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HIGH TECHNOLOGY OPPORTUNITIES

Geomatics

Canada

Geomatics is the science, applications and technology involved in managing geographically referenced information. This includes the acquisition, storage, analysis, display and distribution of this information. It also includes consulting, applications development and training in:

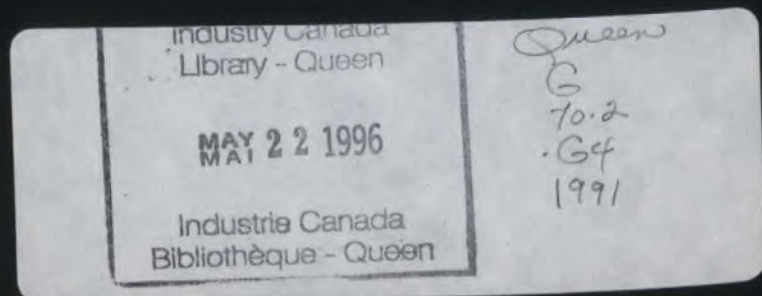
- Geographical Information Systems
- Remote Sensing
- Mapping
- Surveying

"We greatly admire and respect TYDAC's technology and leadership in spatial analysis and, bringing this power together with our VISION™ product line, we will be able to offer users the most effective and scaleable GIS solutions in the world."

Doug Seaborn
CEO
GeoVision Systems Inc.
Ottawa, Canada

"For many years ESRI has recognized the high quality of technical and professional training that is provided in Canadian educational institutes. We and our GIS customers have benefitted greatly by being able to hire qualified staff that know GIS at the concept level as well as the practical level."


Jack Dangermond
President
ESRI Systems Inc.
Redlands, California



HIGH TECHNOLOGY OPPORTUNITIES

Geomatics...
technologies that span
the globe

Canada



Geomatics is defined as technologies and services involved in managing geographically referenced information, specifically in:

- Geographical Information Systems
- Remote Sensing
- Mapping
- Surveying

Canada – A Pioneer in Spatial Information Technology

Since World War II, Canada has played a pivotal role in the rapidly expanding spatial information technology market. As the second largest country in the world, Canada has met the challenges of mapping and charting a vast land and coastline by developing customized solutions. Canada's outstanding performance in Geomatics is recognized worldwide. Over the decades, Canadian landmark achievements have included:

1960s Geographic Information Systems (GIS)

Canada was the first to invent and apply GIS technology in nationwide forestry management.

1970s The Land Registration Information System (LRIS)

Canada developed the first land management system to integrate survey control, land records, base mapping and property mapping. The LRIS has been widely adopted as a model for land records programs in the U.S., Australia and other countries.

1980s Electronic Chart System (ECS)

Canada created the first ECS, a collision and ground-avoidance system for ships. The ECS integrates digital hydrographic chart data with real-time positioning information, radar, gyro compass and other sensors.

1990s RADARSAT

In 1995, Canada will launch RADARSAT, the world's first earth observation satellite system containing a synthetic aperture radar capable of penetrating cloud cover and darkness.

The Canadian Advantage

Nine reasons why your firm should join forces with a Canadian Geomatics partner.

Capability

1. Recognition of Canadian expertise in geomatics technology and services.

Markets

2. Strong and rapidly growing Canadian market for geomatics equipment and services.

3. North American market opportunities.

4. A freer flow of goods and services under the North American Free Trade Agreement (NAFTA).

Industry-University-Government Links

5. An extensive research and engineering infrastructure supported by public and private sector financing.

6. Strong government support for technology transfer, product development, export marketing and financing.

Favourable Tax Structure

7. Competitive tax mechanisms for research and development.

8. Competitive corporate tax structures.

Sophisticated Infrastructure

9. An extensive and cost-effective transportation and communications network.



Applying G.I.S. to
Forestry
Management.
Courtesy of
Forestry Canada.

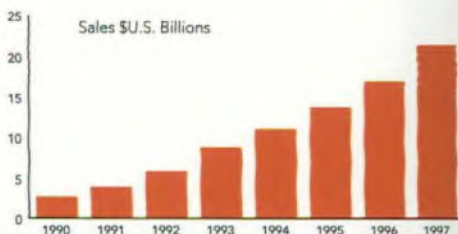
A Key Player in a Lucrative North American Market

Geomatics is projected to be the fastest growing segment of an information technology market which is expected to reach US\$500 billion by 1994. An estimated US\$400 billion will be spent worldwide on value-added spatial information between now and the year 2000. The remote sensing world market, virtually non-existent 5 years ago, is now growing at close to 20% annually. The GIS market is expected to reach US\$20 billion by 1997, marking an outstanding 50% annual growth rate.

With North America representing over 50% of the world geomatics market, Canada provides an excellent gateway to this expanding market. Under the North American Free Trade Agreement (NAFTA), which

comes into effect January 1, 1994, Mexico will also be included in the free trade zone for geomatics products and services that already exists between Canada and the United States.

World Market for GIS Revenue Forecasts
1990-1997



Source: Market Intelligence Research Corporation,
Mountainview, Ca., 1991

"The Centre for GIS was the winner of the 1992 URISA award for exemplary Systems in government. Intera Information Technologies has done an excellent job in providing high-quality digital mapping to enable us to build a topologically structured digital topographic database that helped us to win the URISA award."

Ahmed Bin Hamad Al-Thani
Minister of Municipal Affairs
and Agriculture,
Government of Qatar

The Canadian Geomatics Market – Vibrant and Growing!


