500°). They are involved in programs 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 1 GHz bandwidth communications system based on solid state lasers and waveguide lasers with ceramic envelopes. A spin-off from this work has been a land-based laser communications system. Other areas of laser-related work are custom designed systems based on HeNe, Nd-Yag semiconductor and chemical lasers, optical coherent radar, and nondestructive testing. The company introduced a new line of Excimer Lasers in 1991 and continues to extend their product offering in 1992 by introducing an Erbium fibre optic laser.

• ELECTROMAGNETICS AND RADAR TECHNOLOGY - 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, ship RF and EM) and mine detection using electromagnetic techniques and antenna research (wide-band VHF antennas). The company 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. Further developments include a 60/90 GHz airborne radiometer, a 35 GHz doppler fragmentation measuring radar, and a 90 GHz coherent radar. The company is involved in projects related to target augmentation and to deployment of chaff including the NATO MACE Trials.

High speed fiber optics analog processing techniques applicable to phased array feeds and unique passive microwave receivers have been developed. The company's experience in electromagnetic analytical modelling includes ship analysis (CPF radiation levels, SAR image modelling, millimeter wave reflection), aircraft analysis (fighter aircraft, robot X estimation, dynamic RCS scaling), radar RCS modification (augmentation, reduction), and tracking radar performance (decoy effectiveness, jamming effectiveness, and ACSL based tracking radar simulation.)

• DIGITAL ELECTRONICS - 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).

• INSTRUMENTATION - 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 and the system test equipment. MPB has built a shuttle experiment for growth of GaAs under microgravity conditions and are in the process of building a shuttle experiment for laser/materials interact. Their contribution to the Tokamak de Varennes experiment includes the plasma pre-ionization, diagnostic instrumentation (probes, lasers, microwave interferometry), and software development (controls and on-line data analysis), and the complete control and data acquisition system.

• ROBOTICS - Robotics has been identified as a strategic technology for the company. The important features of the Telerobotics Development Systems Program is the development of three prototypes: a macrorobot, a microrobot, and a research robot. Almost all aspects of robotics technology will be involved in these systems, including materials and sensors (e.g., force, vision, tactile.) MPB has also conducted a study for implementing full and supervised autonomy in robotics systems.

• PRODUCTS - MPB products include the VISTA 90 electronic graphics and composition system. 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-noise ratio greater than 60 db and is immune to RF interference. They have made major sales to the US of their sealed-off CO_2 lasers that are long lived (greater than 38,000 hours) and have power ranges from 3 to 12 watts TEM_{00} and 1 to 18 watts multimode. The company also manufactures a complete line of industrial CO_2 lasers which range from 50 to 200 watts and other laser products.

PERSONNEL: PhD - 32
Engineers - 77
Others - 70

GROSS SALES: 1990 - $35M

PLANT SIZE: 30,000 sq ft (Dorval)
70,000 sq ft (Pointe Claire)
5,000 sq ft (Ottawa)

EQUIPMENT: Equipment includes hydrogen oven for high temperature ceramic band seals, millimeter wave instrumentation, ASIC design center based in Mentor Graphics CAE systems, prototype center, CAD design center, reliability test laboratory, clean rooms rated at 10,000, laser materials processing and test facilities, scientific glass center, optical fiber facility, laser production facility, extensive electromagnetics measurement facilities (20MHz to 18 GHz) to include EMC test cell anechoic chamber and high power microwave sources, extensive in-house computer facilities,

and a TEMPEST secure room, clearance to NATO secret classification.

EXPERIENCE: MPB's typical clients include the Canadian Government (Department of National Defence, Communications Research Center, National Research Council), AFOSR, CBC, SPAR Aerospace Ltd, Telesat Corp, Teleglobe Canada, Br Telecomm, PTT (France), plus others. Recent US customers have included the Department of Energy (Nevada Division), Hughes Aircraft, RCA Astroelectronics, AT&T, USAF (Hanscom AFB), the USA (Ft Belvoir), and National Oceans and Atmospheric Administration. More than 70% of MPB's business originates from outside of Canada.

MPR TELTECH Ltd

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8999 Nelson Way
Burnaby, British Columbia
Canada V5A 4B5

Branch Office:
Suite 2000, Tower A
320 Queen Street
Ottawa, Ontario
Canada K1R 5A3

CONTACT: Mr Alistair W Taylor, Director, Business Development
Tel: (604) 293-5705
Fax: (604) 293-5787

KEYWORDS: Communications; Communications (Consultants); Digital Communications; Digital Signal Processing; Emergency Locator Beacons; Expert Systems; MHMICs; Microelectronics; Microwave Subsystems; Millimeter Wave Subsystems; MMICs; Multimedia Systems; RF Communications; Satellite Communications; Software Development; Storage of Digital Imagery.

HISTORY: MPR Teltech Ltd was incorporated (as Microtel Pacific Research Ltd) in 1979 as a fully owned subsidiary of BC Telephone Company (BC Tel), in which the company GTE has a minority holding. Through its parent companies, Automatic Electric and Lenkurt Electric of Canada, MPR Teltech's history spans over eight decades.

CAPABILITY: MPR Teltech offers the aerospace industry a wide range of design and fabrication services. These include components such as multichip modules (MCM), thick-film hybrids, hybrid and monolithic microwave integrated circuits; complex subsystems such as transmitters and receivers; and complete systems, including large software systems for communications network management.

MPR Teltech is currently active in civilian and military EHF satellite communications, space based radar, and search and rescue satellite beacons. Other areas of expertise include commercial and military airborne radar, air-to-ground communications, navigation, and EW systems.

As Canada's largest design house for satellite earth station engineering, MPR Teltech is a recognized leader in advanced microwave, modem, and associated signal-processing technologies. MPR Teltech was responsible for the system design, terminal design, and development of the satellite communications system which provides the transmission backbone for the $268 million NWS contract awarded by National Defence in 1986.

MPR Teltech was selected as prime contractor for DND's $33 million "FASSET" R&D project, involving the design and integration of an advanced development model of an EHF SATCOM system for evaluation and test. Consisting of two ground terminals and a ground-based payload model, the system incorporates advanced processing techniques to achieve secure, survivable communications links in an ECM environment.

MPR Teltech has designed two major commercial satellite communications systems: the SPACETEL™ SCPC thin route voice/data system used extensively in remote locations of western and northern Canada, the US, and overseas, and a two-way VSAT system using TDM/TDMA technology for interactive data communications. These projects demonstrate MPR Teltech's ability to design and implement all aspects of complex, integrated hardware/software systems. Recently MPR Teltech has received a $9M contract from South Korea relating to the transfer of VSAT technology.

MPR Teltech is continuing to invest in advanced technology development. Significant successes to date include a variable data rate (up to 2Mb/s), variable coding rate, k-7, Viterbi FEC codec. This device incorporates over 140,000 transistors on a single chip, 0.4 inches square. Recent technology development at MPR Teltech now permits integrating several silicon and/or gallium arsenide chips on a silicon carrier. This high-density interconnect system provides an extremely high level of integration of both analog and digital signal processing functions in a single, very compact, extremely light-weight package.

MPR Teltech also has two major research projects supported by the Canadian Department of National Defence: Monolithic Microwave Integrated Circuits (MMIC) and Miniature Hybrid

Microwave Integrated Circuits (MHMIC). MMIC design and component fabrication services are currently available. Similar MHMIC services are available commercially.

Other technologies currently being commercialized for both military and commercial applications include still image and audio compression, expert systems, broad band fibre optics communications, object oriented techniques, multimedia systems, and ATM switches and systems.

PERSONNEL: Technical staff - 400
Support staff - 100

GROSS SALES: 1990 - $48.6M
1991 - $56.2M

PLANT SIZE: R&D facilities in BC - 117,000 sq ft
Branch office in Ottawa - 12,000 sq ft
Pacific Design Engineering Ltd (Burnaby) - 9,000 sq ft
PDE Inc (Beaverton, Oregon) - 8,000 sq ft

EQUIPMENT: 5,500 sq ft of microelectronic clean room facilities of which 1,000 sq ft are Class 100 or better. Microelectronic test equipment includes LT X 77 Analog/Digital Test System; HP 8510 Vector Network Analyzer; Cascade RF Wafer Probe; burn-in ovens; environmental chambers; and chip-packaging equipment. Extensive electronic laboratories which are well equipped with high quality digital, analog, RF, and microwave test equipment operating over the range from DC to 26 GHz. Anechoic chamber (7 ft x 8 ft x 14 ft) for electromagnetic compatibility testing. Extensive mainframe (VAX/UNIX) and distributed computing facilities.

EXPERIENCE: MPR Teltech's customers include the Canadian Government (Department of National Defence, Department of Communications, Communications Research Centre, Department of Transport, National Research Council, etc.) as well as a broad cross section of private industry. Canadian firms include the BC Tel Group, CNCP, Newbridge Networks, NovAtel Communications, Octel, Telesat Canada, Telesat Mobile, Pelorus Navigation Systems, and Prism Systems. Major accounts headquartered in the US include GTE Corporation, ADC Telecommunications, Digital Switch Corporation, Intelsat, and Tellabs Communications. Extensive work has also been carried out for New Zealand Telecom, ETRI (Korea), and international Satcom consortium.

NATIONAL COATING TECHNOLOGIES Inc

ADDRESS: 1975 Logan Avenue
Winnipeg, Manitoba
Canada R2R 0H8

CONTACT: Mr John Read, Vice President and General Manager
Tel: (204) 632-5585
Fax: (204) 694-3282

KEYWORDS: Coatings; Metal Coatings; Plasma Spraying; Thermal Spraying.

HISTORY: National Coating Technologies Inc (NCT) is a Winnipeg-owned and -based company founded in 1990 following the acquisition of the assets of Plasma and Flame Coatings Ltd which began operations in 1971. It is now the largest independent thermal spray (metallizing) facility between southern Ontario and Alberta.

CAPABILITY: NCT is one of only two independent thermal spray facilities in Canada performing work for the aerospace industry. Major customers include Bristol Aerospace and Standard Aero. NCT has five fully equipped plasma spray booths, as well as flame spray and high velocity oxyfuel (HVOF) equipment. NCT uses these thermal spray processes to apply many different coating materials to aircraft engine and airframe components, e.g., thermal barrier (ceramic) coatings on exhaust frames and afterburner liners, wear resistant coatings on exhaust frames, abradable coatings on turbine compressor cases, etc.

PERSONNEL: Engs - 2
Other - 11

GROSS SALES: 1991 - $1.5M
1992 - $1.6M

PLANT SIZE: 18,000 sq ft

EQUIPMENT: Metco 3M and 7M plasma spray systems. Miller 3620 plasma spray system.

EXPERIENCE: Present aerospace customers include Bristol Aerospace Ltd, Winnipeg; Standard Aero Ltd, Winnipeg; Boeing Canada Technology Ltd, Winnipeg; Aero Recip (Canada) Ltd, Winnipeg; and NewCal Aviation of Canada Ltd, Winnipeg.

NATIONAL ENGINEERING & SCIENCE ASSOCIATES Inc

ADDRESS: 367 Water Street
PO Box 1
Stratford, Ontario
Canada N5A 6S8

CONTACT: Ms Kathleen Engberg, PEng, Vice President Engineering
Tel: (519) 271-6710
Fax: (519) 271-6454

KEYWORDS: EMC; EMI/RFI Shielding; Sheet Metal Fabrication; Shielded Racking Cabinets; Shielded Rooms; TEMPEST Enclosures; TEMPEST Workstations.

HISTORY: National Engineering & Science was founded in 1978. In 1983, it purchased its manufacturing division (Jones 83 Mfg Co) in Stratford and proceeded to develop its abilities in production of electronic cabinetry including shielded enclosures. In 1987, shielded rooms were developed.

CAPABILITY: National Engineering & Science designs and manufactures shielded enclosures, including modular rooms, through use of CAD/CAM, CNC/DNC turret punch press, brake bending, and welding to Canadian standards.

PERSONNEL: Engineers & Science Degrees - 3
Drafting & Programming - 2
Others - 15

GROSS SALES: 1988 - $1.8M
1989 - $2.0M

PLANT SIZE: 27,000 sq ft

EQUIPMENT: CAD/CAM, PC-based MIS, CNC 56 station turret punch press, CNC brake (brake bending to 300 tons), stamping presses to 225 tons, MIG and TIG welding in steel and aluminum, spot welding to 90KVA in steel, and batch painting system.

EXPERIENCE: Present customers include the Canadian Government as well as other NATO requirements. They are interested in accessing the US military market for field equipment, office equipment, and laboratories as well as any other areas.

NAVAIR Ltd

ADDRESS: 2450 Derry Rd East, Hangar #2
Mississauga, Ontario
Canada L4T 3B6

Government Liaison Office
275 Slater Street, Suite 320
Ottawa, Ontario
Canada L42 2G6

CONTACT: Mr Terry Malone, Branch Manager
Tel: (613) 232-8323
Fax: (613) 232-3435

KEYWORDS: Avionics Training; Modification (Aircraft/Avionics); R&O (Avionics); Telecommunications Test Equipment.

HISTORY: Navair Limited is a Canadian avionics installation, repair, and overhaul facility. 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. In 1988 Navair Limited became a subsidiary of Field Aviation Company Limited (see separate listing).

CAPABILITY: Navair Limited has three 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, deHavilland DHC-5D Buffalo and DHC-6 Twin Otter, Convair 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.

- 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 authorized to certify avionics installations and modifications

(including structural modification) up to and including Boeing 727 and 737. Navair maintains a Canadian military AQAP-1 quality assurance approval standard.

PERSONNEL: 65 (with additional contract personnel as required)

GROSS SALES: 1990 - $14.0M
1991 - $14.0M

PLANT SIZE: 10,000 sq ft (office and service facilities)
20,000 sq ft (hangar space)

EQUIPMENT: Full complement of test equipment for full-range avionics repair and overhaul; hangaring and aircraft storage facilities for most aircraft; engineering drafting departments; full auto CAD; and classrooms and equipment (including audiovisual) for training programs. The company has word processing/document formatting and full, in-house, desktop publishing capability.

EXPERIENCE: Present customers include various departments in the Canadian Government such as Transport Canada, National Defence, and Coast Guard and the deHavilland Aircraft Company Ltd.

NEWBRIDGE MICROSYSTEMS

(A division of Newbridge Networks Corporation)

ADDRESS: 603 March Road
Kanata, Ontario
Canada K2K 2M5

CONTACT: Mr Jim Roche, Director Sales & Marketing
Tel: (613) 592-0714
Fax: (613) 592-1320

KEYWORDS: VME Bus; Wide Area Networks.

HISTORY: The company was originally founded as Calmos Semiconductor in 1983. It was acquired by Newbridge Networks Corporation in 1989 and now operates as Newbridge Microsystems, a wholly owned division of Newbridge Networks Corporation. Newbridge Networks is a Canadian company founded in 1986 and engaged in the business of wide area networks. Its shares began to trade on both Toronto and New York exchanges (NASDAQ) in 1989.

CAPABILITY: Newbridge Microsystems is involved in the design, manufacture, and sale of Openbus semiconductor components and OEM subsystems related to openbus standards and communication systems. Principle product families include VME interface devices, Futurebus+ components, DES, public key encryption devices, and wide area network interface components. Newbridge offers the only 64 bit VME devices available in the industry today.

By combining our Openbus expertise with the wide area networking knowledge of our parent, Newbridge Microsystems has developed cards such as the 1424 and 1448 VMET1 intelligent VME-board controllers that support two fully compliant T1 links. VME-E1 cards, VME-T3 cards, and combinations of T1, E1, and T3 interfaces with Futurebus+ and Sbus controllers are in development.

PERSONNEL: No data.

GROSS SALES: Newbridge Networks Corp:
1990 - $122M
1991 - $149M

PLANT SIZE: 48,000 sq ft

EQUIPMENT: Design equipment is based on SUN workstations and uses Valid and Cadence software. Test capability includes Sentry, LTX, IMS, and a range of proprietary hardware.

EXPERIENCE: Newbridge Microsystems has an extensive customer base. Military customers include DY4, Hughes Aircraft, Vista Controls, E-Systems, Litton, and Rockwell. Commercial customers cover a broad range but include NCR, AT&T, Schlumberger, National Semiconductor, Racal DataCom, Eaton, and Emulex.

NEWTECH INSTRUMENTS Ltd

ADDRESS: 63 Thorburn Road
PO Box 13635, Station A
St John's, Newfoundland
Canada A1B 4G1

CONTACT: Mr Henry Tremblay, Vice President, Marketing
Tel: (709) 576-6666
Fax: (709) 476-7635

KEYWORDS: Build-To-Print; Cables (Splice Closure); Electronic Receptors; Fuel Sensors (LAV); Heads Up Display (LAV); Instrument Panels (LAV); Pest Control Devices (Electronic); Salinity Measurement; Wire Harnesses.

HISTORY: NewTech Instruments Inc is a Canadian-owned, electronics design and manufacturing firm providing quality products and services to the marine, communications, and defense industries. The company was formed in

1986 to develop, manufacture, and market marine technology. Its first product was Hydroball, an instrument used worldwide to measure water temperature and ocean currents. In the past several years, the company has expanded its operations to include a unique copper telecommunications cable splice closure product as well as the development of various electronic and electro-mechanical assemblies.

CAPABILITY: NewTech Instruments Ltd has specific expertise in the areas of acoustics, build-to-print electronic electro-mechanical assemblies requiring high quality standards.

PERSONNEL:
Engineers - 2
Electronic Engineers - 3
Other Professionals - 4
Electronic Technicians - 4
Others - 30

GROSS SALES: No data.

PLANT SIZE: 8,000 sq ft

EQUIPMENT: Complete electronics productions facility; anti-static climate-controlled room; potting shop for acoustic transducers; hydrostatic test equipment. Associated facilities include acoustic tank, seakeeping (wave) tank, and tow tank.

EXPERIENCE: Products and/or services have been provided to General Motors Diesel Division, Italian Antarctic Project, Admiralty Research Establishment, BritSurvey, WS Ocean Systems, Louisiana State University, Evans-Hamilton Inc, Centre for Cold Ocean Resources, Newfoundland Telephone Co Ltd, Department of Fisheries and Oceans, Ultimateast Data Communications Ltd, Department of National Defence, Computing Devices Company, Northern Telecom, EJE Trans-Lite, Adnatech Manufacturing.

NITREX METAL TECHNOLOGIES Inc

ADDRESS: PO Box 160
South Street North
Port Robinson, Ontario
Canada L0S 1K0

CONTACT: Mr Chris Dennis
Tel: (416) 384-2949
Fax: (416) 384-9110

KEYWORDS: Coatings (Nitreg®); Diffusion Coatings (Nitreg®); Metal Coatings; Nitreg® Process; Surface Treating.

HISTORY: Nitrex Metal Technologies (NMT) Inc was incorporated in 1990 as a joint venture company between H&S Heat Treating of Port Robinson, Ontario, and Nitrex Metal Inc of Montreal, Quebec. The Nitreg® process is a unique gas nitriding technology emerging after eight years of research and development. The process involves improving surface values of finished steel or iron parts and is a Canadian development already enjoying commercial success under licensing agreements in Canada and Europe. NMT Inc's Montreal and Port Robinson locations place the services for a growing demand in advanced surface treating technology close to manufacturers in the province of Quebec and Ontario and in the North Eastern United States.

CAPABILITY: Environmentally friendly, the Nitreg® process offers significant advantages in nitrogen diffusion technology. The success of this technology lies in an understanding and ability to control the nitriding potential at all stages of the nitriding cycle and in turn the resultant surface physical chemistry. The Nitreg® process is unmatched by other nitriding systems in its ability to provide premium quality competitively priced work with 100% guaranteed repeatability from part to part. The guarantee of economical and repeatable results have led to the rapid acceptance of this new technology and service in the aerospace, aviation, DND, automotive, and many other important metal processing industries. The Nitreg® processes have obtained approvals for all the above industries and are being applied to solve the most challenging surface hardening problems.

PERSONNEL:
Metallurgist - PhD - 1
Metallurgists - BASc - 2
Mechanical Engineer - MASc - 2
Metallurgical Technologists - 2
Mechanical Technologist - 2
Systems Analyst - 1
Others - 6

GROSS SALES: No data. First year of operations.

PLANT SIZE: 5,000 sq ft (Port Robinson)
5,000 sq ft (Montreal)

EQUIPMENT:

- Montreal, Quebec: 3 electrically heated pit-type furnaces are currently in operation with a capacity to handle parts up to 60" diameter by 100" long with a maximum weight of 10,000 lbs.

- Port Robinson: 2 pit-type electric furnaces with a capacity to handle parts of to 28" diameter by 60" long. Provision has been made for installation of the largest Nitreg® nitriding facility

in North America, capable of treating parts weighing up to 20,000 lbs.

All ancillary support facilities for processing, testing, and quality control are integrated into both our Quebec and Ontario operations. Processing units are completely automated, using process equipment hardware and software architecture that permits a menu driven selection of cycle parameters most suited to the specific material type and desired case properties. The design philosophy built into Nitreg® process eliminates the possibility of operator error, guarantees repetition of results, and secures the general system reliability.

EXPERIENCE: The Nitreg® Process is rapidly gaining recognition in Canada and the USA as well as many foreign countries through licensing agreements. The company's customers include several domestic forging shops, aluminum extruders, and die casting mould makers, where significant cost reductions have been achieved in die life after Nitreg® treating. The growing list of customers features companies such as Dofasco, Stelco, General Motors, Atoma International, and Tesma International, to mention a few. Users of Nitreg® nitriding abroad include British Leyland (England) for truck diesel engine parts, Steyr (Austria) for differential mechanism components Massey-Ferguson (England) for diesel engine parts, and Fiat (Italy) diesel engine distribution gearing.

NORANCO MANUFACTURING Ltd

ADDRESS: Unit 4
1001 Burns Street East
Whitby, Ontario
Canada L1N 6A6

CONTACT: Mr Bernardo Sztabinski, Vice President
Tel: (416) 666-8121
Fax: (416) 666-8124

KEYWORDS: Cabinets; Enclosures (Electronic); Machining; Metalworking; Sheet Metal Fabrication; Welding.

HISTORY: Noranco Manufacturing is a Canadian-owned company in business since 1964 servicing the electronics, aerospace, and communications industries in the area of custom metal fabrication, and related services.

CAPABILITY: Basically, the company builds to print, following customer specifications. The plant is equipped with modern CNC equipment for the various operations required in metal fabrication such as punching, forming, welding, assembly, etc. Noranco has the facility to send and receive drawings by modem. An addition of CNC machining capability is scheduled for the second half of 1992. The quality control system follows the guidelines of MIL-I-45208A and AQAP-4.

PERSONNEL: Management - 2
Engs - 2
Quality Control - 1
Manufacturing - 7

GROSS SALES: 1990 - $1.0M
1991 - $1.0M

PLANT SIZE: 11,000 sq ft

EQUIPMENT: 2 CNC Amada turret punch presses; 3 80386 autocad drafting stations; CNC press DNC linked to CAM workstation; 3-D modelling system for parts; facility to send and receive drawings by modem; facility to translate CAD drawings to NC program.

EXPERIENCE: Present customers include CAE Electronics, Honeywell (Aerospace Division), Harris Corporation, Spar Aerospace, McCurdy Radio, and Telex Communications.

NORTHWEST INDUSTRIES Ltd

ADDRESS: PO Box 9864
Edmonton International Airport
Edmonton, Alberta
Canada T5J 2T2

CONTACT: Mr Brian C McKenzie, Vice President Contracts and Marketing
Tel: (403) 890-6455
Fax: (403) 890-2351

KEYWORDS: Airframe Components; Components (Airframe); Control Cables (Aircraft); Die Fabrication; Flight Surface Manufacture; Hydraulics; Instrument Repair; Non-Destructive Testing; R&O (Aircraft); R&O (Avionics); Sheet Metal Fabrication; Structural Components; Structural Modification; Technical Publications; Technical Writing; Tooling; Tubing Assembly Fabrication; Wiring Harness Fabrication.

HISTORY: Northwest Industries Ltd, incorporated in 1943, is a subsidiary of CAE Industries Ltd, Toronto, Ontario, Canada. On 25 Mar 92 Lockheed appointed NWI as an authorized service centre, quick engine change unit repair center, and C-130 FRL tanker modification/repair centre for Hercules aircraft. NWI is one of ten Hercules service centres worldwide and the only one in North America.

CAPABILITY: Northwest Industries Ltd (NWI), a recognized DND quality assurance and NATO AQAP-1 company, is one of Canada's principal aircraft maintenance contractors experienced in the overhaul and modification of military and commercial aircraft including CF-18 Hornet and 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 non-destructive 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 Department produces military and commercial manuals, technical orders, and modification leaflets under publication contracts and in direct support of the company's aircraft modification programs. NWI's integrated database and electronic publishing systems support technical writing, editing, translation, illustration, and production of high quality military and commercial publications. Any customer-specified requirements for publication format can be supplied in printed hard copy or digital media.

