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Potential For International Cooperation In Information Technology R&D In Canada

A Report to the
Department of External Affairs
Department of Communications
Government of Canada

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by

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Foreword

Project Overview

This project seeks to identify opportunities for international cooperation in pre-competitive R&D in Information Technology (ITRD) and help Canadian industry initiate and develop such cooperation. It includes:

1) the collection of information on current R&D activities in Canada, Japan and Western Europe;

2) the identification of potential partners in specific priority areas identified as promising for cooperation in ITRD by Canadian industry;

3) the determination of initial contacts and proposed follow-up activities between interested Canadian, Japanese and Western European companies.

The project is an initiative of the Department of Communications in support of the Technology Inflow Program (TIP) of External Affairs. It seeks to enhance Canadian research capabilities in mutually beneficial collaborative R&D activities in Information Technology (IT). R&D activities, considered most amenable to cooperative efforts would be those focussing on specific problem areas the resolution of which would enable application and commercialization of benefits to all the participants. Such R&D is generally of a longer term nature, in effect, the early stages of investigation, development and trial of highly promising areas that will lead to profitable market applications. This early stage of R&D may be thought of as being precompetitive and an excellent one in which to begin building strong professional and personal working relationships.

The Report

This report presents the results of a survey of the research and development interests of Canadian companies active in the information technology field. This was the first of three industry appraisals carried out to identify opportunities for cooperative R&D ventures in Japan and Western Europe where surveys were also conducted. These efforts represent the first steps in the process of establishing specific cooperative R&D projects with Canadian, Japanese or Western European partners.

Acknowledgements

The author wishes to thank Communications Canada and External Affairs for the opportunity to participate in this cooperative research project. In particular, Dr. Y.F. Lum and his staff, Mr. Gil Dobbin and Mr. Andy Kwan were of great assistance in conducting the surveys and preparing the reports. Thanks are also due to the TIP Program Manager, Mr. Brian Cox for support received to conduct the project.

We are very appreciative of the time and effort provided by the Canadian companies in responding to the survey, seminars and indepth discussions.

Finally, the assistance of the staff of Wescom, Mr. Richard Smith and Ms. Esther Lam is very much appreciated.

Executive Summary

Information Technology (IT) concerns the techniques, tools and procedures for acquiring, creating (or composing), extracting, storing (or filing), retrieving, conveying and presenting information for ready assimilation, understanding and utilization. Thus, it affects most, if not all, aspects of business and personal communication.

The application of such Information Technology to the office and manufacturing sectors alone can greatly facilitate access, product or service design, production and delivery, quality and price, and ultimately competitiveness and market acceptance.

Because advances in computing and telecommunications technologies continue to be made at an unprecedented rate, the technology is becoming increasingly electronic. Thus, for example, microelectronics, a high growth area on the materials side of Information Technology, continues to integrate more and more complex electronic circuitry into tiny semiconductor packages, both lowering cost and increasing affordability of products and services. Moreover, Artificial Intelligence (AI), an emerging area of Information Technology, is leading the way toward computational machines which will perceive, learn, understand, plan, decide and act within limited contexts of specific environments, situations and scenarios to achieve limited objectives. As a direct result of well-focused and funded R&D, these limits will widen and allow greater potential, versatility and autonomy for machine assistance and automation.

This report presents the findings from a survey and analysis of Canadian companies in the informatics industry undertaken by Wescom on behalf of the Canadian Department of Communications and External Affairs.

Most of the information referred to in this report, as well as the companion survey reports, is contained in electronic form in the ITRD database[1]. Similar reports are available from surveys of companies and organizations in Japan[2] and Western Europe[3] are reported elsewhere.

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[1]"Potential for International Cooperation in Information Technology R&D, Database System User Guide, Version 3.0", Wescom Communications Research International, Vancouver, for Department of Communications, Ottawa, April 1988.

[2]"Potential for International Cooperation in Information Technology R&D in Japan", A. Kwan, G. Dobbin, Department of Communications, Ottawa, April, 1988.

[3]"Potential for International Cooperation in Information Technology R&D in Western Europe", P.J. Booth, Wescom Communications, Vancouver, for Department of Communications, Ottawa, April 1988.

The objectives of the Canadian survey were:

1) to solicit the interest in Canada towards international cooperative R&D;

2) to notify Canadian companies of the opportunities and possibilities for cooperative ventures in long term R&D informatics projects;

3) to identify current and future areas of activity in information technology R&D for Canadian companies agencies and research centres.

A total of 214 companies were contacted through a mailed out survey. Seventy-six companies provided responses which detailed their background, experience and interest in cooperative projects in precompetitive R&D with partners in Japan and Western Europe. Keen interest in collaboration was expressed by twenty-five of the smaller and medium sized companies. Many of these firms do not have the necessary capital resources or existing product base to facilitate longer term research. However, for them cooperation is viewed as a way to achieve their long term objectives faster and more economically.

Eight major information technology areas were investigated in the survey along with fifty subtopics. The survey assisted in further refining the areas of activity and interests to twelve main topics and thirty-five subtopics. These items were subsequently used in similar surveys conducted in Japan and Western Europe.

The results of pre-survey seminars, indepth discussions and the survey itself were very encouraging. While the industry in Canada may lack the strategic focus of its U.S., Japanese or European counterparts, there were several main interests: artificial intelligence, expert systems, natural language processing, fibre optic components, telecommunications networks, transmission technology, remote sensing and image analysis. Areas, which were not as prevalent, included advanced research on opto-electronics, display systems, submicron lithography and materials research. The latter were subsequently identified in the European and Japanese surveys.

Nonetheless, Canadian firms revealed a substantial interest in cooperative research projects with Japanese and European counterparts. Although they have limited experience in many cases and lack financial resources, their technical knowledge and level of understanding about advances in informatics provides Canadian firms with the basic credentials to be effective partners with European or Japanese firms and research centres.

The Canadian government will need to provide direction and at the very least indirect assistance to small and medium firms for effective cooperation to take place. This will be needed to help overcome some of the inherent fiscal and manpower constraints as well as meet the expectations of European and Japanese partners. Government involvement is very much a part of the R&D scene in both venues. Thus, Canada's efforts should demonstrate the capability of industry and government to develop new ventures jointly and offer long term commitments to potential partnerships with foreign companies and research centres.

In addition, key factors to be addressed are the need:

1) to create greater awareness of Canadian capabilities in Western Europe and Japan;

2) to ensure adequate follow-up with the firms in Western Europe and Japan once initial contacts are established;

3) to create precedents for Canadian firms to participate with European companies in the existing Eureka, Esprit and Race programs of the European Community and where necessary to contribute financial support for such initiatives;

4) to create precedents for Canadian firms to participate with Japanese companies in the existing Sigma, Fifth Generation Computing Systems and Human Frontier programs of Japan and where necessary to contribute financial support to such initiatives;

5) to maintain the ITRD database through regular appraisals of Canadian industry R&D initiatives;

6) to ensure appropriate access to the ITRD database for Canadian and foreign firms while respecting proprietory confidentiality and to incorporate the Technology and Science counsellors into the information collection and dissemination process;

7) to improve the database application software particularly in the incorporation of proprietary and non-proprietary areas, communications access to the latter, as well as the use of knowledge based and expert systems.

The initiative of the government to stimulate and encourage cooperation through this project has received favorable responses from Canada, Western Europe and Japan. However, this activity, it must be remembered, was initially designed as a prototype to determine the feasibility of such endeavors. There is therefore an important need to provide adequate follow-up to these efforts and to provide the necessary support for the pursuit of immediate opportunities. In addition, the longer term goal is the specification and implementation of strategies for Canada which will stimulate key areas of basic and applied research in information technology.

1. Introduction

This report presents the results of a survey and analysis of Canadian R&D interests and activities in information technology. This was undertaken as part of the research conducted to examine the potential for international cooperation in information technology R&D (ITRD) on behalf of the Canadian Federal Government, Department of External Affairs (DEA) and Department of Communications (DOC).

Three surveys were conducted during 1987 in the following countries and regions:

1) Canada

2) Western Europe

3) Japan

The results of the Japan and Western European Surveys are reported in companion volumes to this summary. A substantial portion of the findings are also contained in the ITRD electronic database developed for the internal use of DOC/External Affairs as part of this project.

The impetus for the project came from a joint initiative of the Department of Communications and Department of External Affairs in late 1985 to examine the potential for collaborative projects in information technology between Canada, Western Europe and Japan. The principal focus of the initiative was to gather information from the private sector in the relevant countries and to determine, based on the information obtained, areas of mutual interest in advanced, precompetitive research. The U.S.A. was not included in this project, the reason being that its proximity and familiarity to most Canadian industries makes such information readily available for most practical purposes.

The overriding goal of the project was to make information about relevant areas of R&D more easily available for identifying and fostering potential cooperative ventures among high technology firms, at the "pre-competitive" stage. Pre-competitive R&D usually refers to basic or applied research, having a relatively long time frame, which is oriented towards a strategic initiative in a key technology area. Being relatively remote from the product decision and formulation stage, the pre-competitive phase is considered ideal for developing strong professional and personal working relationships.

2. Objectives

The project was designed to identify opportunities for international cooperation in pre-competitive Information Technology R&D and to help the Canadian industry initiate and pursue joint ventures. It was specifically designed to:

1) collect information on the current R&D activities in Canada, Japan and Western Europe.

2) help identify potential partners, in specific areas, designated as promising for cooperation in R&D projects;

3) facilitate initial contacts and follow-up activities between interested Canadian, Western European and Japanese companies.

The Canadian survey was designed primarily to:

1) solicit Canadian interests in cooperative R&D;

2) notify Canadian companies of the opportunities and possibilities for cooperative ventures in long term R&D in informatics;

3) identify the current and future areas of activity in information technology R&D of Canadian companies, agencies and research centers.

3. Defining Information Technology

3.1. Definition of IT

Information Technology (IT) affects most, if not all, aspects of business and personal communications. It is a broad field which touches virtually all human activity and it concerns the techniques and tools for handling information. Information, acquired by the senses, processed by the mind, and retained in memory, can be represented, conveyed, and presented to other humans. Information can also be processed to create new information or imbedded in processes and materials to create goods and services for human use. These natural processes may also be accomplished, enhanced or assisted using artifices such as transducers (acquisition and presentation), computers (retention and processing) and various media technologies (conveyance). Accordingly, information technology may be defined as follows:

> Information Technology (IT) comprises the techniques, tools and procedures for acquiring, creating (composing), extracting, storing (filing), retrieving, conveying or presenting information ultimately for human assimilation, understanding and utilization.

While Information Technology would cover all information media, whether tactile, aural, or visual, most current interest emphasizes the visual because of relevant progress in electronic microcomputer technology. Historically, visual media have been dominated by paper for both processing and conveyance as well as for input - output and storage. Paper is still the dominant input - output and storage medium for origination, presentation and retention despite some progressive displacement by the increasingly ubiquitous cathode ray tube (CRT) monitor or television display. However, the use of paper for processing and conveyance is diminishing rapidly in favour of electronic media.

Increasingly, Information Technology is becoming more electronic as advances in computing and telecommunications technologies continue to be made at an unprecedented rate. Microelectronics, the high growth area on the materials side of Information Technology, continues to integrate more and more complex electronic circuitry into tiny semiconductor packages, both lowering cost and increasing affordability of products and services. Moreover, Artificial Intelligence (AI), an emerging area of Information Technology, is leading the way toward computational machines which will perceive, learn, understand, plan, decide and act within limited contexts of specific environments, situations and scenarios to achieve limited objectives. As time progresses, these limits will widen and allow greater potential, versatility and autonomy for machine assistance and automation.

In view of the above it is not surprising that Information Technology (IT), of which communications is a major part, is a recognized instrument of social and economic change shaping directions and levels of business and employment well into the future.

3.2. Pre-competitive ITRD

In applied R&D, an early phase critical to success yet amenable to cooperation is the pre-competitive stage in which scientists exchange ideas approaches and experiences. This is a transitional stage where the nature of technological problems inhibiting the development of specific applications are investigated, technological solution approaches evaluated and trade-offs explored. Here, new products are formulated and business relationships forged. Here, international cooperation in advanced research can be significant.

3.3. ITRD Survey Topics

A set of ITRD topics and subtopics was established after consultation through seminars and questionnaires with a representative cross-section of the Canadian IT industry in early 1987. Exhibit 1 presents the topic list used originally in the Canadian survey. (These topics are also used in the ITRD database.)

Exhibit 2 presents the revised topic list used for the detailed discussions held with European and Japanese companies. This was derived from the results obtained by the Canadian survey. Appendix 1 indicates the relationship between the two sets of topics.

Exhibit 1

ITRD Questionnaire and Database Category/Topic List

1) Communications Technology

1 - Telecommunications Networking
2 - Transmission Media
3 - Modulation and Encoding
4 - Switching and multiplexing
99 - Other

2) Communications Systems

1 - Radio and Television Broadcast System
2 - Communications Satellite System
3 - Mobile Communications System
99 - Other

3) Communications Networks

1 - Computer Communications Protocols
2 - ISDN
3 - Local Area Networks
4 - Value Added Networks
5 - Broadband Networks for Video, Fax, etc.
6 - Communications Network Management
99 - Other

4) Office Automation Systems

1 - Text and Graphics Creation, Manipulation, etc.
2 - Database Management
3 - Electronic Mail and Messaging
4 - Electronic File Transfer and Decision Support
99 - Other

5) Computer Systems and Applications

1 - Image Recognition and Processing
2 - Voice Recognition
3 - Distributed and Parallel Processing Systems
4 - Supercomputers
5 - Fifth and Sixth Generation Computers
99 - Other

Exhibit 1 (continued)

6) Software Automation

1 - Relational Database Storage and Retrieval
2 - Computer Aided Education and Instruction (CAE/CAI)
3 - Computer Aided Design and Manufacturing
4 - Computer Integrated Manufacturing
5 - Computer Aided Translation
6 - Computer Aided Animation
7 - Electronic Publishing
99 - Other

7) Human-Machine Interface

1 - Intelligent Input/Output
2 - Speech Recognition
3 - Voice Recognition
4 - Visual Pattern Recognition
5 - Visual Display and Printing
6 - High Definition Television
7 - Flat Panel Display
8 - Three Dimensional Display
9 - Laser Printing
10 - Image and Sound Synthesis
99 - Other

8) Components, Devices and Materials

1 - Microelectronics
2 - Optical and Optoelectronic Devices
3 - Sensors and Transducers
99 - Other

Exhibit 2
International Cooperation In Information Technology R&D
Discussion Guide Topics List

R&D Survey Topics

1) Image and Voice Synthesis/Pattern Recognition

   a) Visual Pattern Recognition
   b) Voice Recognition

2) Dielectric Ceramic Materials

   a) Sensors
   b) Heat and Corrosion Resistant Ceramics
   c) Superconductive Ceramics
   d) Transmission (e.g. microwave 5-channel combiner)

3) Parallel Processing Systems

   a) Operating Systems
   b) Software Modules and Tools

4) Display Systems

   a) High Efficiency, High Intensity Displays
   b) Electroluminescent, Electrochromic Displays
   c) High Resolution Graphics Display Systems
   d) Wide Band Variable Scanning Colour Display
   e) Flat Panel Display

5) Light Sources

   a) Solid State Light Sources for Film Recorders
   b) Blue Lasers with Frequency Doubling for Film Recorders
   c) High Power Ultraviolet Sources for Printed Circuit Board Production, Direct-Read-After-Write (DRAW) Films

6) Expert Systems/Artificial Intelligence

   a) Intelligent Databases
   b) Tools and Techniques for Software Engineering
   c) Diagnostic Expert System Shell

Exhibit 2 (continued)

7) Printed Circuit Board Production Techniques

   a) Direct Writing on PC Laminates

8) Radar

   a) Radar Chromograph, Millimetre Wave Guide - 60 GHz Range
   b) Sidelooking Airborne Radar, Resolution Improvement, Frequency Stability
   c) High Power Coherent Power Sources

9) Videotex/Teletext

   a) NAPLPS Videotex in Korean, Chinese, Japanese and Thai Languages

10) Application Specific Integrated Circuits Development (ASIC VLSI Circuits)

   a) Transmission Systems T1, T2, T3 Carrier Systems
   b) ISDN Devices and Components
   c) Automated Design Techniques of System Level ASIC's
   d) RF Synthesizers to 400 MHz

11) Satellite Based Sensors

   a) Sensors for Topographic and Planimetric Mapping

12) Fiber Optics

   a) Intelligent Buildings System Design Techniques
   b) Small-scale Fibre Optic Telephone-transmission System for use Between and with Large Buildings (direct and/or packet switched)
   c) Integrated Voice/Data/Video/Power/Control Services
   d) Integrated Interfaces (radio/telephone)
   e) 100 Mb/s Fibre Optics LAN
   f) Optical Fibre Couplers (active and passive)

4. Research and Survey Activities

4.1. Research Program

The overall program of research activities conducted for this project can be divided into six parts:

1) Seminars in Ottawa and Vancouver conducted by DOC/DOE and DRIE.