The Canadian geomatics industry comprises over 1,300 companies employing more than 12,000 highly trained professionals. In 1983, the industry's total revenues stood at CDN\$340 million. By 1990, this figure had more than doubled to CDN\$750 million. The two fastest growing segments of the market, remote sensing and GIS, account for about one-quarter of Canada's geomatics sales and for a growing portion of employment in the sector.

Canadian firms offer a variety of products and services, with well known strengths in many geomatics sub-sectors including cartography, geodetic/control surveying, hydrography, geographical information processing and consulting, photogrammetric and cadastral mapping, remote sensing, software development and training. Canada currently supplies:

- 90% of the world's most advanced high-resolution airborne radar systems
- 15% of the world market demand for remote sensing products and services
- 50% of the global demand for all electronics associated with satellite data ground-receiving stations
- 25% of all image processing systems
- 70% of the world's market for geophysical airborne surveys services and equipment



DOLPHIN, a remotely operated vehicle (ROV), maps the ocean floor. Courtesy of Geo-Resources Inc.



To receive additional information on the Canadian geomatics industry, including detailed profiles of Canadian geomatics firms seeking business partners, contact:

The Canadian Embassy, High Commission or
Consulate General nearest you

Or...

Investment Canada
P.O. Box 2800
Station "D"
Ottawa, Ontario
Canada K1P 6A5
Tel: (613) 995-0796
Fax: (613) 996-2515

Please send information on Canadian Geomatics Business Opportunities to:

Name: _____

Title: _____

Company: _____

Address: _____

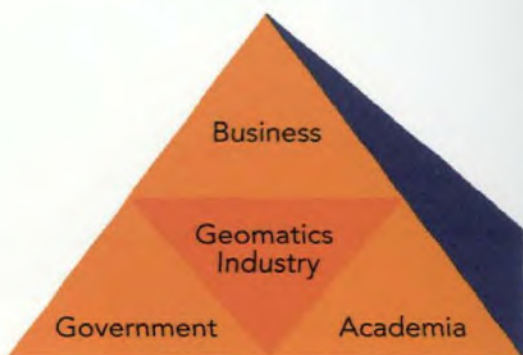
Tel: _____

Fax: _____

Canada – a Leader in Research and Development

Strong linkages between industry, universities and government in this sector have resulted in a solid research and development capability. Canadian firms currently spend over 6.5% of their gross revenues on R&D. Canada's dynamic geomatics research community now spans over 70 universities, colleges, federal and provincial research facilities and industrial consortia.

A Triad of Interests



"The Banff Centre for Management is unique to North America – indeed the world – in providing GIS education that manages to be both thorough and innovative. Both in content and facilities, Banff's professional offerings are truly outstanding."

John Antenucci,
President
PlanGraphics Inc.
Frankfort, KY

Selected Research Organizations in Canada

Research Centre	Area of Specialization
Department of Geography, Memorial University, Newfoundland	GIS/Remote sensing and human- computer interaction
Atlantic Centre for Remote Sensing of the Oceans, Nova Scotia	Airborne and satellite remote sensing of the ocean and coastal areas
Department of Surveying Engi- neering, University of New Brunswick, New Brunswick	Ocean mapping, GPS, systems development and land informa- tion management
Centre de recherche en géoma- tique, Faculté de foresterie et de géomatique, Université Laval, Québec	GIS implementation, data uncer- tainty, real-time and temporal GIS and forestry geomatics
Centre d'application du télédétection, Université de Sherbrooke, Québec	Remote sensing/GIS integration and applications research in resource management and envi- ronmental monitoring
Institute for Space and Terrestrial Science, York University, Ontario	Satellite sensor development and quantitative remote sensing
Centre for Land Information Management, Department of Survey Science, University of Toronto (Erindale), Ontario	GIS/expert systems applica- tions and land information management
Department of Geography, University of Waterloo, Ontario	Digital image analysis and remote sensing applications development
Department of Geography, University of Western Ontario, Ontario	PC-based GIS software development
Department of Geomatics Engineering, University of Calgary, Alberta	Satellite positioning, vehicle nav- igation and systems integration
Alberta Research Council, Alberta	Integration of GIS and know- ledge-based systems and appli- cation of GIS to resource management, environmental and geological problems
Forest Information Resource Management Systems (FIRMS) Group, University of British Columbia, British Columbia	Remote sensing/GIS integration for resource management
Department of Geography, University of Victoria, British Columbia	Cartographic presentation, GIS applications development and application of remote sensing to problems in forestry and geography

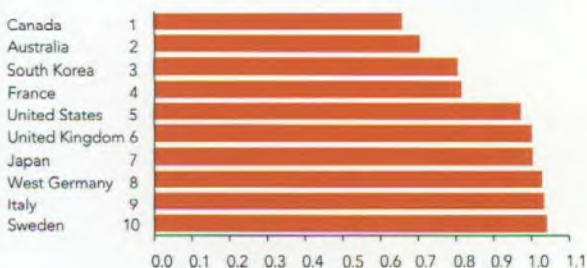
Canada Provides Generous Tax Support

A 1990 study by the Conference Board of Canada reveals that the Canadian corporate tax system provides greater overall incentive for companies to engage in research and development than do the tax systems of nine other leading industrial countries. The study also shows that the Canadian tax incentives for R&D can reduce the costs of doing \$1.00 worth of research to \$0.65. United States incentives reduce the cost to only \$0.97.