NWI's manufacturing shops are utilized primarily in direct support of in-house programs with limited participation with outside activities. The company does, however, manufacture lines, cables, and various fluid tanks for DND, and produces the sophisticated mechanical cable assemblies incorporated in the Spar Aerospace remote manipulator arm of the NASA Space Shuttle.

PERSONNEL:
Engineering - 26
P Eng - 3
Quality Control - 39
Production - 215
Admin & Others - 93
Tech Publications - 96

GROSS SALES: No data.

PLANT SIZE: 250,000 sq ft (Edmonton International Airport)
(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; and Mitutoyo 241 Series co-ordinate measuring machine, Eddy-Current, dye penetrant, ultrasonic, and radiographic equipment.

Production Equipment - precision tube bender up to 3 1/2" OD capacity; cable swaging, splicing and proof loading; and heat treatment, cadmium plating, alodizing sheet metal fabrication, welding, and painting.

EXPERIENCE: Northwest Industries Ltd customers include Government of Canada Department of National Defence, United States Air Force, Spar Aerospace, and other major aircraft manufacturers and operators. The company holds Canadian Department of National Defence and NATO AQAP-1 (MIL-Q-9858A) approval, Canadian Ministry of Transport Approval 3/57, and US Federal Manufacturers Code 35598.

NOVA-QUINTECH Corp

ADDRESS: 155, Marie-Victorin
PO Box 30
Saint-Francois-du-Lac, Quebec
Canada J0G 1M0

CONTACT: Réjean Fortier
Tel: (514) 568-3335
Fax: (514) 568-7032

KEYWORDS: Aerial Ladders; Fire Fighting Equipment; Safety Equipment; Search and Rescue Equipment.

HISTORY: Nova-Quintech Corporation is a Canadian-owned industrial manufacturer who merged in 1991 with Camions Pierre Thibault. The company sold over 5,000 trucks on four continents and was founded in 1908.

CAPABILITY: Nova-Quintech Corporation is involved in the design and manufacture of fire fighting, safety, and rescue equipment. The company designs and manufactures aerial equipment including telescopic booms, aerial ladders, and articulated arms. The company can manufacture specialized equipment and parts. The company offers full after-sales services, parts, training programs, and technical publications.

Nova-Quintech Corporation can provide drawings, specifications, and engineering design on all types of safety, rescue, or firefighting equipment. The company meets commercial and military requirements.

PERSONNEL:
Masters - 1
Engs - 3
Others - 66

GROSS SALES:
1991 - $4.0M
1992 - $12.0M

PLANT SIZE: 125,000 sq ft

EQUIPMENT: 23 PCs on LAN including 5 PCs with Autocad for CAO/FAO purposes, 3 servers, 2 unix, 1 Novell.

EXPERIENCE: No data.

OCEANROUTES SEIMAC

ADDRESS: Swire House
271 Brownlow Ave
Dartmouth, Nova Scotia
Canada B3B 1W6

CONTACT: Mr Geoffrey P Allen, Vice President, Marketing
Tel: (902) 468-3007
Fax: (902) 468-3009

KEYWORDS: Avionics Design Engineering; Data Acquisition; Instrumentation; Software Development.

HISTORY: OCEANROUTES SEIMAC has two major areas of expertise: design and manufacture of rugged instrumentation for harsh environments and software database and system design. We also operate a 24-hour-a-day, 7-days-a-week forecasting office for service to offshore oil drilling operations. Products include data acquisition systems for ocean sensing, aquaculture monitoring, and search and rescue. Software products include an acoustic range prediction system (ARPS) currently being tested by the Canadian Navy for use in the Canadian Patrol Frigates. OCEANROUTES SEIMAC's capabilities span the areas of software design, development, and integration; electronic design, development, and manufacture; system integration; project management; quality assurance; and production manufacturing (build-to-print).

CAPABILITY: No data.

PERSONNEL:
Engs - 11
Scientists - 1
Technologists - 6
Other - 13

GROSS SALES:
1990 - $1.9M
1991 - $2.7M

PLANT SIZE: 12,000 sq ft

EQUIPMENT: Complete analog and digital electronics production facility. In-house computer systems include IRIS, IBM, VAX, and a complete autocad facility.

EXPERIENCE: Present customers include various departments in the Canadian Government including the Department of Transport, Coast Guard, Fisheries and Oceans, and Environment Canada; various US Government Departments including the Naval Oceanographic Office (Stennis), and NOAA (PMEL), Seattle, Washington. Researchers including those at Memorial University Newfoundland, Johns Hopkins University (APL), and the Canadian Centre for Inland Waters are also customers of the company.

OERLIKON AEROSPACE Inc

ADDRESS: 225 Boul du Seminaire Sud
Saint-Jean-sur-Richelieu, Quebec
Canada J3B 8E9

CONTACT: Mr W Matthews, Director Marketing
Tel: (514) 358-2000
Fax: (514) 358-1744

KEYWORDS: Astronautics; Data Communications; Design Engineering; Electro-Optics and Laser Technology; Environment; Fire Control Systems; Fuses; Hydraulic Engineering; Missile and Munitions Technology; Missile Guidance Systems; Models and Simulations; Optical Sighting and Ranging Equipment; Radar Defense Systems; Sensors; Space; Technical Writing; Training.

HISTORY: Oerlikon Aerospace Inc (OA) is a Canadian company which commenced operations in Canada in 1986. Oerlikon Aerospace Inc provides fully integrated design, engineering, assembly, test, production, and logistics support for defense, aerospace, and other high-technology systems.

CAPABILITY: No data.

PERSONNEL: No data.

GROSS SALES:
1990 - $125M
1991 - $150M

PLANT SIZE: 32,000 sq m on a 40 hectare site

EQUIPMENT: Electro-optical laboratory used to assemble, test, and trouble shoot sensitive electro-optical devices and collimator systems; a temperature and humidity controlled and pressurized Class 10,000 (100 parts per million) facility. Mechanical lab for all types of mechanical work within prototype or first unit integration projects. Outside test facilities, including an 800 meter track, for road and vehicle vibration tests; a surveyed target board for navigation systems alignment; a 6-degree slope for system function testing; a radar target simulator (up to ten targets) for doppler and non-doppler radars; a facility for boresight target boards for optical alignment of systems; testing, detecting, and

decoding CO_2 laser signals; and a flight target simulator for target tracking testing using visible or infrared sourcing, with 360-degree rotation simulating aircraft speeds ranging from Mach 0.3 to 3.5. Optical test bench (OTB) (patent pending) for aligning, calibrating, and evaluating complex electro-optical assemblies; testing of boresights and sensor tracking capabilities; and power and coding of lasers. Software support center, including a shielded room, emulators, simulators, and configuration management software for the development of embedded software, software maintenance, training, and testing.

Other equipment includes MRP, CINCOM, CADAM 2D & 3D, VAX, IMB, and IMB-PC hardware and software; various processors, compilers, and programming tools; shielded room; TEMPEST facilities; Interleaf; and LOGOS automated translation software.

EXPERIENCE: OA's experience includes Low Level Air Defense (LLAD) system for the Canadian Government which includes gun, radar, and missile systems, and Forward Area Air Defense (FFAD-LOS) program for the US Army.

ONTARIO HYDRO

(Research Division)

ADDRESS: 800 Kipling Avenue
Toronto, Ontario
Canada M8Z 5S4

CONTACT: Dr G R Floyd, Supervisor, Research Business Relations, KR202
Tel: (416) 231-4111, X6322
Fax: (416) 231-4513

KEYWORDS: Alternate Fuels Research; Analysis; Atmospheric Research; Biological Research; Biomass; Combustion Research; Concrete Technology; Corrosion Science; Distribution Research; Electronics Research; Electrotechnology Research; Emission Control; Energy Conversion; Engineering Services; Environmental Assessment; Failure Analysis; Fracture Mechanics; Geotechnical Engineering; High Voltage Engineering; Instrumentation; Materials Sciences; Neutron Activation Analysis; Non-Destructive Testing; Nuclear Engineering; Nuclear Waste Management; Operations Research and Statistics; Organic Materials Research; Physical Metallurgy; Pollution Control; Power Systems; Process Metallurgy; Rock Sciences; Soil Sciences; Structural Integrity; Thermofluids and Tribology Research; Transmission Research; Tritium Technology; Welding Technology.

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 of expertise. Many of the techniques and skills developed at the Research Division, while developed in support of the utility, are applicable in other areas.

PERSONNEL: Research Division:
Engineers, Physicists, etc - 324
Technicians & Technologists - 253
Support Staff - 71

GROSS SALES: 1990 - $81.1M
1991 - $83.6M

PLANT SIZE: 43,000 sq meters Kipling Complex (plus other test sites)

EQUIPMENT: The following is a list of the major physical facilities. The Research Division also has various sophisticated test and measurement instruments in general use in its laboratories.

- Electrical/Electronic - High voltage laboratory (including winter weather chamber), high current laboratory, industrial processes laboratory (high frequency power, impulse power, high temperature plasma), electromagnetic laboratory, electronics development laboratory, mobile cable fault location laboratory, mobile high potential test facility, SF6 substation (full scale), and battery laboratory.

- Mechanical/Metallurgical/Structural - Nuclear process components test facility (full-scale primary heat transport pump test set up to 12,600 hp), seismic laboratory, anechoic chamber, conductor stress-strain laboratory, heavy mechanical test laboratory, conductor dynamics full-scale test facility, non-destructive evaluation center, welding laboratory, metallographic analysis laboratory, corrosion testing autoclaves and loops, electric furnace facility, scanning and transmission electron microscopes, tritium laboratory, and burst test facility

(full-scale pressure test on pipes, pressure vessels, etc.).

- Chemical - Analytical chemistry laboratory, radioactive materials laboratory, surface analysis facility, oil laboratory, combustion research facility, corrosion research facility, PCB analysis facility, and radiography and thermography facility.

- Environmental - Mobile environmental monitoring facility, environmental chamber, LIDAR and other laser systems, and micrometeorological instrumentation.

- Civil - Soil, rock, and concrete research and testing laboratories (various strength testing equipment); freeze-thaw testing of concrete; petrographic analysis of geological materials; pore size distribution; and surface area determination of porous media.

EXPERIENCE: In the past, the Research Division has won many research and development contracts from the Canadian Electrical Association, the Electric Power Research Institute, the Canadian Federal Government, and other public and private organizations, both domestic and foreign.

OPTOTEK Ltd

ADDRESS: 62 Steacie Drive
Kanata, Ontario
Canada K2K 2A9

CONTACT: Dr David I Kennedy, President
Tel: (613) 591-0336
Fax: (613) 591-0584

KEYWORDS: Cockpit Displays; Data Annotation Displays; Displays; Electronic Test Equipment; Flat Panel Displays; GaAs MMICs; Infrared Detectors; Infrared Instrumentation; Integrated High Density LED Displays; LED Arrays; LED Materials; Microwave Analysis and Design Software; MMICs; Multicolor LED Displays; Printheads (LED); Semiconductors; Software (Microwave Analysis and Design); Solid State Devices; Solid State Recording Heads.

HISTORY: Optotek Ltd is a high-technology company with no other divisions in Canada or the US. Optotek was incorporated in Oct 77.

CAPABILITY: Optotek's capabilities include: (1) Development and manufacture of LED materials and devices based on Group III-V semiconductors, (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 monolithic microwave integrated circuits, (5) design and manufacture of hybrid microwave integrated circuits, and (6) microwave and monolithic integrated circuit analysis and design software.

PERSONNEL: PhDs - 2
Engineers - 10

GROSS SALES: No data.

PLANT SIZE: 37,000 sq ft

EQUIPMENT: Optotek has a full complement of semiconductor processing and test equipment.

EXPERIENCE: Optotek has experience with the USAF, the 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 and GaAs MMICs. 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 P-3 reconnaissance systems.

ORA CANADA

ADDRESS: 265 Carling Ave, Suite 506
Ottawa, Ontario
Canada K1S 2E1

CONTACT: Mr Dan Craigen, Director Ottawa Operations
Tel: (613) 238-7900

KEYWORDS: Artificial Intelligence; Automated Deduction; Automated Reasoning; Automated Theorem Proving; Automatic Induction; Computer Security; Computer Software Verification; Formal Specification; Higher Order Language; Logic of Programs; Program Verification; Rewrite Rules; Soundness; Verification of Software.

HISTORY: ORA Canada is a Canadian subsidiary of ORA Corporation, Ithaca, New York. Prior to May 1989, members of the group were employees of the Ottawa Trusted Systems Group of I P Sharp Associates Limited (IPSA), with corporate headquarters located in Toronto. IPSA was purchased by Reuters in 1987. Due to the changes in business directions at IPSA, the Ottawa Trusted Systems Group departed from IPSA and joined ORA, an organization which is more closely allied to their business and research interests.

CAPABILITY: The primary focus of ORA Canada has been formal methods and, in particular, the development of mathematically sound automated tools that support the application of formal methods to the development of critical systems. This work has spanned a wide spectrum of research fields, including automated deduction, artificial intelligence, language design, formal semantics, security, and critical software and methods for formally specifying and proving programs and systems.

PERSONNEL: 7 (Ottawa office)
60 (Ithaca, NY)

GROSS SALES: 1991 - $700K (Ottawa office)

PLANT SIZE: 2,900 sq ft (Ottawa office)

EQUIPMENT: The hardware resources available for ORA Canada include a PC AT clone, four SPARCstations, and a Sun 360. The software resources include Kyoto Common Lisp, VAX/VMS, Berkeley Unix, and Allegro. All the machines reside on an ethernet; one of our SPARCstations is also connected to internet.

EXPERIENCE: ORA Canada is currently involved in projects related to EVES (Environment for Verifying and Evaluating Software), a program verification system. The current sponsors of EVES are the Canadian Department of National Defence and the communications security establishment. The United States Navy was involved in earlier work on the EVES technology.

The development of EVES has two major streams: the design of a specification and implementation language (with supporting mathematics), called Verdi; and the implementation of a theorem prover, called NEVER.

The first phase of research and development was completed in 1987. This resulted in the m-EVES system, which consists of the language m-Verdi, an m-Verdi compiler, and the m-NEVER theorem prover.

In 1990 we completed a second phase of the project by delivering to DND the EVES verification system. EVES consists of the language Verdi (based on ZFC set theory) and the prover NEVER.

Future work will be directed at the rigorous development of a Verdi compiler, technical improvements to EVES, improved documentation, applications of the technology, and work leading to Canadian government endorsement of the compiler.

ORACLE TELECOMPUTING Inc

ADDRESS: 25 Industrial Avenue
Carleton Place, Ontario
Canada K7C 3V7

CONTACT: Mr Donald Anderson, Marketing Manager
Tel: (613) 257-4425
Fax: (613) 257-7764

KEYWORDS: Air Defense Display; Airport Status; ATC; Aviation Briefing; Cost Allocation; Flight Data Processing; Flight Plan Handling; Message Switching; Meteorological Information Handling; NOTAM Handling; Radar Processing; Satellite Information Distribution; Simulators (ATC); Voice Switching.

HISTORY: Oracle Telecomputing Inc is a Canadian owned, high-technology company founded in 1980. It initially specialized in consulting in telecomputing (i.e., the integration of telecommunications and computing). In 1983 it diversified into custom turnkey system design, implementation, and production.

CAPABILITY: Oracle Telecomputing Inc is primarily involved in the design, implementation, and production of data handling/processing systems for aviation, weather, and defense applications.

Oracle Telecomputing makes extensive use of readily available and proven off-the-shelf hardware and software. It then designs and produces custom hardware and software to tie all elements together as a custom turnkey system.

Oracle Telecomputings' Weather Information Display System (WIDS) software is currently being installed in 590 locations in CONUS, Hawaii, and Alaska as part of the Continental US DOD Meteorological Data System (COMEDS) upgrade. The US Navy have contracted for an additional 42 units for other worldwide locations. They are supplying this software as a subcontractor to GTE/Contel.

Oracle Telecomputing's weather, NOTAM, and flight planning systems are currently in use with Transport Canada, Environment Canada, the Canadian Air Force (at their two air bases in Germany) and the US Air Force (at each Regional Operations Control Centers). Transport Canada is installing an Oracle Telecomputing-designed system in all of its 107 flight service stations.

An Oracle Telecomputing air traffic control system is in use with the Canadian Department of National Defence in seven locations across Canada. This system includes a radar simulator with pseudo pilot control for training.

Their radar processing subsystem is being evaluated as a replacement for the DND's Terminal Radar and Control System (TRACS). In addition, in IV quarter 1992, they will install their Radar Processing and Display System in Goose Bay, Labrador, for DND. This system consists of:

- Radar processing subsystem
- 5 high resolution color raster display processing subsystems
- 1 radar situation display (for the tower)
- 1 flight data management subsystem.

An Oracle Telecomputing satellite information distribution system is being used in 20 locations by Environment Canada.

Oracle Telecomputing message switching systems are being used by Transport Canada (in the Gander International Area Control Centre) and the Bank of China.

Oracle Telecomputing provides full life-cycle support services. These services range from feasibility studies at the front-end all the way through specification, design, implementation, deployment, training, documentation, hardware and software support, repair and overhaul, and life-extension (e.g., the design of form-fit and function-replacement elements).

Software languages used include Ada, C, Pascal, and Assembler. Software quality assurance is compliant with AQAP-13 with adherence to DOD2167/DOD2167A. Hardware quality assurance is compliant with AQAP-4.

PERSONNEL: PhD- 1
MSc - 2
BSc/BA - 3
Technologists - 6
Support - 3

GROSS SALES: 1990 - $0.6M
1991 - $1.1M

PLANT SIZE: 6,000 sq ft

EQUIPMENT: Complete software and hardware design, development, production, and support facilities (computers, software tools, debuggers, serial data analyzers, simulators, schematic capture, PCB board design and routing, logic analyzers, oscilloscopes, function generators, etc.).

EXPERIENCE: Present customers include various departments in the Canadian and the US governments including Transport Canada, Environment Canada, Department of National Defence, and the US Air Force.

PARAMAX SYSTEMS CANADA Inc

ADDRESS: 6111 Royalmount Avenue
Montreal, Quebec
Canada H4P 1K6

CONTACT: Mr Jack Henry, Director, Marketing
Tel: (514) 340-8310
Fax: (514) 340-8318

KEYWORDS: Electronic Systems Design; Naval Combat Systems; Project Management; Systems Integration; Training.

HISTORY: Paramax Systems Canada Inc was created following the granting by the Canadian Government of a $2.6 billion contract to the St John Shipbuilding/Paramax team for the construction of six Canadian Patrol Frigates. Paramax's contract for design, integration, testing, and installation of the combat systems and other electronics on the first six frigates is valued at $1.25 billion. The company has also recently been awarded an additional contract for electronic systems work on a second group of six frigates. This contract, running to 1997, represents a further $1.25 billion to Paramax. Paramax is also presently involved in contract proposals for systems integration work for 35 new shipboard helicopters and 15 search and rescue helicopters for the Canadian Forces.

CAPABILITY: Paramax is in the business of electronic systems management. 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.

Paramax engineers have developed independent expertise in systems integration and management and are now pursuing new large-scale program management business worldwide.

Training Canadian Navy crews is also one of Paramax's immediate responsibilities. The realistic physical environment created in the 16,000 sq ft radio frequency (RF) shielded room within the Combat System Test and Support Facility allows naval personnel to test and familiarize themselves in the use of the system over an extended period of time in life-size detailed mock-ups of the frigate's bridge, operations room, and other ship's space.

The significant advantage of the land-based test concept is that the entire combat system, including the computer software, can be tested to its operational limits through simulation of realistic and repeatable combat scenarios prior to installa-

tion aboard ship. Similar testing is not feasible at sea, except in wartime, because of costs.

PERSONNEL: 1000 specialists in electrical, electronic, and mechanical engineering, computer sciences, and support staff.

GROSS SALES: No data.

PLANT SIZE: 160,000 sq ft

EQUIPMENT: Combat System Test and Support Facility (CSTSF), Avionics Systems Integration Laboratory (ASIL), Ada Software Development Center.

EXPERIENCE: Customers include Saint John Shipbuilding Ltd and E. H. Industries (Canada) Inc.

PATLON AIRCRAFT & INDUSTRIES Ltd

ADDRESS: 5502 Timberlea Blvd
Mississauga, Ontario
Canada L4W 2T7

CONTACT: Mr P B Mann, President
Tel: (416) 624-5572
Fax: (416) 624-0975

KEYWORDS: Aircraft Parts; Library (Aircraft Parts); Parts (Aircraft); Reference Library (Aircraft Parts).

HISTORY: Patlon Aircraft & Industries Ltd has been in business for 35 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, Florida, and a branch office in Ottawa.

CAPABILITY: Patlon, as an engineering sales organization, has provided valuable service to the Canadian government, specifically the Department of National Defence. Patlon has, in conjunction with its principals, designed and supplied mobile electronic weighing systems for the CF-18, electrical connector crimping tool kits for the CP-140 and CF-18 maintenance facilities; and supplied the static facilities, army vehicles, and supply depots. Patlon supplied noise/shock attenuation hardware to the Canadian Navy, and this equipment is approved for use on the Canadian Patrol Frigate program. All frigates will be equipped with Patlon outboard bearings. Patlon also designed and supplied aircraft and ground support equipment cleaning machines.

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.

In the first quarter of 1992, Patlon established a certified overhaul facility for aircraft arresting gear brakes. Patlon's facilities and personnel have been certified by ESCO, a Datron company. ESCO is the designer and manufacturer of all arresting gear systems operated by the Canadian military. Patlon's quality assurance procedures for this overhaul program are in accordance with AQAP-4.

To summarize, Patlon provides both spare support service as well as product support at the original equipment manufacturer level.

PERSONNEL: Management - 4
Support Staff - 7
Sales - 12

GROSS SALES: No data.

PLANT SIZE: 6,000 sq ft (Toronto, Canada)
2,500 sq ft (Miami, Florida)
1,000 sq ft (Ottawa, Canada)

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 Patlon, which was opened in January 1980, has vastly improved Patlon's ability to service both the South and Central American countries.

PAW SPECIALTIES

ADDRESS: 1065 224 Street
RR 9
Langley, British Columbia
Canada V3A 6H5

CONTACT: Mr Peter A Williamson, Owner
Tel: (604) 534-1291
Fax: (604) 888-0533

KEYWORDS: Ground Support Equipment; Tooling.

HISTORY: PAW Specialties is a Canadian-owned company founded in 1991. The company is primarily involved in design and manufacture of aircraft ground support equipment and engine tooling. They also do shop facility planning of repair/overhaul areas.

CAPABILITY: PAW Specialties products now in service:

- Mobile Frame (low profile model); used as a mobile base for the PW 120 and PW 123 series engine when stored on the bare engine shipping stand.

This unit is made of 3"x 8" steel tubing, has removable wheels, can be forklifted from either side or ends for safer transport handling.

- 6" Extension Set; this allows the PW 120 and PW 123 series engines to be positioned higher in the bare engine shipping stand. With the engine higher all the QEC accessories can now be installed with the exception of the flying mounts and the cross shaft.

When using the combination of the mobile frame and the 6" extension set, the engine is ready for local or remote site shipping while QEC. The numbers and types of tiedowns are a customer option.

- APU work and storage stand for the GTCP 36-100M
- Twin Otter tow bar
- Twin Otter beaching gear
- Hughes 500 skid dolly (manual moves)
- Lycoming 502 (modular) holding fixture and turnover stand
- Lycoming 502 fuel nozzle screen crimping tool
- Lycoming 502 work and storage stand.

Products nearing production include:

- Dash 8 (dual) propeller work and storage stand
- Helicopter portable landing pad
- Allison 250 work and turnover stand

PERSONNEL: Total - 2

GROSS SALES: 1991 - $25K

PLANT SIZE: 1,200 sq ft

EQUIPMENT: General manufacturing equipment, lathes, mill, sheet metal break, shear, welders, cutoff saws, spot welder, and drill press.

EXPERIENCE: No data.

PELORUS NAVIGATION SYSTEMS Inc

ADDRESS: #202 - 575 Palmer Road N E
Calgary, Alberta
Canada T2E 7G4

CONTACT: Mr Don Sinclair, Vice President, Marketing
Tel: (403) 250-9377
Fax: (403) 291-9123

KEYWORDS: ATC; Automated Weather Observation; Distance Measuring; Meteorological Stations; MLS; Navigation Systems.

HISTORY: Pelorus Navigation Systems Inc is a Canadian-owned company started in 1982 as a navigation system specialist in the aviation industry. The company headquarters are in Calgary with sales offices in Toronto, Ontario, and Tucson, Arizona.

CAPABILITY: Pelorus supplies, installs, monitors, and maintains ground-based aids to aircraft navigation and ATC communications and control systems. These systems include MLS (microwave landing systems), DME (distance measuring equipment), AWOS (automatic weather reporting systems), NDB (non-directional beacons), and subcontract ability of RF manufacturing in the microwave band. Pelorus systems are installed at over 120 regional airports worldwide.