2) Initial indepth personal interviews with selected firms in Ottawa and Vancouver.

3) A mail-out survey of Canadian industry and research centres.

4) Personal interviews with 46 companies in Western Europe in addition to several government departments, ministries, research centers, and the European Economic Community Telecommunications Directorate.

5) Personal interviews with 14 selected research firms and government agencies in Japan.

6) Development and implementation of the ITRD electronic database.

All activities with the exception of the Japan survey and the seminars in Ottawa and Vancouver were conducted on behalf of the federal government by Wescom Communications Research International of Vancouver.

4.2. Industry Seminars

As a precursor to the main industry surveys, Communications Canada, External Affairs and DRIE held meetings, attended by almost 50 companies involved in R&D for informatics, in the Ottawa and Vancouver areas. Japan's Minister of Posts and Telecommunications was the guest speaker at the luncheon for the Ottawa sessions where he spoke of the value and desirability of international cooperation. During these sessions the purpose of the cooperative program was outlined and a questionnaire administered to the attendees. The results of that activity reinforced the feasibility of proceeding with a broader scale investigation of Canadian companies. The decision was also made at that time to proceed with a more detailed survey of the R&D activities and interests of companies agencies and research centres in Western Europe and Japan. In addition, it was decided to proceed with the development of a rudimentary electronic database containing the information derived from the industry surveys, relevant background documents, research abstracts and notable events relating to information technology.

The industry surveys and database development were conducted under the auspices of the Technology Inflow Program (TIP) of DEA and under the direction of the Directorate of Systems and Networks (DCN) and with support from the Directorate of Systems Interconnection (DSI) of the Department of Communications.

4.3. Preliminary Indepth Personal Interviews

Preliminary interviews were held with a select group of twelve companies in Vancouver and a further ten companies in the Ottawa area in the spring of 1987. These were conducted in person and structured around the use of a detailed discussion guide which addressed the following:

1) company background;

2) area of company activities;

3) R&D activities;

4) future plans and developments;

5) additional information;

6) experience in international ventures;

7) cooperative ventures.

The activity served several purposes:

1) to provide initial input to the core database;

2) to define relevant questions for the wider industry survey;

3) to identify companies for inclusion into the main survey database.

The results of the initial personal interviews indicated a very strong interest in pre-competitive R&D and the possibilities for collaborative efforts. Interest was greatest for contacts with the Japanese companies but several firms had already established linkages with European companies. These contacts were usually for product development or to facilitate technology transfer. At the same time the preliminary surveys supported the feasibility of discussing pre-competitive R&D activities and collaborative ventures with Canadian firms in a broader context.

5. Canadian Industry Survey

5.1. Methodology

The Canadian industry survey was conducted using a mailed out questionnaire administered to 214 companies across the country. This was conducted in two steps each involving the contact of approximately one hundred companies. Contact names for the survey were derived from several sources including:

1) Department of Communications list of Canadian high technology firms;

2) Technology companies contacted for the initial briefing sessions by DOC;

3) Science Council of Canada high technology company contacts;

4) Technology Inflow Program applications; External Affairs;

5) NRC Technology Advisors/Contacts list/IRAP;

6) Canadian Advanced Technology Association - Membership List;

7) External Affairs - Technology Companies in Telecommunications Lists.

These sources provided a population of almost 500 companies, research centres, government labs and centres of excellence at Canadian universities throughout the country. Using this list, the initial sample of 214 names was selected for the survey activity on the basis of their activities, areas of specialization, and past experience in R&D activities. Subsequent surveys are planned which could make use of the company file compiled for the study.

The survey questionnaire was developed to solicit a range of information from the companies and agencies selected for the study. Questions were initially defined and assessed for their meaning and comprehension among a small group of the prospective respondents. (A copy of the complete questionnaire is contained in Appendix 2.)

The main areas of inquiry were:

1) basic company information;

2) company R&D, products and services (8 topics 50 subtopics);

3) market areas for goods and services;

4) current R&D activities;

5) research projects;

6) R&D collaboration;

7) future R&D activities;

8) general comments;

9) supplementary company information.

The questionnaires were mailed in the spring and early summer of 1987. Potential respondents were given a questionnaire, a letter explaining the study purpose and a project description. Company representatives were asked to provide responses within a two week period. A telephone follow-up contact was made to all of the sampled companies and organizations in order to stimulate the return of the questionnaires within a reasonable time period.

5.2. Survey Response and Results

A total of 76 companies provided usable replies which could be incorporated into the ITRD database. The company names and addresses as well as their research topics and areas of activity are included as Appendices 3, 4 and 5 of this report. A further 25 expressed interest and asked to be kept on file for future reference.

The majority of responding companies were classified as small to medium size on the basis of sales and scale of operations. In addition, as expected, many of the companies had limited resources dedicated to the pursuit of long term R&D and placed relatively heavy reliance on government programs for assistance in research and international marketing activities. This is in contrast to many of their European, Japanese and U.S. counterparts who tend to be larger in size and to operate within one or more long term strategic research initiatives.

A notable exception for Canada was Northern Telecom whose capital and cash flow are substantial and assured sufficiently to not require direct assistance from government.

Most of the firms surveyed indicated they were presently involved in an ongoing R&D program (53 of 76) while the remainder expressed their interest in identifying new opportunities. The expenditures allocated to R&D varied considerably according to the size of the firms, ranging from a few thousand dollars per annum to over C$20 million for large firms such as CAE, Microtel, Litton, SR Telecom or Systemhouse. Likewise the size of the staff allocated to R&D functions varied between 2 or 3 to as many as 1,000.

A number of examples of on-going research projects were identified which reflected to a great extent the more general topics and subtopics identified previously. A selection of these projects is presented in Exhibit 3.

Exhibit 3
Sample R&D Projects for Canadian Firms

1. Network training system
2. Multi-user LANS
3. Impulse radar development
4. Diagnostic expert system shell
5. Digital seafloor mapping
6. Terminal protocols in process control
7. ISDN advanced product development
8. Wide area networking control

R&D expenditures on the identified projects ranged from a few thousand dollars to over CDN$20 million. In contrast to precompetitive R&D, product related research was far more dominant with 35 projects identified by the 76 companies.

Smaller and medium sized Canadian firms tended to emphasize government initiatives as a means of furthering their research programs and assisting in the identification of new technology opportunities. In fact this was one of the most important requirements identified in the industry survey. The support and assistance of such programs as IRAP and TIP were noted in this regard. Other support measures included:

1) sponsored trade missions;
2) trade shows;
3) study trips;
4) research networks;
5) increased contacts with Universities;
6) incoming missions;
7) information seminars.

In contrast to the situation in Japan, several European countries, the U.K. and the European Economic Community (EEC), Canadian high technology informatics development is not directed to any great extent by a specific strategy or long term program. This lack of strategic focus was identified by the survey respondents as a major deficiency in Canada's information technology industry

efforts. Nonetheless, there are key areas such as artificial intelligence, natural language processing, fibre optic components, telecommunications networks, transmission technology, remote sensing and image analysis which represent various foci for the long term R&D efforts of small and medium sized Canadian information technology firms.

Canadian high technology companies, for the most part, view cooperative research initiatives cautiously but very necessary if they are to compete in global markets. In addition, such ventures are viewed as instrumental in market entry and expansion and in facilitating faster product development. The majority of Canadian firms (60) indicated Canada was the principal market for their products and services while only 12 companies indicated more than 60% of their activities were directed to off-shore markets. The U.S. was identified as the most active foreign market while Europe and Japan were identified by a much smaller proportion of the respondents. However, many of the firms, large as well as small ones, reinforced the importance of pursuing opportunities in the Pacific Rim for products, services and research activities. There seemed to be less awareness of the opportunities for R&D ventures with European firms.

Experience with cooperative research ventures and participation in long term pre-competitive projects was generally quite limited. Only a handful of the largest companies such as Northern Telecom, SRTelecom and Microtel have such experience. It was more common for international cooperation and joint ventures to be directed to product development and technology acquisition or transfer than longer term precompetitive R&D ventures. However, there was a great deal of interest in the potential for moving away from product development to the longer term strategic interests of pre-competitive R&D.

Cooperation for longer term pre-competitive R&D was considered suitable and desirable by most of the sampled companies. The areas where this should be focused were also specified although in a very general context. The main topic areas of interest included:

1) Image and Voice Synthesis/Pattern Recognition

2) Parallel Processing Systems

3) Expert Systems/Artificial Intelligence/Knowledge Based Systems

4) Radar

5) Sensors/Remote Sensing

6) Fibre Optics Components and Devices

7) Display Technology.

8) Encryption

Other areas of interest were:

1) Natural Language Processing, Automatic Translation

2) Telecommunications Networks

3) Transmission Technology

4) Remote Sensing/Satellite Based Sensors

5) Very Large Scale Integrated Circuits/Application Specific Integrated Circuits VLSI/ASICs

6. Summary and Recommendations

The Canadian industry survey supported the strategy developed by the federal government and substantiated the interest in establishing closer ties with Western European and Japanese high technology companies, agencies and research centres.

There was general agreement that the government should provide support to facilitate the development of such collaborative projects. However, the government's role is viewed as being more indirect than direct thereby allowing industry to take the lead and determine where efforts should be directed.

The state of the Canadian information technology industry and the need for broadening the scope of effort in long term R&D make it imperative that efforts be directed to encouraging cooperation and collaboration. Such efforts will be needed to substantially improve Canada's standing in the international R&D community.

In addition, several other key factors should be addressed:

1) The need to create greater awareness of Canadian capabilities in Western Europe and Japan;

2) The need to ensure adequate follow-up with the firms in Western Europe and Japan once initial contacts are established;

3) The need to create precedents for Canadian firms to participate with European companies in the existing Eureka, Esprit and Race programs of the European Community and where necessary to contribute financial support for such initiatives;

4) The need to create precedents for Canadian firms to participate with Japanese companies in the existing Sigma, Fifth Generation Computing Systems and Human Frontier programs of Japan and where necessary to contribute financial support to such initiatives;

5) The need to maintain and provide regular updates to the ITRD database through appraisals of the Canadian industry R&D initiatives;

6) The need to ensure appropriate access to the ITRD database for Canadian and foreign firms while respecting proprietary confidentiality and to incorporate the Technology and Science councilors into the information collection and dissemination process;

7) Improvements should be examined for the database application software particularly the incorporation of proprietary and non-proprietary areas, communications access to the latter, as well as the use of knowledge based and expert systems.

The initiative of the government to stimulate and encourage cooperation through this project has received favorable responses from Canada, Western Europe and Japan. However, this activity, it must be remembered, was initially designed as a prototype to determine the feasibility of such endeavors. There is therefore an important need for adequate follow-up to these efforts and to provide the necessary support for the pursuit of immediate opportunities. In addition, a longer term goal should be the specification and implementation of strategies for Canada which will stimulate key areas of basic and applied research in information technology.

Appendix 1
International Cooperation in Information Technology

Appendix 1

International Cooperation in Information Technology R&D

Project Description

The project seeks to identify opportunities for international cooperation in precompetitive R&D in Information Technology and help Canadian industry initiate and develop such cooperation.

The project relates to an initiative of the Department of Communications (DOC) in support of the Technology Inflow Program (TIP) of the Department of External Affairs and seeks to enhance Canadian research capabilities in Information technology by identifying and promoting mutually beneficial cooperative precompetitive R&D activities with Japan and Western Europe.

The project specifically seeks to:

1) collect information on current R&D activities in Japan and Western Europe, in areas of priority to Canadian industry;

2) identify potential partners in specific areas identified as promising for international IT R&D cooperation; and

3) facilitate initial contacts and follow-up activities between Canadian organization and their international counterparts.

Background

Information Technology, of which communications is a part, is a broad field touching virtually every facet of human activity. In human terms, information means knowledge; and technology means techniques and tools. Information, acquired by the senses, processed by the mind, and retained in memory, can be represented, conveyed and presented to other humans; processed to create new information; or imbedded in processes and materials to create services, tools and other goods for human use. These natural processes may also be accomplished using artifices of one sort or another such as: transducers (representation and presentation) or by computers (retention and processing). All are a part of information technology.

It is widely recognized that a stage in R&D critical to success yet amenable to cooperation is the precompetitive one where scientists exchange ideas, approaches and experience. Here, informed choices in developing technologies are made. Here, new products and business relationships are forged. International cooperation at this precompetitive R&D stage can lead to significant benefits.

ITRD Database Category/Topic List

1) Communications Technology

1 - Telecommunications Networking
2 - Transmission Media
3 - Modulation and Encoding
4 - Switching and multiplexing
99 - Other

2) Communications Systems

1 - Radio and Television Broadcast System
2 - Communications Satellite System
3 - Mobile Communications System
99 - Other

3) Communications Networks

1 - Computer Communications Protocols
2 - ISDN
3 - Local Area Networks
4 - Value Added Networks
5 - Broadband Networks for Video, Fax, etc.
6 - Communications Network Management
99 - Other

4) Office Automation Systems

1 - Text and Graphics Creation, Manipulation, etc.
2 - Database Management
3 - Electronic Mail and Messaging
4 - Electronic File Transfer and Decision Support
99 - Other

5) Computer Systems and Applications

1 - Image Recognition and Processing
2 - Voice Recognition
3 - Distributed and Parallel Processing Systems
4 - Supercomputers
5 - Fifth and Sixth Generation Computers
99 - Other

6) Software Automation

1 - Relational Database Storage and Retrieval
2 - Computer Aided Education and Instruction (CAE/CAI)
3 - Computer Aided Design and Manufacturing
4 - Computer Integrated Manufacturing
5 - Computer Aided Translation
6 - Computer Aided Animation
7 - Electronic Publishing
99 - Other

7) Human-Machine Interface

1 - Intelligent Input/Output
2 - Speech Recognition
3 - Voice Recognition
4 - Visual Pattern Recognition
5 - Visual Display and Printing
6 - High Definition Television
7 - Flat Panel Display
8 - Three Dimensional Display
9 - Laser Printing
10 - Image and Sound Synthesis
99 - Other

8) Components, Devices and Materials

1 - Microelectronics
2 - Optical and Optoelectronic Devices
3 - Sensors and Transducers
99 - Other

R&D Survey - ITRD Database Topics Cross Reference

Survey	Database	Survey	Database
1.1	7.4	7.1	8.99
1.2	7.2 7.3 7.10	8.1	1.99
	5.2		
2.1	8.3	8.2	1.99
2.2	8.99	8.3	1.99
2.3	8.99	9.1	3.1 4.1 7.5
2.4	8.99 1.4 1.3	10.1	8.1 1.1 2.99
			3.2 3.3
3.1	5.3	10.2	8.1 1.1 3.1
3.2	5.33	10.3	6.3 8.1
4.1	7.5	10.4	8.1 1.99
4.2	7.5	11.1	8.3
4.3	7.5 4.1		
4.4	7.5	12.1	6.3 3.3 3.4
			3.5 4.3 7.1
4.5	7.7	12.2	1.1 1.4 3.3
			3.4 3.5 4.3
5.1	8.99 8.2	12.3	3.5 3.3 3.4
			4.3
5.2	8.99 8.2	12.4	1.1 3.1
5.3	8.99 8.2	12.6	8.2
6.1	4.2 6.1 7.1	12.6	8.2
6.2	6.1 6.3		
6.3	6.1 6.3		
	6.1 6.3		

Appendix 2
Canadian Industry Survey Questionnaire
(Informatics Sector)

Federal Dept of Communications
Wescom Communications

PRE-COMPETITIVE R&D
INDUSTRY QUESTIONNAIRE
(INFORMATICS SECTOR)

May, 1987

1. COMPANY PROFILE:

ID: [ ] (office use only)

1.1. Company Name: _____

1.2. Address: Head Office _____

_____

_____

1.3. Branch Office(s): _____

_____

1.4. Company Registration: _____
(Country/Province)

1.5. Company Type: _____
(describe main areas of activity)

1.6. Area Code/Tel.No. _____

1.7. Number of Years your company has operated in Canada

2. CONTACT PROFILE:

2.1. Chief Executive & Title Mr__ Mrs __ Ms __ Other ____ (specify)

_____
(name)

2.2. Contact Person for Scientific Activities and R&D:

_____
(name and title)

2.3. Department, Group, Division responsible for R&D:

_____

2.4. Type of Organization (Check one or more)

A) Partnership __ B) Subsidiary __ C) Affiliate __
D) Consortium __ E) Associate __ F) Incorporated __
G) Non-Profit __ H) University __ I) Govt Agency __

2.5. Specify Ownership to nearest % (Canada) ____ (Foreign) ____

2.6. Is your company currently involved in an active program of scientific R & D?

Yes ___ No ___

If no, please answer those questions that apply to your company's activities, i.e. products, services and markets.