At present, Canada's federal tax incentives for R&D include deductibility of current expenses (i.e. wages, materials) and capital expenses (i.e. machinery and equipment), with the exception of expenses incurred by a building, which have to be depreciated. A further 20% investment tax credit is available to all firms. These federal incentives, combined with significant provincial R&D tax incentives, make Canada's overall tax treatment of R&D among the most favourable in the western world.

The Canadian corporate taxation system is also highly competitive, providing specific advantages for companies with manufacturing or R&D activities in Canada.

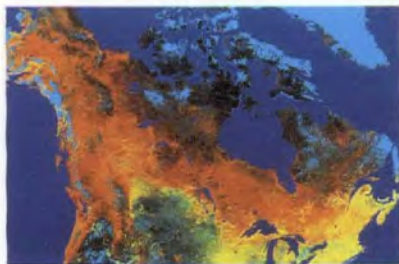
**The Cost of Doing \$1.00 Worth of Research;
A 10-Country Comparison**



Source: The Conference Board of Canada Report, 55-90, p.13, May 1990

Cost Effective and Efficient Infrastructure

- Canada received the highest rating by the World Economic Forum for transportation, communications and power supply infrastructure among the G-7 countries in the 1990 survey of international business leaders.
- Canada features one-day air courier services across the entire North American continent with no customs delay.
- Canada has one of the most reliable and sophisticated telecommunications systems in the world, featuring integrated, privately owned, direct dial facilities with competitive prices across Canada and the world.
- There are common-carrier computer and electronic mail networks that span the Canada/U.S. border and cover the entire globe.
- Canada has very efficient transportation systems featuring frequent air links between major metropolitan centres, with many non-stop morning and evening return routes.




Composite image of Canada produced by the Canadian Centre for Remote Sensing from NOVA AVHRR Data. Courtesy of Energy, Mines and Resources Canada.

Partner with a World-Class Canadian Company

From the most advanced remote sensing, GIS, surveying and mapping technologies, to consulting and training, Canada is a world leader. The following is a sampling of the many geomatics activities and applications spearheaded by Canadian companies:

- The DOLPHIN, built by International Submarine Engineering Ltd. (ISE) and used by Geo-Resources Inc., is a remote-controlled semi-submersible vehicle that is fitted with a multi-beam swath echosounder and positioned by a differential GPS to portray ocean mapping information.
- Nortech Surveys (Canada) Inc. has developed a unique airborne data acquisition system called Digital Video Geographic (DVG) for route and forest inventory.
- EASI/PACE, a software package by PCI Enterprises, displays remotely sensed optical and radar imagery. It is used internationally to monitor and map resources, land use and the environment.
- The Ice Data Integration and Analysis System (IDIAS) developed by MacDonald Dettwiler and Associates Ltd. provides sea-ice mapping, monitoring and forecasting services for the Canadian Arctic and Atlantic and the Great Lakes.
- CARIS is a GIS software package developed by Universal Systems Ltd. which offers a full topology and true three-dimensional data structure in an integrated raster/vector environment. Universal Systems also offers a hydrographic information processing system designed specifically to process data collected by echo-sounders.
- ORACLE Corporation Canada is developing an extension to the ORACLE Relational Data Base Management System (RDBMS) which will permit the efficient management of complex multi-dimensional, geo-referenced or spatio-temporal data within the RDBMS.

Canadian Geomatics
Partners –
See Poster on
Reverse Side!



To receive additional information on the Canadian geomatics industry, including detailed profiles of Canadian geomatics firms seeking business partners, contact:

The Canadian Embassy, High Commission or
Consulate General nearest you

Or...

Investment Canada
P.O. Box 2800
Station "D"
Ottawa, Ontario
Canada K1P 6A5
Tel: (613) 995-0796
Fax: (613) 996-2515

Please send information on Canadian Geomatics Business Opportunities to:

Name: _____

Title: _____

Company: _____

Address: _____

Tel: _____

Fax: _____

Succeed with Canadian Geomatics Partners

Company	Technology Focus	Address
BCGT Inc.	GIS consulting and systems integration	#295 - 710 rue Bouvier Quebec, PQ Canada, G2S 1C2 Tel: (418) 622-8411 Fax: (418) 622-0427
Béliveau-Couture Group	Provides a full range of geomatic services	2797, rue Watt Sainte-Foy, PQ Canada, G1P 3X3 Tel: (418) 656-1572 Fax: (418) 656-6910
Digital Resource Systems (Canada) Ltd.	GIS software developers for micro-computers and work stations for natural resource and municipal applications.	#402 - 495 Dunsmuir St. Nanaimo, BC Canada, V9R 2V2 Tel: (604) 753-7122 Fax: (604) 753-1700
DMR Group Inc.	GIS/LIS-related consulting services	#1200 McGill College Ave. Suite 2300 Montreal, PQ Canada, H3B 4G7 Tel: (514) 877-3301 Fax: (514) 866-0423
EMCO Geomatics Inc.	Digital cartography and data conversion	8389, avenue Sous-le-Vent Charny, PQ Canada, G6X 1K7 Tel: (418) 832-6163 Fax: (418) 832-8911
ESRI Canada Ltd.	Canadian distributor of ESRI's ARC/INFO™ GIS software; GIS/LIS information processing and consulting	49 Gervais Dr. Don Mills, ON Canada, M3C 1Y9 Tel: (416) 441-6035 Fax: (416) 441-6838
Gendron Lefebvre et Associés	Cartography and Surveying Services	#200 - 1 Place Laval Laval, PQ Canada, H7N 1A1 Tel: (514) 384-1260 Fax: (514) 639-8737
Geo-Resources Inc.	Ocean mapping services, including advanced bathymetric surveys and GPS satellite technology	P.O. Box 2516, Station 'C' St. John's, NF Canada, A1C 6K1 Tel: (709) 747-5599 Fax: (709) 747-8881
GEOsurv Inc.	GPS surveys and survey network applications	#6 - 1050 Baxter Rd. Ottawa, ON Canada, K2C 3P1 Tel: (613) 820-4545 Fax: (613) 820-9772
GeoVision Systems Inc.	Advanced Mapping System (AMS™) and GIS software products	#200 - 1600 Carling Ave. Ottawa, ON Canada, K1Z 8R7 Tel: (613) 722-9518 Fax: (613) 722-5385
Hauts-Mont Inc.	Aerial photography, GPS and mapping	3645, boul. Ste-Anne Beauport, PQ Canada, G1E 3L1 Tel: (418) 667-1913 Fax: (418) 667-7340