The company is a manufacturer of radio navigational and meteorological equipment, and as well, supplies products through long-term exclusive distributor agreements with leading manufacturers. Engineering surveys and consulting are also capabilities.

Pelorus has an active R&D program. Currently under development is a low-cost DME/P precision DME for collocation with a precision approach aid such as MLS or ILS.

PERSONNEL: MBA/B Communications - 2
Engineers/Technicians - 25
Others - 18

GROSS SALES: 1990 - $1.9M
1991 - $2.3M

PLANT SIZE: 11,000 sq ft

EQUIPMENT: Pelorus' electronic test equipment includes oscilloscopes, spectrum analyzers, watt meters, power meters, meteorological devices, logic analyzer, CAD, CCA assembly and wave soldering, PCs and LAN.

EXPERIENCE: Pelorus' present customers include Transport Canada, Province of Alberta, Canadian Coast Guard, Petro Canada, Shell Canada Resources, Home Oil Co, Canterra Energy Co, municipal airports in Canada, governments of Korea, Thailand, Ireland, as well as municipal airports in Germany, Sweden, Holland, Taiwan, and Australia.

PLANE AVIONIC ENTERPRISES Inc

ADDRESS: 4314 Stella Crescent
Gloucester, Ontario
Canada K1J 8T7

CONTACT: Mr J E Gibbs, President
Tel: (613) 749-7466
Fax: (613) 731-9782

KEYWORDS: Aircraft Conversions; Aircraft Systems Certification; Aircraft Systems Installation Design; Aircraft Systems Integration; Avionics Testing; Consulting (Engineering); Consulting (Management); Consulting (Reliability Analysis); Consulting (Telecommunications).

HISTORY: Plane Avionic Enterprises Inc (PAEI) is a 100% Canadian-owned company specializing in aircraft avionic systems integration, installation, design, design studies, and program management. PAEI was formed early in 1988 by John E Gibbs as president. Currently the company employs four qualified aeronautical engineers/designers full time with part-time assistance as required by another three engineers.

CAPABILITY: PAEI has assembled a dedicated professional team of engineers and designers who have the capability to undertake complete aircraft design taskings. PAEI has completed the preliminary design for the installation of electronic warfare (EW) equipment into the DND Electronic Support and Training (EST) Challenger aircraft. As part of this program, PAEI completed the preliminary design for the installation of selected EW pods into the CT-133 and CF-188 aircraft, which included a redesign of the power generating system and the preparation of an electrical load analysis for the CT-133. They have completed the system integration and installation design for the introduction of a digital RF memory for the I-band jammer system and for the instrumented receiver system in the IEST aircraft. They have completed the feasibility design study, which included the antenna performance study, for the introduction of an airborne receiver system which includes the relocation of existing antennas and the installation of a large spinning antenna assembly onto the IEST Challenger for DND.

PAEI is currently involved in the following projects:

- The final installation and testing for the I-band jammer modifications to the IEST with DND.
- The design, installation, and manufacture of a radar augmentation system into a pod for carriage on a CT-133 aircraft.
- The CT-133 avionics update project in the areas of antenna placement study, EMC control, and EMI testing.

PERSONNEL: Engs - 4
Designers - 2
Drafters - 1

GROSS SALES: No data.

PLANT SIZE: 1300 sq ft

EQUIPMENT: Complete aircraft design office capable of manual drafting and computer aided design facility. Computerized stress and damage tolerant analysis. Word processing.

EXPERIENCE: The company's customers include Lockheed Canada, Electronic Warfare Associates Canada Ltd, Honeywell Ltd, Innotech Aviation Ltd, Omicron International Inc, and Kelowna Flightcraft.

PRATT & WHITNEY CANADA Inc

ADDRESS: 1000 Marie-Victorin
Longueuil, Quebec
Canada J4G 1A1

CONTACT: Mr T Yoshinaka, Manager Turboprop Component Engineering
Tel: (514) 647-7595
Fax: (514) 647-2506

KEYWORDS: Auxiliary Power Units; Combustion Research; Component Structural and Dynamic Research; Computational Fluid Dynamics; Engine Emission Research; Hydrogen Fuel Research; Manufacturing Research; Small Gas Turbine Engines; Turbine Cooling Research; Turbomachinery Aerodynamic Research.

HISTORY: Established in 1928 as a Canadian center for the overhaul of Pratt & Whitney Aircraft radial piston engines, Pratt & Whitney Canada Inc (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, paramilitary and for aircraft auxiliary power units. 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. Today the PTG family engines cover a power range of 550 to 1,400 horsepower. In 1979, the development started on the PW100 turboprop engine. This fuel efficient engine of a 1,500 to 3,000 horsepower class is used primarily in commuter and short-haul aircraft. In 1991 P&WC introduced a 600 shaft horsepower turboshaft engine, PW206A, to the helicopter market.

The JT15D turbofan engine was introduced in 1967. It is the power plant of the Cessna Citation series of corporate jets, and the Beech Diamond 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). A turbofan engine of 5,000 lb thrust class was developed at P&WC and was introduced in 1991. BAe 1000 is the first aircraft powered by this PW305 engine.

A 1,700 horsepower class APU was developed for Boeing 747-400 aircraft, and has been in service since 1989.

To date, the company has delivered over 36,000 engines for the world market.

PERSONNEL: Company Total - 8,100
R&D Center - 1,532

GROSS SALES: 1990 - $1.58B
1991 - $1.53B

PLANT SIZE: No data.

EQUIPMENT: Equipment includes extensive manufacturing and R&D equipment and facilities for all aspects of small aviation gas turbines - engine test cells, component test rigs, 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 (also carried out as a shared development program).

- United States Army - (1) Subcontractor in Cooled Radial Turbine Program to Pratt & Whitney, Government Engine and Space Products Division (GE&SP) (1969-1971). Pratt & Whitney Canada Inc was responsible for the aerodynamic design and participated in the structural analysis and mechanical design of the turbine; (2) Consultant to P&W (GE&SP) 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 (GE&SP) 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 and 1970 (1970-1972); and (4) Contracted with the US Army at Ft Eustis for an advanced 15:1 pressure ratio single centrifugal compressor concluding in 1989. Compressor performance exceeded all the original program goals. In addition, during the 1978-1988 time period P&WC either as a subcontractor or as a partner participated in the modern technology demonstrator engine program (with PWA (GE&SP)), the T800-APW-800 development (with Textron Lycoming and PWA (GE&SP)) and the multiple purpose small power unit program (with Sundstrand Power Systems). P&WC designed centrifugal compressors for all of the three engines and power turbines for the MTDE and T800-APW-800 engines, and completed the programs by demonstrating the targeted performance on all of these components.

- United States Navy - (1) P&WC was a subcontractor to P&W, Commercial Engine Business (CEB), 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 and (3) P&WC has also performed as a subcontractor to P&W (CEB) 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 (CEB) on a turbofan core noise program at NASA 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 (CEB) 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 (CEB) 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).

PRECISE SOFTWARE TECHNOLOGIES Inc

ADDRESS: Suite 309
301 Moodie Drive
Nepean, Ontario
Canada K2H 9C4

CONTACT: Mr Jeremy James, President
Tel: (613) 596-2251
Fax: (613) 596-6713

KEYWORDS: Real-Time Systems; Satellite Subsystems; Software Engineering.

HISTORY: Precise Software Technologies Inc is a Canadian-controlled private corporation incorporated in 1989. It is a software engineering product and service company supplying to users of real-time embedded systems. Precise Software also provides R&D and consulting expertise in the areas of multiprocessor systems integration, operating system design, and real-time software development in using Ada, C, and C++.

CAPABILITY: Precise Software Technologies Inc supplies real-time multi- and distributed-processor operating systems. The real-time operating system product line is supported with PC and workstation based integrated software development environments. Product sales are supported with customer specific enhancements and on-site training, documentation, installation, acceptance, and life cycle support.

These capabilities are used in applications where the requirements of the system meet with the integration of multiple microprocessor based systems used for robotics, avionics, voice, data communications, and space.

PERSONNEL: Computer Scientists - 6
Engs - 2
Other - 2

GROSS SALES: 1991 - $0.6M
1992 - $1.0M (est)

PLANT SIZE: No data.

EQUIPMENT: Complete network of Unix workstations, personal computers, and embedded integration test hardware.

EXPERIENCE: Our clients include NASA, Hughes Aircraft, Orbital Sciences Corporation, CAL Corporation, DY-4 Systems, National Research Council, and the Department of National Defence.

PRIOR DATA SCIENCES Ltd

ADDRESS: 240 Michael Cowpland Drive
Kanata, Ontario
Canada K2M 1P6

CONTACT: Mr Kester Hamilton, Vice President, Marketing
Tel: (613) 591-7235
Fax: (613) 591-0343

KEYWORDS: ASW; ATC; C3 Systems; Communications; Computer Graphics; Computer Simulation; Computers; Consulting; Data Acquisition; Electronic Warfare; Feasibility Studies; Graphics; Life Cycle Support; Module Design; Project Management; Radar; Requirements Analysis; Simulation; Software Development; Software Engineering; Software Services; Surveillance; Systems Analysis; Turnkey Computer Systems.

HISTORY: PRIOR Data Sciences Ltd was founded in early 1977 and has experienced steady growth to its current level of 250 employees (Apr 92). 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.
- Air traffic control, command, and control systems.
- 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 and VAX family of computers; the RSX-11M, RT-11, VMS, 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. Prior has 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.

PERSONNEL: Professionals - 200
Others - 50

GROSS SALES: 1990 - $16.1M
1991 - $20.1M

PLANT SIZE: 30,000 sq ft (Ottawa)
8,000 sq ft (Toronto)
4,000 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; electronic warfare; 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 NSA, CPF, TRUMP, ADLIPS, CANEWS SHINCOM, MACs, and MCOIN II. PRIOR has successfully teamed with other members of Canadian industry such as Spar Aerospace, 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 command, control, and communications; 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 Defence or as a subcontractor on a DND-sponsored project.

PROMAVIA INTERNATIONAL Corp

ADDRESS: 2610 Koyl Avenue
PO Box 1605
Saskatoon, Saskatchewan
Canada S7K 3R8

CONTACT: Ms Bernie Sutton
Mr Jean-Michel Willame
Tel: (306) 665-3333
Fax: (306) 665-6900

KEYWORDS: Aircraft; Training.

HISTORY: Promavia International Corporation is a Canadian company established in 1990. Promavia International Corporation was created through a transfer of assets from Promavia SA in Belgium which was founded in 1984. The asset transfer relates to a complete jet training system developed over ten years by Promavia SA. Aircraft manufacturing is scheduled to begin in 1992.

CAPABILITY:

- Manufacturing: The basic jet trainer, the Jet Squalus, allows student pilots to receive ab initio through the full spectrum of basic training directly on jet powered aircraft for approximately the same costs associated with turboprop aircraft commonly utilized in existing training systems. The Jet Squalus is appropriate for civilian and military pilot training.

- Research and Development: Ongoing development of further configurations of the basic Jet Squalus design continues. Additional versions to be introduced include an advanced military trainer and 4- and 6-seat configurations.

- Marketing: Markets for the Promavia product line are worldwide. A well established international marketing network is in place and has been responsible for the sale of nearly 1000 aircraft over a 30-year period. Promavia is represented worldwide and has established its own marketing offices in five countries including the United States.

- Flight Training: The Promavia Flight Training Academy is an important part of the overall Promavia training system. The concept is designed to offer ab initio through the full spectrum of basic training utilizing the Jet Squalus. Graduates will leave the academy with the required accreditation to take the controls of military or civilian aircraft. The Promavia Training Academy is designed for an annual enrollment of 150 students. The base academy will be located in Saskatoon, Saskatchewan, Canada. Long-term plans include franchising this concept in other locations around the world.

PERSONNEL: Production, R&D - 120
Management & Administration - 50
(Dec 92 projections)

GROSS SALES: No data.

PLANT SIZE: 80,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: No data.

PYLON ELECTRONICS

ADDRESS: 147 Colonnade Road
Ottawa, Ontario
Canada K2E 7L9

CONTACT: Mr Chris Garrick, Corporate Marketing Manager
Tel: (613) 226-7920
Fax: (613) 226-8195

KEYWORDS: Calibration; Converters (Power); Detectors; Inverters; Ordnance Detectors; Radiation Monitoring Systems.

HISTORY: Pylon Electronics is a Canadian-owned company founded in 1955 and is a wholly-owned subsidiary of Autrex Inc of Weston, Ontario. The company is comprised of three divisions in Montreal, Toronto, and Ottawa, and a subsidiary in Dartmouth, Nova Scotia.

CAPABILITY: Pylon is involved in three main areas:

- The design, production, and integration of specialized sensors for radiation, magnetic, and chemical application including the development of mechanical, electrical, and software to support integration of sensor information systems.

- The design and production of high frequency switching power convertors, inverters, uninterruptable power supplies, battery chargers, and ringing generators.

- Repair and calibration of electronic and mechanical measuring equipment with traceability to national standards.

PERSONNEL: PhDs - 3
Engs - 12
Other - 135

GROSS SALES: 1990 - $7.0M
1991 - $8.3M

PLANT SIZE: No data.

EQUIPMENT: Complete electronics production facility including in-house CAD systems, manufacturing requirement planning software on in-house network computer system. 5000 liter Radon chamber, NC mechanical production equipment, gas chromatograph with automated sampler, calibration and reference with various capability to 40GHz.

EXPERIENCE: No data.

QUANTUM INSPECTION AND TESTING Ltd

(A partner in the Westinghouse Services Group)

ADDRESS: 916 Gateway
Burlington, Ontario
Canada L7L 5K7

CONTACT: Mr Michael Dudley, President
Mr Scott Brown, Marketing Manager

Tel: (416) 632-5869
Fax: (416) 847-1634

KEYWORDS: Calibration; Fabrication Procedures; Failure Analysis; Inspection; Metrology; Non-Destructive Testing; Precision Measurement; Product Surveillance; Quality Assurance; Subcontract Management; Testing/Test Equipment; Training; Vendor Surveillance; Welding Procedures.

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. In March 1990, Quantum Inspection and Testing Limited was acquired by the Westinghouse Services Group, which will serve to strengthen the technical resources and services available as a third party services organization.

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 or 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, eddy current, infrared thermography.

- 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 - mechanical and electrical calibration laboratory, three coordinate measurement, laser theodolite dimensional coordinate analyzing capability (unlimited size and contour), casting layout, dimensional verification, and relapping and calibration of granite surface plates.

Other services include electrical calibration and electrical inspection capabilities such as inductance, resistance, impedance, and capacitance.

PERSONNEL: Engineers - 5
Scientists - 3
Technicians - 45
Others - 15

GROSS SALES: No data.

PLANT SIZE: 29,000 sq ft

EQUIPMENT: Complete NDE facility and electrical/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 Defence, Canadian Standards Association, Department of Transportation and Communications, the Canadian Government Standards Board (US MIL

and NATO standards), and Standards Council of Canada.

Buyer approvals include such organizations as Pratt and Whitney, Boeing, McDonnell Douglas, Rockwell, General Electric, Bell Helicopter, Spar Aerospace and Menasco Aerospace, etc. They are recognized by NASA as being the sole Canadian source approved for the non-destructive testing of fracture-critical components for the Space Program. Quantum has been recently appointed by Spar Aerospace to develop, monitor, and edit all NDE operations for the Space Station Freedom Project. This will incorporate all Spar vendors contracted to produce hardware for this project.

QUESTECH NORTH AMERICAN Ltd

ADDRESS: Suite 21
21 Antares Drive
Nepean, Ontario
Canada K2E 7T8

CONTACT: Mr Gerry Mayefskie, President
Tel: (613) 723-2298
(800) 336-0354
Fax: (613) 723-2520

KEYWORDS: ATC; Communications; Computer Simulation; Engineering Services; Independent Verification/Validation; Navigation Systems; Process Control.

HISTORY: QuesTech North American Ltd (QNAL), incorporated in 1987, provides engineering, independent verification and validation, and project management support services to industry and the Canadian Government. QNAL is a wholly-owned subsidiary of QuesTech Inc headquartered in Virginia.

QNAL was created to continue work initiated by its US parent to provide system engineering support to the Canadian Department of National Defence.

CAPABILITY: QNAL provides proven technical and managerial expertise which has been successfully demonstrated. Their experience spans the entire spectrum of disciplines related to the design, development, and deployment of real-time systems. Particular emphasis has been placed on independent verification and validation, test and evaluation, system and software design, and SETA support.

QNAL's technical staff consists of senior systems and software engineers with applications experience in defense and air navigation systems.

QNAL's approach to meeting client requirements consists of the timely and cost effective application of highly qualified professionals. Cost effectiveness is realized through the application of innovative techniques, such as criticality assessment, which focuses scarce resources on critical problem areas.

As a result of its continuing efforts, QNAL maintains a wide array of general and specialized tools and techniques for evaluating, analyzing, and developing system design and improving system performance which can be cost effectively applied to their customers' efforts.

PERSONNEL: Engs - 9

GROSS SALES: 1990 - $750K

PLANT SIZE: 1,700 sq ft

EQUIPMENT: IBM compatible microprocessors, telecommunications and reproduction facilities, networks to our parent firm's VAX 8800 and IBM 4381 mainframes.

EXPERIENCE: QNAL customers include various government agencies such as Canadian Space Agency, Navigation Systems Engineering and Communications Systems Engineering branches of Transport Canada, Department of National Defence directorates of Maritime Combat Systems and Land Armament and Electronics Engineering. Commercial clients include Saint John Shipbuilding Limited (SJSL) Saint John, New Brunswick; Paramax Electronics (Unisys Canada), Montreal, Quebec; DMR Group, Ottawa, Ontario; and Government Consulting Group, Ottawa, Ontario.

QUIMPEX Ltd

ADDRESS: 5450 St-Roch
Drummondville, Quebec
Canada J2B 6V4

CONTACT: Mr Jack W Jennings, Vice President Marketing
Tel: (819) 472-3326
Fax: (819) 477-9423

KEYWORDS: Drive Sprockets; Metalworking; Plastic Sprockets; Road Wheels; Sprockets (Drive); Tracks (Molded Rubber); Wheels (Road).

HISTORY: Quimpex Ltd is a wholly owned subsidiary of Les Placements Gilles Soucy Inc, Drummondville, Quebec. Quimpex is the manufacturing division in the group of Gilles Soucy companies. Started in 1965, the group is still privately owned by Mr Gilles Soucy. In 1987 the

company opened its USA subsidiary, Kimpex USA in Champlain, New York.

CAPABILITY: Quimpex Ltd is primarily involved in designing and manufacturing rubber tracks, road wheels, and drive sprockets for military, industrial, agricultural, and recreational vehicles.

Quimpex also has a metal fabrication department including tube bending, stamping, and welding all located in a high ceiling factory able to address a variety of work. In this facility, it also has a thermo-forming department using polycarbonate materials for such things as windshields.

Quimpex also manufactures a full range of gaskets to customer specifications.

PERSONNEL: Total - 120

GROSS SALES: 1991 - $10.0M
1992 - $11.0M

PLANT SIZE: 105,000 sq ft (145,000 sq ft land for expansion)

EQUIPMENT: Circular and flat vulcanizing presses. Compression molding presses. Ram extrusion machines. Thermo-forming machines. Various metal forming equipment.

EXPERIENCE: Present customers include National Defence, Hull, Quebec, Canada; Tacom, Warren, Michigan, USA; Ford New Holland, Pennsylvania, USA; Arctco Inc, Minnesota, USA; Bombardier Inc, Quebec, Canada; SISU Defence, Helsinki, Finland; Hagglunds Vehicles, Sweden; Track Marshall, UK; Alvis Ltd, UK; GKN Defence, UK; ASV Inc, USA; and Polaris, USA.

RAYTHEON CANADA Ltd

ADDRESS: 400 Phillip Street
Waterloo, Ontario
Canada N2J 4K6

CONTACT: Mr Moe Vyas, Director of Marketing
Tel: (519) 885-0110
Fax: (519) 885-1178

KEYWORDS: ATC; ATC Display Systems; EHF Synthesizer; Flight Data Processing; Ground Control Approach Radar; Precision Approach Radar; Primary Surveillance Radar; Radar; Radar Processing; Satellite Ground Stations.

HISTORY: Raytheon Canada Limited is a high-technology electronics company established as a Canadian corporation in 1956. Raytheon Canada is an independent, wholly owned subsidiary of the Raytheon Company, Lexington, MA.

CAPABILITY: Raytheon Canada designs, develops, and manufactures air traffic control (ATC) and communications systems for civil and military applications for the world market. As a complete system supplier, Raytheon Canada is equipped to take on assignments of a national scope. In its role as a developer and manufacturer of high technology, state-of-the-art systems, Raytheon Canada's product base includes a broad range of ATC equipment including primary radars for terminal and en route applications, and ground control approach radar systems (mobile and fixed base). Raytheon Canada also has a distinguished background in the design and manufacture of a wide range of communications equipment for both domestic and export markets. Products in this area span the range from microwave components to complete satellite ground stations and terrestrial microwave systems.

PERSONNEL: PhDs - 21
Engineers - 53
Others - 330

GROSS SALES: 1990 - $109M
1991 - $ 74M

PLANT SIZE: 132,000 sq ft

EQUIPMENT: In-house computer systems include VAX and IBM. Manufacturing includes some of the most sophisticated, fully automated machinery available for today's technology, such as Hardinge precision lathes, and a group of vertical and horizontal mills with direct read-out control. The test area also includes the most up-to-date multi-layer board test equipment.

EXPERIENCE: Raytheon Canada's customers include Transport Canada, the Department of National Defence, and international civil aviation authorities. Previous customers include all Canadian telephone companies, Telesat Canada, and Teleglobe, as well as numerous overseas PTTs.

RE:ACTION MARKETING SERVICES Ltd

(RE:PRINT COPY & PRINTING Ltd)

ADDRESS: 517 Parliament Street
Toronto, Ontario
Canada M4X 1P3

CONTACT: Mr Gerald R Graves, President
Mr John J Iskra, General Manager
Tel: (416) 964-8049
Fax: (416) 964-8386

KEYWORDS: Desk Top Publishing; Digital Printing; Direct Mail; Documentation; Information

Systems; Laser Printing; Marketing; Project Management; Public Relations; RFP Response; Technical Writing.

HISTORY: Both Re:Action Marketing Services and Re:Print Copy & Printing were founded by Gerald R Graves, who is president and sole director of both firms. Established in 1977, Re:Action initially offered advertising, marketing, and promotion services. Recognizing the potential of computer-based word processing and other office automation technology, Graves expanded both companies' facilities to provide many of these new services, starting with the establishment of both Re:Print and Re:Action's Document Creation Centre 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 also automated text and data creation, desk top publishing, data conversion, word and information processing, telecommunications, laser printing, graphic design, writing, editing, and system facility management and consulting services. Today, many of Re:Action's clients use the Document Creation Centre to supplement their in-house capability on a regular basis.

CAPABILITY: Re:Action offers the project teams and technology to support marketing and print communications of all types, including text creation, enhancement, and print production projects; marketing plans; product sheets; technical, user, 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 marketing and promotional services. Both facilities and personnel have clearance to NATO secret level.

PERSONNEL: 26+

GROSS SALES: No data.

PLANT SIZE: 7,500 sq ft

EQUIPMENT: The companies are well equipped with the latest in PC-based publishing hardware and software. Facilities also include digital imaging and digital reprographic equipment, and data communications and data format conversion capabilities.

EXPERIENCE: Services are available in both French and English. Customers include General Motors, Thomson-CSF, Ontario Ministry of the Environment, Canac Telecom (CN Communications), Chemetics (CIL), Chrysler Canada, Warner Lambert, Motorola Information Systems, Institute for Hydrogen Systems, Procter & Gamble, Addiction Research Foundation, Guaranty Trust, Liquid Carbonic Inc, Ontario Economic Council, Ontario Ministry of Education, Marshall Macklin Monaghan, Atomic Energy of Canada, Consumers Gas Company, Environics Research Group Ltd, Municipality of Metropolitan Toronto, Ontario Ministry of Municipal Affairs & Housing, Price Daxion, Supply and Services Canada, Toyota Canada, and Xerox Canada.

RELTEK Inc

ADDRESS: 44 Steacie Drive
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Canada K2K 2A9

CONTACT: Mr Mervyn F Sullivan, President
Tel: (613) 592-2411
Fax: (613) 592-5204

KEYWORDS: Data Communications; ISDN; Wide Area Networks.

HISTORY: Reltek Inc is a high-technology electronics company incorporated in 1974. It is classified as a private corporation (small business) under Revenue Canada regulations. The company-owned offices, laboratories, and manufacturing facilities are located in Kanata, a high-tech suburb of Ottawa, Ontario. Reltek Data Inc, a wholly owned subsidiary, is located in the same facility.

CAPABILITY: Our data products division, Reltek Data Inc, has extensive experience in electronic product development and manufacture with emphasis on the data communication area. A series of communications coprocessor boards trademarked as X.CALIBRE has been developed. These are available for Q-BUS (DEC Vax, Microvax, etc.), VME bus, and most recently the PC/AT bus. This product line is aimed at the frame relay, X.25 packet switching, ISDN, HDLC, and other protocol markets which are growing rapidly. Software for both router and X.25 gateways are available.