3. COMPANY R&D ACTIVITIES, PRODUCTS AND SERVICES(*)

Please indicate by checking the appropriate space the R&D activities, products and services of your company.

	(A) R&D (✓)	(B) Products (✓)	(C) Services (✓)
3.1. Communications Technology			
3.1.1.Telecommunications Networking	—	—	—
3.1.2.Transmission Media	—	—	—
3.1.3.Modulation and encoding	—	—	—
3.1.4.Switching and multiplexing	—	—	—
3.1.5.Other _____ (specify)	—	—	—
3.2. Communications System			
3.2.1.Radio and Television Broadcast System	—	—	—
3.2.2.Communications Satellite Systems	—	—	—
3.2.3.Mobile Communication Systems	—	—	—
3.2.4.Other _____ (specify)	—	—	—
3.3. Communication Networks			
3.3.1.Computer Communication Protocols	—	—	—
3.3.2.ISDN	—	—	—
3.3.3.Local Area Networks	—	—	—
3.3.4.Value Added Networks	—	—	—
3.3.5.Broadband Networks for Video, fax, etc	—	—	—
3.3.6.Communications Network Mgmt.	—	—	—
3.3.7.Other _____ (specify)	—	—	—
3.4. Office Automation Systems			
3.4.1. Text and Graphics (creation) manipulation, storage, retrieval and communication	—	—	—
3.4.2. Database management	—	—	—
3.4.3. Electronic mail and messaging	—	—	—
3.4.4. Electronic file transfer and management decision support systems	—	—	—
3.4.5. Other _____ (specify)	—	—	—
3.5. Computer Systems & Applications			
3.5.1. Image recognition and processing	—	—	—
3.5.2. Voice recognition	—	—	—
3.5.3. Distributed and parallel processing systems	—	—	—
3.5.4. Supercomputers	—	—	—
3.5.5. 5th and 6th generation computers	—	—	—
3.5.6.Other _____ (specify)	—	—	—

3. COMPANY R&D ACTIVITIES, PRODUCTS AND SERVICES(*) (continued)

Please indicate by checking the appropriate space the R&D activities, products and services of your company.

	(A) R&D (✓)	(B) Products (✓)	(C) Services (✓)
3.6. Software Automation			
3.6.1. relational database storage and retrieval	—	—	—
3.6.2. computer aided education and instruction (CAE/CAI)	—	—	—
3.6.3. computer aided design and manufacturing (CAD/CAM)	—	—	—
3.6.4. computer integrated mfg	—	—	—
3.6.5. computer aided translation	—	—	—
3.6.6. computer aided animation	—	—	—
3.6.7. electronic publishing	—	—	—
3.6.8. other _____ (specify)	—	—	—
3.7. Human-machine Interface			
3.7.1. Intelligent input/output	—	—	—
3.7.2. Speech recognition	—	—	—
3.7.3. Voice recognition	—	—	—
3.7.4. Visual pattern recognition	—	—	—
3.7.5. Visual display and printing	—	—	—
-High Definition Television	—	—	—
-Flat panel display	—	—	—
-Three dimensional display	—	—	—
-Laser printing	—	—	—
3.7.6. Image and sound synthesis	—	—	—
3.7.7. Other _____ (specify)	—	—	—
3.8. Components Devices & Materials			
3.8.1. Micro-electronics	—	—	—
3.8.2. Optical and opto-electronic devices	—	—	—
3.8.3. Sensors and transducers	—	—	—
3.8.4. Other _____ (specify)	—	—	—

3.9. Market areas for goods and services/worldwide (indicate the % of sales in $CAN for all products and services sold or provided by your company in the designated region last year)

Area	Products %	Services %
1. Canada	—	—
2. U.S.A.	—	—
3. W. Europe	—	—
4. Japan	—	—
5. Pacific Rim	—	—
6. India	—	—
7. S. America	—	—
8. Other _____ (specify)	—	—

4. CURRENT RESEARCH AND DEVELOPMENT ACTIVITIES:

4.1. Total Annual expenditures on R&D (last fiscal year): $CAN _____

4.2. A. Total Number of Employees (full time) A._____
B. Number of employees actively engaged in R&D activities B._____

5. RESEARCH PROJECTS:

Using the format presented below please provide a description of any ongoing R&D project(s) being conducted by your company. (use boxes below as required)

Project Description #1

5.1.Title: _____ 5.2.Cost/Budget $CAN_____

5.3.Nature of The Project: (Describe, including expected outcome)

5.4.Joint Venture Partner (if any):

5.5.Type of R&D:

__pre-competitive
__Product related
__Contract

5.6.Duration of Project_____ (years)

5.7. What, if any, specific items is your company hoping to access through its joint and collaborative ventures with foreign partners. (Please specify).

5. RESEARCH PROJECTS: (continued)

Project Description #2

5.8.Title: _____ 5.9.Cost/Budget $CAN_____

5.10.Nature of The Project: (Describe, including expected outcome)

5.11.Joint Venture Partner (if any):

5.12.Type of R&D:

__pre-competitive
__Product related
__Contract

5.13.Duration of Project_____ (years)

5.14. What, if any, specific items is your company hoping to access through its joint and collaborative ventures with foreign partners. (Please specify).

Project Description #3

5.15.Title: _____ 5.16.Cost/Budget $CAN_____

5.17.Nature of The Project: (Describe, including expected outcome)

5.18.Joint Venture Partner (if any):

5.19.Type of R&D:

__pre-competitive
__Product related
__Contract

5.20.Duration of Project_____ (years)

5.21. What, if any, specific items is your company hoping to access through its joint and collaborative ventures with foreign partners. (Please specify).

6. R&D COLLABORATION:

6.1. Describe those R&D areas for which collaborative activities are considered desirable and why that is the case (i.e. has expertise, technology, funding, etc)

-

-

-

6.2. Describe your experience working on collaborative R&D projects:
(check either or both and note year)

Partner Country	Firm/Agency Name	Year of Activity
6.2.1. Canada	_____	___
6.2.2. Japan	_____	___
6.2.3. Federal Republic of Germany	_____	___
6.2.4. Britain	_____	___
6.2.5. France	_____	___
6.2.6. Italy	_____	___
6.2.7. Netherlands	_____	___
6.2.8. Other _____ (specify)	_____	___
6.2.9. No collaborative activities		___

6.3. What in general are your impressions of working on collaborative R&D projects with foreign firms or agencies.

(Please provide your impression and opinions re: joint activities with firms or agencies in the countries identified above).

_____

_____

_____

_____

_____

6.4. (A) Indicate which of the following activities would aid in fostering joint ventures and collaboration.

(B) Which would you or your company be likely to participate in and use?

	Check either or both (A)	(B)
6.4.1. Information sharing (non-exclusive basis)	—	—
6.4.2. Scientific Exchanges (bilateral government sponsored)	—	—
6.4.3. Exchange visits (companies and research institutions)	—	—
6.4.4. Study trips and missions	—	—
6.4.5. Company to company exchanges	—	—
6.4.6. Government funded mission to foreign countries	—	—
6.4.7. Government sponsored incoming missions	—	—
6.4.8. Trade shows	—	—
6.4.9. Technology Information Seminars	—	—
6.4.10. Direct Company to Company Contacts	—	—
6.4.11. Company to government contacts	—	—
6.4.12. University Contacts	—	—

6.5. In general, what are you and your company's views and or policies re: collaborative "pre-competitive" R&D activities.

Comments: (Please specify)

7. FUTURE R&D ACTIVITIES:

7.1. Describe the R&D activities your firm or organization is likely to undertake over the next two to five years (please describe, use extra sheets if required).

Project description: _____

_____

_____

_____

_____

7.2. What type of collaborative activities are you likely to undertake with foreign firms and/or agencies (joint ventures, exchange of scientists, information exchanges, seminars, etc. Please specify in detail where possible.)

_____

_____

_____

_____

_____

7.3. What if any government (federal, provincial) assistance is likely to be used to support the proposed R&D activities. (domestically and internationally, e.g. TIP, Mission funds)

Type of support Please indicate by writing in sources of support	(A) Have used	(B) Would use	(C) Would not use
7.3.1. _____	___	___	___
7.3.2. _____	___	___	___
7.3.3. _____	___	___	___
7.3.4. _____	___	___	___
7.3.5. _____	___	___	___

7.4. (A) Likely expenditures on R&D by activity areas and,

(B) Likely sources of funding to be used in the future.
(please indicate for each activity specified above)

_____

8. GENERAL COMMENTS:

8.1. Would you like to receive further information about this project and the federal government's activities in fostering collaborative R&D?

8.2. (A) What if any role do you feel the government (federal or provincial) should play in fostering R&D activities.

(B) What mechanisms do you feel should be put in place to stimulate R&D activities in the informatics sector at the pre-competitive stage?

Comments:

_____

_____

_____

_____

_____

Appendix 3

Canadian Companies with Addresses, Contacts and Topics

Canada Report
ITRD Database

A&D INFORMATICS SOFTWARE LTD.
338 Queen Street East Suite 204
Brampton, ON
L6V 1C4

Mr Karl Ullman, President

416-454-2644

1.1:Communications Technology:Telecommunications Networking
8.99:Cmpnts, Devices,material:Other
6.2:Software Automation :Computer Aided Educ and Inst
7.99:Human-Macine Interface :Other
6.6:Software Automation :Computer Aided Animation

ABEL COMPUTERS LTD
3310 South Service Road
Burlington, ON
L7N 3M6

Mr Arun Rele, President
David Rajczak

1-416-333-3200

4.2:Office Automation Systems:Database Management
6.1:Software Automation :Rel Database Storage and Retrieval

ABALL SOFTWARE INC
2174 Hamilton St
Regina, SK
S4P 2E6

Dr A.J.S. Ball, President

1-306-569-2180

1.1:Communications Technology:Telecommunications Networking
6.7:Software Automation :Electronic Publishing
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.4:Office Automation Systems:Elec File Trans & Decision Support
4.3:Office Automation Systems:Electronic Mail and Messaging
7.99:Human-Macine Interface :Other
7.1:Human-Machine Interface :Intelligent Input/Output

ACDS GRAPHIC SYSTEMS INC.
100 Rue Edmonton, Suite 232
Hull, PQ
J8Y 9Z9

Mr R. Carrierre, President
R.J. Teahen, V.P. Finance

(819) 770-9631

4.1:Office Automation Systems:Text and Graphics Creation, Manip

ACQUIRED INTELLIGENCE
C/O Faculty Of Education U.Of Vic., P.O. Box 1700
Victoria, BC
V8W 2L2

Dr. Brian A. Schaefer, President And Direct
Dr. Ian Morrison, Director

1-604-595-1187

9.1:Artificial Intelligence :Expert Systems

AEG BAYLY ENGINEERING LTD
167 Hunt Street
Ajax, ON
L1S 1P6

Mr Douglas E. Carl, President
R. Abelleyro, Mgr, Telecom Div

1-416-683-8200

3.5:Communications Networks :Broadband Networks for Video, FAX
2.3:Communications Systems :Mobile Communications System
1.2:Communications Technology:Transmission Media
4.1:Office Automation Systems:Text and Graphics Creation, Manip
1.3:Communications Technology:Modulation and Encoding
7.4:Human-Machine Interface :Visual Pattern Recognition
1.4:Communications Technology:Switching and Multiplexing
3.99:Communication Networks :Other
2.1:Communications Systems :Radio and Tv Broadcast Systems
5.1:Computer Systems and Apps:Image Recognition and Processing
3.4:Communications Networks :Value Added Networks

ALMAX INDUSTRIES LTD.
61 Needham Street
Lindsay, ON
K9V 4Z7

Dr. G. Sinclair, Ch.B.
K. El-Assal, President

1-705-324-5100

8.3:Cmpnts, Devices,materials:Sensors and Transducers

ANATEK MICROCIRCUITS INC
240 Brooksbank Avenue
North Vancouver, BC
V7J 2G1

Mr Scott Lewis, President

1-604-980-7061

8.3:Cmpnts, Devices,materials:Sensors and Transducers

AISI RESEARCH CORP.
Discovery Park - U. Vic 3771a Haro Road
Victoria, BC
V8W 2Y2

Mr W.E. Smith, President

1-604-477-1415

4.2:Office Automation Systems:Database Management
1.3:Communications Technology:Modulation and Encoding
8.1:Cmpnts, Devices,materials:Micro-Electronics
1.4:Communications Technology:Switching and Multiplexing
7.2:Human-Machine Interface :Speech Recognition
1.99:Communication Technology:Other
8.3:Cmpnts, Devices,materials:Sensors and Transducers
3.1:Communications Networks :Computer Communications Protocols
8.99:Cmpnts, Devices,material:Other
3.2:Communications Networks :ISDN
7.3:Human-Machine Interface :Voice Recognition
3.3:Communications Networks :Local Area Networks
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
3.4:Communications Networks :Value Added Networks
7.1:Human-Machine Interface :Intelligent Input/Output

BECK TECHNOLOGY INC.
1324 Wallace Street
Regina, SK
S4N 3Z4

Mr. Tom Beck, President

306-522-8448

7.2:Human-Machine Interface :Speech Recognition
7.3:Human-Machine Interface :Voice Recognition
7.4:Human-Machine Interface :Visual Pattern Recognition

CEGIR (CANADA) INC.
2, Complexe Desjardins Bureau 2301
Montreal, PQ
H5B 1B3

Mr Marcel Desjardins
Andre Sicotte, M

514-288-6942

4.99:Office Automation System:Other
3.99:Communication Networks :Other
2.99:Communication Systems :Other
5.99:Computer Systems and App:Other
6.2:Software Automation :Computer Aided Educ and Inst

CAE ELECTRONICS LTD.
8585, Cote De Liesse, C.P. 180
Ville St-Laurent, PQ
H4T 1G6

Mr N.B. Cavadias, President
G.M. Mckinnon, Directeur, Recherche

514-341-6780

8.3:Cmpnts, Devices,materials:Sensors and Transducers
7.1:Human-Machine Interface :Intelligent Input/Output
6.1:Software Automation :Rel Database Storage and Retrieval
7.3:Human-Machine Interface :Voice Recognition
8.1:Cmpnts, Devices,materials:Micro-Electronics
7.5.1:Human-Machine Interface:Visual Display and Printing
6.2:Software Automation :Computer Aided Educ and Inst
2.1:Communications Systems :Radio and Tv Broadcast Systems
6.6:Software Automation :Computer Aided Animation
5.1:Computer Systems and Apps:Image Recognition and Processing
7.2:Human-Machine Interface :Speech Recognition
5.2:Computer Systems and Apps:Voice Recognition
7.4:Human-Machine Interface :Visual Pattern Recognition
5.5:Computer Systems and App:5th and 6th Generation Computers
7.6:Human-Machine Interface :Laser Printing
5.99:Computer Systems and App:Other
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
6.3:Software Automation :Computer Aided Design and Mfg

CALMOS SYSTEMS INC
20 Edgewater St
Kanata, ON
K2L 1V8

Mr Adam Chowaniec, President

1-613-836-1014

2.99:Communication Systems :Other
3.99:Communication Networks :Other
8.1:Cmpnts, Devices,materials:Micro-Electronics

CANADIAN MARCONI COMPANY
Datacomm Products Division P.O. Box 13330, 415 Legget Dr.
Kanata, ON
K2K 2B2

Mr Joe Bedford, Vp/Datacomm
Larry Schweizer, Bus.Devl.Mgr.