Company	Technology Focus	Address
Horler Information Inc.	Development and application of GIS and remote sensing, including HI-VIEW™ software for terrain database generation	#1006 - 130 Albert St. Ottawa, ON Canada, K1P 5G4 Tel: (613) 594-5155 Fax: (613) 594-8679
Hughes Aircraft of Canada Ltd.	Application software development and spatial data systems services in SCADA, GIS, AM/FM	Spatial Data Systems Division #320, 6715 - 8th St. N.E. Calgary, AB Canada, T2E 7H7 Tel: (403) 295-6600 Fax: (403) 295-6676
Integrated Systems Applications Corp.	Designers and implementers of large relational databases	#835, 10040 - 104th St. Edmonton, AB Canada, T5J 2V6 Tel: (403) 420-8081 Fax: (403) 420-8037
Intera Information Technologies Corp.	Design, development and fabrication of remote sensing products for airborne surveillance and reconnaissance	#1000, 645 - 7th Ave. S.W. Calgary, AB Canada, T2P 4G8 Tel: (403) 266-0980 Fax: (403) 265-0499
INTERA TYDAC Technologies Inc.	Development of GIS software and related applications. Develops, markets and supports the SPANIS™ family of GIS products	#210 - 2 Gurdwara Rd. Nepean, ON Canada, K2E 1A2 Tel: (613) 226-5525 Fax: (613) 226-3819
Itres Research Ltd.	Development of electro-optical instruments for remote sensing. Key product is CASI™ (Compact Airborne Spectrographic Imager).	#155, 2635 - 37th Ave. N.E. Calgary, AB Canada, T1Y 5Z6 Tel: (403) 274-7440 Fax: (403) 295-3570
Kanotech Information Systems Ltd.	GIS systems integration. Developers of Spatialist™, a GIS based on AUTOCAD	#105, 13245 - 146St. Edmonton, AB Canada, T5L 4S8 Tel: (403) 455-9197 Fax: (403) 452-4183
LINNET Graphics International Inc.	Systems integration 'or land related information, including GIS and AM/FM	#600 - 191 Broadway Winnipeg, MB Canada, R3C 3T8 Tel: (204) 957-7566 Fax: (204) 957-7568
MacDonald Dettwiler & Associates Ltd.	World's leading supplier of remote sensing ground receiving and processing systems	13800 Commerce Pkwy. Richmond, BC Canada, V6V 2J3 Tel: (604) 278-3411 Fax: (604) 278-2117
McElhanney Geosurveys Ltd.	Marine and geodetic surveys, mapping and GIS services	#100 - 780 Beatty St. Vancouver, BC Canada, V6B 2M1 Tel: (604) 683-8521 Fax: (604) 683-4350
Nortech Surveys (Canada) Inc.	GPS services to oil and gas, engineering and resource industries. DVGS™ is a unique GIS data acquisition system	#1, 820 - 28th St. N.E. Calgary, AB Canada, T2A 6K1 Tel: (403) 248-5000 Fax: (403) 258-5196
Northway Map Technology Ltd.	Mapping and data conversion	44 Upjohn Rd. Don Mills, ON Canada, M3B 2W1 Tel: (416) 441-6025 Fax: (416) 441-2432

Company	Technology Focus	Address
Offshore Systems Ltd.	Electronic charting systems	#107 - 930 W. 1st St. North Vancouver, BC Canada, V7P 3N4 Tel: (604) 986-4440 Fax: (604) 987-2555
Oracle Corporation Canada Inc. Research and Development Centre	World's largest provider of relational database management systems (including spatial data sets) for ocean mapping, resource industries, and ecosystem management	#228 - 975 St. Joseph Blvd. Hull, PQ Canada, J8Z 1W8 Tel: (819) 772-2606 Fax: (819) 772-2830
PAMAP Technologies Corporation	Customized software for environmental surveying and engineering using PAMAP GIS	#200 - 6772 Oldfield Rd. Victoria, BC Canada, V8X 3X1 Tel: (604) 652-8895 Fax: (604) 652-8896
PCI Enterprises	Developer of EASI/PACET™, image analysis software for displaying remotely sensed imagery	#100E - 50 West Wilmot St. Richmond Hill, ON Canada, L4B 1M5 Tel: (416) 764-0614 Fax: (416) 764-9604
Photo-Compilation PMS Inc.	Mapping, geodesy and photogrammetry	2405, ch. Sainte-Foy Sainte-Foy, PQ Canada, G1V 1T1 Tel: (418) 651-5436 Fax: (418) 651-2279
Photosur Geomat (1991) Inc.	Photogrammetric mapping and remote sensing	#300 - 5160 boul. Décarie Montreal, PQ Canada, H3X 2H9 Tel: (514) 369-5000 Fax: (514) 369-5059
RADARSAT International Inc.	Processing and marketing of Landsat, SPOT and ERS1 satellite data	#200 - 3851 Shell Rd Richmond, BC Canada, V6X 2W2 Tel: (604) 231-4913 Fax: (604) 231-4900
Stewart Weir Land Data Inc.	Cartography and surveying products and services.	11411 - 1635t. Edmonton, AB Canada, T5M 3V3 Tel: (403) 451-0679 Fax: (403) 451-3419
Terra Surveys Ltd.	Geodetic, hydrographic, cadastral, photogrammetric, GIS and photo reproduction	2060 Walkley Rd. Ottawa, ON Canada, K1G 3P5 Tel: (613) 731-9571 Fax: (613) 731-0453
Universal Systems Ltd.	Software and systems integration. Developer of CARIS™ GIS system	270 Rookwood Ave. Fredericton, NB Canada, E3B 2M2 Tel: (506) 458-8533 Fax: (506) 459-3849
Usher Canada Ltd.	A complete range of surveying services	#101, 10335 - 172 St. Edmonton, AB Canada, T5S 1K9 Tel: (403) 484-4644 Fax: (403) 486-1134
Western Photogrammetry A Division of UMA Engineering Ltd.	GIS-related services for municipal applications, urban and regional planning	17007 - 107 Ave. Edmonton, AB Canada, T5S 1G3 Tel: (403) 486-7000 Fax: (403) 486-7070