X.CALIBRE is easily customized and has therefore been well accepted by integrators and VARS in configurations where standard products are not supported.

The company's ability to design, develop, and manufacture reliable equipment has attracted the attention of Canada's larger corporations. Because of its ability to meet the high reliability requirements of the Bell Canada test centers, Reltek was chosen to develop two test modules for the Bell Canada testing centers.

A master accelerator board developed for Q-bus systems using a 68020 has allowed many older PDP-type systems to be rejuvenated and find new

Ada applications with the Ada software developed in conjunction with it.

The company has just announced an MVIP version of the X.CALIBRE series. The multi vendor integration protocol (MVIP) trademarked by National Microsystems Inc allows communications products from various vendors to communicate over a secondary bus in a PC environment. In this area, X.CALIBRE can act as an ISDN interface, X.25 gateway, SS7 controller, frame relay interface, etc.

The company offers its design and manufacturing abilities to customers in the area of product development and customization. Their primary R&D expertise is in the area of small systems and add-ons. They can carry out design, development, and manufacture. This includes functional specification, actual product design, prototyping, testing, and medium volume manufacturing. Their involvement is usually weighted to the hardware side with sufficient software capabilities in low-level and on-board systems. A special interest is in the PC-type bus where they have extensive experience. Their knowledge of other busses, such as VME and DEC, are an asset in product conceptualization. Their customers are usually in the high end system integration markets.

The parent company, Reltek Inc, operates the only commercial reliability screening laboratory in Canada serving medium to large corporate accounts. Most of their customers are involved in defence or communications markets, although some work has been done directly for the Department of National Defence.

This reliability and QA experience is helpful to clients whose requirements include product qualification, production engineering, and ruggedized equipment. The services offered range from reliability analysis and quality assurance to the actual screening programs themselves.

Reliability screening subjects electronic components including integrated circuits, semiconductors, passive components, etc., to various conditioning procedures that remove early failures from the batch. This procedure improves the reliability of the system utilizing these components.

PERSONNEL: Eng - 2
Tech - 3
Other - 6

GROSS SALES: No data.

PLANT SIZE: 6,000 sq ft

EQUIPMENT: Digital hardware and software development equipment including schematic capture, board layout, FPGA programmers, software development tools, etc.

Reliability screening equipment includes burn-in chambers and environmental chambers.

EXPERIENCE: Their major customers include the Department of National Defence, defense integration companies, major communication equipment suppliers and Canada Post. More detail can be supplied upon request.

ROHDE & SCHWARZ CANADA Inc

ADDRESS: 555 March Road
Kanata, Ontario
Canada K2K 2M5

CONTACT: Mr David G Stephenson, President
Tel: (613) 592-8000
Fax: (613) 592-8009

KEYWORDS: Antennas; Automated Monitoring and Control; Broadcasting; Communications; Direction Finders; Electromagnetic Compatibility; Electronic Support Measures; Electronic Warfare; RF Communications; Telecommunications Test Equipment; Test Instrumentation; Testing/Test Equipment.

HISTORY: Rohde & Schwarz Canada Inc, a wholly owned subsidiary of Rohde & Schwarz GmbH, was established in Canada in 1970 to be responsible for the sales and service of Rohde & Schwarz products throughout Canada. In 1984 a research and development and manufacturing capability was started to specialize in communications intelligence and communication direction finders for defence and surveillance activities.

CAPABILITY: Rohde & Schwarz Canada Inc is a recognized Canadian leader in the fields of:

Electronic Test and Measurement Equipment and Systems

- EMI/EMC test systems
- RF analysis
- Signal generators to 18 GHz
- Radio communication tests and analyzers
- Controllers
- Remote integrated monitoring and measurement systems

Radio Monitoring and Direction Finding Systems

- Receivers 10 KHz to 18 GHz
- Antennas
- Direction finders: HF, VHF, and UHF

- Radio monitoring systems

Radio Communications Systems

- Air traffic control
- HF systems and networks
- Aircraft radio sets and controllers
- Shipboard communication systems
- Mobile radio systems

The company has a full capability to undertake engineering development and manufacturing of products related to RF direction finding and electronic support measures, as well as special purpose test equipment for automatic monitoring and remote control.

In the field of direction finding systems, Rohde & Schwarz Canada designed and developed the PA 2000 Integrated Signal Intercept System. The PA 2000 is a state-of-the-art signal interception and direction finding system which has been designed to detect and provide lines of bearing to radio emitters, including frequency agile radios in the HF, VHF, and UHF ranges. The company has the world product mandate for the PA 2000 and related products. Of particular note is the demonstrated capability to network the PA2000 to provide location of complex emitters.

New developments are underway to network nonportable DF systems and DF equipment for spectrum management applications.

Rohde & Schwarz Canada is a member of the worldwide Rohde & Schwarz organization, giving it access to the technologies and marketing resources of all of the affiliated companies. Canadian offices are maintained in Kanata, Toronto, and Montreal to provide sales and support of all Rohde and Schwarz products directed to the defense, communications, broadcasting, and test and measurement markets.

PERSONNEL: PhD - 1
Engs - 12
Others - 25

GROSS SALES: 1991 - $6.0M

PLANT SIZE: 18,400 sq ft

EQUIPMENT: Electronics and mechanical design and development software, including simulation capability and CAD electronics and testing facilities for RF receivers, antennas, and direction finders.

EXPERIENCE: The primary customer base includes government organizations in Canada (DND, Transport, Communications) and abroad. Significant sales are made to defense prime contractors, telecommunications operators, and broadcasters.

ROLLS-ROYCE (CANADA) Ltee

ADDRESS: 9500 Cote de Liesse Road
Lachine, Quebec
Canada H8T 1A2

CONTACT: Mr Richard F Moore, Technical Services Manager, Military Programmes
Ms D Bayly, Account Manager, US Military Programs
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Fax: (514) 636-9969

KEYWORDS: Aluminum Components; Calibration; Combustion Research; Components (Engines); Compressor Blade Tip Grinding; Corrosion Control; Engine Components; Engine Systems; Engines; Gas Turbine Engines; Heat Treating; Life Cycle Support; Magnesium; Metal Plating; Non-Destructive Testing; R&O (Engines); Tooling; Turbine Blade Inspection; Turbine Engines; Welding.

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 plc.

CAPABILITY: Repair and overhaul is the backbone of Rolls-Royce Canada's business. The company has the ability to repair and overhaul the following engines:

- Military - Nene; GE T64; ADOUR.
- Civil - Spey; Dart; Viper; RB211, Tay.
- Industrial - Avon; RB211; Spey.

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 5000 repair schemes in an effort to increase component lives and to reduce overhaul costs.

Rolls-Royce Canada is the world source for the industrial RB211 gas generators. This aero derivative gas turbine is manufactured to aero-

space standards. The company has developed and manufactures the off-engine support systems for the engines.

PERSONNEL: Salaried - 215
Hourly - 562
Management - 74
Executive - 8

GROSS SALES: No data.

PLANT SIZE: 190,000 sq ft (factory space)
75,000 sq ft (warehouse)
57,000 sq ft (office)
5,000 sq ft (laboratory/ electronic & standards room)
4 engine test cells

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. The latest addition to machining capabilities is a Butler Newall compressor blade tip grinding machine. Welding capabilities include Hobart Dabber Automatic Pulse Weld System, 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 include 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. A new state-of-the-art test bed was inaugurated in November 1986, which can accommodate engines of up to 100,000 lbs thrust. 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 performs chemical, metallurgical, and mechanical tests 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 80% of the company's business is with non-Canadian customers. Although 84% 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 40 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, seal fins, and jet pipes are repaired by direct welding or the fabrication of locally formed patches welded into the structures. Resistance and fusion weld certification in accordance with MIL-STD-1595 and DND SPEC D-QA-001-005/SF-001.

ROYAL AEROSPACE

ADDRESS: 270 Millway Ave
Concord, Ontario
Canada L4K 3W4

CONTACT: Mr Gary Austin, Vice President Marketing
Mr Rick Aikins, Defence Marketing/ Sales Manager
Tel: (416) 660-7070
Fax: (416) 660-0682

KEYWORDS: R&O (Generators); R&O (Motors); Rewind Rotors.

HISTORY: Royal Aerospace is a Canadian-owned repair and overhaul facility founded in 1985. The company's specialty is custom rewind work.

CAPABILITY: Royal Aerospace is primarily involved in the rewinding of a wide range of electrical components which are used in the aerospace industry. The company specializes in custom rewinding of generator components used in military aircraft which have a high speed operating range. The company has full engineering capability and will provide the answer for the repair and overhaul of rotors, stators, armatures, and exciters which have long lead times, sole source, or are not available from the OEM. Airworthiness RDA approval.

PERSONNEL: Prof Eng DAR - 2

Engs - 2
Technicians - 15
Others - 20

GROSS SALES: 1990 - $2.5M
1991 - $5.7M

PLANT SIZE: 40,000 sq ft

EQUIPMENT: Complete machine shop and custom grinding and plating. High speed test equipment for rotors and armatures (25,000 RPM plus), balancing equipment and 250 HP test stand. Non-destructive structural test.

EXPERIENCE: Present customers include US Navy, US Army, US Air Force, Canadian DND, international airlines licensed by Auxilec OEM for rewind, and Deutch Aerospace.

SCIEMETRIC INSTRUMENTS Inc

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Nepean, Ontario
Canada K2H 8S1

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Tel: (613) 596-3995
Fax: (613) 820-3746

KEYWORDS: Data Acquisition; Data Control Systems; Monitoring and Control.

HISTORY: Sciemetric is a Canadian-owned, high technology/electronics company founded in 1981. Since 1985, Sciemetric has been involved in an intensive R&D effort developing a sophisticated line of electronic hardware and software and has now initiated an ambitious export marketing program for the products.

CAPABILITY: Sciemetric designs and manufactures a wide range of data acquisition monitoring, control, and test systems. The company has developed a powerful modular hardware and software product line for data acquisition and automated testing and has applied this equipment in numerous fields including manufacturing, research, and oil and gas. The company has an internal design engineering and an applications engineering group. The company focuses on the development and supply of computer-integrated production and quality test and monitoring systems for electro-mechanical applications such as hydraulic pressing, circuit breakers, fatigue testing, crimping, pump testing, gauging, and more.

PERSONNEL: Engs/Comp Science - 6
Technicians - 3
Others - 6

GROSS SALES: 1991 - $0.5M
1992 - $1.0M

PLANT SIZE: 5,000 sq ft

EQUIPMENT: Complete electronics assembly including wave solderer, 486 hardware and software development platforms including CAD and electronic test equipment.

EXPERIENCE: Sciemetric Instruments Inc has received the following awards:

- Best Canadian Product - Sep 88 - Canadian High Technology Show for the SYSTEM 200 hardware.

- Best Canadian Product - Oct 91 - Canadian High Technology Show for the BENCHMATE modular testing software.

SCINTREX Ltd

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CONTACT: Mr Abe Rolnick, President
Tel: (416) 669-2280
Fax: (416) 669-5132

KEYWORDS: Atomic Absorption Spectrophotometers; Beta Ray Monitors; Dosimeters; Drug Detection; Electromagnetics; Explosives Detection; Gamma Ray Monitors; Geochemical Equipment; Geophysical Equipment; Gravity Sensors; Hazardous Gas Detection; Magnetic Sensors; Ordnance Detectors; Radiation Monitoring Systems; Remote Sensing; Toxic Gas Detectors; Trace Gas Detection; Tritium Monitors; Ultraviolet Fluorescence Systems.

HISTORY: Scintrex Ltd began as Sharpe Instruments Ltd in 1947 and was incorporated as Scintrex Ltd, a public Canadian owned company, in 1967.

CAPABILITY: Scintrex Defense/Security Products Group 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, vehicle, 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. In addition, a detector of PGDN vapors from OTTO II Torpedo fuel has been developed on behalf of the Canadian Department of National Defence and provided to the Canadian Navy for use in their depots, ships, and submarines to protect personnel against these toxic vapors.

Scintrex also manufactures environmental monitoring instrumentation such as ozone, nitrous oxide, PAN, as well as gas ordorant detectors such as the OVD-229.

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. Detectors for illicit drugs have also been developed using similar principles.

PERSONNEL: Electronic Engineers - 12
Mechanical Engineers - 2
Chemists - 5
Geophysicists - 3
Physicists - 4
Technicians - 40
Machinists - 20
Sales, Office Staff & Others - 43

GROSS SALES: 1990 - $12.2M

PLANT SIZE: 70,000 sq ft

EQUIPMENT: No data.

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); and the Canadian Department of National Defence (development and supply of PGDN and radiation monitors).

SED SYSTEMS Inc

ADDRESS: PO Box 1464
Saskatoon, Saskatchewan
Canada S7K 3P7

CONTACT: Mr Robert D Herbert, Business Manager Defence and Government Systems
Tel: (306) 933-1446
Fax: (306) 933-1486

KEYWORDS: Ada Software; Command and Control Centers; Communications; Communications (Software); Digital Signal Processing; In-Orbit Real-Time Test Systems; Payload Design; Payload Test Services; Project Management; Satellite Ground Stations; Satellite Ground Control Equipment; Satellite Telemetry Stations; Simulation Programs; Space Science Instrumentation; Spectrum Analysis; Systems Engineering.

HISTORY: SED Systems Inc is an advanced technology company specializing in communications systems, engineering, software development, and custom electronic manufacturing in space and defense. Located in Saskatoon, Saskatchewan, Canada, SED evolved from the Space Engineering Division of the University of Saskatchewan where their mandate was to design and build rocket instrumentation for upper atmospheric research. Since their incorporation as a private company, SED has pursued a development policy which has firmly established them as a leader in communications technology for both commercial and defense applications. SED was incorporated in 1972 and was purchased by Calian Technology Ltd in 1990.

CAPABILITY: SED supplies systems engineering and custom manufacturing in space and defense communications advanced technology. The major products and services offered are:

- Communications systems engineering, custom satellite communications ground stations both mobile and fixed (C, Ku, and X band) installations, complete satellite telemetry tracking and command ground stations, satellite ground control equipment, in-orbit test systems and equipment, customized telemetry and tracking systems, sounding rocket payloads, and scientific instrumentation for use on the space shuttle.

- Inmarsat H/B Access Control and Signalling Equipment (ACSE).

- Two-way, voice and data satellite communications systems for private networks; TVRO systems and subsystems for satellite ground stations; and design of radio and microwave communications links for frequencies in the HF through EHF bands.

PERSONNEL: Professional - 130
Technical - 70

GROSS SALES: 1990 - $23M
1991 - $23M

PLANT SIZE: 43,000 sq ft (manufacturing)
82,000 sq ft (other)

EQUIPMENT: SED has a variety of specialized facilities including computer systems, ground stations, and payload integration facilities; Class 10,000 clean room; a medium volume PCB production facility working to AQAP-1 for specifications and NASA standards for space-qualified hardware; and a thermal vacuum chamber.

EXPERIENCE: SED experience in the space and defense areas includes:

- SPACE: Payloads - Sounding rocket and balloon payloads (Canadian National Research Council); Firewheel sub-satellite. Space Instrumentation - GEODE 1 and 2 as the prime contractor to NRC for the manufacture in microgravity of crystals; Suprathermal and Energetic Ion Mass Spectrometer (Japanese AKEBONO satellite) measures solar emissions; COBRA to measure primeval light left over from the "big bang". Mission Planning and Support - Communications Technology Satellite (1970-1976) ground control station and software for the Canadian Department of Communication (DOC). Satellite Telemetry, Tracking, and Command Stations - ANIK A TAC station, Telesat Canada; ANIK C/ANIK D transportable tracking station; LANDSAT/GOES tracking station, Canadian Centre for Remote Sensing (CCRS); and Brazil Telecommunications Satellite System Satellite Control Facility. Ground Control Equipment - ANIK C, ANIK D, SBS, and INTELSAT V command generators and upconverters and telemetry displays. Communications Ground Terminals - over 200 terminals including low cost TV receive only, and 2-way fixed and transportable terminals. Satellite Systems Test Sets - ANIK C/SBS and ANIK D computerized payload test and integration support unit and in-orbit test systems for Embratel, SES, and British Satellite Broadcasting.

- DEFENSE: Digital Switches - switches to handle digitized radar data for NORAD Joint Surveillance System and digital switches for Hughes Aircraft Co. Satellite Control Centers - SARSAT Canadian Mission Control Centre engineering and operational phases of this project for the Department of National Defence. SED supports the system through an FSR now. Tracking Systems - a tracking antenna and telemetry receiving system for Defence Research Establishment Suffield. Communications Systems - designed, developed, and installed a full, 2-way satellite communications ground system for the DND and Telesat Canada. SED is the system designer, the system integrater, the test manager, and the producer of the communications and the meteorological systems for the new Canadian Patrol Frigates. Design and manufacture of specialized test sets to AQAP-1 standards for the Low Level Air Defence Project (LLAD). Mobile Military Satcon Terminals - SED is the designated satellite communication system supplier for the IRIS Project. This responsibility includes the satellite communication subsystems in both the gateways and the tactical long-range communication terminals.

SED provides space and defense systems to Raytheon, Oerlikon Aerospace Inc, Telsat, Department of National Defence, Hughes Aircraft Co, British Satellite Broadcasting, Canadian Department of Communication, Paramax Electronics Ltd, Intelsat, British Telecom Inc, Inmarsat, Spar Aerospace Ltd, Canadian Space Agency, TRW, CDC, and the Canadian National Research Council.

SEMICONDUCTOR INSIGHTS Inc

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Stittsville, Ontario
Canada K2S 1A2

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Tel: (613) 831-6116
Fax: (613) 831-5001

KEYWORDS: Design Analysis Reports; Integrated Circuits; Legal Support; Memory; Reverse Engineering; Semiconductors; Technology Reviews; Training.

HISTORY: Semiconductor Insights Inc (SI) was formed in July 1989. SI has acquired the business and equipment of Mosaid Inc's former Technology Service Group. SI is located 20 minutes west of Ottawa off the Carp Road.

CAPABILITY: SI is an information source on integrated circuit design and related issues. The company publishes design analysis reports on state-of-the-art memory chips including dynamic, static, and non-volatile RAM and ROM, and ASIC chips. These analysis reports include introductory overviews, block and logic diagrams, full schematics with device sizes, timing waveforms, memory cell layout sketches, photographs of key areas of the chip, comparisons with competing parts, and process parameters.

SI also provides technology reviews which involve complete or partial analysis of prototype memory IC designs. They check for circuit functionality and optimization, thus ensuring that the customer has greater accuracy and a more readily usable database.

They prepare design seminars and in-depth training courses to give memory groups access to the most innovative design ideas and talent, help define new designs, or improve existing ones.

Their legal support work consists of interpreting technology to assist in patent licensing negotiations, litigations, contract disputes, and product liability cases. Semiconductor Insights provides technical and documentary support from their unique library to assist all persons interested in semiconductor design.

PERSONNEL: Engineers - 11
Technologists - 6
Other - 14

GROSS SALES: No data.

PLANT SIZE: 8,500 sq ft

EQUIPMENT: MS2300 test facility, high-magnification universal microscope (13x - 500x) with differential interference contrast (DIC), and Multiphot camera system for taking package and die photos.

EXPERIENCE: Present customers include international IC companies, government, and legal firms located in North America, the Far East, and Europe. They deal with design engineers, IC managers, and lawyers.

SENSTAR Corp

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Kanata, Ontario
Canada K2K 1X5

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KEYWORDS: Alarm Systems; Intrusion Detection; Security Systems.

HISTORY: Senstar Corporation is a Canadian-owned manufacturer and distributor of outdoor perimeter security products. The company was founded in 1982 and since then has become the leading supplier of outdoor sensors to government, industrial, and defense customers. Senstar operates a US office in Billerica MA and a UK office in Evesham.

CAPABILITY: Senstar manufactures and distributes a full line of outdoor intrusion detection products, as well as alarm communication and monitoring devices. The product lines include Panther and Sentrax, buried ported-coax sensors; David 200, a video intrusion detector; Repels, a portable perimeter sensor; and Senstar 100, a touch screen alarm monitoring system. Senstar's customer base includes over 400 installed sites in 45 countries. Senstar's capabilities include software and hardware design, systems design, production (including R&O), quality assurance, documentation, and training.

PERSONNEL: PhD - 2
Eng - 17
Sales & Marketing - 11
Other - 60

GROSS SALES: No data.

PLANT SIZE: 27,500 sq ft

EQUIPMENT: CAE and CAD facilities.

EXPERIENCE: Customers include the United States military; NATO; Canadian and US correctional facilities; Canadian and US electric generating stations; European, North American, and Asian government facilities; and industrial sites all over the world.

SHERRITT GORDON Ltd

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Canada T8L 2P2

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KEYWORDS: Abradable Seals; Advanced Materials; Alloys; Coatings; Cobalt-Samarium Magnets; Composite Powders; Dispersion Strengthened Alloys; Electroplating; Metal Powders; Nickel (Coinage, Powders, Strip); Powder Metallurgy; Specialty Alloys; Thermal Spraying; Wear Resistant Materials.

HISTORY: Sherritt is a highly diversified company with a US subsidiary located in Vancouver, Washington (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 Technology Division and Westaim Technologies Inc, a wholly owned subsidiary of Sherritt Gordon Limited. Westaim is dedicated to the research, development, and commercialization of advanced industrial materials and systems.

CAPABILITY: Sherritt operates an integrated metallurgical-chemical complex at Fort Saskatchewan, Alberta, where it refines nickel and cobalt, manufactures nitrogen and phosphate fertilizers, manufactures sulphur chemical, and produces a wide range of materials used for nuclear, aerospace, electronic, industrial, and coinage applications. The international research reputation of Sherritt is based on the development and commercialization of metal powders, metallic composites, coinage, and extractive hydrometallurgical processes.

Sherritt's Specialty Materials Division manufactures a wide variety of highly specialized metal powders. A unique precipitation process enables Sherritt to supply metal powders and metal composite powders with controlled purity particle size and surface morphology. One of the many uses for these powders is in the aerogas turbine industry as an abradable seal material.

Nickel-coated graphite composite powder deposited by flame spraying was one of the first materials used as an abradable seal in the compressor stages of aircraft turbine engines. The operating temperature limit is about 450°C; for operating temperatures above 450°C, Sherritt manufactures a specially designed composite powder consisting of a core of bentonite (predominantly silica and alumina) coated with a nickel-based alloy containing 5% chromium and 3% aluminum. These materials are used on engines manufactured by most of the major aerogas turbine manufacturers.

Sherritt has recently entered into a cooperative initiative to develop and commercialize advanced materials and systems in Canada. Participants in the initiative include the Government of Canada, the Province of Alberta, and industry. The program is known as "Westaim" and is managed by Westaim Technology Inc, a wholly owned subsidiary of Sherritt Gordon Limited. One of the major programs within Westaim is the development of new materials for the aerospace industry.

PERSONNEL: Total (Technology) - 266
PhDs - 40
MSs - 25
BSs - 135
Others - 66

GROSS SALES: 1991 - $384M

PLANT SIZE: No data.

EQUIPMENT: Process research equipment such as autoclaves, solvent extraction, and ion exchange equipment. Powder manufacturing equipment such as spray drying, inert gas melting and atomizing, and hydrometallurgical precipitation equipment. Powder processing equipment such as thermal spray guns, sintering furnaces, cold and hot isostatic presses, and rolling mills. Materials research equipment such as tape casting facility, thick film equipment for electronic circuits, and laser trimmers. Materials property analysis equipment such as tensile testing, stress rupture, wear resistance, metallography, transmission and scanning electron microscopes, electron microprobe, X-ray diffraction, electrical conductivity, and standard chemical laboratory equipment.

EXPERIENCE: A large portion of the Specialty Materials Division'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 research for the USAF/US Army 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.

SHL SYSTEMHOUSE Inc

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Fax: (613) 236-2043

KEYWORDS: Communication Systems Integrator; Computer Systems Integrator; Facilities Management; Fault-Tolerant Systems; Imaging Technology; Information Systems; Optical Storage Technology; Specifications Development; Systems Integration; Systems Support; Voice and Data Integration.

HISTORY: SHL Systemhouse Inc is a Canadian-owned, systems integration company with corporate offices based in Ottawa, Canada. Founded in 1974, Systemhouse has become one of the world leaders in computer systems integration with branch offices located across Canada, the United States, and Europe.

CAPABILITY: SHL Systemhouse Inc is a full service computer and communications systems integrator delivering complex systems and microcomputer integration products and services to meet the specific needs of business and government organizations in Canada, the United States, and internationally. The outstanding success of the company is attributed to its ability and commitment to provide the most effective solution for each customer. Given the complex technological possibilities available, Systemhouse works with its customers to identify, evaluate, and recommend technologies that are best suited for the customers' needs.

PERSONNEL: 3200

GROSS SALES: 1990 - $689M
1991 - $689M

PLANT SIZE: No data.