1-613-592-6500

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
1.3:Communications Technology:Modulation and Encoding

CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION
106 Colonnade Road Suite 220
Nepean, ON
K2E 7P4

Mr J. Grant Thomas, President
Gavrel Jean-Claude, Director - R&D

1-613-727-0082

4.2:Office Automation Systems:Database Management
5.5:Computer Systems and App:5th and 6th Generation Computers
6.5:Software Automation :Computer Aided Translation
5.99:Computer Systems and App:Other
7.1:Human-Machine Interface :Intelligent Input/Output
6.3:Software Automation :Computer Aided Design and Mfg
6.99:Software Automation :Other
6.4:Software Automation :Computer Integrated Manufacturing
9.3:Artificial Intelligence :Natural Language processing
9.4:Artificial Intelligence :Machine translation

CANADIAN ASTRONAUTICS LTD
1050 Morrison Drive
Ottawa, ON
K2H 8K7

Mr J.D. Taylor, President And Ceo
Dr. W.F., Payne

1-613-820-8280

2.2:Communications Systems :Communications Satellite System
2.3:Communications Systems :Mobile Communications System
7.4:Human-Machine Interface :Visual Pattern Recognition
5.1:Computer Systems and Apps:Image Recognition and Processing
8.3:Cmpnts, Devices,materials:Sensors and Transducers
5.3:Computer Systems and Apps:Dist and Par Processing Systems
7.6:Human-Machine Interface :Laser Printing
7.1:Human-Machine Interface :Intelligent Input/Output

CANSTAR (DIVISION OF CANADA WIRE & CABLE LTD.)
1240 Ellesmere Road
Scarborough, ON
M1P 2X4

Mr. Peter A.W. Green, See Memo
Dr. Colin Barron, Vp Technol.-Canstar

416-293-9722

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media

CRES ELECTRONICS CORPORATION
212 Discovery Park 3700 Gilmore Way
Burnaby, BC
V6G 4M1

K.A.S. Spencer, President

1-604-437-6879

8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices

C-TECH LTD.
P.O. Box1960
Cornwall, ON
K6H 6N7

Mr H.M. Johnson, President
L. Gorving, Mgr. Of Engineering

613-933-7970

1.3:Communications Technology:Modulation and Encoding
1.4:Communications Technology:Switching and Multiplexing
5.3:Computer Systems and Apps:Dist and Par Processing Systems
5.1:Computer Systems and Apps:Image Recognition and Processing
8.3:Cmpnts, Devices,materials:Sensors and Transducers
8.99:Cmpnts, Devices,material:Other

CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
R.R. # 3
North Gower, ON
K0A 2T0

Mr George Piskor, President

613-489-3747

3.4:Communications Networks :Value Added Networks
3.2:Communications Networks :ISDN
3.6:Communications Networks :Communications Network Mgmt.
5.4:Computer Systems and Apps:Supercomputers
4.2:Office Automation Systems:Database Management
3.3:Communications Networks :Local Area Networks
1.1:Communications Technology:Telecommunications Networking
3.5:Communications Networks :Broadband Networks for Video, FAX
1.2:Communications Technology:Transmission Media
4.1:Office Automation Systems:Text and Graphics Creation, Manip
2.2:Communications Systems :Communications Satellite System
6.3:Software Automation :Computer Aided Design and Mfg
3.1:Communications Networks :Computer Communications Protocols
6.1:Software Automation :Rel Database Storage and Retrieval
4.3:Office Automation Systems:Electronic Mail and Messaging

DIDATECH SOFTWARE LIMITED
3812 William Street
Burnaby, BC
V5C 3H9

Mr. Paul Melhus, President
David Vincent, V.P. - R&D

1-604-299-4435

6.2:Software Automation :Computer Aided Educ and Inst

DEES COMMUNICATION ENGINEERING LTD
6415 - 64th Street
Delta, BC
V4K 4E2

Mr Don Simkins, Chairman
Stephen Spiro, Mgr. Engineering

1-604-946-8433

1.99:Communication Technology:Other
7.3:Human-Machine Interface :Voice Recognition
3.99:Communication Networks :Other
3.0:Communications Networks
1.0:Communications Technology

DY-4 SYSTEMS INC.
21 Credit Union Way
Nepean, ON
K2H 9G1

Mr Gary Dool, President
Kim Cluhessy, Vp Technology

1-613-596-9911

3.2:Communications Networks :ISDN
6.99:Software Automation :Other
3.6:Communications Networks :Communications Network Mgmt.
7.1:Human-Machine Interface :Intelligent Input/Output
5.99:Computer Systems and App:Other
6.99:Software Automation :Other
6.99:Software Automation :Other

DYNAPRO SYSTEMS INC.
1000 - 1200 W. 73rd Avenue
Vancouver, BC
V5P 6G5

Dr Karl H. Backhaus, President
Dr. Doug Dean, Mgr, R&D

604-263-2638

3.3:Communications Networks :Local Area Networks
8.1:Cmpnts, Devices,materials:Micro-Electronics
3.6:Communications Networks :Communications Network Mgmt.
6.7:Software Automation :Electronic Publishing
6.4:Software Automation :Computer Integrated Manufacturing
7.99:Human-Macine Interface :Other
7.1:Human-Machine Interface :Intelligent Input/Output

EPITEK INTERNATIONAL INC.
100 Schneider Road
Kanata, ON
K2K 1Y2

Mr Robert W. Corson, President

1-613-592-2240

6.3:Software Automation :Computer Aided Design and Mfg
8.1:Cmpnts, Devices,materials:Micro-Electronics

EASYNET SYSTEMS INC
4283 Village Centre Court
Mississauga, ON
L4Z 1S2

Mr J. Brian Beswick, President

(416) 273-6410

1.1:Communications Technology:Telecommunications Networking
3.3:Communications Networks :Local Area Networks
4.3:Office Automation Systems:Electronic Mail and Messaging

GEAC COMPUTERS INTERNATIONAL LTD.
350 Steelcase Road West
Markham, ON
L3R 1B3

Mr. T.C. Gruneau, Chairman
H. Porteous, Senior V.P.

416-474-0525

4.2:Office Automation Systems:Database Management
5.99:Computer Systems and App:Other
4.4:Office Automation Systems:Elec File Trans & Decision Support
4.1:Office Automation Systems:Text and Graphics Creation, Manip
1.1:Communications Technology:Telecommunications Networking
4.3:Office Automation Systems:Electronic Mail and Messaging
3.3:Communications Networks :Local Area Networks
5.3:Computer Systems and Apps:Dist and Par Processing Systems
3.6:Communications Networks :Communications Network Mgmt.
6.1:Software Automation :Rel Database Storage and Retrieval
6.99:Software Automation :Other

GIGATEK LIMITED
31 Progress Court P.O. Box 498
Scarborough, ON
M1G 3V5

Mr. Michael L., Paull
Ggreg Tribe

1-416-439-4104

4.1:Office Automation Systems:Text and Graphics Creation, Manip

GANDALF SYSTEMS GROUP
701-880 Wellington Street
Ottawa, ON
K1R 6K7

Mr. Gordon Gow, President

1-613-226-5400

4.3:Office Automation Systems:Electronic Mail and Messaging
1.1:Communications Technology:Telecommunications Networking
6.4:Software Automation :Computer Integrated Manufacturing
1.2:Communications Technology:Transmission Media
5.2:Computer Systems and Apps:Voice Recognition
1.3:Communications Technology:Modulation and Encoding
4.1:Office Automation Systems:Text and Graphics Creation, Manip
1.3:Communications Technology:Modulation and Encoding
4.99:Office Automation System:Other
1.4:Communications Technology:Switching and Multiplexing
8.1:Cmpnts, Devices,materials:Micro-Electronics
1.99:Communication Technology:Other
3.6:Communications Networks :Communications Network Mgmt.
2.2:Communications Systems :Communications Satellite System
4.2:Office Automation Systems:Database Management
2.3:Communications Systems :Mobile Communications System
4.4:Office Automation Systems:Elec File Trans & Decision Support
3.2:Communications Networks :ISDN
5.1:Computer Systems and Apps:Image Recognition and Processing
3.3:Communications Networks :Local Area Networks
6.1:Software Automation :Rel Database Storage and Retrieval
3.4:Communications Networks :Value Added Networks
6.3:Software Automation :Computer Aided Design and Mfg
3.5:Communications Networks :Broadband Networks for Video, FAX
7.99:Human-Macine Interface :Other
6.2:Software Automation :Computer Aided Educ and Inst

GANDALF TECHNOLOGIES
177 Colonnade Road
Nepean, ON
K2E 7J4

Mr Desmond Cunningham, Chairman
Roger D'hollander

1-613-225-6400

1.3:Communications Technology:Modulation and Encoding
3.6:Communications Networks :Communications Network Mgmt.
1.4:Communications Technology:Switching and Multiplexing
3.4:Communications Networks :Value Added Networks
2.3:Communications Systems :Mobile Communications System
3.3:Communications Networks :Local Area Networks
3.1:Communications Networks :Computer Communications Protocols
3.5:Communications Networks :Broadband Networks for Video, FAX
3.2:Communications Networks :ISDN
4.4:Office Automation Systems:Elec File Trans & Decision Support
4.3:Office Automation Systems:Electronic Mail and Messaging

GENERAL CYBERNETICS
210 - 1176 W. Georgia St
Vancouver, BC
V6E 4A2

Tom Hobbs, President
R.C. Mountfort, Dir. Defence Systems

604-688-4005

9.5:Artificial Intelligence :Vision systems

GEOVISION CORPORATION
1600 Carling Avenue Suite 350
Ottawa, ON
K1Z 8R7

Mr Douglas Seaborn, President
Alex J. Wood, Mgr, Prod Dvlpment

613-722-9518

4.1:Office Automation Systems:Text and Graphics Creation, Manip
6.1:Software Automation :Rel Database Storage and Retrieval
4.2:Office Automation Systems:Database Management

H.A. SIMONS LTD.
425 Carrall St.
Vancouver, BC
V6B 2JB

Mr T.A. Simons, President
M Don Sturgess, Director R&D

604 664 4648

3.6:Communications Networks :Communications Network Mgmt.

ICAM TECHNOLOGIES CORPORATION
1900 Boul. Des Sources
Pointe Claire, PQ
H9R 4Z3

John Nassr, President
John J. Nassr, Sr

514-697-8033

6.4:Software Automation :Computer Integrated Manufacturing
6.3:Software Automation :Computer Aided Design and Mfg
6.2:Software Automation :Computer Aided Educ and Inst

IDON CORPORATION
875 Carling Avenue, 2nd Floor
Ottawa, ON
K1S 2E9

Mr Herbert G. Bown, President

1-613-722-8101

1.1:Communications Technology:Telecommunications Networking
5.1:Computer Systems and Apps:Image Recognition and Processing
1.2:Communications Technology:Transmission Media
4.2:Office Automation Systems:Database Management
2.1:Communications Systems :Radio and Tv Broadcast Systems
3.99:Communication Networks :Other
2.99:Communication Systems :Other
4.4:Office Automation Systems:Elec File Trans & Decision Support
3.1:Communications Networks :Computer Communications Protocols
6.2:Software Automation :Computer Aided Educ and Inst
3.2:Communications Networks :ISDN
6.7:Software Automation :Electronic Publishing
3.3:Communications Networks :Local Area Networks
4.3:Office Automation Systems:Electronic Mail and Messaging
3.4:Communications Networks :Value Added Networks
4.99:Office Automation System:Other
3.5:Communications Networks :Broadband Networks for Video, FAX
6.1:Software Automation :Rel Database Storage and Retrieval
3.6:Communications Networks :Communications Network Mgmt.
6.3:Software Automation :Computer Aided Design and Mfg
4.1:Office Automation Systems:Text and Graphics Creation, Manip

IMPERIAL SIGN CORP.
2821 Huntington Place
Port Coquitlam, BC
V3C 4T3

Mr David Downing, President

1-604-464-1211

7.5.1:Human-Machine Interface:Visual Display and Printing
6.3:Software Automation :Computer Aided Design and Mfg
4.1:Office Automation Systems:Text and Graphics Creation, Manip

INFOMART
164 Merton Street
Toronto, ON
M4S 3A8

Garry Bloxam, Vice-president

3.4:Communications Networks :Value Added Networks

INTERACT RESEARCH AND DEVELOPMENT
4252 Commercial Circle
Victoria, BC
V8Z 4M2

Chris Corbett, President

* NO PHONE YET

9.1:Artificial Intelligence :Expert Systems

INTERACTIVE IMAGE TECHNOLOGIES
49 Bathurst Street Suite 400
Toronto, ON
M5V 2P2

Mr Joseph Koenig, President
Roy Bryant

1-416-361-0333

6.99:Software Automation :Other
7.1:Human-Machine Interface :Intelligent Input/Output

INTERNATIONAL GEOSYSTEMS CORP.
1200 West Pender Street Suite 605
Vancouver, BC
V6E 2S9

Hugh Mah, President

4.1:Office Automation Systems:Text and Graphics Creation, Manip

INTERNATIONAL TELEMETRICS LTD.
261 West 64th Avenue
Vancouver, BC
V5X 2L7

Mr. Frank G. Petersohn, President

604-324-1230

7.6:Human-Machine Interface :Laser Printing
6.6:Software Automation :Computer Aided Animation
6.2:Software Automation :Computer Aided Educ and Inst
7.5.1:Human-Machine Interface:Visual Display and Printing
8.3:Cmpnts, Devices,materials:Sensors and Transducers
6.1:Software Automation :Rel Database Storage and Retrieval
2.99:Communication Systems :Other
6.3:Software Automation :Computer Aided Design and Mfg
4.1:Office Automation Systems:Text and Graphics Creation, Manip
6.7:Software Automation :Electronic Publishing
4.2:Office Automation Systems:Database Management
7.5.1:Human-Machine Interface:Visual Display and Printing
5.1:Computer Systems and Apps:Image Recognition and Processing
8.1:Cmpnts, Devices,materials:Micro-Electronics
1.3:Communications Technology:Modulation and Encoding

INTERA TECHNOLOGIES LTD.
2500 - 101 6th Avenue S.W.
Calgary, AB
T2P 3P4

Mr. Brian Bullock, President And Ceo
Rob Inkster, Vice Pres.-Radar Div

403-266-0900

1.3:Communications Technology:Modulation and Encoding
2.99:Communication Systems :Other
6.2:Software Automation :Computer Aided Educ and Inst
5.1:Computer Systems and Apps:Image Recognition and Processing
8.3:Cmpnts, Devices,materials:Sensors and Transducers
7.1:Human-Machine Interface :Intelligent Input/Output

KIS INFORMATION SYSTEMS INC.
318 - 1190 Melville Street
Vancouver, BC
V6E 3W1

Mr Walden Kunz, President
Carl Rugger

604-662-8180

6.99:Software Automation :Other
4.2:Office Automation Systems:Database Management
6.0:Software Automation

LA CIE D'ELECTRONIQUE NORMEX LTEE.
55 Boul. Montpellier
St-Laurent, QC
H4N 2G3

Mr Jacques Coutellier
Jerome Masson, Dir.Oper.