Sponsored by:

- Energy, Mines and Resources Canada
- External Affairs and International Trade Canada
- Fisheries and Oceans
- Geomatics Industry Association of Canada (GIAC)
- Industry, Science and Technology Canada
- Investment Canada

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- Investment Canada

OPPORTUNITIES IN GEOMATICS

COMPANY	Remote Sensing	G.I.S.		Surveying	Mapping	Hydrography	Consulting	Training
		Software	Applications					
BCGT Inc.			X		X		X	
Beliveau-Couture Group (The)			X	X	X			
Digital Resource Systems Ltd.			X				X	X
DMR Group Inc.			X				X	
EMCO Geomatics Inc.			X		X			
ESRI Canada Ltd.		X					X	X
Gendron Lefebvre Inc.			X	X	X			
Geo-Resources Inc.	X					X		
GEOsurv Inc.	X			X				X
GeoVision Corporation		X					X	X
Hauts-Monts Inc.			X		X			
Horler Information Inc.	X						X	X
Hughes Aircraft of Canada Ltd.			X				X	X
Integrated Systems Applications Corp.			X				X	
INTERA TYDAC Technologies Inc.		X					X	X
Intera Information Technologies Ltd.	X		X		X		X	
Itres Instruments	X						X	

OPPORTUNITIES IN GEOMATICS

COMPANY

COMPANY	Remote Sensing	G.I.S.		Surveying	Mapping	Hydrography	Consulting	Training
		Software	Applications					
Kanotech Information Systems Ltd.		X						
LINNET Graphics International Inc.			X		X		X	X
MacDonald Dettwiler & Associates	X						X	
McElhanney Geosurveys Ltd.				X	X	X	X	
Nortech Surveys (Canada) Inc.	X		X					
Northway Map Technology Ltd.	X		X	X				
Offshore Systems Ltd.	X					X		
PAMAP Technologies Corporation		X					X	X
PCI Inc.	X							
Photosur Geomat (1991) Inc.			X	X	X		X	
RADARSAT International Inc.	X							
Steward Weir Land Data Inc.	X		X	X	X			
Terra Surveys Ltd.				X	X	X	X	
UMA GIS			X	X	X		X	X
Universal Systems Ltd.		X				X	X	X
Usher Canada Ltd.	X							
Western Photogrammetry			X	X	X		X	X

RADARSAT INTERNATIONAL INC.

#200 – 3851 Shell Road
Richmond, British Columbia
CANADA V6X 2W2

Telephone: (604) 231-4913
Facsimile: (604) 231-4900

Contact:
Mr. Robert E. Tack, President

NATURE OF BUSINESS

RADARSAT International's (RSI) primary role is to internationally market and distribute data from RADARSAT and to help pioneer the commercial use of this data worldwide. RSI is committed to educate potential users about the features of the satellite and to demonstrate how RADARSAT data can provide important information to users in many application areas.

MAJOR ACHIEVEMENTS

RSI helped to establish the ERS Consortium to promote, market and distribute data from the ERS-1 earth observation satellite. The consortium includes Eurimage of Rome, Italy, RADARSAT International and Spot Image of Toulouse, France.

COMPANY PROFILE

- Established: 1988
- Annual Revenue: \$2 million
- Employees: 24
 - R&D/Engineers: 6
 - Marketing: 10
 - Production: 3
 - Administration: 5
- R&D Expenditures: \$800,000

COMPANY BACKGROUND

RADARSAT International Inc. (RSI) was established by a consortium of leading Canadian aerospace companies: Spar Aerospace Ltd.; MacDonald Dettwiler and Associates Ltd., and COM DEV Ltd.

RADARSAT is an advanced Earth observation satellite developed by the Canadian government and is Canada's first remote sensing satellite. RADARSAT data products will be accessible to commercial, government and scientific users around the world. RADARSAT is scheduled for launch in 1995 and is designed for a five-year lifetime.