EQUIPMENT: Extensive computing and network management facilities in Canada, the US, and Europe.

EXPERIENCE: The company's list of clients include Canadian governmental organizations of the Department of National Defence, National Capital Commission, Canada Post Corporation, Tax Court of Canada, Public Archives, Ministry of Transport, Supply and Services, and the provinces of British Columbia through to Newfoundland. Canadian commercial customers include Petro Canada, Bell Canada, Gemini Group, McCain Foods, Northern Telecom, Stanfield's Limited, Imperial Tobacco, Dofasco Inc, Somerville Packaging, BP Canada, and Nova Corporation. SHL Systemhouse has performed services for the following US government organizations: US Navy, US Marine Corps, US Air Force, Treasury Department, US Health and Human Services, and the Customs Service. United States commercial customers include AMEX, Amtrak, Safeway, Intel Rail, US Sprint, and Ameritech.

SJM PACKAGING Inc

ADDRESS: 1428B 38 Street SW
Calgary, Alberta
Canada T3C 1T5

CONTACT: Mr Jim McCuaig
Tel: (403) 242-1455
Fax: (403) 244-0055

KEYWORDS: Cases (Custom); Instrumentation (Cases); Medical Equipment (Cases); Packaging (Custom); Strobe Lighting; Test Equipment (Cases).

HISTORY: SJM Packaging Inc is a Calgary-based, Canadian-owned company.

CAPABILITY: SJM Packaging is a distributor of several lines of carrying/transport cases and containers for all applications (ATA and MIL SPEC). Custom interiors are available for specific tasks. SJM Packaging is also a distributor of both industrial and specialty (military and police) flashlights, strobe (including IFR), and distress lights.

PERSONNEL: No data.

GROSS SALES: No data.

PLANT SIZE: 1,500 sq ft

EQUIPMENT: No data.

EXPERIENCE: Products distributed by SJM Packaging are currently in use with the US Navy, Marines, Air Force, and Army; the US and Canadian Coast Guard; the US Secret Service; the RCMP; assorted US and Canadian police and medical services; and a wide cross section of industrial users.

SKYWAVE ELECTRONICS Ltd

ADDRESS: 300 March Road, Suite #304
Kanata, Ontario
Canada K2K 2E2

CONTACT: Mr Peter Rossiter, Vice President Engineering
Tel: (613) 592-0908
Fax: (613) 592-2104

KEYWORDS: Air/Ground Data Links; Digital Signal Processing; HF Radios; Modems; RF

Communications; Satellite Communications; Satellite Terminals; Telephone Communications; Voice and Data Communications.

HISTORY: SkyWave is a Canadian-owned, high-technology company specializing in digital signal processing for radio and satellite communications. Founded in 1984, it is located in the Kanata Industrial Park.

CAPABILITY: SkyWave is principally involved in the design and manufacture of state-of-the-art voice and data communications equipment for radio and satellite communications, particularly for airborne, mobile, and transportable systems. Their main products are:

- Satellite Voice/Data Channel Unit - Model SCU-1
- Suitcase Satellite Voice/Data Terminal - Model KSST-1 and CSST-1
- Vocoders at 2400/4800/8000/9600/14400 and 16 kbps.
- NAVLINK (air-to-ship) Data Link
- Digital Squelch/Vox Unit for HF Radio
- Aeronautical satcom and test equipment

PERSONNEL: PhDs - 1
Engineers - 13
Others - 7

GROSS SALES: 1992 - $4.0M

PLANT SIZE: 7,000 sq ft

EQUIPMENT: SkyWave maintains well equipped engineering development facilities for DSP, RF, and digital engineering, and computer facilities - IBM, Macintosh, TMS 320/32020/320C25, V40, and 68HC11.

EXPERIENCE: SkyWave's present customers include various departments in the Canadian Government, the UK, and Australia, and commercial customers in the US, Spain, Austria, Korea, Taiwan, and the PRC.

SOFTWARE KINETICS Ltd

ADDRESS: 65 Iber Road
Stittsville, Ontario
Canada K2S 1E7

CONTACT: Mr Tony Moretto, Director-Sales and Marketing
Tel: (613) 831-0888
Fax: (613) 831-1836

KEYWORDS: Ada Software; ATC; Data Acquisition; Data Command and Control; Data Processing; Display Systems; Electronic Warfare; Flight Data Recorder Playback; Military Message Handling; Radar Processing; Real-Time Systems; Sensor Data Fusion; Sensor Integration; Systems Analysis; Tactical Network Communications; Training Simulators; Weather Radar.

HISTORY: Software Kinetics is a Canadian systems and software engineering company specializing in aerospace, defense, and communications applications as well as real-time and advanced software technologies. The company was founded in 1981 and currently employs over 100 professionals in its head office in Stittsville (near Ottawa) and its branch office (in Dartmouth, Nova Scotia). The company is federally incorporated and is entirely owned by its employees.

CAPABILITY: No data.

PERSONNEL: Eng - 90
Others - 20

GROSS SALES: 1990 - $7.0M
1991 - $7.5M

PLANT SIZE: 21,000 sq ft (Ottawa)
4,600 sq ft (Dartmouth)

EQUIPMENT: TEMPEST shielded computer room; in-house computer system includes VAX, UNISYS, SUN, and IBM.

EXPERIENCE: Present customers include several departments in the Canadian Federal Government: Department of National Defence, Defence Research Establishment Ottawa, Department of Communications, Communications Research Centre, Energy Mines and Resources, National Research Council, Transport Canada, Department of Public Works, and Atomic Energy Control Board.

Within the defense and aerospace sector, Software Kinetics has been a qualified subcontractor with Paramax, Westinghouse Canada, Litton Systems Canada, Computing Devices Canada, Pratt and Whitney, Canadian Marconi Company, and EHI Canada.

Software Kinetics has also worked with several high-technology companies including Bell Northern Research, Gandalf Data Systems, DY-4 Systems, Honeywell, Systemhouse, Hughes Aircraft Canada, Digital Equipment Corporation, and IBM (Federal Systems Division).

SOUTHPORT AEROSPACE CENTRE Inc

ADDRESS: PO Box 233
Southport, Manitoba
Canada R0H 1N0

CONTACT: Mr Douglas E Thomson, President and Chief Executive Officer
Tel: (204) 428-2270
Fax: (204) 428-3377

KEYWORDS: Airfield Services; Airport; Hangars; Military Flight Training; Training (Flight and Maintenance).

HISTORY: Southport Aerospace Centre Inc is a non-profit, community-based organization formed in February of 1990 to re-develop a former military base. Southport Aerospace assumed ownership of all the assets on September 1, 1992, consisting of 93 commercial buildings, including 5 hangars, 185 housing units, and 1500 acres of land.

CAPABILITY: Southport Aerospace is a very active aerospace operation with Transport Canada approval airport certification.

The prime tenant, Canadair, will operate Canada's first private, bilingual air traffic control tower, as well as general airfield operations. Under the Canadian Aviation Training Centre, Canadair will provide military flying training.

Aircraft maintenance training will be provided through Stevenson Aviation Technical College locating at Southport in January of 1993.

The airport is serviced by an operational VFR tower with IFR services. The airfield is serviced with an NDB and VOR/DME/ILS. There are four asphalt runways at Southport, the longest being 7,000 feet.

There are a wide variety of business opportunities at Southport Aerospace Centre including aircraft manufacturing, aircraft maintenance engineering, aviation technology, overhaul and refinishing, air traffic control training, and commercial pilot training to name a few. Existing facilities may be leased or new facilities constructed with a number of choice building sites adjacent to the ramp still available.

PERSONNEL: No data.

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: Canadair, a subsidiary of Bombardier, is the anchor tenant at Southport Aerospace Centre. Frontec Logistics are also tenants and perform various groundside, airside, and building maintenance services as well as a new training program to commence in 1993. Thompson Hickling, Field Aviation, and Versa Services are located at the Centre in support of the Canadair program. Stevenson Aviation Technical College will commence operations in 1993. Kae's Place Inc is a further food service tenant.

Southport is an active member of the Aerospace Industries Association of Canada, the Canadian Manufacturer's Association, the National Association of Installation Developers, the Manitoba Aerospace Group, and the Canadian Advanced Technology Association.

SPAR AEROSPACE Ltd

ADDRESS: Suite 900
5090 Explorer Drive
Mississauga, Ontario
Canada L4W 4X6

*Government Relations Office
222 Queen Street, Suite 402
Ottawa, Ontario
Canada K1P 5V9

Satellite and Communications Systems Group
21025 Trans-Canada Highway
Ste-Anne-de-Bellevue, Quebec
Canada H9X 3R2

Advanced Technology Systems Group
9445 Airport Road
Brampton, Ontario
Canada L6S 4J3

Applied Systems Group
PO Box 13050
365 March Road
Kanata, Ontario
Canada K2K 1X3

Gears & Transmissions Division
825 Caledonia Road
Toronto, Ontario
Canada M6B 3X8

Aviation Services Division
7785 Tranmere Drive
Mississauga, Ontario
Canada L5S 1N5

Subsidiaries:

Astro Aerospace Corporation
6384 Via Real
Carpinteria, California
USA 93013-2993

Commercial Telecommunications Corp (COMTEL)
2811 Airpark Drive
Santa Maria, California
USA 93455

Spar Aerospace (US) Limited
Suite 550
1001 Jefferson Street
Wilmington, Delaware
USA 19801

Spar Aerospace (UK) Limited
Springfield Road
Hayes
Middlesex UB4 0TY
England

CONTACT: *Mr K. Mackay, Director, Government Relations
Tel: (613) 563-0230
Fax: (613) 563-4284

KEYWORDS: Airframe Components; Antennas; Communications; Control Systems; Electro-Optics; Engine Components; FLIRs; Gear Boxes; Ground Stations; Helicopter Subsystems; Infrared Instrumentation; Infrared Systems; R&O (Aircraft); R&O (Avionics); Remote Manipulator Systems; Remote Sensing; Robotics; Satellite Subsystems; Satellites; Space Based Radar; Space Systems; Structures; Telerobotic Products; Transmissions.

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 deHavilland 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, now Astro Aerospace Corporation.

- 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.

- 1990 - Leigh Instruments of Carleton Place, Ontario.

- 1992 - The majority (70%) of the assets of Prior Data Sciences of Kanata and Cambridge, Ontario and Halifax, Nova Scotia.

- 1992 - A minority interest in Alouette Telecommunications Inc, a joint venture with Telecom Canada which has acquired the assets of Telesat Canada of Gloucester, Ontario.

CAPABILITY: Spar Aerospace Limited is a Canadian-owned company engaged in the design, development, manufacture, and servicing of systems, subsystems, and products for the space, communications, remote sensing, defence, electro-optics, aviation, and remote manipulator markets. The company employs over 2900 people of which more than 1200 are engineers and technicians, one of the largest technological groups in the private sector in Canada.

As Canada's premier space company, Spar will celebrate its 25th anniversary in 1992. In twenty-five years of growth, Spar has gained international recognition as a diversified, high-technology company, and its new corporate structure and internal renewal program based on continuous improvement methodologies has made Spar more competitive and efficient. Spar had record revenues of $467 million in 1991 - with research and development activity representing about 50% of these revenues.

- SPACE - Spar's facility in Ste-Anne-de-Bellevue near Montreal is the principal supplier in Canada and a major international manufacturer of communications, remote sensing, and surveillance systems, including satellites and satellite subsystems.

Spar and its predecessor companies have contributed to the design and manufacture of over 50 satellites and subsystems, including the fabrication of structures and payloads for all Canadian satellites and many international programs. The company's contract from Telesat Canada in 1979 to supply two 24-channel ANIK D communications satellites was the first satellite prime contract awarded to a Canadian company. ANIK D1 was successfully launched in August 1982, and ANIK D2 was launched in 1984. Since that time, Spar has consolidated its position as Canada's leading company. 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 two ANIK E series telecommunications satellites built for Telesat Canada were successfully launched in 1991 and are now fully operational. The ANIK E satellites are the largest and most powerful com-

mercial dual-band communications satellites in the world.

In January 1990, Spar and its Canadian team were awarded the contract for the Radarsat remote sensing satellite for the Canadian Space Agency. Also in 1990, Spar and its US partner, Hughes, were awarded contracts to build two mobile telecommunications satellites (MSAT) for Telesat Mobile Inc and the American Mobile Satellite Corp.

Spar's subsidiary Astro Aerospace 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, manufactures, and implements satellite communication networks and systems using the latest technology for installations around the world. Spar's proprietary Time Division Multiple Access products afford the user an uniquely flexible and expandable approach to network connectivity and growth. Two recent additions to this product line, the Fone Club and the VSATPLUS, are directed at rural telephony and light-to-medium route voice, data, and image transmission, respectively. Optimal application of these or other approaches to a specific requirement is carried out by a world class development and system engineering capability resulting from over 30 years in the field. Spar's reputation in program management for turnkey projects around the world is second to none in the industry.

This earth station network capability, together with Spar's expertise in satellite design allows the company to provide complete service in both space and ground segments, including overall systems architecture, to the customer.

Spar's subsidiary, COMTEL, designs and builds light and medium rate earth station nets for such customers as Dow-Jones Inc, NASA, and the US Defense Department.

• DEFENSE - Spar develops and manufactures electro-optical, surveillance, and telerobotics for the Canadian Armed Forces and international markets. 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 infrared technology, with its AN/SAR-8 infrared surveillance system for the passive detection of ships, missiles, and aircraft for defense and navigation purposes. The AN/SAR-8 infrared search and target designation system successfully completed sea trials in mid 1991. The Gulf War heightened the value of infrared surveillance for use against the growing threat of low flying missiles, and the intensive test program has demonstrated AN/SAR-8's effectiveness. Efforts are now focused on moving the program towards production.

Spar manufactured the Forward Looking Infrared (FLIR) systems for the Canadian Forces Low Level Air Defence System and, in addition, offers several configurations of FLIR devices for land and airborne applications for both Canadian and export markets. Spar manufactures the Night Observation Device Long Range (NODLR) for the Canadian and Korean armies. Several NODLR systems are deployed to support Canada's peacekeeping operations abroad. In addition, Spar has a well established MILSPEC manufacturing capability and is the preferred supplier in several space and defence programs.

• AVIATION SERVICES DIVISION - The Aviation Services Division (ASD) of Spar Aerospace Limited is housed in a modern 68,000 square foot facility and is staffed by approximately 180 skilled and trained staff. The Division provides total aviation services including the repair and overhaul of components and systems, engineering and fleet management, in support of both commercial and military aircraft in Canada and throughout the world.

This third line support is vital to ensuring the maximum useable life of aircraft and components can be achieved. It is Spar's reputation for the highest quality of workmanship and the ensuing technically compliant products that ensure long operational life with maximum safe operations.

Repair and overhaul services are provided by four prime business units (Constant Speed Drive, Engine Accessories, Instrument, and Helicopter Operations) and items serviced include constant speed drives, helicopter dynamic components, hydraulic components, accessory gearboxes, aircraft generators, engine and flight instruments, flight control components, aircraft heaters, aircraft electrical components, aircraft navigation equipment, aircraft autopilot systems, electro-optical components, and aircraft high voltage power supply (HVPS) systems.

The policy of Spar Aerospace Limited is to produce high quality, reliable products and to provide assurance and control of product quality throughout all phases of its activities.

The quality assurance program is structured to comply with various government, military, and commercial specifications and standards including MIL-Q-9858A, US FAA FAR 21, and AQAP-1, and is certified by Transport Canada as an

approved maintenance organization in accordance with Airworthiness Manual Chapter 573.

The Engineering Department provides internal engineering and technical support, as well as providing engineering support directly to ASD customers. Process development, performance trend analysis, special investigations, and engineering studies are undertaken to provide customer support as necessary.

• REMOTE MANIPULATORS (ROBOTICS) - The Canadarm, the original remote manipulator system (RMS), was successfully tested for the first time on the Space Shuttle "Columbia" in November 1981 and continues to perform flawlessly on space flights. 1991 was the tenth anniversary of the first Canadarm flight and Spar export revenues from the program now exceed $300M as a result of manned space activities for NASA (US), Matra (France), and Toshiba (Japan).

Spar, under a contract from Ontario Hydro, designed and delivered a remote manipulator and control system to replace and repair fuel tubes in nuclear reactors. Using similar technology, under an MOU with Inco, Spar developed a remotely controlled and operated rock bolter. Spar continues to apply remote handling technologies to the nuclear power industry, both in support of fusion research in the US, Germany, and the United Kingdom, and in the area of cleaning up the environment. In 1991, Spar received a US Department of Energy contract to develop and demonstrate environmental clean-up techniques.

Finally, Spar is the prime contractor for the mobile servicing system (MSS) which is Canada's contribution to Space Station Freedom. Spar's Advanced Technology Systems Group has established itself as a world leader in space robotics.

PERSONNEL: Engineers & Technicians - 1200
Others - 1700

GROSS SALES: 1990 - $335M
1991 - $466M

PLANT SIZE: No data.

EQUIPMENT: See CAPABILITY.

EXPERIENCE: See CAPABILITY.

SPARTON OF CANADA Ltd

ADDRESS: 99 Ash Street
London, Ontario
Canada N5Z 4V3

CONTACT: Mr Bruce Eidsvik, Director, Business Development
Tel: (519) 455-6320
Fax: (519) 452-3967

KEYWORDS: Acoustic Sensing; ASW; Bathythemographs; BT Sonobuoys; Environmental Sensors; Hydrophones; Ice Penetration; Oceanographic Products; Power Supplies; Sonobuoys.

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 expendable bathythermal and oceanographic systems; new, improved, low-noise, passive sonobuoys; acoustic projectors; LFA systems; ice penetration systems; and switch-mode electronic power supplies.

Sparton's Engineering Department staff covers professional disciplines of electrical/electronic engineering, mechanical engineering, physics, hydro-dynamics, and hydro-acoustics. 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 passive sonobuoys for military customers, acoustic projectors, oceanographic instrumentation (including XBTs, AXBTs, XSVs, etc.) and switch mode and linear power supplies for HV sensors (e.g., image intensifiers).

PERSONNEL: Administration - 20
Production - 41
Engineering Dept:
PhD - 1
MSc - 2
BSc - 8
Technologists - 19
Technicians - 14

GROSS SALES: 1991 - $9.5M
1992 - $12.0M

PLANT SIZE: 28,000 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; two IBM 370 systems; and two Perkin Elmer Corporate computers.

EXPERIENCE: Sparton is a supplier of passive sonobuoys to the Canadian Government; active sonobuoys (AN/SSQ62B) 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 supply of low frequency acoustic projectors and oceanographic systems; is now in the development stage of an ice penetration sonobuoy; and is also developing LFA systems. Applications for the latter device are anti-submarine warfare (ASW) crew training, dipping sonar, towed array active adjunct, and scientific investigations of ocean sound propagation characteristics or sound detection systems.

SPECIALIZED WELDING & FABRICATION Ltd

ADDRESS: 1173 North Service Road West
Unit D10
Oakville, Ontario
Canada L6M 2V9

CONTACT: Mr J Lawrence McNutt, President and General Manager
Tel: (416) 847-7278
Fax: (416) 847-7299

KEYWORDS: Airframe Components; Engine Components; Fluorescent Penetrant Inspection; Inspection; Magnetic Particle Inspection; R&O (Components); Radiographic Penetrant Inspection; Welding; X-Ray Inspection.

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, fluorescent penetrant, and magnetic particle inspection to the aircraft and allied industries. Working to quality controls and procedures designed specifically to meet the requirements of the Department of National Defence 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.

PERSONNEL: Management - 2
Accounting - 1
Production - 4
Inspection - 2

GROSS SALES: 1990 - $700K

PLANT SIZE: 9,000 sq ft

EQUIPMENT: Welding--300 amp AC/DC welding machines, Cobramatic GMAW machine; Fabricating - Shear, press brake, notcher, turret punches, drill press, sanding equipment, Vapour degreaser, and hand tools; Inspection - Phillips 300Kv constant potential X-ray machine, Magnaflux 400 amp wet bench, and fluorescent and dye penetrant equipment.

EXPERIENCE: Present customers include Air Canada, Boeing of Canada (deHavilland Division), Dowty Equipment of Canada Ltd, Garrett Canada, Genaire Ltd, Haley Industries, Lucas Aerospace, 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.

SPECTRUM SIGNAL PROCESSING Inc

ADDRESS: In Canada:
8525 Baxter Place
100 Production Court
Burnaby, British Columbia
Canada V5A 4V7

In Eastern US:
Westborough Office Park
1500 West Park Drive
Westborough MA 01581
Tel: (508) 366-7355
Fax: (800) 323-1842

In Western US:
264 H Street
PO Box 8110-25
Blaine WA 98230
Tel: 800-663-8986

CONTACT: Mr Michael Mertens, Chairman and CEO
Mr Barry Jinks, President
Tel: (604) 421-5422
Fax: (604) 421-1764

KEYWORDS: Digital Signal Processing; Digital Signal Processing; PC/XT/AT Bus; Plug-in Computer Boards; Real-Time Systems; Signal Processing; VME Bus.

HISTORY: Spectrum Signal Processing Inc is a Canadian company founded in August 1987 with the head office located in Burnaby, British Columbia, and a regional sales office in Westborough, Massachusetts. Its principal business is the design, manufacture, and sale of Digital Signal Processing (DSP) computer boards and software development tools for the PC/XT/AT bus, VME bus, and S bus. Spectrum also provides applications consulting and the ability to customize hardware products for particular applications. Depending on the opportunity, Spectrum may undertake custom design and manufacturing contracts.

Spectrum's products incorporate the latest in DSP technology, addressing applications ranging from electronic warfare, image processing, and vibration analysis to speech recognition, digital audio, and seismic analysis.

CAPABILITY: Development Tools: Spectrum supplies the widest range of development tools for single-chip DSPs supporting processors from Texas Instruments, Motorola, AT&T, and Analog Devices. These tools are complete with plug-in boards, monitor/debuggers, C interface libraries, assemblers, C compilers, data acquisition software, and filter design software.

Applications Consulting: Spectrum's staff of applications engineers are available to assist customers with leading-edge implementations of digital signal processing. This includes algorithm design, hardware prototyping and layout, system integration, and project management services.

OEM Products: Spectrum supplies off-the-shelf DSP systems for the PC and VME-bus which can be customized for specific customer needs.

PERSONNEL: Electrical Engineers - 10
Technologists - 4
Marketing - 6
Management/Admin - 13

GROSS SALES: 1990 - $4.5M
1991 - $6.5M

PLANT SIZE: Burnaby BC - 17,500 sq ft
Westborough MA - 1,100 sq ft

EQUIPMENT: Lab equipment for commercial grade QA, prototyping, and repairs.

EXPERIENCE: Spectrum sells 40% of its products to DOD, DND, and military prime contractors; 40% to companies specializing in medical electronics, telecommunications, professional audio, and industrial control; and 20% to universities and research institutes. About 90% of sales are exported to the United States.

SPILSBURY COMMUNICATIONS Ltd

ADDRESS: 1495 Franklin Street
Vancouver, British Columbia
Canada V5L 5B6

CONTACT: Mr Berge Tuyssuzian, General Sales Manager
Tel: (604) 254-6411
Fax: (604) 254-2080

KEYWORDS: Antennas; Beacons; Communications; Digital Voice Repeaters; HF Antennas; HF Radios; HF Whip Antennas; Low Frequency Beacon Systems; Mobile Radios; Navigation Systems; Non-Directional Beacon; Radiotelephone Equipment; Single Sideband Radios; Variable Tuned Antennas; VHF/FM.

HISTORY: Spilsbury is a Canadian-owned company incorporated in 1941. Spilsbury is the major shareholder of RACE Technologies Inc, a sister company which operates from the same address and specializes in adaptive HF radio controllers and high speed fax modems for HF radio.

CAPABILITY: Spilsbury specializes in HF/SSB radiotelephone equipment, HF antennas, and navigational aids for long-range communications. The company develops and manufactures HF single-sideband radio communication equipment for land and marine use, fixed and mobile, as well as HF/SSB aircraft antennas. They are also concerned with the overall concept of providing a system of communications rather than just with the manufacture of specific units. The Spilsbury center-loaded, variably tuned, HF whip antennas are used in portable, mobile, and fixed service operations on land, sea, and air. Other specialized equipment includes low frequency, non-directional beacon systems for medium range aeronautical or marine navigation installations, and a complete line of digital voice repeaters for instant recall of telephone or radio messages as used by emergency response organizations (911) such as police, fire, and ambulance dispatchers.

PERSONNEL: Professional (Technical) - 16
General Assembly - 15
Others - 25

GROSS SALES: No data.

PLANT SIZE: 60,000 sq ft

EXPERIENCE: Spilsbury equipment is used in over 50 countries including the US.

STANDARD AERO Ltd

ADDRESS: 33 Allen Dyne Road
Winnipeg International Airport
Winnipeg, Manitoba
Canada R3H 1A1

CONTACT: Mr John Keelan, Manager
Government Marketing
Tel: (204) 788-2261
Fax: (204) 783-2878

KEYWORDS: Aircraft Engine and Accessory Overhaul; R&O (Engines).