1-513-748-7811

1.2:Communications Technology:Transmission Media
2.1:Communications Systems :Radio and Tv Broadcast Systems

LOGIBEC GROUPE INFORMATIQUE LTEE.
1 Place Du Commerce Bureau 500 Ile Des Soeurs
Verdun, PQ
H3E 1A2

Mr. Claude Roy
Michael Poirier Or David, Whil

514-766-0134

4.3:Office Automation Systems:Electronic Mail and Messaging
4.1:Office Automation Systems:Text and Graphics Creation, Manip
5.1:Computer Systems and Apps:Image Recognition and Processing
3.3:Communications Networks :Local Area Networks
5.3:Computer Systems and Apps:Dist and Par Processing Systems
7.4:Human-Machine Interface :Visual Pattern Recognition
6.2:Software Automation :Computer Aided Educ and Inst
3.6:Communications Networks :Communications Network Mgmt.
6.4:Software Automation :Computer Integrated Manufacturing
4.2:Office Automation Systems:Database Management
1.1:Communications Technology:Telecommunications Networking
4.4:Office Automation Systems:Elec File Trans & Decision Support
1.2:Communications Technology:Transmission Media
5.2:Computer Systems and Apps:Voice Recognition
1.3:Communications Technology:Modulation and Encoding
6.1:Software Automation :Rel Database Storage and Retrieval
1.4:Communications Technology:Switching and Multiplexing
6.3:Software Automation :Computer Aided Design and Mfg
3.1:Communications Networks :Computer Communications Protocols
6.7:Software Automation :Electronic Publishing
3.2:Communications Networks :ISDN
7.2:Human-Machine Interface :Speech Recognition
7.1:Human-Machine Interface :Intelligent Input/Output

LEIGH INSTRUMENTS LIMITED
2680 Queensview Drive
Ottawa, ON
K2B 9J9

Andrew Bond, Director

1-613-820-9720

2.3:Communications Systems :Mobile Communications System

LINDSAY SPECIALTY PRODUCTS LTD.
12 Mary Street West
Lindsay, ON
K9V 4S7

Mr. John C. Anderson, President And Ceo

705-324-2196

1.2:Communications Technology:Transmission Media
2.3:Communications Systems :Mobile Communications System
1.3:Communications Technology:Modulation and Encoding
8.3:Cmpnts, Devices,materials:Sensors and Transducers
2.1:Communications Systems :Radio and Tv Broadcast Systems
3.3:Communications Networks :Local Area Networks
2.2:Communications Systems :Communications Satellite System
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
3.5:Communications Networks :Broadband Networks for Video, FAX

LINEAR SYSTEMS LTD.
1760 Sargent Ave.
Winnipeg, MB
R3H 0C7

Mr Tom Thorsteins, President
Tom Thorsteinson, President

1-204-783-2228

3.3:Communications Networks :Local Area Networks
7.1:Human-Machine Interface :Intelligent Input/Output
8.1:Cmpnts, Devices,materials:Micro-Electronics

LNS SYSTEMS INC.
7 Bovis Avenue
Pointe Claire, PQ

Mr Richard Prytula
Neil Bronson

(514) 695-8130

5.99:Computer Systems and App:Other
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
8.1:Cmpnts, Devices,materials:Micro-Electronics

LITTON SYSTEMS CANADA LTD.
25 Cityview Drive
Etobicoke, ON
M9W 5A7

Mr Thomas Mcguigan, President
A.G Schwartz, Mktg Mgr

416-249-1231

3.3:Communications Networks :Local Area Networks
5.2:Computer Systems and Apps:Voice Recognition
7.99:Human-Macine Interface :Other
5.99:Computer Systems and App:Other
7.5.2:Human-Machine Interface:High Definition Television
6.2:Software Automation :Computer Aided Educ and Inst
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
8.1:Cmpnts, Devices,materials:Micro-Electronics

MOBILE DATA INTERNATIONAL INC.
Riverside Industrial Park 11411 No. 5 Road
Richmond, BC
V7A 4Z3

Mr Barclay Isherwood, President
Dave Sloan, Dir. Of Tech. Asses.

1-604-277-1511

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
1.4:Communications Technology:Switching and Multiplexing
1.3:Communications Technology:Modulation and Encoding
2.3:Communications Systems :Mobile Communications System
3.1:Communications Networks :Computer Communications Protocols
8.1:Cmpnts, Devices,materials:Micro-Electronics
3.6:Communications Networks :Communications Network Mgmt.
7.3:Human-Machine Interface :Voice Recognition
5.2:Computer Systems and Apps:Voice Recognition
7.2:Human-Machine Interface :Speech Recognition
5.3:Computer Systems and Apps:Dist and Par Processing Systems
7.6:Human-Machine Interface :Laser Printing
6.1:Software Automation :Rel Database Storage and Retrieval
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
8.3:Cmpnts, Devices,materials:Sensors and Transducers

MACDONALD DETTWILER LTD
3751 Shell Road
Richmond, BC
V6X 2Z9

John Macdonald, President

1-604-464-1211

2.2:Communications Systems :Communications Satellite System
4.1:Office Automation Systems:Text and Graphics Creation, Manip
5.1:Computer Systems and Apps:Image Recognition and Processing
7.5.1:Human-Machine Interface:Visual Display and Printing

MICROLIGHT COMPUTER SYSTEMS LTD.
4438 Valencia Avenue
North Vancouver, BC
V7N 4B1

Mr John Whalen, President
John Whalen

1-604-980-5353

7.5.1:Human-Machine Interface:Visual Display and Printing
6.2:Software Automation :Computer Aided Educ and Inst
4.4:Office Automation Systems:Elec File Trans & Decision Support
4.1:Office Automation Systems:Text and Graphics Creation, Manip
6.1:Software Automation :Rel Database Storage and Retrieval
4.2:Office Automation Systems:Database Management
6.3:Software Automation :Computer Aided Design and Mfg
5.1:Computer Systems and Apps:Image Recognition and Processing

MICROART SERVICES INC.
3261 Kennedy Road Unit 7
Scarborough, ON
M1V 2K1

Mr. Herb Ratchford, Director

1-416-298-4611

3.3:Communications Networks :Local Area Networks
4.1:Office Automation Systems:Text and Graphics Creation, Manip
5.3:Computer Systems and Apps:Dist and Par Processing Systems

MICROSTAR SOFTWARE LTD
14 Concourse Gate,Suite 400
Nepean, ON
K2E 7S6

Wendy E. Kennedy, Manager

1-613-727-5696

6.7:Software Automation :Electronic Publishing
4.4:Office Automation Systems:Elec File Trans & Decision Support
5.3:Computer Systems and Apps:Dist and Par Processing Systems
3.1:Communications Networks :Computer Communications Protocols
4.3:Office Automation Systems:Electronic Mail and Messaging
3.3:Communications Networks :Local Area Networks
5.1:Computer Systems and Apps:Image Recognition and Processing
4.1:Office Automation Systems:Text and Graphics Creation, Manip
6.2:Software Automation :Computer Aided Educ and Inst
7.5.4:Human-Machine Interface:Three Dimensional Display
7.5.1:Human-Machine Interface:Visual Display and Printing
4.2:Office Automation Systems:Database Management

MICROTEL PACIFIC RESEARCH
8999 Nelson Way
Burnaby, BC
V5A 4B5

Mr. Bruce G. Hartwick, President
Ian J. Dowdeswell, Vp-Systems And Tech.

1-604-294-1471

1.4:Communications Technology:Switching and Multiplexing
2.2:Communications Systems :Communications Satellite System
2.1:Communications Systems :Radio and Tv Broadcast Systems
3.6:Communications Networks :Communications Network Mgmt.

NORDCO LIMITED.
P.O. Box 8833
Saint John's, NF
A1B 3T2

Mr Frank D. Smith, President & Ceo

1-709-364-1200

7.5.2:Human-Machine Interface:High Definition Television
5.1:Computer Systems and Apps:Image Recognition and Processing
6.99:Software Automation :Other
6.1:Software Automation :Rel Database Storage and Retrieval
7.4:Human-Machine Interface :Visual Pattern Recognition
2.2:Communications Systems :Communications Satellite System
4.2:Office Automation Systems:Database Management
2.3:Communications Systems :Mobile Communications System
5.3:Computer Systems and Apps:Dist and Par Processing Systems
6.2:Software Automation :Computer Aided Educ and Inst
3.4:Communications Networks :Value Added Networks
7.1:Human-Machine Interface :Intelligent Input/Output
8.99:Cmpnts, Devices,material:Other
7.6:Human-Machine Interface :Laser Printing
4.1:Office Automation Systems:Text and Graphics Creation, Manip
8.3:Cmpnts, Devices,materials:Sensors and Transducers
3.6:Communications Networks :Communications Network Mgmt.

NORPAK CORPORATION
10 Hearst Way
Kanata, ON
K2L 2P4

Dr J.F. Carruthers, President

1-613-592-4164

1.2:Communications Technology:Transmission Media
6.6:Software Automation :Computer Aided Animation
1.3:Communications Technology:Modulation and Encoding
3.99:Communication Networks :Other
1.4:Communications Technology:Switching and Multiplexing
3.5:Communications Networks :Broadband Networks for Video, FAX
1.99:Communication Technology:Other
4.2:Office Automation Systems:Database Management
2.1:Communications Systems :Radio and Tv Broadcast Systems
7.5.1:Human-Machine Interface:Visual Display and Printing
2.2:Communications Systems :Communications Satellite System
3.6:Communications Networks :Communications Network Mgmt.
2.99:Communication Systems :Other
4.1:Office Automation Systems:Text and Graphics Creation, Manip
3.1:Communications Networks :Computer Communications Protocols
4.99:Office Automation System:Other
3.2:Communications Networks :ISDN
8.1:Cmpnts, Devices,materials:Micro-Electronics
3.3:Communications Networks :Local Area Networks
7.4:Human-Machine Interface :Visual Pattern Recognition

NORSAT INTERNATIONAL
302-12886 78th Avenue
Surrey, BC
V3W 8E7

Mr Greg J. Peet, President Vice-presi
Donald D. Filmer, Vice-President

604-591-3334

1.1:Communications Technology:Telecommunications Networking
8.1:Cmpnts, Devices,materials:Micro-Electronics
1.3:Communications Technology:Modulation and Encoding
6.1:Software Automation :Rel Database Storage and Retrieval
2.1:Communications Systems :Radio and Tv Broadcast Systems
4.4:Office Automation Systems:Elec File Trans & Decision Support
2.2:Communications Systems :Communications Satellite System
3.99:Communication Networks :Other
3.1:Communications Networks :Computer Communications Protocols
4.3:Office Automation Systems:Electronic Mail and Messaging
3.5:Communications Networks :Broadband Networks for Video, FAX
5.3:Computer Systems and Apps:Dist and Par Processing Systems
3.6:Communications Networks :Communications Network Mgmt.
6.2:Software Automation :Computer Aided Educ and Inst
4.2:Office Automation Systems:Database Management

PACIFIC LEARNING INSTITUTE LTD.
2426 West 33rd Avenue
Vancouver, BC
V6M 1C3

Dr. Peter Braun

604-266-2671

1.99:Communication Technology:Other
5.99:Computer Systems and App:Other
4.99:Office Automation System:Other
6.2:Software Automation :Computer Aided Educ and Inst
6.99:Software Automation :Other

PAMAP GRAPHICS LTD.
301-3440 Douglas Street
Victoria, BC
V8N 2N6

Dr. Pamela Salaway

1-604-381-3838

6.99:Software Automation :Other
6.7:Software Automation :Electronic Publishing
6.3:Software Automation :Computer Aided Design and Mfg
4.1:Office Automation Systems:Text and Graphics Creation, Manip

POSITRON INC.
4810 Jean Talon Ouest
Montreal, PQ
H4P 2N5

Eng Reginald Weiser, President
Ronald Notkin

1-514-731-3715

2.3:Communications Systems :Mobile Communications System
2.99:Communication Systems :Other
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
5.2:Computer Systems and Apps:Voice Recognition

RIMQUEST INTERNATIONAL
Suite 1423-400 Burrard St Po Box 41
Vancouver, BC
V6C 3G2

Mr J.S. Farrell, Exec. Director

604-669-1751

2.2:Communications Systems :Communications Satellite System

SED SYSTEMS INC.
P.O. Box 1464
Saskatoon, SK
S7K 3P7

Kent Mckerlie, Director Of Marketin

2.2:Communications Systems :Communications Satellite System

SHL SYSTEMHOUSE INC
99 Bank Street 3rd Floor
Ottawa, ON
K1P 6B9

Mr Peter A. Sandiford
Avery J. Burdett

(613)236-9734

6.2:Software Automation :Computer Aided Educ and Inst
6.4:Software Automation :Computer Integrated Manufacturing
4.3:Office Automation Systems:Electronic Mail and Messaging
6.6:Software Automation :Computer Aided Animation
5.3:Computer Systems and Apps:Dist and Par Processing Systems
7.1:Human-Machine Interface :Intelligent Input/Output
5.1:Computer Systems and Apps:Image Recognition and Processing
3.3:Communications Networks :Local Area Networks
4.2:Office Automation Systems:Database Management
3.4:Communications Networks :Value Added Networks
4.4:Office Automation Systems:Elec File Trans & Decision Support
7.3:Human-Machine Interface :Voice Recognition
5.2:Computer Systems and Apps:Voice Recognition
4.1:Office Automation Systems:Text and Graphics Creation, Manip
6.1:Software Automation :Rel Database Storage and Retrieval
1.1:Communications Technology:Telecommunications Networking
6.3:Software Automation :Computer Aided Design and Mfg
2.3:Communications Systems :Mobile Communications System
6.5:Software Automation :Computer Aided Translation
3.1:Communications Networks :Computer Communications Protocols
6.7:Software Automation :Electronic Publishing
3.2:Communications Networks :ISDN
7.2:Human-Machine Interface :Speech Recognition
3.6:Communications Networks :Communications Network Mgmt.

SIMWARE INC
20 Colonade Road
Nepean, ON
K2E 7M6

Colin Patterson, Chairman
Lew Sherpherson, Vp Technology

(613) 727-1778

1.1:Communications Technology:Telecommunications Networking
4.4:Office Automation Systems:Elec File Trans & Decision Support
3.3:Communications Networks :Local Area Networks
3.1:Communications Networks :Computer Communications Protocols
3.6:Communications Networks :Communications Network Mgmt.
1.2:Communications Technology:Transmission Media

SR TELECOM INC.
8150 Transcanada Highway
St-Laurent, PQ
H4S 1M5

Mr. Donald M. Beaupre, President
Mathew Krzyczkowski, Vice President

514-335-1210

1.1:Communications Technology:Telecommunications Networking
1.3:Communications Technology:Modulation and Encoding
1.2:Communications Technology:Transmission Media
3.1:Communications Networks :Computer Communications Protocols
3.2:Communications Networks :ISDN

SEASTAR INSTRUMENTS LTD
2045 Mills Road
Sydney, BC
VBL 3S1

Mr Peter G. Berrang, President
Dr. David Green, V. Pres.

1-604-656-0891

1.99:Communication Technology:Other
3.3:Communications Networks :Local Area Networks
2.99:Communication Systems :Other
8.1:Cmpnts, Devices,materials:Micro-Electronics
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices

STANDARD SOFTWARE SYSTEMS INC.
10331-178 Street
Edmonton, AB
T5S 1R5

Mr Igor Vernik, President

(403)489-0055

1.1:Communications Technology:Telecommunications Networking
1.99:Communication Technology:Other
4.2:Office Automation Systems:Database Management
3.3:Communications Networks :Local Area Networks
4.4:Office Automation Systems:Elec File Trans & Decision Support
3.6:Communications Networks :Communications Network Mgmt.
4.3:Office Automation Systems:Electronic Mail and Messaging
4.1:Office Automation Systems:Text and Graphics Creation, Manip

SATURN DISQ INC.
4800, Ave. Hickmore
Montreal, PQ
H4T 1K2

Mr. C. George Hurlburt
Robert Belzile, Technical Dir.

514-738-4880

6.1:Software Automation :Rel Database Storage and Retrieval
5.99:Computer Systems and App:Other
4.99:Office Automation System:Other

SYDNEY DEVELOPMENT CORPORATION
1385 W. 8th Avenue, Suite 600
Vancouver, BC
V6H 3V9

Walter Steel, Ceo

9.1:Artificial Intelligence :Expert Systems

TEECOM ELECTRONICS INC.
8116 Montview Road
Montreal, PQ
H4P 2L7

Oscar Steiner

1-514-342-3550

8.1:Cmpnts, Devices,materials:Micro-Electronics

TIAC MANUFACTURING INC
3080 Spring Street
Port Moody, BC
V3H 1Z8

Mr Stephen Swift, President
Howard Malm, Proj.Mgr.

1-604-461-1626

5.1:Computer Systems and Apps:Image Recognition and Processing
3.1:Communications Networks :Computer Communications Protocols
4.3:Office Automation Systems:Electronic Mail and Messaging
3.3:Communications Networks :Local Area Networks
4.1:Office Automation Systems:Text and Graphics Creation, Manip
3.6:Communications Networks :Communications Network Mgmt.
6.3:Software Automation :Computer Aided Design and Mfg
3.99:Communication Networks :Other
5.3:Computer Systems and Apps:Dist and Par Processing Systems
4.4:Office Automation Systems:Elec File Trans & Decision Support

TELEMUS ELECTRONIC SYSTEMS INC
310 Moodie Dr
Nepean, ON
K2H 8G3

T. W. Tucker, Chairman

1-613-726-1102

8.1:Cmpnts, Devices,materials:Micro-Electronics

TELEWAVE COMUNICATIONS OF CANADA LTD
#4 - 11151 Horshoe Way
Richmond, BC
V7A 4S5

Mr Ray Collins, President
John A. Webster, Vice President

1-604-274-8300

1.1:Communications Technology:Telecommunications Networking
2.3:Communications Systems :Mobile Communications System
2.1:Communications Systems :Radio and Tv Broadcast Systems

XIOS SYSTEMS CORPORATION
Suite 150 1600 Carling Avenue
Ottawa, ON
K1Z 8R8

Brian E. Greenleaf, President

1-613-725-5411

1.1:Communications Technology:Telecommunications Networking

Appendix 4

Canadian Companies with Topics
Sorted by Company Name

Canada Report
ITRD Database

A&D INFORMATICS SOFTWARE LTD.