Equipped with a Synthetic Aperture Radar (SAR) system, data is transmitted from the satellite in real time to a ground station or stored on RADARSAT's tape recorders for subsequent down-link. RADARSAT's SAR is able to "see through" darkness, clouds, fog and haze, and thus provides significant advantages in viewing the Earth under conditions that preclude observation by aircraft or optical satellite sensors.

continued

PRODUCTS/BUSINESS DESCRIPTION

Some of the potential applications of the RADARSAT data include:

Agriculture

- Crop Type Identification
- Soil Conservation Assessment

Cartography

- Base Map Production

Coastal/Oceans

- Coastal Zone Mapping
- Aquaculture Site Detection
- Ship Detection
- Oil Spill Detection
- Wave Spectra Derivation
- Ocean Circulation Features Mapping

Forestry/Geology/Hydrology

- Clear Cut Mapping
- Terrain Mapping
- Flood Mapping
- Snow and Freshwater Ice Mapping
- Soil Moisture Estimation

Sea Ice/Land Use

- Ice Type/Features Mapping
- Land Cover Mapping

The markets for these applications are expected to comprise resource managers in Europe, North America, Asia/Pacific Rim, Latin America, the Middle East and Africa.

CURRENT MARKETING ACTIVITIES

To ensure the best possible service to the user community after RADARSAT's launch, RSI is currently:

- Building marketing and distribution experience through the sale of Landsat and SPOT data in Canada and ERS-1 data products in Canada and the United States.
- Supporting the development of SAR applications and associated products by working with industry, government and universities.
- Developing user support materials.
- Establishing international education and professional development programs to enhance the transfer of technology to the international user community.

RSI has entered into a co-operative marketing and product development agreement with SPOT IMAGE S.A. of Toulouse, France. Under the terms of the three-year agreement, SPOT IMAGE and RSI will explore mutual international marketing opportunities, co-ordinate marketing activities, share marketing and sales expertise, and evaluate ways to combine optical and radar imagery with a view to expanding the market and increasing each company's market share.

PARTNERING INTERESTS

RSI is interested in contacting individuals and organizations that would like to:

- Evaluate the potential contribution of RADARSAT to their specific application needs.
- Distribute RADARSAT data in any country or region outside of North America.

EMCO GEOMATICS INC.

8389, avenue Sous-le-Vent
Charny, Quebec
CANADA G6X 1K7

Telephone: (418) 832-6163
Facsimile: (418) 832-8911

Contact:
Mr. Claude Levasseur, President

NATURE OF BUSINESS

EMCO Geomatics Inc. uses the most advanced data processing and graphic technologies to produce high-quality digital base mapping systems which serve as the basis for all geographic information systems (GIS).

MAJOR ACHIEVEMENTS

- Converted base maps for AM/FM application (cable network, Videotron-Quebec).
- Used soft photogrammetry concepts (DVP software) for cartography of one thousand of 1:1000 digital maps. (Gaz Metropolitain).
- Participated in development of DVP software (soft photogrammetry).
- Used FRAMME technology to convert telephone networks to digital format.

COMPANY PROFILE

- Established: 1971
- Annual Revenue: \$1 million
- Employees: 15
 - R&D: 1
 - Administration: 1
 - Sales and Service: 1
 - Production: 12
- R&D Expenditures: \$75,000(in association with parent companies)

COMPANY BACKGROUND

EMCO Geomatics Inc. is a privately owned company incorporated under the laws of the Province of Quebec in 1986. EMCO's affiliate companies, Émond, Coulombe et associés (a survey engineering society concentrating on geodetic and cadastral surveying) and DVP Geomatics Systems (a software development and worldwide marketing company) also operate in the geomatics marketplace.

PRODUCTS/BUSINESS DESCRIPTION

EMCO provides services in the following sectors:

Digitizing

Cable television, forestry, telephone, municipal maps, raster-to-vector conversion

Mapping

Digital cartography, digital maps updating, thematic cartography, environmental applications

Soft photogrammetry

Scanning of aerial photos, image rectification, mapping, DTM, consulting

GIS

Data structuration, municipal management, forestry, public works, consulting

continued

CURRENT MARKETING ACTIVITIES

EMCO Geomatics Inc. developed a partnership with SIGEE in Paris, France, to market geomatics products and services in municipalities.

PARTNERING INTERESTS

EMCO Geomatics Inc. would like to establish a national or international partnership with any firms interested in producing a base map for GIS management or consulting in a national cadastral (tax map) project.

CENTRE DE RECHERCHE EN GÉOMATIQUE UNIVERSITÉ LAVAL

Faculté de foresterie et de géomatique
Pavillon Casault, Université Laval
Sainte-Foy, Québec
CANADA G1K 7P4

Telephone: (418) 656-5491
Facsimile: (418) 656-7411

Contact:
Dr. Yvan Bédard, Director

NATURE OF RESEARCH

The Centre de recherche en géomatique is involved in R&D in digital spatial data acquisition and management in:

- Geographical Information Systems & Cartography
- Geodesy
- Photogrammetry
- Cadastral Studies
- Remote Sensing

MAJOR ACHIEVEMENTS

- Series of continuing education courses
- CASE tools to help GIS designers (cartographic data inventory, spatial data modelling using MODUL-R formalism)
- Image classification software based on segmentation
- Software for the analysis of image texture
- Software to analyse error propagation in GPS network
- Telescopic pole for GPS positioning to avoid obstruction
- Software for digital image rectification
- Automated system for object measuring with CCD cameras
- Tutorials for dynamic GIS and image analysis

RESEARCH GROUP PROFILE

- Established in 1989
- Research team of 12 researchers
 - 4 associate researchers
 - 15 research assistants
 - 40 graduate students
- R&D annual budget: \$1.5 million
- Equipment: \$3.5 million (workstations, GPS receivers, GIS and image analysis softwares, digital videoplotters, etc.)