HISTORY: Standard Aero Ltd is Canada's largest independent aircraft engine overhaul facility. The company started overhauling reciprocating engines in 1938. Turbine engine overhaul began in 1960. In 1989, Standard Aero was purchased by Hawker Siddeley Plc, a diversified international company with headquarters in London, England. In 1990 Hawker Siddley was purchased by BTR of England.

CAPABILITY: Standard Aero's head offices and overhaul facilities are located at the Winnipeg International Airport. An experienced and dedicated work force of over 650 technical and support staff committed to total quality management is capable of meeting a wide range of commercial and military requirements. These capabilities include repair, overhaul, and technical support for the following engines, components, and associated accessories:

- Allison T63/250
- Allison T56/501
- Allison 501 (industrial)
- Lycoming T53
- Sundstrand Turbomach T62 (APU)

In addition to the overhaul facility in Winnipeg, Standard Aero's North American operations include a network of regional service centers in Dallas, Texas; Van Nuys, California; Charlotte, North Carolina; Allentown, Pennsylvania; Vancouver, British Columbia; and Montreal, Quebec.

Allison Gas Turbines has appointed Standard Aero as a T56/501D flight distribution/501K industrial major repair center for North America, and through its London, England, operation, for the European market. Standard Aero is also a flight distributor for the Allison T63/250 series engine.

Pratt & Whitney Canada has appointed Standard Aero as a designated overhaul facility for the PT6A series engine.

An international branch in Bellevue, Washington, exports overhaul services and parts to all seven continents.

Standard Aero has complete engineering, quality control, parts remanufacturing, field services, and test facilities to support a worldwide commercial and military customer base.

PERSONNEL: Engineers/Technicians - 49
Mechanics/Technicians - 450
Support Personnel - 160

GROSS SALES: 1990 - $131M
1991 - $137M

PLANT SIZE: 330,000 sq ft

EQUIPMENT: Complete in-house parts remanufacturing facility including robotic thermal and plasma spray, CNC machining, EDM, furnace braze and heat treating equipment. Complete publications department including electronic scanning, desktop publishing, and offset printing.

EXPERIENCE: Standard Aero has extensive experience in meeting military and commercial specifications for such customers as the Canadian Forces, the US Air Force and the US Army, and Zantop. Standard Aero operates under Canadian Department of Transport Approval Number 22-58 and NATO's highest standard AQAP-1 which is equivalent to MIL-Q-9858. Canadian Forces Quality Assurance Representatives on site ensure seamless quality assurance for US military agencies. FAA approval is automatic under the Canadian American Bilateral Agreement ETT-1583. Standard Aero's US CAGE Code is 36213.

STEVESTED MACHINERY & ENGINEERING Ltd

ADDRESS: 7943 Progress Way
Tilbury Industrial Park
Delta, British Columbia
Canada V4G 1A3

CONTACT: Mr I Z (Steve) Lovas, President
Tel: (604) 946-7621
Fax: (604) 946-7317

KEYWORDS: CAD/CAM; CNC Machining; Machining; Precision Machining; Welding (Advanced).

HISTORY: Stevested Machinery & Engineering Ltd was established in 1970. The main focus has been on precision machining from conception. The company moved to its present location in Tilbury Industrial Park in 1979 where it has now 49,000 sq ft of working area.

CAPABILITY: The company is one of the most advanced machine shops in Western Canada and capable of handling anything from medium to large complicated aircraft parts and assemblies required by today's aerospace industries. During recent years, Stevested purchased a large true-5-axis machining center and a large 3-axis turning center. Both these machines are designed specifically to handle the machining challenges of sophisticated parts encountered in the aircraft industry. The other CNC equipment purchased in the past is quite standard in a technologically advanced machine shop. The machines are programmed by our McDonnell Douglas Unigraphics II CAD/CAM Programming System.

The company's Quality Assurance Program has been refined thoroughly to meet US and Canadian military specifications. At present, Stevested Machinery & Engineering Ltd is approved by Bell Helicopters, Raytheon, Litton Systems, and Boeing of Seattle.

PERSONNEL: Office Staff - 5
QA Manager - 1
Others - 5

GROSS SALES: 1990 - $2.0M
1991 - $0.75M

PLANT SIZE: 49,000 sq ft

EQUIPMENT: CNC machining (large parts, small quantities); CNC production (smaller parts, large quantities); general machining (large turned parts to 13.5 ft); general machining (large horizontal boring mill parts); fabricating to 20,000 lbs (steel & stainless); and detail & production engineering facilities.

EXPERIENCE: Stevested Machinery & Engineering Ltd's customer list includes:

- BC Research (Div of Fleet Aerospace) - Prototype work on compensating bases for satellite receiving antennae.

- Boeing Commercial Aircraft - High precision aircraft parts.

- CAE Machinery - Components for pulp and paper equipment.

- Canadian Airlines International - Machine and assemble ground support equipment.

- Conair Aviation - High precision firefighting aircraft parts.

- Johnson-Matthey Ltd (Cominco) - Fabricate components for high purity metals refinement equipment.

- Lips Canada - Marine industry items. High precision work on propellers and shafts.

- Moli Energy - Machine aluminum parts and fabricate for battery production.

- Osborne Propellers - Marine industry items. Precision machining on propellers and shafts.

- Sunds Defibrator Ltd - Pulp and paper equipment. 5-axis machining center complexity. Extremely high precision and repeatability requirements.

- Triumf, UBC - Cycletron parts & prototype work for experimental purposes. Very high precision requirements.

- Westcoast Manly Shipyards - Machining on components for proprietary marine drives. Work on sea-going navigation systems.

STRITE INDUSTRIES Ltd

ADDRESS: 298 Shepherd Avenue
Cambridge, Ontario
Canada N3C 1V1

CONTACT: Mr Joseph D Strite, President
Tel: (519) 658-9361
Fax: (519) 658-6925

KEYWORDS: Avionics Components; CAD/CAM; Components (Avionics); Gyros; Inertial Navigation Components; Instrumentation (Components); Landing Gear Components; Machining; Thread Grinding.

HISTORY: Strite Industries is a private Canadian-owned small business. The company was incorporated in 1964 to serve the US avionics industry. For over 28 years, the company has been a major supplier of gyro and accelerometer hardware.

CAPABILITY: Strite specializes in ultra precision machining of small and medium-sized, close-tolerance, precision components and assemblies for the aerospace, defense, electro-optic, hydraulic, and other high-technology industries. The company has total machining, assembly, and treatment facilities including engineering, prototype, and high-volume production capabilities. The company's products range from aluminum

housings to miniature gimbals to spools and sleeves. Materials include aircraft aluminum, high nickel alloys, and titanium. Strite's quality control system meets MIL-Q-9858A standards and has been approved by major aerospace and defense contractors.

PERSONNEL: Engineers - 2
Technicians - 8
QC Personnel - 15
Production - 280

GROSS SALES: No data.

PLANT SIZE: 74,000 sq ft

EQUIPMENT: Strite Industries is the largest and most up-to-date manufacturing facility of its kind in North America using the best equipment available from the USA, European, and Japanese machine tool manufacturers. Much of the equipment is CNC controlled, and CAM is used extensively. In addition to common machining processes, the company also has machining centers, machinery for broaching, EDM machining, thread grinding, plating and finishing, as well as an extensive range of inspection equipment. The company regularly updates its methods to ensure that it remains on the leading edge of machining technology.

EXPERIENCE: Strite Industries has been a supplier of strategic high-precision, machined products to the US aerospace and defense industry since 1964. The company excels at developing solutions for the most challenging components. The company's background in original equipment manufacture makes it an excellent source of supply, particularly for R&O and retrofit gyro components. The company's objective is to become a source of spares supply for the US military for components previously manufactured by Strite for prime contractors.

T R COX AEROFOILS Ltd

ADDRESS: 2170 Speers Road
Oakville, Ontario
Canada L6L 2X8

CONTACT: Mr T Ron Cox, President
Tel: (416) 825-1218
Fax: (416) 825-1220

KEYWORDS: CNC Machining; Components (Engines); Engine Components; Machining; Precision Machining; Tooling.

HISTORY: The company was incorporated in 1977 with a concentration on toolmaking. In 1978, there was further concentration on aircraft gas turbine engine research and development. The name was changed in 1984 to T R Cox Aerofoils Ltd to reflect the thrust of their work. The company has progressed significantly in this field.

CAPABILITY: T R Cox Aerofoils Ltd is a toolmaking operation specializing in the manufacture of air foils connected with gas turbine engines, e.g., compressor blades, turbine blades, vanc rings, fan blades, and stators for core and bypass. T R Cox Aerofoils is approved for flying machined parts, conventional, and EDM by three major companies.

The company specializes in short and medium runs of blade sets of the above, also manufacturing jigs, fixtures, and tool-making requirements associated with the development of engines, including fir tree forms and disks.

T R Cox Aerofoils manufactures flaps and air foil sections for air frame manufacturers up to a 20" x 20" x 40" envelope including propeller blade parts.

The company has the capability to manufacture production machined parts in any machinable material, including titanium, for such parts as deicing manifolds, brackets, and similar parts. The company manufactures parts using wire and sink CNC EDM.

PERSONNEL: Management - 2
Toolmakers, Machinists - 8
Admin - 1

GROSS SALES: No data.

PLANT SIZE: 5,000 sq ft

EQUIPMENT: CNC Machining Centre - new 1989, complete with digitizer. Japax CNC wire EDM with 12" height clearance and X, Y, U, V axis complete with hole sinking unit. Japax CNC wire EDM, X, Y, U, V axis. 1 die sink EDM Sparkatron No 1024 and 1 die sink EDM Sparkatron No ES200. Form measuring equipment, large capacity optical comparators, and digitizing equipment for reverse engineering. Turning capacity up to 30" diameter and surface grinding to 14 x 24. The company has the capacity to coin and forge precision.

EXPERIENCE: The company's customers include General Electric Aircraft Company (Lynn and Evandale), Pratt & Whitney Canada Inc (Mississauga and Longueuil), Canadair Inc (St Laurent), and Hawker Siddeley Canada Inc (Orenda Division).

TARGA ELECTRONICS SYSTEMS Inc

ADDRESS: 18 Auriga Drive
Nepean, Ontario
Canada K2E 7T9

CONTACT: Mr Gavin McLintock, President
Tel: (613) 727-9876
Fax: (613) 727-1705

KEYWORDS: Bubble Memory; Computer Mass Memory; Data Loggers; Data Recorders; Floppy Disk Emulators; Mass Storage Systems; Memory; Peripheral Mass Storage; Removable Media Mass Storage Systems; Ruggedized Mass Storage Systems; Solid State Memory.

HISTORY: Targa Electronics Systems Inc is a Canadian company founded in 1981.

CAPABILITY: Targa Electronics is a 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, E2PROM, 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 several 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 CH-series interface units are suitable as low cost data storage components for integration into systems. The units are available with RS232, 8-bit parallel, and SCSI interfaces.

Targa is also able to supply custom designs where the requirements are not met by the existing range of products.

PERSONNEL: Engineering - 10
Manufacturing - 10
Others - 10

GROSS SALES: No data.

PLANT SIZE: 6,000 sq ft

EQUIPMENT: In-house computer systems include DEC, IBM, Multibus, and Hewlett-Packard. Test equipment includes circuit emulation, oscilloscopes, etc., burn-in thermal cycling, and test facilities.

EXPERIENCE: Targa products are used by the US Navy in dockside test equipment, deep sea rescue vehicles, flight line test equipment and memory loader/verifiers, and by the US Army in portable communications monitoring and chemical "sniffing" systems. They are also used by the armed forces of several countries including Great Britain and Australia. Targa products have been used in airborne flight inspection systems and helicopter-borne test equipment. Targa products are presently used in industrial applications by automobile manufacturers in mobile on-board 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. Targa has offices in San Ramon, California, and Great Britain, and representatives or distributors throughout the US and Europe.

TEAM Inc

ADDRESS: 4105 Cousens
Saint-Laurent, Quebec
Canada H4S 1V6

CONTACT: Mr Alain G Fouilloux, Vice President, Marketing
Tel: (514) 745-1600
Fax: (514) 745-2711

KEYWORDS: Audio Control Panel; Centralized Control Units; Data Acquisition; Data Processing; Digital Warning Systems; Failure Indicators; Intercom (Digital Analog); Radio Management Panel; Selective Calling Systems; Sound Equipment; Synthetic Voice.

HISTORY: TEAM Inc (Telecommunications, Electronics, Aeronautics, and Maritime) is a Canadian-owned, high-technology, electronics company founded in 1985. It is a subsidiary of TEAM SA, a 35-year-old French company. Created in 1951, TEAM has its own R&D department in its new premises in Rungis (France), a production unit in a modern plant in Troyes (France), and a commercial and industrial subsidiary in Montreal (Canada). TEAM SA has been supplying electronic equipment and computing systems for aircraft, ships, trains, communications, and industry for 35 years.

CAPABILITY: TEAM is primarily involved in the design and manufacture of airborne analog and digital intercom systems: audio control panels, junction boxes, interphone amplifiers, and cabin

and galley amplifier systems. The company also designs and manufactures computer-controlled centralized systems: audio management, radio management, failure warning computer, and selective calling systems. The energy conversion department provides a wide range of power supply and converters in the form of equipment units, cards, modules, and miniature hybrids. The sound equipment division provides intercom systems for vehicles and weapon system shelters, field and yard telephones for defense, sound and intercom systems for railway, and data acquisition computers for naval applications. TEAM's capabilities cover the broad areas of engineering (including system logic and design), software design and development, systems management, product assurance (including reliability and maintainability analysis), production (including R&O), quality assurance, documentation, and training. TEAM is a NATO supplier (F6168) and is certified for AQAP-4. Its Canadian subsidiary is DOT approved.

PERSONNEL: PhD - 3
Engs - 15
Others 235

GROSS SALES: No data.

PLANT SIZE: 100,000 sq ft

EQUIPMENT: Complete digital electronics production facility. In-house computer systems include HP, DEC, and IBM PCs.

EXPERIENCE: Present customers include various aircraft manufacturers in both Europe and the US such as Boeing, Douglas, Airbus Industries, Fokker, British Aerospace, etc. Major airline customers include American Airlines, United Airlines, Air France, Lufthansa, Swissair, Northwest Airlines, etc.

TELESAT CANADA

ADDRESS: 1601 Telesat Court
Gloucester, Ontario
Canada K1B 5P4

CONTACT: Mr W L Jurgens, Manager
International Business Development
Tel: (613) 748-0123
Fax: (613) 748-8720

KEYWORDS: Broadcasting (Audio and Video); Communications; Satellite Communications; Voice and Data Communications.

HISTORY: Telesat Canada is a private company that owns and operates Canada's domestic satellite communications system, including a fleet of ANIK satellites. Since its establishment in 1969, Telesat has been recognized as a world leader in satellite technology.

CAPABILITY: Telesat provides television, broadcasting, data, and voice services to customers across Canada. As well as owning six satellites, Telesat has an extensive ground station network including a number of teleports sited in Canada's major cities.

Telesat provides specialized engineering consulting service to countries interested in establishing, operating, and upgrading their satellite systems. In addition, Telesat offers customized training programs, documentation, and advice in almost every area ranging from spacecraft design, procurement, launching, and operating a communications satellite system.

PERSONNEL: No data.

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: Present customers include various departments in the Canadian Government and industries in Canada, the United States, and worldwide.

TERRA AEROSPACE Corp

ADDRESS: Unit 112
2465 Stevenage Drive
Ottawa, Ontario
Canada K1G 3W5

CONTACT: Mr Scott McLean, General Manager
Tel: (613) 736-7974
Fax: (613) 736-7976

KEYWORDS: Explosives Disposal Equipment; Machining.

HISTORY: Terra Aerospace is a Canadian company based in Ottawa, Canada. The company has been operating for the past four years and has enjoyed rapid growth and international recognition for innovation, quality, and customer service.

CAPABILITY: Terra Aerospace provides engineering, precise tolerance, custom machine, and fabrication facilities to North America's leading high-tech and aerospace companies. The company is also heavily involved in "threat removal" products with the design and manufacture of "smart system" bomb disposal equipment and SWAT assault/escape/evacuation ladder systems.

PERSONNEL: Total - 12

GROSS SALES: No data.

PLANT SIZE: 3,500 sq ft

EQUIPMENT: Equipment consists of fully computer integrated high speed machine centers, and full welding facilities for TIG, MIG, and all other welding requirements.

EXPERIENCE: The following is a partial listing of companies for whom Terra has completed major projects and maintains an ongoing business relationship: Canadian Marconi, Lockheed Canada, SPAR Aerospace, Davis Engineering, Swedish Military, MDS Aerosupport, Supply and Services Canada, US Navy, US Air Force, US Army, Royal Canadian Mounted Police (Canada), Federal Bureau of Investigation (USA), and Bell Canada.

THOMPSON-HICKLING AVIATION Inc

ADDRESS: Suite 601, 255 Albert Street
Ottawa, Ontario
Canada K1P 6A9

CONTACT: John Belcher, President
Tel: (613) 563-3849
Fax: (613) 563-4272

KEYWORDS: ATC; Consulting; Economic Analysis; Human Factors Design; Integrated Logistics Support; Project Management; Requirements Analysis; Simulation; Systems Engineering; Systems Integration.

HISTORY: Thompson-Hickling Aviation Inc (THA), is a Canadian, high-technology company, based in Ottawa, Ontario, and Portage la Prairie, Manitoba, Canada. Incorporated in 1985, THA provides engineering, air traffic control/airport airside operations, and management consulting services to the aviation community. Since incorporation, THA has enjoyed continued, high, steady growth in revenue and staff.

CAPABILITY: THA is primarily involved in aviation systems engineering in support of air traffic services and air navigation as well as aviation/airport services in the operational and maintenance fields. Expertise exists in a wide range of systems engineering applications, management, and economic analysis as well as air traffic and air navigation operational activities.

Major work has been carried out in a systems engineering and integration project to provide systems design and discipline management of the modernization of the Canadian Air Space System for Martin Marietta Canada and Transport Canada. Other projects include systems engineering and technical assistance to Transport Canada for the modernization of the National Air Traffic Control System, cost benefit analysis for the Canadian Microwave Landing Systems transition, and many other related projects in the air traffic service and air navigation environments.

PERSONNEL: 63

GROSS SALES: 1990 - $3.2M
1991 - $4.0M

PLANT SIZE: 7,000 sq ft

EQUIPMENT: Office PCs with graphics and LAN; ATC simulation systems.

EXPERIENCE: Present customers include various departments in the Canadian Government and industry in Canada, the United States, and overseas. These include Transport Canada, Department of National Defence, Martin Marietta Canada Ltd, Transportation Development Centre, Raytheon Canada, Monenco Ltd, Prior Data Science, Canadair/Bombardier, and Telesat Mobile Inc.

THOMSON-CSF SYSTEMS CANADA Inc

(Thomson Systems)

ADDRESS: 18 Auriga Drive
Nepean, Ontario
Canada K2E 7T9

CONTACT: Mr Ken Bowering, Marketing Manager
Tel: (613) 723-7000
Fax: (613) 723-5600

KEYWORDS: C3 Systems; Computer Simulation; Effectiveness Evaluation; Engineering Services; Enhanced Blast Technology; Integrated Logistics Support; Logistics Engineering; Mine Clearance Systems; Robotics; Space Systems; Systems Integration; Training.

HISTORY: Thomson-CSF Systems Canada Inc is a Canadian company, incorporated in 1984, with facilities and offices in Nepean, Ontario. The company's main business areas are command and control systems technology development, countermine technology and systems development, integrated logistics support, mission systems design and integration, and space systems and robotics technology development. Thomson Systems was established to meet the

needs of the Canadian, North American, and world markets for management and delivery of complex defence and aerospace systems and their associated logistics support on a turnkey, fully supported basis.

CAPABILITY: Thomson Systems has the resources, capabilities, personnel, and facilities to respond to complex and diverse requirements in aerospace, communications, command and control, training, marine, and transportation applications for military, government, industrial, and commercial customers. With its systems engineering expertise, its software development capability, its logistics engineering tools, and its project management know-how, Thomson Systems is able to develop and deliver systems which meet all performance, cost, schedule, and logistics requirements. As a true systems engineering management company, Thomson Systems designs and develops systems, integrating software, hardware, and systems which best meet the customer's needs.

Thomson Systems is a subsidiary of Thomson-CSF, a multinational corporation based in France that operates worldwide.

Thomson Systems' professional engineering staff are top level systems engineers with successful track records in the management of major national and international programs. Thomson Systems' 20,000 sq ft secure facility is equipped with two TEMPEST-shielded rooms equipped for addressing classified projects and a systems assembly area of 3,000 sq ft. Sufficient resources, personnel, and management infrastructures are in place to handle medium-sized projects ($100 M).

PERSONNEL: Engineers - 40
Others - 10

GROSS SALES: No data.

PLANT SIZE: 20,000 sq ft

EQUIPMENT: Secure facilities, two TEMPEST rooms, Apollo workstation, IRIS workstation, and MicroVAX computers and associated management, logistics, simulation, and applications software.

EXPERIENCE: Present customers include various departments in the Canadian Government including National Defence and Canadian Space Agency, and industries based in Canada, the US and Europe.

3-L FILTERS Ltd

ADDRESS: 427 Elgin Street N
PO Box 371
Cambridge, Ontario
Canada N1R 5V5

CONTACT: Mr Dwayne Wanner, Vice President Marketing/Sales
Tel: (519) 621-9949
Fax: (519) 621-3371

KEYWORDS: Air Gas Separators; Cartridges; Coalescing Filters; Filter Separators; Fuel Monitors; Fuses; Micronic Filters; Nozzles; Pressure Vessel Filters; Refueling Hose; Refueling Systems; Separators; Water Purification Systems.

HISTORY: 3-L Filters Ltd is a Canadian filtration system and cartridge manufacturing company founded in 1965. The company is a fully owned subsidiary of Velcon Filters of San Jose, California.

CAPABILITY: 3-L Filters Ltd is primarily involved in the design and manufacture of aviation, marine, industrial, petroleum, petrochemical, 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 worldwide 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 worldwide service, product assurance, including reliability and maintainability, analysis, documentation, testing, and free training.

PERSONNEL: PhD - 1
Engineers - 6
Others - 30

GROSS SALES: No data.

PLANT SIZE: 55,300 sq ft

EQUIPMENT: Complete fabrication facility for pressure vessel filtration equipment. Strong engineering group capable of designing sophisticated filtration systems.

EXPERIENCE: Customers include oil companies such as Esso, Exxon, Shell, Gulf, Texaco, Petrocan, Mobil, Chevron, BP, Philips, Conoco, Sunoco, Petrosar, and others; DOD, CP Air, Air Canada, Boeing, Delta Air, Westinghouse,

General Electric, Pratt & Whitney, De Laval Turbines, and many others.

TIMMINCO Ltd

ADDRESS: 10 Bay Street
PO Box 1160
Station 4
Toronto, Ontario
Canada M5W 1G5

CONTACT: Mr Paul MacMillan
Tel: (613) 432-7551
Fax: (613) 432-7897

KEYWORDS: Adhesives; Alloys; Casting Alloys; Magnesium; Metals; Non-Ferrous Metals.

HISTORY: Timminco Ltd is a Canadian organization resulting from a series of mergers and acquisitions since the formation of Chromium Mining and Smelting Corporation Ltd in 1934.

CAPABILITY: Timminco Ltd operates two businesses, specialized metals and industrial adhesives, through two separate divisions.

- METALS DIVISION - Timminco Metals is a world class producer of non-ferrous metals including magnesium, calcium, strontium, and their alloys. They serve the aluminum, automotive, aerospace, atomic energy, and steel industries. With plants in Canada, the division supplies North America, Europe, and the Pacific Rim. Timminco's product line in the division includes pure metals, sacrificial anodes, calcium alloys, strontium alloys, and extrusions.

- ADHESIVES DIVISION - Timminco Adhesives which includes Industrial Adhesives in Canada and Universal Adhesives in the US is a leading producer of adhesives and coatings for use by industries in North America. From its 11 plants in Canada and the US, the division produces over 700 specially formulated adhesives, serving over 2,000 industrial customers in a wide range of businesses. Timminco's product line in this division includes emulsions, natural and synthetic latexes, polyvinyl alcohols, detrines and starches, polychloroprene contact cements, natural and synthetic rubber cements, lacquers, one- and two-component polyurethane adhesives, hot melts, epoxies, urethane adhesives, and modified rubber-based cold seals.

While Timminco's two businesses differ in the products they make and the markets they serve, they are alike in their emphasis on the highest standards of technology, engineering, chemistry, quality control, product development, production efficiency, and timely responsiveness to the specific and exacting requirements of industrial customers. Customer satisfaction is ensured by the broad application of statistical process control and the high standards of Timminco's quality assurance program.