1.1:Communications Technology:Telecommunications Networking
6.2:Software Automation :Computer Aided Educ and Inst
6.6:Software Automation :Computer Aided Animation
7.99:Human-Macine Interface :Other
8.99:Cmpnts, Devices,material:Other

ABEL COMPUTERS LTD

4.2:Office Automation Systems:Database Management
6.1:Software Automation :Rel Database Storage and Retrieval

ABALL SOFTWARE INC

1.1:Communications Technology:Telecommunications Networking
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support
6.7:Software Automation :Electronic Publishing
7.1:Human-Machine Interface :Intelligent Input/Output
7.99:Human-Macine Interface :Other

ACDS GRAPHIC SYSTEMS INC.

4.1:Office Automation Systems:Text and Graphics Creation, Manip

ACQUIRED INTELLIGENCE

9.1:Artificial Intelligence :Expert Systems

AEG BAYLY ENGINEERING LTD

1.2:Communications Technology:Transmission Media
1.3:Communications Technology:Modulation and Encoding
1.4:Communications Technology:Switching and Multiplexing
2.1:Communications Systems :Radio and Tv Broadcast Systems
2.3:Communications Systems :Mobile Communications System
3.4:Communications Networks :Value Added Networks
3.5:Communications Networks :Broadband Networks for Video, FAX
3.99:Communication Networks :Other
4.1:Office Automation Systems:Text and Graphics Creation, Manip
5.1:Computer Systems and Apps:Image Recognition and Processing
7.4:Human-Machine Interface :Visual Pattern Recognition

ALMAX INDUSTRIES LTD.

8.3:Cmpnts, Devices,materials:Sensors and Transducers

ANATEK MICROCIRCUITS INC

8.3:Cmpnts, Devices,materials:Sensors and Transducers

AISI RESEARCH CORP.

1.3:Communications Technology:Modulation and Encoding
1.4:Communications Technology:Switching and Multiplexing
1.99:Communication Technology:Other
3.1:Communications Networks :Computer Communications Protocols
3.2:Communications Networks :ISDN
3.3:Communications Networks :Local Area Networks
3.4:Communications Networks :Value Added Networks
4.2:Office Automation Systems:Database Management
7.1:Human-Machine Interface :Intelligent Input/Output
7.2:Human-Machine Interface :Speech Recognition
7.3:Human-Machine Interface :Voice Recognition
8.1:Cmpnts, Devices,materials:Micro-Electronics
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
8.3:Cmpnts, Devices,materials:Sensors and Transducers
8.99:Cmpnts, Devices,material:Other

BECK TECHNOLOGY INC.

7.2:Human-Machine Interface :Speech Recognition
7.3:Human-Machine Interface :Voice Recognition
7.4:Human-Machine Interface :Visual Pattern Recognition

CEGIR (CANADA) INC.

2.99:Communication Systems :Other
3.99:Communication Networks :Other
4.99:Office Automation System:Other
5.99:Computer Systems and App:Other
6.2:Software Automation :Computer Aided Educ and Inst

CAE ELECTRONICS LTD.

2.1:Communications Systems :Radio and Tv Broadcast Systems
5.1:Computer Systems and Apps:Image Recognition and Processing
5.2:Computer Systems and Apps:Voice Recognition
5.5:Computer Systems and App:5th and 6th Generation Computers
5.99:Computer Systems and App:Other
6.1:Software Automation :Rel Database Storage and Retrieval
6.2:Software Automation :Computer Aided Educ and Inst
6.3:Software Automation :Computer Aided Design and Mfg
6.6:Software Automation :Computer Aided Animation
7.1:Human-Machine Interface :Intelligent Input/Output
7.2:Human-Machine Interface :Speech Recognition
7.3:Human-Machine Interface :Voice Recognition
7.4:Human-Machine Interface :Visual Pattern Recognition
7.5.1:Human-Machine Interface:Visual Display and Printing
7.6:Human-Machine Interface :Laser Printing
8.1:Cmpnts, Devices,materials:Micro-Electronics
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
8.3:Cmpnts, Devices,materials:Sensors and Transducers

CALMOS SYSTEMS INC

2.99:Communication Systems :Other
3.99:Communication Networks :Other
8.1:Cmpnts, Devices,materials:Micro-Electronics

CANADIAN MARCONI COMPANY

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
1.3:Communications Technology:Modulation and Encoding

CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION

4.2:Office Automation Systems:Database Management
5.5:Computer Systems and App:5th and 6th Generation Computers
5.99:Computer Systems and App:Other
6.3:Software Automation :Computer Aided Design and Mfg
6.4:Software Automation :Computer Integrated Manufacturing
6.5:Software Automation :Computer Aided Translation
6.99:Software Automation :Other
7.1:Human-Machine Interface :Intelligent Input/Output
9.3:Artificial Intelligence :Natural Language processing
9.4:Artificial Intelligence :Machine translation

CANADIAN ASTRONAUTICS LTD

2.2:Communications Systems :Communications Satellite System
2.3:Communications Systems :Mobile Communications System
5.1:Computer Systems and Apps:Image Recognition and Processing
5.3:Computer Systems and Apps:Dist and Par Processing Systems
7.1:Human-Machine Interface :Intelligent Input/Output
7.4:Human-Machine Interface :Visual Pattern Recognition
7.6:Human-Machine Interface :Laser Printing
8.3:Cmpnts, Devices,materials:Sensors and Transducers

CANSTAR (DIVISION OF CANADA WIRE & CABLE LTD.)

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media

CRES ELECTRONICS CORPORATION

8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices

C-TECH LTD.

1.3:Communications Technology:Modulation and Encoding
1.4:Communications Technology:Switching and Multiplexing
5.1:Computer Systems and Apps:Image Recognition and Processing
5.3:Computer Systems and Apps:Dist and Par Processing Systems
8.3:Cmpnts, Devices,materials:Sensors and Transducers
8.99:Cmpnts, Devices,material:Other

CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
2.2:Communications Systems :Communications Satellite System
3.1:Communications Networks :Computer Communications Protocols
3.2:Communications Networks :ISDN
3.3:Communications Networks :Local Area Networks
3.4:Communications Networks :Value Added Networks
3.5:Communications Networks :Broadband Networks for Video, FAX
3.6:Communications Networks :Communications Network Mgmt.
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.3:Office Automation Systems:Electronic Mail and Messaging
5.4:Computer Systems and Apps:Supercomputers
6.1:Software Automation :Rel Database Storage and Retrieval
6.3:Software Automation :Computer Aided Design and Mfg

DIDATECH SOFTWARE LIMITED

6.2:Software Automation :Computer Aided Educ and Inst

DEES COMMUNICATION ENGINEERING LTD

1.0:Communications Technology
1.99:Communication Technology:Other
3.0:Communications Networks
3.99:Communication Networks :Other
7.3:Human-Machine Interface :Voice Recognition

DY-4 SYSTEMS INC.

3.2:Communications Networks :ISDN
3.6:Communications Networks :Communications Network Mgmt.
5.99:Computer Systems and App:Other
6.99:Software Automation :Other
6.99:Software Automation :Other
6.99:Software Automation :Other
7.1:Human-Machine Interface :Intelligent Input/Output

DYNAPRO SYSTEMS INC.

3.3:Communications Networks :Local Area Networks
3.6:Communications Networks :Communications Network Mgmt.
6.4:Software Automation :Computer Integrated Manufacturing
6.7:Software Automation :Electronic Publishing
7.1:Human-Machine Interface :Intelligent Input/Output
7.99:Human-Macine Interface :Other
8.1:Cmpnts, Devices,materials:Micro-Electronics

EPITEK INTERNATIONAL INC.

6.3:Software Automation :Computer Aided Design and Mfg
8.1:Cmpnts, Devices,materials:Micro-Electronics

EASYNET SYSTEMS INC

1.1:Communications Technology:Telecommunications Networking
3.3:Communications Networks :Local Area Networks
4.3:Office Automation Systems:Electronic Mail and Messaging

GEAC COMPUTERS INTERNATIONAL LTD.

1.1:Communications Technology:Telecommunications Networking
3.3:Communications Networks :Local Area Networks
3.6:Communications Networks :Communications Network Mgmt.
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support
5.3:Computer Systems and Apps:Dist and Par Processing Systems
5.99:Computer Systems and App:Other
6.1:Software Automation :Rel Database Storage and Retrieval
6.99:Software Automation :Other

GIGATEK LIMITED

4.1:Office Automation Systems:Text and Graphics Creation, Manip

GANDALF SYSTEMS GROUP

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
1.3:Communications Technology:Modulation and Encoding
1.3:Communications Technology:Modulation and Encoding
1.4:Communications Technology:Switching and Multiplexing
1.99:Communication Technology:Other
2.2:Communications Systems :Communications Satellite System
2.3:Communications Systems :Mobile Communications System
3.2:Communications Networks :ISDN
3.3:Communications Networks :Local Area Networks
3.4:Communications Networks :Value Added Networks
3.5:Communications Networks :Broadband Networks for Video, FAX
3.6:Communications Networks :Communications Network Mgmt.
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support
4.99:Office Automation System:Other
5.1:Computer Systems and Apps:Image Recognition and Processing
5.2:Computer Systems and Apps:Voice Recognition
6.1:Software Automation :Rel Database Storage and Retrieval
6.2:Software Automation :Computer Aided Educ and Inst
6.3:Software Automation :Computer Aided Design and Mfg
6.4:Software Automation :Computer Integrated Manufacturing
7.99:Human-Macine Interface :Other
8.1:Cmpnts, Devices,materials:Micro-Electronics

GANDALF TECHNOLOGIES

1.3:Communications Technology:Modulation and Encoding
1.4:Communications Technology:Switching and Multiplexing
2.3:Communications Systems :Mobile Communications System
3.1:Communications Networks :Computer Communications Protocols
3.2:Communications Networks :ISDN
3.3:Communications Networks :Local Area Networks
3.4:Communications Networks :Value Added Networks
3.5:Communications Networks :Broadband Networks for Video, FAX
3.6:Communications Networks :Communications Network Mgmt.
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support

GENERAL CYBERNETICS

9.5:Artificial Intelligence :Vision systems

GEOVISION CORPORATION

4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
6.1:Software Automation :Rel Database Storage and Retrieval

H.A. SIMONS LTD.

3.6:Communications Networks :Communications Network Mgmt.

ICAM TECHNOLOGIES CORPORATION

6.2:Software Automation :Computer Aided Educ and Inst
6.3:Software Automation :Computer Aided Design and Mfg
6.4:Software Automation :Computer Integrated Manufacturing

IDON CORPORATION

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
2.1:Communications Systems :Radio and Tv Broadcast Systems
2.99:Communication Systems :Other
3.1:Communications Networks :Computer Communications Protocols
3.2:Communications Networks :ISDN
3.3:Communications Networks :Local Area Networks
3.4:Communications Networks :Value Added Networks
3.5:Communications Networks :Broadband Networks for Video, FAX
3.6:Communications Networks :Communications Network Mgmt.
3.99:Communication Networks :Other
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support
4.99:Office Automation System:Other
5.1:Computer Systems and Apps:Image Recognition and Processing
6.1:Software Automation :Rel Database Storage and Retrieval
6.2:Software Automation :Computer Aided Educ and Inst
6.3:Software Automation :Computer Aided Design and Mfg
6.7:Software Automation :Electronic Publishing

IMPERIAL SIGN CORP.

4.1:Office Automation Systems:Text and Graphics Creation, Manip
6.3:Software Automation :Computer Aided Design and Mfg
7.5.1:Human-Machine Interface:Visual Display and Printing

INFOMART

3.4:Communications Networks :Value Added Networks

INTERACT RESEARCH AND DEVELOPMENT

9.1:Artificial Intelligence :Expert Systems

INTERACTIVE IMAGE TECHNOLOGIES

6.99:Software Automation :Other
7.1:Human-Machine Interface :Intelligent Input/Output

INTERNATIONAL GEOSYSTEMS CORP.

4.1:Office Automation Systems:Text and Graphics Creation, Manip

INTERNATIONAL TELEMETRICS LTD.

1.3:Communications Technology:Modulation and Encoding
2.99:Communication Systems :Other
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
5.1:Computer Systems and Apps:Image Recognition and Processing
6.1:Software Automation :Rel Database Storage and Retrieval
6.2:Software Automation :Computer Aided Educ and Inst
6.3:Software Automation :Computer Aided Design and Mfg
6.6:Software Automation :Computer Aided Animation
6.7:Software Automation :Electronic Publishing
7.5.1:Human-Machine Interface:Visual Display and Printing
7.5.1:Human-Machine Interface:Visual Display and Printing
7.6:Human-Machine Interface :Laser Printing
8.1:Cmpnts, Devices,materials:Micro-Electronics
8.3:Cmpnts, Devices,materials:Sensors and Transducers

INTERA TECHNOLOGIES LTD.

1.3:Communications Technology:Modulation and Encoding
2.99:Communication Systems :Other
5.1:Computer Systems and Apps:Image Recognition and Processing
6.2:Software Automation :Computer Aided Educ and Inst
7.1:Human-Machine Interface :Intelligent Input/Output
8.3:Cmpnts, Devices,materials:Sensors and Transducers

KIS INFORMATION SYSTEMS INC.

4.2:Office Automation Systems:Database Management
6.0:Software Automation
6.99:Software Automation :Other

LA CIE D'ELECTRONIQUE NORMEX LTEE.

1.2:Communications Technology:Transmission Media
2.1:Communications Systems :Radio and Tv Broadcast Systems

LOGIBEC GROUPE INFORMATIQUE LTEE.

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
1.3:Communications Technology:Modulation and Encoding
1.4:Communications Technology:Switching and Multiplexing
3.1:Communications Networks :Computer Communications Protocols
3.2:Communications Networks :ISDN
3.3:Communications Networks :Local Area Networks
3.6:Communications Networks :Communications Network Mgmt.
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support
5.1:Computer Systems and Apps:Image Recognition and Processing
5.2:Computer Systems and Apps:Voice Recognition
5.3:Computer Systems and Apps:Dist and Par Processing Systems
6.1:Software Automation :Rel Database Storage and Retrieval
6.2:Software Automation :Computer Aided Educ and Inst
6.3:Software Automation :Computer Aided Design and Mfg
6.4:Software Automation :Computer Integrated Manufacturing
6.7:Software Automation :Electronic Publishing
7.1:Human-Machine Interface :Intelligent Input/Output
7.2:Human-Machine Interface :Speech Recognition
7.4:Human-Machine Interface :Visual Pattern Recognition

LEIGH INSTRUMENTS LIMITED

2.3:Communications Systems :Mobile Communications System

LINDSAY SPECIALTY PRODUCTS LTD.

1.2:Communications Technology:Transmission Media
1.3:Communications Technology:Modulation and Encoding
2.1:Communications Systems :Radio and Tv Broadcast Systems
2.2:Communications Systems :Communications Satellite System
2.3:Communications Systems :Mobile Communications System
3.3:Communications Networks :Local Area Networks
3.5:Communications Networks :Broadband Networks for Video, FAX
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
8.3:Cmpnts, Devices,materials:Sensors and Transducers

LINEAR SYSTEMS LTD.

3.3:Communications Networks :Local Area Networks
7.1:Human-Machine Interface :Intelligent Input/Output
8.1:Cmpnts, Devices,materials:Micro-Electronics

LNS SYSTEMS INC.

5.99:Computer Systems and App:Other
8.1:Cmpnts, Devices,materials:Micro-Electronics
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices

LITTON SYSTEMS CANADA LTD.

3.3:Communications Networks :Local Area Networks
5.2:Computer Systems and Apps:Voice Recognition
5.99:Computer Systems and App:Other
6.2:Software Automation :Computer Aided Educ and Inst
7.5.2:Human-Machine Interface:High Definition Television
7.99:Human-Macine Interface :Other
8.1:Cmpnts, Devices,materials:Micro-Electronics
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices

MOBILE DATA INTERNATIONAL INC.