DESCRIPTION OF RESEARCH

The Centre's research is focused on four areas:

Geomatics Implementation Within Organizations

- GIS design methodologies
- Adaptation or design of Computer-Assisted Systems Engineering software
- Decision support systems adapted to spatial reference
- Organization, legal and social impacts

Spatial Data Integration

- Data uncertainty studies
- Selection of best sources of data
- Data transfer algorithms
- Standards for data exchange

Dynamic Systems

- Historical data and spatial phenomena follow-up
- Real time data acquisition and updating
- Dynamic data structures
- Spatio-temporal analysis

Forestry Geomatics

- Remote sensing application to forestry (MEIS and RADAR data)
- Computer-assisted forest interpretation
- GPS positioning to help forestry operations on the field
- Decision support systems applied to forestry
- GIS applied to forestry
- Historical data for forestry management

continued

CURRENT INDUSTRIAL INVOLVEMENT

- Industrial Chair in Geomatics applied to forestry: Chair funded by Quebec forestry industry and the National Research Council
- Partner in two large projects funded by the Quebec government and industry
- Research contracts with industry (Intergraph, Hydro-Quebec, Gendron-Lefebvre, etc.)
- Research contracts with federal and provincial ministries (resources, mines, forestry, cadastre, environment, etc.) and municipalities
- Collaborations with research groups in other universities, governments and industries.

INDUSTRIAL INVOLVEMENT SOUGHT

The CRG wishes to continue developing partnerships with industry and government agencies for geomatics research and development and marketing of results. CRG is also looking for joint ventures involving continuing education at the international level.

SURVEYS MAPPING AND REMOTE SENSING SECTOR

Energy Mines and Resources Canada
Office of External Relations
580 Booth Street, 14th floor
Ottawa, Ontario
CANADA K1A 0Y7

Telephone: (613) 943-7644
Facsimile: (613) 943-8838

Contacts:

Mr. J.H. O'Donnell, Assistant Deputy Minister
Dr. L. Sayn-Wittgenstein, Director General, CCRS
Mr. R. Gareau, Director, CCG
Dr. M. Allam, Director, GIS Division

NATURE OF RESEARCH

The sector provides research and development in the areas of remote sensing, GIS and mapping in support of the objectives of the Government of Canada, including the development of a strong industry in these areas. Research is conducted through three key groups; the Canada Centre for Remote Sensing (CCRS), the Canada Centre for Geomatics (CCG) and the Geographic Information Systems Division (GISD).

MAJOR ACCOMPLISHMENTS

CCRS has developed the world's most advanced airborne synthetic aperture radar system and is actively involved in developing applications for radar remote sensing in a number of topical areas ranging from forestry and agriculture to ice and oceans. Recently, CCRS developed the first digital elevation model in the world created with radar interferometry.

CCRS has worked with a number of Canadian companies to develop advanced capabilities in radar remote sensing, satellite image data reception and handling, airborne electro-optical sensing, and image processing and artificial intelligence.

CCG was created in response to the explosion in demand for geographic information that accompanied the development of GIS. It has put in place highly specialized processes for the standardization of existing digital data captured over the past 20 years using different systems and technical applications. Processes have also been implemented to feed the National Topographic Data Base (NTDB) through the digitizing of the tremendous number of Canada's topographic maps (over 12,000). These new techniques enable the digitizing, cleaning, correlation, structuring, and the integration of digital topographic data to NTDB standards.

CCG, working with CCRS, put remote sensing into operational use for cartographic purposes. Over the past few years geometric correction of imagery and production of orthoimages was done with potential great economic savings. Several of these technologies have been made available to Canadian industry.

GISD has developed and implemented an innovative prototype GIS applications data base for a heterogeneous GIS environment on a local area network.

GISD has developed a number of prototype applications of GIS using non-GIS data models integrated with spatial data in the GIS domain to improve decision making.

continued

RESEARCH GROUP PROFILE

- The Centres were established on various dates beginning in 1971
- Number of Researchers: 100 (approximately)
- R&D Annual Budget: \$27 million
- Major Equipment
SMRS owns: major remote sensing satellite receiving stations at Prince Albert, Saskatchewan and Gatineau, Quebec; the most advanced airborne radar system currently flying; GPS equipment; ground based spectral radiometers; a full range of image analysis and GIS hardware and software; advanced digital mapping systems; advanced laboratories for digital image and map production; as well as a full operational production facility.

DESCRIPTION OF RESEARCH

- Remote sensing technology development for data acquisition, production, data handling, processing and interpretation
- Remote sensing applications development
- GIS applications development
- Development of a prototype GIS applications data base
- Digital topographic map acquisition, maintenance, management and dissemination
- Development of a GIS browser and linkages to other data bases for data exchange using the most recent technical innovations
- Testing of a variety of attribute models for integration with the sector's spatial data for urban infrastructure management.

CURRENT INDUSTRIAL INVOLVEMENT

SMRS currently works with a range of companies in technology transfer projects, product development and delivery, applications research, service delivery and as partners in international ventures headed by the private sector.

Examples of collaborative research are as follows:

- Active collaboration with Energy, Mines & Resources, defence research establishments, Communications Canada and other federal agencies on various geomatics-related projects.
- Industrial collaboration for the development of an airborne gravity system
- Industrial collaboration for the development of alignment methods for industrial applications
- Industrial collaboration for the development of uncertainty management in spatial information systems
- Industrial collaboration for the development of a precise mobile road survey system
- Development of an airborne forestry management system using remote sensing techniques with funding from the Natural Sciences and Research Council (NSERC) and with strong industrial support
- Active collaboration with several U.S. national laboratories and federal agencies on the use of satellite and inertial navigation systems for precise kinematic positioning.