PERSONNEL: Total - 600

GROSS SALES: 1990 - $78M
1991 - $65M

PLANT SIZE: No data.

EQUIPMENT: Facilities are available for extensive chemical and mechanical testing or other methods as appropriate to the product lines.

EXPERIENCE: Suppliers to automotive, nuclear power, aerospace, and chemical industries for more than 25 years, Timminco's staff of technical development engineers are capable of providing support for the solution to materials and casting problems.

TRACKER INDUSTRIES Ltd

ADDRESS: 6A Tilbury Court, Units 1, 2, 5
Brampton, Ontario
Canada L6T 3T4

(Mailing Address)
PO Box 1094, Station A
Toronto, Ontario
Canada M5W 1G6

CONTACT: Mr Lou Fedyna, President
Tel: (416) 454-0891
Fax: (416) 454-3939

KEYWORDS: Aviation Software; Build-To-Print; Computers; Consulting; Control Systems; Data Acquisition; Laser Communications; Microcomputers; Software Development; Software Services; Systems Integration.

HISTORY: Tracker Industries was established in 1974 to provide products and services associated with the use of electronic and computer systems. To date Tracker has concentrated on supplying technical services, design products, and engineering to the automotive and aerospace industries. Tracker Industries Ltd is a privately owned, Canadian company.

CAPABILITY: Tracker provides custom design/integration/manufacture/maintenance and repair of electronic and computer circuits and systems and software that are used in real-time control and data acquisition environments, and SCADA applications.

Real-time control programming using assembly and high-level languages has been implemented for industrial automation applications.

- Software Experience: Operating systems - UNIX, MS-DOS, OS-2; Languages - BASIC, APL, "C", FORTRAN, Ada, Motorola and Intel assembly; and Other - Manufacturing Automation Protocol (MAP).

- Hardware Experience: Mini/microcomputers - VME, PC AT/XT, DEC, IBM, HP, Olivetti; programmable logic controllers - GEC and Allen-Bradley; magnetic and optical bar code readers, printers, and systems; computer controlled security systems; ruggedized portable computers; and laser and fiber-optic communications devices; GPS systems.

- Present Activity: Industrial automation and SCADA systems.

PERSONNEL: Engineers/Programmers - 8
Others - 6

GROSS SALES: 1991 - $1.5M

PLANT SIZE: 5,000 sq ft

EXPERIENCE: Tracker Industries' clients include General Motors, McDonnell Douglas, Bell Helicopter, Boeing, and federal and provincial government departments.

TRECO MACHINE & TOOL Ltd

ADDRESS: 123 Crockford Boulevard
Scarborough, Ontario
Canada M1R 3C1

CONTACT: Mr Barry Lodge, Engineering and Sales
Tel: (416) 751-5861
Fax: (416) 751-8713

KEYWORDS: Aircraft Engine Components; CNC Machining; Guidance System Components; Landing Gear Components; Nuclear Reactor Components; Precision Machining; Printer Components/Assemblies.

HISTORY: Treco Machine & Tool is a Canadian-owned company founded in 1957.

CAPABILITY: Treco Machine & Tool specializes in manufacturing small, high-precision components. Their comprehensive capabilities include CNC machining, production milling, drilling, tapping, turning, boring, and grinding. Production is supported by their process engineers assisted with a CAD/CAM system. Treco is a military-approved supplier with an established quality control program approved to the following standards: MIL-I-45208, DND 1016, AQAP-4, CSA Z 299-3.

PERSONNEL: Engineering - 10
Administration - 6
Plant - 65
Others - 90

GROSS SALES: 1990 - $7.0M
1991 - $6.0M

PLANT SIZE: 40,000 sq ft

EQUIPMENT: Major equipment includes 3- and 4-axes CNC machine centers, 2- and 3-axes CNC turning centers, coordinate measuring machines, and CAD/CAM stations.

EXPERIENCE: Major customers include Pratt & Whitney Aircraft, Litton Guidance Systems, Atomic Energy of Canada, and IBM.

TRILINK TECHNOLOGIES GROUP Inc

ADDRESS: 797 Eastbourne Avenue
Ottawa, Ontario
Canada K1K 0H8

CONTACT: Mr Michael K G Venables, President
Tel: (613) 720-1395
Fax: (613) 746-3049

KEYWORDS: Consulting; Consulting (Engineering); Consulting (Management); Engineering Services; Project Management; Software Development.

HISTORY: TriLink Technologies Group Inc (TTG) was formed in 1989 to provide professional services to the aerospace industries in Canada and abroad.

The head office is located in Ottawa with a branch in Bethesda, Maryland.

CAPABILITY: Trilink Technologies Group Inc provides a complete service through all phases of project management: definition, scheduling, tracking, reporting, and delivery. Their experience includes the use of modern computer-based scheduling packages and spans a number of years managing large complex aerospace system projects.

TTG's aerospace engineering experience includes space mission planning, aircraft operations and maintenance, and systems engineering analysis.

TTG is able to configure and specify training simulation systems to take advantage of the latest technology available.

TTG maximizes the use of computers and advanced applications to enhance the capabilities of the clients' organizations. This includes the development of custom applications to meet specific needs.

PERSONNEL: Professional - 3
Technical - 2
Other - 2

GROSS SALES: No data.

PLANT SIZE: No data.

EQUIPMENT: No data.

EXPERIENCE: Recent clients include The ADGA Group, Canadair, The Canadian Space Agency, a defense electronics company, The Social Sciences and Humanities Research Council of Canada, and Microsoft Corporation.

TRL MICROWAVE TECHNOLOGY Inc

ADDRESS: Suite 207 Discovery Park
3700 Gilmore Way
Burnaby, British Columbia
Canada V5G 4M1

CONTACT: Mr T R Lee, President and CEO
Tel: (604) 430-4361
Fax: (604) 430-3826

KEYWORDS: Communications (Microwave); MHMICs; Navigation Systems.

HISTORY: TRL Microwave Technology Inc (TRL) was founded as a private company in 1987 to research and develop innovative microwave products using the GaAs MMIC technology as a primary tool. Through a number of R&D contracts, TRL earned its reputation of a leading GaAs MMIC design firm in Canada. In 1992 based on its strong technical capabilities, TRL has diversified into its own advanced product development and manufacturing for satellite, mobile, and personal communication markets. TRL's present management has many years of proven experience in both commercial and defence areas.

CAPABILITY: TRL Microwave Technology Inc (TRL) is in the business of designing and manufacturing microwave communication and navigation products. TRL has established its research and development capability using state-of-the-art SMD, HMIC, MHMIC, and MMIC technologies as well as in-house chip handling process capability. The company has gained an excellent reputation as a leading GaAs MMIC design firm in Canada and maintains a close relationship with a number of US-based MMIC foundries.

The company's major achievements include:

- Prime contractor for Phase 1 of the $5,000,000 Canadian Microwave Landing System (MLS) project (GaAs MMIC module development for phased array antenna) from the Ministry of Transport in 1988.

- Awarded a $700,000 research contract from the Canadian Department of National Defence to develop custom GaAs MMIC chips for military application in 1988.

- Prime contractor for Phase II of the MLS project with Canadian Marconi as a subcontractor in 1989.

- Successfully developed and delivered a unique 2-18 GHz harmonic mixer for a near field scanner application.

- Design and development of a low cost single chip GaAs MMIC LNB for DBS application.

- Awarded a contract to design medium power K/Ka band transceiver for Department of Communications under Space Industry Development Program (SIDP) in 1992.

PERSONNEL: Full time - 7
Part time - 2
Consultants and subcontractors available as needed.

GROSS SALES: 1992 - $1.2M

PLANT SIZE: 3,000 sq ft

EQUIPMENT: Testing and production facilities, including HMIC processing area (class 100,000 clean room, class 100 under laminar flow bench) to handle unpackaged chips.

EXPERIENCE: Customers include Department of Communications (Canada), Department of National Defence (Canada), Orbit Advanced Technologies Inc (Israel), and the Ministry of Transportation (Canada).

TUBE-FAB Ltd

ADDRESS: 15 Ellen Street
Mississauga, Ontario
Canada L5M 2C1

CONTACT: Mr Denis C Pickler, General Manager
Tel: (416) 826-4172
Fax: (416) 826-2017

KEYWORDS: Machining; Tubing; Tubing Assembly Fabrication.

HISTORY: Tube-Fab Ltd was founded in 1951 and is a division of Health-Mor Inc of Cleveland, Ohio. The company has a subsidiary, Machined Products Division, located in Charlottetown, Prince Edward Island, Canada.

CAPABILITY: Tube-Fab Ltd is primarily involved in the manufacture of tube assemblies for the aerospace industry. Tube-Fab Ltd's capabilities include cutting, bending, deburring, balling, cropping, reducing and expanding, beading, swaging, and brazing of tube gauges with outside diameters ranging from 1/8" to 3 1/2" in stainless steel, titanium, aluminum, and bronze materials. Tube-Fab Ltd also offers full detail machining capabilities from castings, forgings, or bar stock.

PERSONNEL: Total - 45 (including Machined Products Div)

GROSS SALES: 1990 - $3.0M
1991 - $3.0M

PLANT SIZE: 18,000 sq ft - Tube-Fab Ltd
20,000 sq ft - Machined Products Div

EQUIPMENT: Tube-Fab Ltd has over 50 production machines capable of forming and machining a variety of gauges. Machined Products Div boasts a full machine shop including CAD/CAM and coordinate measuring machines.

EXPERIENCE: Major customers include Pratt & Whitney Canada, Textron Lycoming, McDonnell Douglas, Bell Helicopter, Dowty Aerospace, Spar Aerospace, Andrew Antenna, Mitec, and Fleet Industries.

TUL SAFETY EQUIPMENT Ltd

ADDRESS: 1432 Aberdeen Street
Hawkesbury, Ontario
Canada K6A 1K7

CONTACT: Mr J C (Chuck) Derby, President
Tel: (613) 632-1411
Fax: (613) 632-7270

KEYWORDS: Life Support Equipment; Lifejackets; R&O (Lifejackets); R&O (Rafts); Rafts; Safety Harnesses; Webbing Straps.

HISTORY: The company, now known as Tul Safety Equipment Ltd, was previously RFD Canada which was established in Granby, Quebec, in 1951 by its parent company RFD, situated in the United Kingdom. In 1963, RFD Canada was sold and renamed Tul Safety Equipment Ltd. Tul Safety Equipment Ltd remained in Granby until January 1969 when it moved to its present location in Hawkesbury, Ontario. There have been three expansions since then with the latest completed in late fall 1988.

CAPABILITY: Tul Safety Equipment Ltd is a Ministry of Transport approved inflatable liferaft and lifejacket manufacturing, repair, and overhaul facility, as well as being approved to DND 1015/NATO AQAP-1, FAA, and Canadian Coast Guard specifications.

Tul Safety Equipment Ltd is a supplier of safety equipment to the Canadian Armed Forces, Ministry of Transport, all Canadian air carriers, shipping fleets, as well as fishing fleets. Tul Safety Equipment Ltd is also the major supplier of all webbing straps and associated hardware to General Motors of Canada for the Light Assault Vehicle (LAV) as supplied to the American Armed Forces. Tul Safety Equipment Ltd is qualified to service, repair, and overhaul helicopter floats and to manufacture aircraft and automobile safety harnesses.

Tul Safety Equipment Ltd maintains an approved network for repair and overhaul facilities from Newfoundland to British Columbia to ensure its customers do not suffer any unwarranted delays in satisfying their requirements.

In conjunction with its above-mentioned capabilities, Tul Safety Equipment Ltd has initiated and maintains a strong research and development profile with ongoing research and development for NASA, Canadian Armed Forces, and industry.

PERSONNEL: Management - 12
Others - 35

GROSS SALES: 1991 - $3.0M

PLANT SIZE: 36,000 sq ft

EQUIPMENT: Tul Safety Equipment Ltd's specialized equipment includes four heat sealing machines.

EXPERIENCE: The company's present customers include various departments in the Canadian Government and industry, both in Canada and the US. The company has also exported to Norway, Japan, Australia, and other countries. Major customers include Department of National Defence, Air Canada, Canadian Airlines, and General Motors.

UDT INDUSTRIES Inc

ADDRESS: 2125 East, St-Catherine East
Montreal, Quebec
Canada H2K 2H9

CONTACT: Mr Walter Herbst, General Manager
Mr Alberto Stagnaro, Contract Administration
Tel: (514) 526-9454
Fax: (514) 526-0902

KEYWORDS: CNC Machining; Heat Treating; Machining; Precision Machining.

HISTORY: UDT was incorporated in 1942 under the name of Universal Die & Tool. The 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 products are machined parts ranging from light-medium to hard core items, such as fittings, splice plates, hinges, bulkheads, slat-tracts, 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.

An aluminum alloy heat treating electrical air furnace is part of UDT's capability, 5 ft diameter by 18 ft high. It is continuously performing quench and age hardening of major structural parts for McDonnell Douglas and Lockheed Aircraft from AL-AL 7075 T 411 and 2014 T 411 condition F to T6 or T73 condition. UDT works to MIL-I-45208 and DND AQAP-4 and AQAP-6. Tolerances are maintained as per customer's requirements.

PERSONNEL: Engineers - 1
Inspectors - 6
Machinists - 60
Programmers - 3
Others - 24

GROSS SALES: 1990 - $11.3M
1991 - $12.3M

PLANT SIZE: 110,000 sq ft

EQUIPMENT: NC equipment includes vertical machining centers; horizontal machining centers; vertical profiling milling machines; vertical profilers (bed type 3- and 4-axes); a 5-axes machining center; a 3-spindle, 5-axes, 2-gantry profiler with a 90 ft bed; and 1 rail-type profiler (3-spindle, 5-axes).

EXPERIENCE: UDT's customers include McDonnell Douglas Canada Ltd (MD-90 & MD-11), Canadair (from T-33 to Airbus and 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), Grumman Aerospace, and Bristol Aerospace.

ULTIMATEAST DATA COMMUNICATIONS Ltd

ADDRESS: 60 Water Street
PO Box 5933
St John's, Newfoundland
Canada A1C 5X4

CONTACT: Mr Roderick J White, Vice President
Tel: (709) 576-4747
Fax: (709) 576-2125

KEYWORDS: Communications (Network Controllers); Communications (Software); Digital Signal Processing; Interface Devices; Marine Communications; Remote Communications Terminals; Satellite Communications.

HISTORY: Ultimateast was formed in 1985 to specifically develop technology for marine, remote, and mobile communications. It is a 100% Canadian-owned company based in St John's, Newfoundland. Ultimateast is affiliated with Canada's privately owned high seas coastal station, Sea Link Ltd.

CAPABILITY: Ultimateast specializes in marine, remote, and mobile communication networks. It has developed a fully integrated data communications network called MNet using high frequency radio based on its intelligent modem called DataHail. Developed for the network are a network controller and a communicating GIS called FLAG (Fleet Locating and Graphics). At present Ultimateast is converting their products for use on MSAT (mobile satellite) for use throughout North America and on the international Inmarsat network.

PERSONNEL: Computer Scientists - 4
Engs - 5
Physicists - 1

Technolgists - 5
Technicians - 3
Other - 15

GROSS SALES: 1990 - $2.0M
1991 - $2.5M

PLANT SIZE: 5,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: Present customers include various departments in the Canadian Government and industries in both Canada and the US. The following is a partial list: Canadian Coast Guard; Department of Fisheries and Oceans; Petro Canada; Telesat Mobile Inc; American Mobile Satellite Corporation (AMSC); Hughes Network Systems; Rockwell International; and Atlantic Research Corp.

ULTRA LASERTECH Inc

ADDRESS: 6423 Northam Drive
Mississauga, Ontario
Canada L4V 1J2

CONTACT: Mr T F E Loster, VP, Marketing & Sales
Tel: (416) 677-8091
Fax: (416) 695-6521

KEYWORDS: CO2 Lasers; CO2 Opto-Acoustic Detector; Continuous Wave CO2; Frequency Stabilizers; Isotopic CO2; Laser Controllers; Lasers; Mirror Mounts; Opto-acoustic Trace Gas Analyzer; Photo-acoustics; Pollution Detection; Power Supplies; Sealed CO2; Spectroscopy; Stark Cell; Tuneable CO2.

HISTORY: Ultra Lasertech Inc (ULI) 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 CO_2 lasers and wave guide lasers. They are involved in R&D associated with laser photo-acoustics, laser spectroscopy, and laser communications and 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 CO_2 lasers; tunable CO_2 lasers; a CO_2 laser opto-acoustic detector; industrial-type sealed CO_2 lasers; laser stabilizers; laser power supplies; mirror mounts; stark cell frequency controller; and a frequency stabilizer.

PERSONNEL: Total - 12

GROSS SALES: No data.

PLANT SIZE: 10,000 sq ft

EQUIPMENT: A laser-based opto-acoustic facility for measuring absorption coefficients 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 CO_2 laser structures of glass and ceramic materials. These seals can be made between various thermally mismatched materials.

EXPERIENCE: From its principals, the company has a background of some 14 years' experience in sealed CO_2 laser technology and ultra-high power, fast-flow CO_2 laser development. Since its founding in 1979, Ultra Lasertech has continued developments in long life, sealed CO_2 laser systems, tunable and non-tunable, to power ranges from 5-90 watts CW and with various CO_2 isotopes. These projects include the development of the $^{13}CO_2$, $^{14}CO_2$ and $^{18}CO_2$ laser systems covering the 8.9 to 12.1 um range; a folded 75 watt system, a feedback stabilization system based on the opto-galvanic effect for controlling the laser to a line center or off-set; a stark cell frequency controller for shifting waveguide lasers by +500 MHz; and a variety of customized laser systems for special research applications. Presently under development is a compact CW or pulsed air cooled, sealed CO_2 laser and a compact excimer laser for medical applications. Also ULI has, since 1979, a continuing program in laser-based opto-acoustic research and development. These projects include the development of CO_2 laser opto-acoustic trace gas analyzer for detecting ambient nitric acid vapors to the 1 ppb level; a balanced dual spectro-phone chamber; a stark modulated opto-acoustic detector that can detect ammonia of concentrations of 0.2 ppb in air; the measurement of the opto-acoustic 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 systems to companies around the world. Among these are NASA, JPL, Vought Aerospace, NOAA, McDonnell Douglas, Naval Research Labs, Brookhaven, Max Planck Institute, and Horiba & Sumitomo. ULI has also performed contract research for the Department of National Defence, National Research Council, and Atmospheric Environment Service.

UNITED MARINE ELECTRONICS AND COMMUNICATIONS (1988) Inc

ADDRESS: 34 Capital Drive
Nepean, Ontario
Canada K2G 0E9

CONTACT: Mr Gennady Reshetnikov, Manager
Security Business Unit
Tel: (613) 723-8826
Fax: (613) 723-1347

KEYWORDS: Intrusion Detection; Encryption; Security Systems.

HISTORY: With over 20 years of experience, United Marine is a leading Canadian manufacturer of proprietary intrusion and access control security systems, shipboard communications systems, computerized hospital nurse call networks, and public address/evac systems for domestic and export markets.

CAPABILITY: Ideal for the high security requirements of military establishments, United Marine's IDS-3000 can service up to 1000 separate sites, 64,000 alarm points, and 32,000 users. It is built around an IBM AT compatible for the central monitoring facility. In the alarm processing mode, it can display 1500 different text, floor plan, and map displays and indicate alarm type, location, and response procedure. System management capabilities include database updates, report generation and audit trails. The modular building block architecture allows for efficient expansion.

PERSONNEL: Engs - 4
Technologists - 4
Others - 22

GROSS SALES: 1992 - $5.1M

PLANT SIZE: 10,000 sq ft

EQUIPMENT: Full research and development facility, manufacturing plant, and service department.

EXPERIENCE: No data.

VAC-AERO INTERNATIONAL Inc

ADDRESS: 1371 Speers Road
Oakville, Ontario
Canada L6L 2X5

CONTACT: Mr Ross E Pritchard, Chairman
Tel: (416) 827-4171
Fax: (416) 827-7489

KEYWORDS: Brazed Aluminum Heat Sinks; Brazing; Build-To-Print; Coatings (CODEP); Coatings (Plasma Spray); Diffusion Coatings (CODEP); Electron Beam Welding; Heat Treating; Machining; Metal Coatings; Plasma Spray Coating; R&O (Engine Components); Vacuum Brazing; Vacuum Furnaces; Vacuum Heat Treating.

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; 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 for landing gear components and structural airframe parts.

- Vacuum heat treatment for turbine parts, shafts, turbine blades, casings, and nuclear components.

- Vacuum brazing for turbine nozzles, compressor stators, afterburner casings, combustion cowls, wave guides, aluminum cold wall assemblies and heat exchangers, and nuclear parts.

- Electron beam welding for turbine assemblies and electronic components.

- Plasma spray coating for combustion liners, fan and stator casings, and 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. VAC-AERO specializes 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. VAC-AERO has supplied these furnaces to a wide variety of customers in the aerospace, nuclear, and other high-laboratory industries.

- In addition, VAC-AERO can supply ancillary furnace equipment such as high-temperature molybdenum fixtures, water recirculating units, and work handling systems. VAC-AERO also offers complete turnkey installation services, extensive operator training programs, and post-sale preventive maintenance service.

PERSONNEL: Engineers - 18
Others - 110

GROSS SALES: 1990 - $11.4M

PLANT SIZE: 40,780 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. diam. 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.

- CNC machining centers, a fin forming machine, and a computer controlled co-ordinate measuring machine, combined with an electron beam welder (chamber size 36"L x 36"H x 52"W, extendible to accommodate shafts to 72"L) provide full in-house capabilities for the manufacture of parts to print.

- Plasma coating equipment including Metco 3M, 45kW and Metco 7M, 80kW plasma guns, and a METCO AR-1000 Robot.

- 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 Aerospace Ltd; 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.

VARIAN CANADA Inc

ADDRESS: Varian Canada Microwave Products
45 River Drive
Georgetown, Ontario
Canada L7G 2J4

CONTACT: Mr Andrew E. Tafler
Tel: (416) 877-0161 Ext 254
Fax: (416) 877-5327

KEYWORDS: Amplifiers; Control Systems; Extended Interaction Klystrons; High Voltage; Klystrons; Microwave; Millimeter Wave Subsystems; Power Amplifiers; Power Klystrons; Power Supplies; Pulsers; Reflex Klystrons; Satellite Communications Power Amp; Solid State Devices; Transmitters; Travelling Wave Tubes; Waveguides; X-Ray Power Supplies.

HISTORY: Varian Canada Inc is a wholly owned subsidiary of Varian Associates of Palo Alto, California. 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 Products (VCMP), operates under the umbrella of the Electron Device Group of the parent company, Varian Associates Inc, Palo Alto, California. This group forms the largest electron tube manufacturing operation in the free world. Since its inception, the Canada Microwave Products 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 Products. 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 ground 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: VCMP 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 (EIK): This product line originated at the VCMP facility. The products address millimeter wave applications, ranging from 30 GHz to 280 GHz. EIKs are rugged, lightweight, and 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: VCMP 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 VCMP'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 80 kW and voltages up to 200 kV have been achieved. Power supplies available include those for x-ray systems, microwave tubes, and semiconductor processing application.

VCMP 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. ISO 9001 qualification will occur in 1992.

PERSONNEL: Total - 300

GROSS SALES: 1991 - $20M

PLANT SIZE: 120,000 sq ft

EQUIPMENT/FACILITIES: VCMP 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. Environmental stress screening facilities for 100% of production power supplies have been added.

EXPERIENCE: VCMP has in excess of thirty-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 VCMP'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.

VESTSHELL Inc

ADDRESS: 10378 Pelletier Avenue
Montreal North, Quebec
Canada H1H 3R3

CONTACT: Mr Greg Brown, Sales Manager
Tel: (514) 326-1280
Fax: (514) 326-6140

KEYWORDS: Castings; Heat Treating; Investment Castings.

HISTORY: Vestshell Inc is a Canadian-owned, ferrous investment casting foundry, specializing in aerospace applications of this technology. Vestshell has been in business in Canada for 33 years and has a sister plant in St Albans, Vermont, controlled by the same ownership.

CAPABILITY: Vestshell Inc has an approved quality assurance system working within the parameters required by AQAP-1, MIL-I-45208, and DND 1015. Complete NDT capability to MIL specs and heat treating to MIL-H-6875 are under their roof. Castings from 1 oz to 200 lbs and in size from .125" to 42" cube are currently possible. Vestshell has developed a process capable of casting large castings with wall thicknesses as low as .040" which have integrity to pass radiographic inspection levels of Grade B generally and locally, Grade A.

PERSONNEL: Manufacturing - 175
Engineering - 10
Quality Assurance - 8
Others - 15

GROSS SALES: 1990 - $14.0M
1991 - $16.0M

PLANT SIZE: 80,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: The company's customers include Texas Instruments (DSEG), Martin Marietta (Orlando Division), Pratt & Whitney Canada, Northrop Corporation, Raytheon Co (Missile Systems Group), Canadair, and FMC (Land Systems Group).