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
1.3:Communications Technology:Modulation and Encoding
1.4:Communications Technology:Switching and Multiplexing
2.3:Communications Systems :Mobile Communications System
3.1:Communications Networks :Computer Communications Protocols
3.6:Communications Networks :Communications Network Mgmt.
5.2:Computer Systems and Apps:Voice Recognition
5.3:Computer Systems and Apps:Dist and Par Processing Systems
6.1:Software Automation :Rel Database Storage and Retrieval
7.2:Human-Machine Interface :Speech Recognition
7.3:Human-Machine Interface :Voice Recognition
7.6:Human-Machine Interface :Laser Printing
8.1:Cmpnts, Devices,materials:Micro-Electronics
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices
8.3:Cmpnts, Devices,materials:Sensors and Transducers

MACDONALD DETTWILER LTD

2.2:Communications Systems :Communications Satellite System
4.1:Office Automation Systems:Text and Graphics Creation, Manip
5.1:Computer Systems and Apps:Image Recognition and Processing
7.5.1:Human-Machine Interface:Visual Display and Printing

MICROLIGHT COMPUTER SYSTEMS LTD.

4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.4:Office Automation Systems:Elec File Trans & Decision Support
5.1:Computer Systems and Apps:Image Recognition and Processing
6.1:Software Automation :Rel Database Storage and Retrieval
6.2:Software Automation :Computer Aided Educ and Inst
6.3:Software Automation :Computer Aided Design and Mfg
7.5.1:Human-Machine Interface:Visual Display and Printing

MICROART SERVICES INC.

3.3:Communications Networks :Local Area Networks
4.1:Office Automation Systems:Text and Graphics Creation, Manip
5.3:Computer Systems and Apps:Dist and Par Processing Systems

MICROSTAR SOFTWARE LTD

3.1:Communications Networks :Computer Communications Protocols
3.3:Communications Networks :Local Area Networks
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support
5.1:Computer Systems and Apps:Image Recognition and Processing
5.3:Computer Systems and Apps:Dist and Par Processing Systems
6.2:Software Automation :Computer Aided Educ and Inst
6.7:Software Automation :Electronic Publishing
7.5.1:Human-Machine Interface:Visual Display and Printing
7.5.4:Human-Machine Interface:Three Dimensional Display

MICROTEL PACIFIC RESEARCH

1.4:Communications Technology:Switching and Multiplexing
2.1:Communications Systems :Radio and Tv Broadcast Systems
2.2:Communications Systems :Communications Satellite System
3.6:Communications Networks :Communications Network Mgmt.

NORDCO LIMITED.

2.2:Communications Systems :Communications Satellite System
2.3:Communications Systems :Mobile Communications System
3.4:Communications Networks :Value Added Networks
3.6:Communications Networks :Communications Network Mgmt.
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
5.1:Computer Systems and Apps:Image Recognition and Processing
5.3:Computer Systems and Apps:Dist and Par Processing Systems
6.1:Software Automation :Rel Database Storage and Retrieval
6.2:Software Automation :Computer Aided Educ and Inst
6.99:Software Automation :Other
7.1:Human-Machine Interface :Intelligent Input/Output
7.4:Human-Machine Interface :Visual Pattern Recognition
7.6:Human-Machine Interface :Laser Printing
7.5.2:Human-Machine Interface:High Definition Television
8.3:Cmpnts, Devices,materials:Sensors and Transducers
8.99:Cmpnts, Devices,material:Other

NORPAK CORPORATION

1.2:Communications Technology:Transmission Media
1.3:Communications Technology:Modulation and Encoding
1.4:Communications Technology:Switching and Multiplexing
1.99:Communication Technology:Other
2.1:Communications Systems :Radio and Tv Broadcast Systems
2.2:Communications Systems :Communications Satellite System
2.99:Communication Systems :Other
3.1:Communications Networks :Computer Communications Protocols
3.2:Communications Networks :ISDN
3.3:Communications Networks :Local Area Networks
3.5:Communications Networks :Broadband Networks for Video, FAX
3.6:Communications Networks :Communications Network Mgmt.
3.99:Communication Networks :Other
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.99:Office Automation System:Other
6.6:Software Automation :Computer Aided Animation
7.4:Human-Machine Interface :Visual Pattern Recognition
7.5.1:Human-Machine Interface:Visual Display and Printing
8.1:Cmpnts, Devices,materials:Micro-Electronics

NORSAT INTERNATIONAL

1.1:Communications Technology:Telecommunications Networking
1.3:Communications Technology:Modulation and Encoding
2.1:Communications Systems :Radio and Tv Broadcast Systems
2.2:Communications Systems :Communications Satellite System
3.1:Communications Networks :Computer Communications Protocols
3.5:Communications Networks :Broadband Networks for Video, FAX
3.6:Communications Networks :Communications Network Mgmt.
3.99:Communication Networks :Other
4.2:Office Automation Systems:Database Management
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support
5.3:Computer Systems and Apps:Dist and Par Processing Systems
6.1:Software Automation :Rel Database Storage and Retrieval
6.2:Software Automation :Computer Aided Educ and Inst
8.1:Cmpnts, Devices,materials:Micro-Electronics

PACIFIC LEARNING INSTITUTE LTD.

1.99:Communication Technology:Other
4.99:Office Automation System:Other
5.99:Computer Systems and App:Other
6.2:Software Automation :Computer Aided Educ and Inst
6.99:Software Automation :Other

PAMAP GRAPHICS LTD.

4.1:Office Automation Systems:Text and Graphics Creation, Manip
6.3:Software Automation :Computer Aided Design and Mfg
6.7:Software Automation :Electronic Publishing
6.99:Software Automation :Other

POSITRON INC.

2.3:Communications Systems :Mobile Communications System
2.99:Communication Systems :Other
5.2:Computer Systems and Apps:Voice Recognition
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices

RIMQUEST INTERNATIONAL

2.2:Communications Systems :Communications Satellite System

SED SYSTEMS INC.

2.2:Communications Systems :Communications Satellite System

SHL SYSTEMHOUSE INC

1.1:Communications Technology:Telecommunications Networking
2.3:Communications Systems :Mobile Communications System
3.1:Communications Networks :Computer Communications Protocols
3.2:Communications Networks :ISDN
3.3:Communications Networks :Local Area Networks
3.4:Communications Networks :Value Added Networks
3.6:Communications Networks :Communications Network Mgmt.
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support
5.1:Computer Systems and Apps:Image Recognition and Processing
5.2:Computer Systems and Apps:Voice Recognition
5.3:Computer Systems and Apps:Dist and Par Processing Systems
6.1:Software Automation :Rel Database Storage and Retrieval
6.2:Software Automation :Computer Aided Educ and Inst
6.3:Software Automation :Computer Aided Design and Mfg
6.4:Software Automation :Computer Integrated Manufacturing
6.5:Software Automation :Computer Aided Translation
6.6:Software Automation :Computer Aided Animation
6.7:Software Automation :Electronic Publishing
7.1:Human-Machine Interface :Intelligent Input/Output
7.2:Human-Machine Interface :Speech Recognition
7.3:Human-Machine Interface :Voice Recognition

SIMWARE INC

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
3.1:Communications Networks :Computer Communications Protocols
3.3:Communications Networks :Local Area Networks
3.6:Communications Networks :Communications Network Mgmt.
4.4:Office Automation Systems:Elec File Trans & Decision Support

SR TELECOM INC.

1.1:Communications Technology:Telecommunications Networking
1.2:Communications Technology:Transmission Media
1.3:Communications Technology:Modulation and Encoding
3.1:Communications Networks :Computer Communications Protocols
3.2:Communications Networks :ISDN

SEASTAR INSTRUMENTS LTD

1.99:Communication Technology:Other
2.99:Communication Systems :Other
3.3:Communications Networks :Local Area Networks
8.1:Cmpnts, Devices,materials:Micro-Electronics
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices

STANDARD SOFTWARE SYSTEMS INC.

1.1:Communications Technology:Telecommunications Networking
1.99:Communication Technology:Other
3.3:Communications Networks :Local Area Networks
3.6:Communications Networks :Communications Network Mgmt.
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.2:Office Automation Systems:Database Management
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support

SATURN DISQ INC.

4.99:Office Automation System:Other
5.99:Computer Systems and App:Other
6.1:Software Automation :Rel Database Storage and Retrieval

SYDNEY DEVELOPMENT CORPORATION

9.1:Artificial Intelligence :Expert Systems

TEECOM ELECTRONICS INC.

8.1:Cmpnts, Devices,materials:Micro-Electronics

TIAC MANUFACTURING INC

3.1:Communications Networks :Computer Communications Protocols
3.3:Communications Networks :Local Area Networks
3.6:Communications Networks :Communications Network Mgmt.
3.99:Communication Networks :Other
4.1:Office Automation Systems:Text and Graphics Creation, Manip
4.3:Office Automation Systems:Electronic Mail and Messaging
4.4:Office Automation Systems:Elec File Trans & Decision Support
5.1:Computer Systems and Apps:Image Recognition and Processing
5.3:Computer Systems and Apps:Dist and Par Processing Systems
6.3:Software Automation :Computer Aided Design and Mfg

TELEMUS ELECTRONIC SYSTEMS INC

8.1:Cmpnts, Devices,materials:Micro-Electronics

TELEWAVE COMUNICATIONS OF CANADA LTD

1.1:Communications Technology:Telecommunications Networking
2.1:Communications Systems :Radio and Tv Broadcast Systems
2.3:Communications Systems :Mobile Communications System

XIOS SYSTEMS CORPORATION

1.1:Communications Technology:Telecommunications Networking

Appendix 5

Canadian Companies with Topics
Sorted by Topic

Canada Report
ITRD Database

Topic and Subtopic:
1.0:Communications Technology

DEES COMMUNICATION ENGINEERING LTD

Topic and Subtopic:
1.1:Communications Technology:Telecommunications Networking

A&D INFORMATICS SOFTWARE LTD.
ABALL SOFTWARE INC
CANADIAN MARCONI COMPANY
CANSTAR (DIVISION OF CANADA WIRE & CABLE LTD.)
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
EASYNET SYSTEMS INC
GEAC COMPUTERS INTERNATIONAL LTD.
GANDALF SYSTEMS GROUP
IDON CORPORATION
LOGIBEC GROUPE INFORMATIQUE LTEE.
MOBILE DATA INTERNATIONAL INC.
NORSAT INTERNATIONAL
SHL SYSTEMHOUSE INC
SIMWARE INC
SR TELECOM INC.
STANDARD SOFTWARE SYSTEMS INC.
TELEWAVE COMUNICATIONS OF CANADA LTD
XIOS SYSTEMS CORPORATION

Topic and Subtopic:
1.2:Communications Technology:Transmission Media

AEG BAYLY ENGINEERING LTD
CANADIAN MARCONI COMPANY
CANSTAR (DIVISION OF CANADA WIRE & CABLE LTD.)
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
GANDALF SYSTEMS GROUP
IDON CORPORATION
LA CIE D'ELECTRONIQUE NORMEX LTEE.
LOGIBEC GROUPE INFORMATIQUE LTEE.
LINDSAY SPECIALTY PRODUCTS LTD.
MOBILE DATA INTERNATIONAL INC.
NORPAK CORPORATION
SIMWARE INC
SR TELECOM INC.

Topic and Subtopic:
1.3:Communications Technology:Modulation and Encoding

AEG BAYLY ENGINEERING LTD
AISI RESEARCH CORP.
CANADIAN MARCONI COMPANY
C-TECH LTD.
GANDALF SYSTEMS GROUP
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
INTERNATIONAL TELEMETRICS LTD.
INTERA TECHNOLOGIES LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
LINDSAY SPECIALTY PRODUCTS LTD.
MOBILE DATA INTERNATIONAL INC.
NORPAK CORPORATION
NORSAT INTERNATIONAL
SR TELECOM INC.

Topic and Subtopic:
1.4:Communications Technology:Switching and Multiplexing

AEG BAYLY ENGINEERING LTD
AISI RESEARCH CORP.
C-TECH LTD.
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
LOGIBEC GROUPE INFORMATIQUE LTEE.
MOBILE DATA INTERNATIONAL INC.
MICROTEL PACIFIC RESEARCH
NORPAK CORPORATION

Topic and Subtopic:
1.99:Communication Technology:Other

AISI RESEARCH CORP.
DEES COMMUNICATION ENGINEERING LTD
GANDALF SYSTEMS GROUP
NORPAK CORPORATION
PACIFIC LEARNING INSTITUTE LTD.
SEASTAR INSTRUMENTS LTD
STANDARD SOFTWARE SYSTEMS INC.

Topic and Subtopic:
2.1:Communications Systems :Radio and Tv Broadcast Systems

AEG BAYLY ENGINEERING LTD
CAE ELECTRONICS LTD.
IDON CORPORATION
LA CIE D'ELECTRONIQUE NORMEX LTEE.
LINDSAY SPECIALTY PRODUCTS LTD.
MICROTEL PACIFIC RESEARCH
NORPAK CORPORATION
NORSAT INTERNATIONAL
TELEWAVE COMUNICATIONS OF CANADA LTD

Topic and Subtopic:
2.2:Communications Systems :Communications Satellite System

CANADIAN ASTRONAUTICS LTD
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
GANDALF SYSTEMS GROUP
LINDSAY SPECIALTY PRODUCTS LTD.
MACDONALD DETTWILER LTD
MICROTEL PACIFIC RESEARCH
NORDCO LIMITED.
NORPAK CORPORATION
NORSAT INTERNATIONAL
RIMQUEST INTERNATIONAL
SED SYSTEMS INC.

Topic and Subtopic:
2.3:Communications Systems :Mobile Communications System

AEG BAYLY ENGINEERING LTD
CANADIAN ASTRONAUTICS LTD
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
LEIGH INSTRUMENTS LIMITED
LINDSAY SPECIALTY PRODUCTS LTD.
MOBILE DATA INTERNATIONAL INC.
NORDCO LIMITED.
POSITRON INC.
SHL SYSTEMHOUSE INC
TELEWAVE COMUNICATIONS OF CANADA LTD

Topic and Subtopic:
2.99:Communication Systems :Other

CEGIR (CANADA) INC.
CALMOS SYSTEMS INC
IDON CORPORATION
INTERNATIONAL TELEMETRICS LTD.
INTERA TECHNOLOGIES LTD.
NORPAK CORPORATION
POSITRON INC.
SEASTAR INSTRUMENTS LTD

Topic and Subtopic:
3.0:Communications Networks

DEES COMMUNICATION ENGINEERING LTD

Topic and Subtopic:
3.1:Communications Networks :Computer Communications Protocols

AISI RESEARCH CORP.
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
GANDALF TECHNOLOGIES
IDON CORPORATION
LOGIBEC GROUPE INFORMATIQUE LTEE.
MOBILE DATA INTERNATIONAL INC.
MICROSTAR SOFTWARE LTD
NORPAK CORPORATION
NORSAT INTERNATIONAL
SHL SYSTEMHOUSE INC
SIMWARE INC
SR TELECOM INC.
TIAC MANUFACTURING INC

Topic and Subtopic:
3.2:Communications Networks :ISDN

AISI RESEARCH CORP.
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
DY-4 SYSTEMS INC.
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
IDON CORPORATION
LOGIBEC GROUPE INFORMATIQUE LTEE.
NORPAK CORPORATION
SHL SYSTEMHOUSE INC
SR TELECOM INC.

Topic and Subtopic:
3.3:Communications Networks :Local Area Networks

AISI RESEARCH CORP.
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
DYNAPRO SYSTEMS INC.
EASYNET SYSTEMS INC
GEAC COMPUTERS INTERNATIONAL LTD.
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
IDON CORPORATION
LOGIBEC GROUPE INFORMATIQUE LTEE.
LINDSAY SPECIALTY PRODUCTS LTD.
LINEAR SYSTEMS LTD.
LITTON SYSTEMS CANADA LTD.
MICROART SERVICES INC.
MICROSTAR SOFTWARE LTD
NORPAK CORPORATION
SHL SYSTEMHOUSE INC
SIMWARE INC
SEASTAR INSTRUMENTS LTD
STANDARD SOFTWARE SYSTEMS INC.
TIAC MANUFACTURING INC

Topic and Subtopic:
3.4:Communications Networks :Value Added Networks

AEG BAYLY ENGINEERING LTD
AISI RESEARCH CORP.
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
IDON CORPORATION
INFOMART
NORDCO LIMITED.
SHL SYSTEMHOUSE INC

Topic and Subtopic:
3.5:Communications Networks :Broadband Networks for Video, FAX

AEG BAYLY ENGINEERING LTD
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
IDON CORPORATION
LINDSAY SPECIALTY PRODUCTS LTD.
NORPAK CORPORATION
NORSAT INTERNATIONAL

Topic and Subtopic:
3.6:Communications Networks :Communications Network Mgmt.

CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
DY-4 SYSTEMS INC.
DYNAPRO SYSTEMS INC.
GEAC COMPUTERS INTERNATIONAL LTD.
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
H.A. SIMONS LTD.
IDON CORPORATION
LOGIBEC GROUPE INFORMATIQUE LTEE.
MOBILE DATA INTERNATIONAL INC.
MICROTEL PACIFIC RESEARCH
NORDCO LIMITED.
NORPAK CORPORATION
NORSAT INTERNATIONAL
SHL SYSTEMHOUSE INC
SIMWARE INC
STANDARD SOFTWARE SYSTEMS INC.
TIAC MANUFACTURING INC

Topic and Subtopic:
3.99:Communication Networks :Other

AEG BAYLY ENGINEERING LTD
CEGIR (CANADA) INC.
CALMOS SYSTEMS INC
DEES COMMUNICATION ENGINEERING LTD
IDON CORPORATION
NORPAK CORPORATION
NORSAT INTERNATIONAL
TIAC MANUFACTURING INC

Topic and Subtopic:
4.1:Office Automation Systems:Text and Graphics Creation, Manip

ABALL SOFTWARE INC
ACDS GRAPHIC SYSTEMS INC.
AEG BAYLY ENGINEERING LTD
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
GEAC COMPUTERS INTERNATIONAL LTD.
GIGATEK LIMITED
GANDALF SYSTEMS GROUP
GEOVISION CORPORATION
IDON CORPORATION
IMPERIAL SIGN CORP.
INTERNATIONAL GEOSYSTEMS CORP.
INTERNATIONAL TELEMETRICS LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
MACDONALD DETTWILER LTD
MICROLIGHT COMPUTER SYSTEMS LTD.
MICROART SERVICES INC.
MICROSTAR SOFTWARE LTD
NORDCO LIMITED.
NORPAK CORPORATION
PAMAP GRAPHICS LTD.
SHL SYSTEMHOUSE INC
STANDARD SOFTWARE SYSTEMS INC.
TIAC MANUFACTURING INC

Topic and Subtopic:
4.2:Office Automation Systems:Database Management

ABEL COMPUTERS LTD
AISI RESEARCH CORP.
CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
GEAC COMPUTERS INTERNATIONAL LTD.
GANDALF SYSTEMS GROUP
GEOVISION CORPORATION
IDON CORPORATION
INTERNATIONAL TELEMETRICS LTD.
KIS INFORMATION SYSTEMS INC.
LOGIBEC GROUPE INFORMATIQUE LTEE.
MICROLIGHT COMPUTER SYSTEMS LTD.
MICROSTAR SOFTWARE LTD
NORDCO LIMITED.
NORPAK CORPORATION
NORSAT INTERNATIONAL
SHL SYSTEMHOUSE INC
STANDARD SOFTWARE SYSTEMS INC.

Topic and Subtopic:
4.3:Office Automation Systems:Electronic Mail and Messaging

ABALL SOFTWARE INC
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
EASYNET SYSTEMS INC
GEAC COMPUTERS INTERNATIONAL LTD.
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
IDON CORPORATION
LOGIBEC GROUPE INFORMATIQUE LTEE.
MICROSTAR SOFTWARE LTD
NORSAT INTERNATIONAL
SHL SYSTEMHOUSE INC
STANDARD SOFTWARE SYSTEMS INC.
TIAC MANUFACTURING INC

Topic and Subtopic:
4.4:Office Automation Systems:Elec File Trans & Decision Support

ABALL SOFTWARE INC
GEAC COMPUTERS INTERNATIONAL LTD.
GANDALF SYSTEMS GROUP
GANDALF TECHNOLOGIES
IDON CORPORATION
LOGIBEC GROUPE INFORMATIQUE LTEE.
MICROLIGHT COMPUTER SYSTEMS LTD.
MICROSTAR SOFTWARE LTD
NORSAT INTERNATIONAL
SHL SYSTEMHOUSE INC
SIMWARE INC
STANDARD SOFTWARE SYSTEMS INC.
TIAC MANUFACTURING INC

Topic and Subtopic:
4.99:Office Automation System:Other

CEGIR (CANADA) INC.
GANDALF SYSTEMS GROUP
IDON CORPORATION
NORPAK CORPORATION
PACIFIC LEARNING INSTITUTE LTD.
SATURN DISQ INC.

Topic and Subtopic:
5.1:Computer Systems and Apps:Image Recognition and Processing

AEG BAYLY ENGINEERING LTD
CAE ELECTRONICS LTD.
CANADIAN ASTRONAUTICS LTD
C-TECH LTD.
GANDALF SYSTEMS GROUP
IDON CORPORATION
INTERNATIONAL TELEMETRICS LTD.
INTERA TECHNOLOGIES LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
MACDONALD DETTWILER LTD
MICROLIGHT COMPUTER SYSTEMS LTD.
MICROSTAR SOFTWARE LTD
NORDCO LIMITED.
SHL SYSTEMHOUSE INC
TIAC MANUFACTURING INC

Topic and Subtopic:
5.2:Computer Systems and Apps:Voice Recognition

CAE ELECTRONICS LTD.
GANDALF SYSTEMS GROUP
LOGIBEC GROUPE INFORMATIQUE LTEE.
LITTON SYSTEMS CANADA LTD.
MOBILE DATA INTERNATIONAL INC.
POSITRON INC.
SHL SYSTEMHOUSE INC

Topic and Subtopic:
5.3:Computer Systems and Apps:Dist and Par Processing Systems

CANADIAN ASTRONAUTICS LTD
C-TECH LTD.
GEAC COMPUTERS INTERNATIONAL LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
MOBILE DATA INTERNATIONAL INC.
MICROART SERVICES INC.
MICROSTAR SOFTWARE LTD
NORDCO LIMITED.
NORSAT INTERNATIONAL
SHL SYSTEMHOUSE INC
TIAC MANUFACTURING INC

Topic and Subtopic:
5.4:Computer Systems and Apps:Supercomputers

CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED

Topic and Subtopic:
5.5:Computer Systems and App:5th and 6th Generation Computers

CAE ELECTRONICS LTD.
CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION

Topic and Subtopic:
5.99:Computer Systems and App:Other

CEGIR (CANADA) INC.
CAE ELECTRONICS LTD.
CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION
DY-4 SYSTEMS INC.
GEAC COMPUTERS INTERNATIONAL LTD.
LNS SYSTEMS INC.
LITTON SYSTEMS CANADA LTD.
PACIFIC LEARNING INSTITUTE LTD.
SATURN DISQ INC.

Topic and Subtopic:
6.0:Software Automation

KIS INFORMATION SYSTEMS INC.

Topic and Subtopic:
6.1:Software Automation :Rel Database Storage and Retrieval

ABEL COMPUTERS LTD
CAE ELECTRONICS LTD.
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
GEAC COMPUTERS INTERNATIONAL LTD.
GANDALF SYSTEMS GROUP
GEOVISION CORPORATION
IDON CORPORATION
INTERNATIONAL TELEMETRICS LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
MOBILE DATA INTERNATIONAL INC.
MICROLIGHT COMPUTER SYSTEMS LTD.
NORDCO LIMITED.
NORSAT INTERNATIONAL
SHL SYSTEMHOUSE INC
SATURN DISQ INC.

Topic and Subtopic:
6.2:Software Automation :Computer Aided Educ and Inst

A&D INFORMATICS SOFTWARE LTD.
CEGIR (CANADA) INC.
CAE ELECTRONICS LTD.
DIDATECH SOFTWARE LIMITED
GANDALF SYSTEMS GROUP
ICAM TECHNOLOGIES CORPORATION
IDON CORPORATION
INTERNATIONAL TELEMETRICS LTD.
INTERA TECHNOLOGIES LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
LITTON SYSTEMS CANADA LTD.
MICROLIGHT COMPUTER SYSTEMS LTD.
MICROSTAR SOFTWARE LTD
NORDCO LIMITED.
NORSAT INTERNATIONAL
PACIFIC LEARNING INSTITUTE LTD.
SHL SYSTEMHOUSE INC

Topic and Subtopic:
6.3:Software Automation :Computer Aided Design and Mfg

CAE ELECTRONICS LTD.
CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION
CAVALIER INFORMATION TECHNOLOGY SYSTEMS LIMITED
EPITEK INTERNATIONAL INC.
GANDALF SYSTEMS GROUP
ICAM TECHNOLOGIES CORPORATION
IDON CORPORATION
IMPERIAL SIGN CORP.
INTERNATIONAL TELEMETRICS LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
MICROLIGHT COMPUTER SYSTEMS LTD.
PAMAP GRAPHICS LTD.
SHL SYSTEMHOUSE INC
TIAC MANUFACTURING INC

Topic and Subtopic:
6.4:Software Automation :Computer Integrated Manufacturing

CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION
DYNAPRO SYSTEMS INC.
GANDALF SYSTEMS GROUP
ICAM TECHNOLOGIES CORPORATION
LOGIBEC GROUPE INFORMATIQUE LTEE.
SHL SYSTEMHOUSE INC

Topic and Subtopic:
6.5:Software Automation :Computer Aided Translation

CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION
SHL SYSTEMHOUSE INC

Topic and Subtopic:
6.6:Software Automation :Computer Aided Animation

A&D INFORMATICS SOFTWARE LTD.
CAE ELECTRONICS LTD.
INTERNATIONAL TELEMETRICS LTD.
NORPAK CORPORATION
SHL SYSTEMHOUSE INC

Topic and Subtopic:
6.7:Software Automation :Electronic Publishing

ABALL SOFTWARE INC
DYNAPRO SYSTEMS INC.
IDON CORPORATION
INTERNATIONAL TELEMETRICS LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
MICROSTAR SOFTWARE LTD
PAMAP GRAPHICS LTD.
SHL SYSTEMHOUSE INC

Topic and Subtopic:
6.99:Software Automation :Other

CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION
DY-4 SYSTEMS INC.
DY-4 SYSTEMS INC.
DY-4 SYSTEMS INC.
GEAC COMPUTERS INTERNATIONAL LTD.
INTERACTIVE IMAGE TECHNOLOGIES
KIS INFORMATION SYSTEMS INC.
NORDCO LIMITED.
PACIFIC LEARNING INSTITUTE LTD.
PAMAP GRAPHICS LTD.

Topic and Subtopic:
7.1:Human-Machine Interface :Intelligent Input/Output

ABALL SOFTWARE INC
AISI RESEARCH CORP.
CAE ELECTRONICS LTD.
CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION
CANADIAN ASTRONAUTICS LTD
DY-4 SYSTEMS INC.
DYNAPRO SYSTEMS INC.
INTERACTIVE IMAGE TECHNOLOGIES
INTERA TECHNOLOGIES LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
LINEAR SYSTEMS LTD.
NORDCO LIMITED.
SHL SYSTEMHOUSE INC

Topic and Subtopic:
7.2:Human-Machine Interface :Speech Recognition

AISI RESEARCH CORP.
BECK TECHNOLOGY INC.
CAE ELECTRONICS LTD.
LOGIBEC GROUPE INFORMATIQUE LTEE.
MOBILE DATA INTERNATIONAL INC.
SHL SYSTEMHOUSE INC

Topic and Subtopic:
7.3:Human-Machine Interface :Voice Recognition

AISI RESEARCH CORP.
BECK TECHNOLOGY INC.
CAE ELECTRONICS LTD.
DEES COMMUNICATION ENGINEERING LTD
MOBILE DATA INTERNATIONAL INC.
SHL SYSTEMHOUSE INC

Topic and Subtopic:
7.4:Human-Machine Interface :Visual Pattern Recognition

AEG BAYLY ENGINEERING LTD
BECK TECHNOLOGY INC.
CAE ELECTRONICS LTD.
CANADIAN ASTRONAUTICS LTD
LOGIBEC GROUPE INFORMATIQUE LTEE.
NORDCO LIMITED.
NORPAK CORPORATION

Topic and Subtopic:
7.5.1:Human-Machine Interface:Visual Display and Printing

CAE ELECTRONICS LTD.
IMPERIAL SIGN CORP.
INTERNATIONAL TELEMETRICS LTD.
INTERNATIONAL TELEMETRICS LTD.
MACDONALD DETTWILER LTD
MICROLIGHT COMPUTER SYSTEMS LTD.
MICROSTAR SOFTWARE LTD
NORPAK CORPORATION

Topic and Subtopic:
7.6:Human-Machine Interface :Laser Printing

CAE ELECTRONICS LTD.
CANADIAN ASTRONAUTICS LTD
INTERNATIONAL TELEMETRICS LTD.
MOBILE DATA INTERNATIONAL INC.
NORDCO LIMITED.

Topic and Subtopic:
7.5.2:Human-Machine Interface:High Definition Television

LITTON SYSTEMS CANADA LTD.
NORDCO LIMITED.

Topic and Subtopic:
7.5.4:Human-Machine Interface:Three Dimensional Display

MICROSTAR SOFTWARE LTD

Topic and Subtopic:
7.99:Human-Macine Interface :Other

A&D INFORMATICS SOFTWARE LTD.
ABALL SOFTWARE INC
DYNAPRO SYSTEMS INC.
GANDALF SYSTEMS GROUP
LITTON SYSTEMS CANADA LTD.

Topic and Subtopic:
8.1:Cmpnts, Devices,materials:Micro-Electronics

AISI RESEARCH CORP.
CAE ELECTRONICS LTD.
CALMOS SYSTEMS INC
DYNAPRO SYSTEMS INC.
EPITEK INTERNATIONAL INC.
GANDALF SYSTEMS GROUP
INTERNATIONAL TELEMETRICS LTD.
LINEAR SYSTEMS LTD.
LNS SYSTEMS INC.
LITTON SYSTEMS CANADA LTD.
MOBILE DATA INTERNATIONAL INC.
NORPAK CORPORATION
NORSAT INTERNATIONAL
SEASTAR INSTRUMENTS LTD
TEECOM ELECTRONICS INC.
TELEMUS ELECTRONIC SYSTEMS INC

Topic and Subtopic:
8.2:Cmpnts, Devices,materials:Optical and Optoelectronic Devices

AISI RESEARCH CORP.
CAE ELECTRONICS LTD.
CRES ELECTRONICS CORPORATION
LINDSAY SPECIALTY PRODUCTS LTD.
LNS SYSTEMS INC.
LITTON SYSTEMS CANADA LTD.
MOBILE DATA INTERNATIONAL INC.
POSITRON INC.
SEASTAR INSTRUMENTS LTD

Topic and Subtopic:
8.3:Cmpnts, Devices,materials:Sensors and Transducers

ALMAX INDUSTRIES LTD.
ANATEK MICROCIRCUITS INC
AISI RESEARCH CORP.
CAE ELECTRONICS LTD.
CANADIAN ASTRONAUTICS LTD
C-TECH LTD.
INTERNATIONAL TELEMETRICS LTD.
INTERA TECHNOLOGIES LTD.
LINDSAY SPECIALTY PRODUCTS LTD.
MOBILE DATA INTERNATIONAL INC.
NORDCO LIMITED.

Topic and Subtopic:
8.99:Cmpnts, Devices,material:Other

A&D INFORMATICS SOFTWARE LTD.
AISI RESEARCH CORP.
C-TECH LTD.
NORDCO LIMITED.

Topic and Subtopic:
9.1:Artificial Intelligence :Expert Systems

ACQUIRED INTELLIGENCE
INTERACT RESEARCH AND DEVELOPMENT
SYDNEY DEVELOPMENT CORPORATION

Topic and Subtopic:
9.3:Artificial Intelligence :Natural Language processing

CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION

Topic and Subtopic:
9.4:Artificial Intelligence :Machine translation

CANADIAN ARTIFICIAL INTELLIGENCE PRODUCTS (CAIP) CORPORATION

Topic and Subtopic:
9.5:Artificial Intelligence :Vision systems

GENERAL CYBERNETICS