VICTRIX Ltd

ADDRESS: Box 1807
Guelph, Ontario
Canada N1H 7A1

CONTACT: Mr H Lawry, Vice President
Tel: (519) 836-1480
Fax: (519) 836-4693

KEYWORDS: Ground Plane Antennas; Machining; Modular Practice Bombs; Plastic Fabrication; Portable Telescopic Antenna Masts (Surface); Pyrotechnics; R&D (Electronics); Smoke Markers; Target Systems (Infantry and Armored); Weapon System Controls.

HISTORY: Incorporated in 1975 (100% Canadian-owned).

CAPABILITY: Approximately 80% of the R&D and manufacturing conducted by Victrix is for the Canadian Department of National Defence. 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.
- Design and development of telescopic antenna masts.
- Design and development of infantry and armored target systems.

Manufacturing capability includes the following items:

- Amplifiers, reactors, special transformers, and RF coils.
- Lightweight telescopic antenna masts.
- 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.
- 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.

PERSONNEL: Engineering & Technical - 12
Machinists - 5
Production People - 50
Quality Control Manager - 1

GROSS SALES: 1990 - $4.1M
1991 - $4.3M

PLANT SIZE: 30,000 sq ft (2 locations)

EQUIPMENT: Full range machining (CNC), vacuum molding, fiberglass lay up 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 Telescopic Antenna Masts
- Modular Practice Bombs
- Target System Infantry and Armoured (remotely controlled)
- Software

DOC:

- Satellite M/W Parabolic Dishes

VORTEK INDUSTRIES Ltd

ADDRESS: 1820 Pandora Street
Vancouver, British Columbia
Canada V5L 1M5

CONTACT: Dr G G Albach, Executive Vice President
Tel: (604) 251-2451
Fax: (604) 251-3356

KEYWORDS: Heating (High Intensity Light); High Intensity Light Source; Lamps (High Power); Laser Simulation; Semiconductor Processing; Solar Simulation; Thermal Testing.

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 in aerospace and defense laboratories. 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.

PERSONNEL: Scientists & Engineers - 5
Others - 15

GROSS SALES: No data.

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 in-house.

the USAF, NASA, and DOE use Vortek lamps for laser development and radiation testing. Large-area solar simulators are installed in the US, Canada, and Europe.

EXPERIENCE: See above.

W R DAVIS ENGINEERING Ltd

ADDRESS: 1260 Old Innes Road
Ottawa, Ontario
Canada K1B 3V3

CONTACT: Mr Richard Church, Manager, Marketing
Tel: (613) 748-5500
Fax: (613) 748-3972

KEYWORDS: Component Militarization; Electronic and Mechanical Fabrication; Engineering Services; Feasibility Studies; Finite Element Analysis; Human Engineering; Infrared Signature Suppression; Manufacturing; Military Vehicle Engineering; Product Development; Project Management; Prototyping; Shock/Vibration Analysis; Software Development; Technology Assessment; Testing/Test Equipment; Thermodynamics Analysis.

HISTORY: W R Davis Engineering Limited was founded in 1975 as Davis & Associates. In 1980, the corporate name was changed to W R Davis Engineering Limited. Today the company continues to grow in all areas of electro-mechanical engineering and production with significant expansion into international markets.

CAPABILITY: W R Davis Engineering Limited was initially formed as a consulting engineering company to provide mechanical and electrical consulting engineering. This continues, and the mechanical field can be further subdivided into stress, shock, vibration, heat transfer and fluid analysis, vehicle and human engineering, and mechanical component/systems design. The electrical field has branched into electronic system design and control system design and analysis. Software development has been added to supplement other activities. A military engineering group which addresses land, air, and naval applications, using the core mechanical and electrical groups, has emerged. The military group has been enhanced with illustrators and technical writers to enable the production of technical documentation.

Hardware production and modification capabilities have emerged as a result of engineering projects. Specifically, the company can provide structural fabrication (including sheet metal rolling/forming) in steel, stainless steel, and aluminum; vehicle modification and kitting; hydraulic systems fabrication; and mechanical component/system fabrication. Electronic fabrication is available in a fully equipped laboratory.

Specific products are infrared signature suppression devices, infrared signature computer modelling, wave generation systems for all sizes of test basins, active shaft grounding systems for naval vessels, a variety of vehicle test devices, low quantity production electronic systems, outfitted military special equipment vehicles, and vehicle data acquisition systems. Much work involves one-of prototypes. Examples include vehicle test systems, light emitting diode lighting systems, a road roughness and rolling resistance test rig, a 7m long submarine model for wind tunnel testing and 10m high interactive displays for Expo '86, a new drive system for the DCIEM Human Centrifuge, and a specially constructed quarter-scale hot exhaust gas test facility.

Much of the design and build work performed by W R Davis Engineering Limited culminates with a test program. The company also analyzes, modifies, and tests hardware provided by others. A comprehensive project involving protective masks is an example.

PERSONNEL: PhDs - 3
Engineers - 25
Others - 57

GROSS SALES: 1990 - $8.0M

PLANT SIZE: Manufacturing - 23,000 sq ft
Warehouse - 5,000 sq ft
Office - 15,000 sq ft

EQUIPMENT: W R Davis Engineering Limited's equipment includes:

- Test - Basic test equipment plus programmable data logger, mobile vehicle data acquisition systems (plus sensors). Use of external test facilities at Transport Canada Motor Vehicle Test Centre, National Research Council, and Canadian Department of National Defence Naval Engineering, Land Engineering, and Quality Engineering Test Establishments.

- Electronic Laboratory - Electronics laboratory equipped for prototype and low quantity production and testing.

- Mechanical Shop - Equipped with the basics which include a full complement of welding equipment plus pinch-type forming rolls (1/4" stainless capacity), plate shear (1/2" x 10' mild steel capacity), 12' x 300 ton press brake, and 10,000 lb weld positioner.

- Computing Facility - MicroVAX/VMS plus a full complement of PCs (12) and peripherals (plotters, laser printers). External access to PDP 11/73, Honeywell CP6, IBM mainframe and CYBERS. In-house software includes Primavera, PrimaVision, ANSYS, Symphony, Microsoft Fortran Compiler, Tango, Smart Work, DBase IV, and the Harvard Project Manager.

EXPERIENCE: W R Davis Engineering Limited's customers include the Canadian Department of National Defence, Transport Canada, the National Research Council of Canada, St John Shipbuilding Ltd (Canadian Patrol Frigate Program), Pratt and Whitney Canada (DDH-280 Destroyer Update Program), David Taylor Research Center (US re Active Shaft Grounding), Texas A&M University (US re Wave Generation Systems), International Ship Study Company (Germany re NFR 90), Construction Engineering Limited (US re Fabrication), Icelandic Harbor Authority (Iceland re Wave Analysis Equipment), KIA Motor Corporation (Korea re Automobile Test Services and Equipment), Daewoo Engineering Company (Korea re Korean Automobile Testing and Research Institute), and Hyundai Motors (Korea re Automobile Test Services and Equipment).

WALBAR CANADA Inc

ADDRESS: 1303 Aerowood Drive
Mississauga, Ontario
Canada L4W 2P6

CONTACT: Mr Colin D Strain, Director, Sales
Tel: (416) 602-1810
Fax: (416) 625-6030

KEYWORDS: Engine Components; Gas Turbine Blades.

HISTORY: Walbar Canada was established in 1962 as an offshoot of Walbar Inc of Massachusetts in order to supply increasing demands of the aerospace industry. A second plant was opened in 1971 as product line and customer base quickly diversified. In 1985 Walbar was acquired in its entirety by Colt Industries Inc of New York, now Coltec Industries, providing a solid financial and management foundation.

CAPABILITY: Walbar Canada Inc offers precision machined compressor and turbine blades and vanes as well as nozzle segments utilizing the CATIA/CAD/CAM system and diffraction laser inspection to ensure total conformance to customer specifications. Components are machined by a variety of specialized machining and processing operations such as CNC 5-axis milling, CNC electrical discharge machining (EDM), CNC twin and reciprocating grinding, electro-chemical machining (ECM), and diffusion coating.

PERSONNEL: Production - 304
Engs - 21
Quality - 46
Administration - 79

GROSS SALES: No data.

PLANT SIZE: 36,000 sq ft (Plant 1)
90,000 sq ft (Plant 2)
5,500 sq ft (Turbo Tool)

EQUIPMENT: ECM, CNC lathes, CNC EDM, CNC mill, peening, CNC grinding, CATIA/CAD/CAM.

EXPERIENCE: Customers include Allison Gas Turbines, Euro Precision Forge, Garrett, General Electric, Hamilton Standard, MTU, Orenda, Pratt & Whitney Canada, Rocketdyne, Rolls Royce Plc, Textron-Lycoming, and Volvo Flygmotor.

WARDROP ENGINEERING Inc

ADDRESS: 6725 Airport Road, Suite #600
Mississauga, Ontario
Canada L4V 1V2

CONTACT: Mr Ernie Card, Vice President
Tel: (416) 673-3788
Fax: (416) 673-8007

KEYWORDS: Automated Systems; Computer Analysis; Engineering Services; Failure Analysis; Feasibility Studies; Flight Hardware; Ground Support Equipment; Integration and Test Facilities; Maintainability Analysis; Microgravity Equipment; O&M Planning; Project Management; Prototyping; Reliability Analysis; Remote Handling; Robotics; Software Engineering; Systems Engineering; Systems Integration.

HISTORY: Wardrop Engineering Inc is a Canadian multi-disciplinary engineering company. Founded in 1955, it has grown to be a major engineering company providing diversified engineering services across Canada and internationally.

CAPABILITY: Wardrop Engineering provides a multi-disciplinary engineering service to aerospace and other high technology industries. Throughout their 35-year history, they have worked hard to maintain their position on the leading edge of technology, striving for excellence in their service, their products, and their people. Wardrop offers a complete range of engineering services from their three offices across Canada, as well as international project offices, to a wide variety of clients. These services include feasibility studies, conceptual designs, prototyping, development, detailed design, fabrication, commissioning, and operating assistance. In addition, Wardrop designs, prototypes, and develops specialized components, systems, and mechanisms for the aerospace and related industries. The company also provides systems integration, numerical analyses (stress, thermal, and seismic), reliability analyses, as well as failure and maintainability analyses. In addition, they have expertise in electronics, instrumentation, and control systems, as well as software engineering. Areas of specialization within the aerospace industry include flight hardware, ground support equipment, integration and test facilities, equipment and facilities for micro-gravity research, robotics, and automated remote handling.

PERSONNEL: Professional Engineers - 110
Technicians & Technologists - 95
Others - 35

GROSS SALES: 1990 - $16.0M
1991 - $18.0M

PLANT SIZE: 35,000 sq ft

EQUIPMENT: Wardrop Engineering employs VAX and IBM in-house computer systems for engineering, analysis, engineering computations, as well as computer aided design and drafting.

EXPERIENCE: Wardrop Engineering has 35 years' experience providing engineering services to high-technology industries within Canada and interna-

tionally. Representative projects undertaken by their staff in the aerospace field include:

- Design, development, and supply of ground support equipment and integration and test facilities for the Mobile Servicing System - Canada's contribution to NASA's Space Station.

- Design, development, and supply of grapple fixtures and other flight hardware for the Mobile Servicing System.

- Engineering assistance with the JEMRMS, the remote manipulator associated with the Japanese experimental module on NASA's space station.

- Design of ground support equipment for ANIK-E Communications Satellite.

- Design for furnace and other facilities for materials processing and manufacturing in micro-gravity.

- Design, analysis, prototyping, development and supply of various mechanisms, rigs, fixtures and components for the aerospace industry.

WEATHERHAVEN

ADDRESS: 5700 Marine Way
Burnaby, BC
Canada V5J 5C8

CONTACT: Mr J M Gin, Vice President Marketing
Tel: (604) 451-8900
Fax: (604) 451-8999

KEYWORDS: Modular Buildings; Portable Buildings; Shelters; Tents.

HISTORY: The company was established in 1981 and is Canadian-owned with operations in Canada and the USA.

CAPABILITY: Weatherhaven is a supplier of air-transportable shelters for highly mobile field operations throughout the world for personnel housing and food and equipment storage.

Weatherhaven can fly to any location and establish instant camp operations under any weather extreme.

Some of disciplines the company is involved in are industrial fabric and frame production, heat seal and RF welded seams, aluminum and steel MIG welding, electrical component installations, and mechanical component installations.

Product names include Weatherhaven Series 4A, 4S, 8, and 8-Shop as well as the Polarhaven and the Endurance. Weatherhaven can provide shelters for virtually all needs including camps (4 to 200+ men), maintenance shelters, welding shops, water purification and storage systems, and sewage treatment systems. The company meets NATO AQAP quality assurance specifications.

PERSONNEL: Management/Technical - 15
Direct Labor - 40

GROSS SALES: 1991 - $16M
1992 - $10M

PLANT SIZE: 40,000 sq ft (expandable as required)

EQUIPMENT: No data.

EXPERIENCE: Our clients include the Red Cross, the United Nations, the Canadian Department of National Defence, the US Navy, and the US Marines.

Project locations are worldwide. Extreme locations include Ellesmere Island; Thule, Greenland; DMZ Kuwait; Antarctica; Cambodia; Papua; New Guinea; Angola; Nepal; and Mt McKinley.

Peacekeeping mission projects have been completed in Iraq, Lebanon, Western Sahara, Angola, and Cambodia.

WELDING INSTITUTE OF CANADA

ADDRESS: 391 Burnhamthorpe Road East
Oakville, Ontario
Canada L6J 6C9

CONTACT: Dr Steven A Gedeon, Director
Research and Technology
Tel: (416) 257-9881, ext 230
Fax: (416) 257-9886

KEYWORDS: Advanced Materials; Brazing; Mechanical Testing; Welding.

HISTORY: The Welding Institute of Canada (WIC) is a non-profit center of welding expertise. Formed in 1973 by Canadian industry, it performs contract research and networks to increase the level of welding technology and transfers this technology through a focussed program of seminars, conferences, and training. It has over 3,000 individual members and 250 corporate members for which it provides technical assistance, information, and problem solving as well as contract technology development.

CAPABILITY: WIC has the largest welding laboratory in the Western Hemisphere. It has 10 ton materials handling capacity, a variety of full-scale structural testing facilities, over 25 welding power supplies, the most advanced welding diagnostic system in Canada, and a full range of machining, metallographic, and mechanical testing laboratories. WIC has design, health and safety, metallurgical, failure analysis, and welding process expertise and networks extensively to increase its range of capabilities.

PERSONNEL: PhDs - 4
Engs - 10
Techs - 10

GROSS SALES: 1990 - $3.0M
1991 - $3.5M

PLANT SIZE: 8,000 sq ft

EQUIPMENT: In addition to the extensive welding, machining, and testing facilities, WIC has in-house IBM and Mackintosh as well as University of Toronto workstations and supercomputer.

EXPERIENCE: WIC has performed research for the Canadian Departments of National Defence, Transportation, Labour, Environment, Supply and Services, Coast Guard, and Energy, Mines, and Resources.

WESTEC AEROSPACE Inc

ADDRESS: 830 - 1200 West 73rd Avenue
Vancouver, British Columbia
Canada V6P 6G5

CONTACT: Mr Murray Craig, President
Tel: (604) 264-9886
Fax: (604) 264-9883

KEYWORDS: Aircraft Maintenance; Aviation Software (Maintenance); Engine Health Monitoring; Fuel Control; Inventory Control Systems; Scheduling (Crew, Aircraft).

HISTORY: Westec Aerospace Inc is a wholly Canadian-owned, private company specializing in aviation software. It was incorporated in Victoria, BC as Westec Software Services Ltd in May 1984. The name was changed to Westec Aerospace Inc in November 1987, and the company began to offer software to the aviation/aerospace industry. The company has invested $1.2 million in developing, testing, and marketing its software products and services.

CAPABILITY: Westec has developed a series of aviation computer software packages for the aviation/aerospace industry. These software packages operate on a unique three-dimensional relational database management system. This allows thousands of individual files to be automatically interrelated. Information changes in one file will automatically be reflected in all other related files. The database system has the ability to operate on mainframe, mini-, and microcomputers from most computer hardware vendors. It is flexible enough to meet the changing needs of any size aviation/aerospace user.

The maintenance software package and related maintenance control modules have been accepted by the industry, and there are about 30 customer installations. The existing customer base includes large charter air carriers, airlines, helicopter operators, law enforcement agencies, and aerospace manufacturers.

In addition to developing its own software, Westec has acquired the rights to additional software packages to offer an integrated software system to aviation customers. Its recent marketing and technology alliance with Sun Microsystems and Texas Instruments places Westec in a position to achieve leadership in the aviation software field. These new alliances will make Westec one of the leaders in aviation software within the next twelve months.

Westec and Texas Instruments have entered into a joint project that will see all of Westec's software migrated into the new Information Engineering Facility (IEF). The IEF is a full life-cycle CASE tool that will develop software for a variety of hardware platforms, operating systems, and databases.

PERSONNEL: Executive - 3
Analysis/Programmers - 4
Sales/Support - 5

GROSS SALES: 1990 - $0.4M
1991 - $0.8M

PLANT SIZE: 4700 sq ft

EQUIPMENT: No specialized equipment.

EXPERIENCE: Present customers include Beech Aircraft Corporation, Safe Air (a division of Air New Zealand), BC Institute of Technology, Croman Corporation, and Peace Helicopters.

WESTINGHOUSE CANADA Inc

(Information Service Division)

ADDRESS: 777 Walkers Line
PO Box 5009
Burlington, Ontario
Canada L7R 4B3

CONTACT: Mr David J Paines, Marketing
Tel: (416) 333-6007
Fax: (416) 333-6014

KEYWORDS: Airport Status; ATC; Communications; Network Management; Workstations.

HISTORY: The Information Services Division of Westinghouse Canada is a high technology, electronics organization formed in 1951. Over a period of four decades, the division has produced products of its own design and of US and licensed US industry design. The aerospace products included are AS fire control systems, air search radars, AS projectiles, seeker radars for missiles, troposcatter communication equipment, and the fire control radar and radar test set for the CF-104 aircraft.

In 1986 Westinghouse Canada became a wholly owned subsidiary of Westinghouse Electric Corporation, and in 1989 a worldwide restructuring of the corporate organization was undertaken with reporting lines of all business units into the corporate counterpart.

CAPABILITY: The Information Services Division of Westinghouse Canada is a leading supplier of data communications equipment used in the airline industry. Information display terminals designed by Westinghouse Canada are widely used by travel agents and by over 160 airlines in 80 countries around the world. The company has recently developed a new generation of interactive workstations to maintain its leadership position in this specialized field. Communications controllers developed by Westinghouse Canada allow communications between different makes of equipment and represent a major technological advance which has gained rapid international acceptance.

Westinghouse Canada has long been a supplier of sophisticated defence products to NATO and other western bloc countries. Today, the focus is on such technologies as ground-based radar, electronic surveillance systems, logistics support systems, and deep water sonar systems. The company's extensive experience in defence production has evolved into a diversity of skills which range from the design of original equipment to serving as a subcontractor for systems purchased offshore. The Information Services Division capabilities cover broad areas of engineering (including system logic and design), software design and development, systems management, product assurance (including reliability and maintainability analysis), production (including R&O), quality assurance, documentation, and training.

PERSONNEL: Eng Staff - 60
Administration - 20
Support Staff - 40
Production - 120

GROSS SALES: 1990 - $105.2M
1991 - $ 84.4M

PLANT SIZE: 150,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: Present customers include Canadian Department of National Defence, Westinghouse Electric Corp, Computing Devices of Canada, Paramax, Lockheed Canada, and all major airlines.

WINDSOR AEROSPACE

(Division of Hawker Siddeley Canada Inc)

ADDRESS: 204 East Pike Creek Road
PO Box 100
Emeryville, Ontario
Canada N0R 1C0

CONTACT: Mr Keith Branston, Director of Marketing
Tel: (519) 727-6666
Fax: (519) 727-6238

KEYWORDS: CNC Machining; Gear Boxes; Gears; Landing Gear Components; Machining; Missile Components; Precision Machining; Radar Drives; Shaft Assemblies.

HISTORY: Windsor Aerospace was incorporated in the Province of Ontario in 1975 as a division of Bachan Aerospace Corporation. The company is owned by Hawker Siddeley Canada Inc of Mississauga, Ontario.

CAPABILITY: Windsor 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. Windsor Aerospace 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. Windsor Aerospace operates to MIL-Q-9858A.

PERSONNEL: 75

GROSS SALES: 1990 - $6.5M

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

coordinate measuring machine, gear checking equipment, NDT testing, copper plating, and complete inspection facilities.

EXPERIENCE: Windsor Aerospace has manufactured 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 and for Raytheon. Windsor Aerospace has been surveyed and approved 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, TRW Power Accessories, Boeing, Menasco, Bell Helicopter, and Westland Helicopter.

ZARGES AFC CANADA Ltd

ADDRESS: 238 11 Ave SE
Calgary, Alberta
Canada T2G 0X8

CONTACT: Mr Brent Rawlinson, President
Tel: (403) 269-1774
Fax: (403) 264-4815

KEYWORDS: Armament (Cases); Cases (Custom); Custom Packaging; Instrumentation (Cases); Medical Equipment (Cases); Packaging (Custom); Test Equipment (Cases).

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 cases, containers, and transport systems for military and civilian applications. All manufacturing is to NATO standards.

PERSONNEL: Total - 20

GROSS SALES: No data.

PLANT SIZE: 10,000 sq ft

EQUIPMENT: No data.

EXPERIENCE: Zarges products are currently in use with the Armed Forces of Germany, Austria, Sweden, Italy, Canada, England, and the Netherlands. Cases are fabricated for electronics, medical equipment avionics, test and calibration equipment, optical, weapons, etc. Interiors can include special foam liners, aluminum dividers, tray, rack mounts, and shock mount systems.

ZENON ENVIRONMENTAL Inc

ADDRESS: Headquarters
845 Harrington Court
Burlington, Ontario
Canada L7N 3P3

Regional Offices
Amsterdam, Calgary, Edmonton, Montreal, Vancouver

Sales Offices
Florida, Georgia, New Jersey

CONTACT: Mr Ron W Clifton, General Manager
Tel: (416) 639-6320
Fax: (416) 639-1812

KEYWORDS: Desalination Systems; Environmental Laboratory; Wastewater Treatment; Water Purification Systems.

HISTORY: Zenon is a Canadian-owned, advanced technology environmental corporation. The corporation was founded in 1980 and today comprises the following companies:

- Zenon Environmental Inc (ZEI-the parent-100% Canadian-owned)
- Zenon Environmental Laboratories Inc (ZEL-minority shareholder: Lyonnaise des Eaux of France, since 1990)
- Zenon Environmental Systems Inc (ZES-minority shareholder: Exxon Chemical since 1991)

CAPABILITY:

ZEL - a full service environmental analytical laboratory serving industry, engineering firms, and government. An integrated network across North America provides capacity for small to large projects. Analyses range from simple pH to dioxins and furans at the ppq level.

ZEI - research and development, membrane manufacturing, process engineering and design services. Services include contracted environmental audits, waste characterization, remedial investigation/feasibility studies, on-site operation/management, process optimization and design.

ZES - research and development, process engineering and manufacturing of water, wastewater treatment and solvent recovery systems to industrial and NATO QA standards. Systems are prepackaged at factory or assembled on site and range in size typically up to 1,000 gpm.

PERSONNEL: 300 employees

GROSS SALES: 1990 - $25M
1991 - $25M

PLANT SIZE: 130,000 (total of all operations)

EQUIPMENT:

ZEL - Broad range of analytical equipment capable of providing organic and inorganic data on soil, air, water, and tissue samples. Typical equipment includes gas chromatographs, mass spectrometers, high resolution mass spectrometers, and inductively coupled plasma emission spectrographs.

ZEI - Bench- and pilot-scale systems for treatability studies, process development and pilot studies of water and physical (chemical processes). Special facilities for testing of toxic and volatile materials.

ZES - Manufacturing, assembly, and test equipment for water and wastewater systems.

EXPERIENCE:

ZEL - The largest environmental laboratory in Canada and ranked in the top 20 in North America. Experienced with broad range of regulations and regulators, e.g., NYSDOH, DEC, PETER, USEPA, CARB, ASME, CWA & CAA, and EPA SW-846.

ZEI - Hollow-fibre spiral and tubular membrane filtration with reverse osmosis, nanofiltration, ultrafiltration, microfiltration, and pervaporation products. Examples of process engineering work: landfill leachate, TCE-PCB contaminated ground waters, solvent vapor recovery, oily wastewaters, heavy metal contaminated waste, membrane biological treatment, and low-level radiation waste.

ZES - Land-based and shipboard systems for water purification and wastewater treatment. Purewater applications include potable and boiler feed water including desalination and NBCW contaminated water. Wastewater applications include compact biological treatment systems for blackwater, greywater, and oily bilge water. Capabilities include site remediation of AFFF, oil, paint waste, volatile organics, metals, and other contaminated waters from soil washing, lagoons, landfills, and underground storage tanks.