INDUSTRIAL INVOLVEMENT SOUGHT

SMRS is willing to participate in

- joint ventures,
- personnel exchanges,
- shared R&D.

UNIVERSITÉ DE SHERBROOKE

Centre d'applications et de recherches en télédétection
(CARTEL)
Sherbrooke, Québec
CANADA J1K 2R1

Telephone: (819) 821-7180
Facsimile: (819) 821-7944

Contact:
Dr. Ferdinand Bonn, Director, Research

NATURE OF RESEARCH

CARTEL has three major research axes:

- The physical aspects of remote sensing, including data calibration and radiometric correction. This includes applications in the field of surface changes. Research uses a mobile ground measurement unit and correction models.
- Image processing and GIS, including the development of new approaches using the texture spectrum and segmentation.
- Development of applications based on the integration of multisource data. Examples include spatial modelling of soil erosion and humidity, modelling of climatic changes in the boreal forest, development of methodologies based on imaging spectrometers, texture analysis and desertification.

MAJOR ACHIEVEMENTS

- Development of atmospheric and radiometric correction softwares
- Establishment of the only remote sensing Ph.D. program in Canada, which started in 1990 with an enrollment of 22 Ph.D. students, half from foreign countries
- Research, technology transfer and international co-operation with many countries (France, Belgium, Morocco, Dominican Republic, Costa Rica, Bolivia, Sweden, Finland, Ivory Coast, Mali, Burkina Faso, Niger, Thailand, Vietnam)
- Co-ordination of the international network of francophone remote sensing laboratories (900 scientists in 40 countries), including grants and fellowship management
- Development of integrated, systematic approaches for GIS based environmental modelling such as erosion risk mapping and global change biomass evolution
- Publication of the first French language hardcover remote sensing textbook in 1992, which was nominated for the Roberval Prize in Paris. Over 2,000 copies were sold in less than a year, second printing in progress.
- Development of original texture spectrum and image segmentation algorithms

DESCRIPTION OF RESEARCH

A detailed description of ongoing research is available each year, including a list of publications. Enquiries should be sent to Paul Gagnon, assistant to the director.

continued

RESEARCH GROUP PROFILE

Dr. C. Ansseau (Ecology)
Dr. G.B. Bénié (Image segmentation)
Dr. F. Bonn (Thermal, microwave, soils)
Dr. J.-M.M. Dubois (Lithoral and marine applications)
Dr. H.B. Granberg (Micro-climatology, snow and ice)
Dr. Q.H.J. Gwyn (Radar, geology)
Dr. D.C. He (Texture analysis)
Dr. D. Morin (Urban areas)
Dr. N.T. O'Neil (Radioactive transfer, spectrometry)
Dr. R. Paquette (Tropical environment)
Dr. A. Royer (Atmosphere, global change)

In addition to the 11 scientists, the Centre has 12 associate researchers from the private and public sectors.

EQUIPMENT:

Image Analysis System

MICRO-VAX based DIPIX ArRIES III System including:
EIKONIX digitizing camera, ACT-II ink-jet plotter, IMAPRO film printer, 2 workstations, software: ARIES III - 2 PCI micro-computer based stations and peripherals - Micro-computer based ERDAS station and peripherals - SPANS, PAMAP, IDRISI and GRASS geographic information systems and, INTERGRAPH Micro-station - IBM RISC 6000 Laboratory (3 Stations) - IBM PS2 55SX Laboratory (10 stations)

Spectro-Radiometry Laboratory and Field Equipment

Barnes PRT-5 & PRT-10, EXOTECH, SPOT CIMEL and SPECTRON radiometers, SONOTECH Solar Sunphotometer and AGEMA thermal camera - Truck equipped with hydraulic ladder - Mobile unit for use during ground campaigns, illumination and reflectance standards.

UNIVERSITY/INSTITUTE INVOLVEMENT

CARTEL is part of the letter and human sciences faculty since it grew out of the geography department. However, it is a strongly interdisciplinary centre including physicists, mathematicians, geologists, botanists, geographers and engineers. The research programs at CARTEL support students involved in the Remote Sensing Ph.D. program, but also M.Sc. students in geography, biology, environment and electrical engineering.

CURRENT INDUSTRIAL INVOLVEMENT

The Centre is involved in projects with various private firms, for example, SNC-Lavalin, SPAR Aerospace and Groupe SM Inc. The Centre also has collaborations with other university research groups (in Canada and elsewhere). The Centre is involved in research and technology transfer projects in Morocco, Cote d'Ivoire, Bolivia, Mali, Niger, Burkina Faso, Costa Rica, the Dominican Republic and Vietnam.

INDUSTRIAL INVOLVEMENT SOUGHT

Co-operative joint ventures with industry are welcome, especially in software development on the international scene.

PRODUCTS/BUSINESS DESCRIPTION

ArcForest is a Forest Management Decision Support System designed to assist foresters and natural resource managers in making complex decisions in managing multiple uses of forested lands. Designed for use by both government and industry forestry organizations, the system features a forest records management system, tools for strategic and operational planning, and a system implementation support module. ArcForest is designed to be easy to use for end users and as a development tool for value-added partners who wish to develop additional tools.

PC TIN is a digital terrain modelling package designed for use with PC ARC/INFO on DOS computers. PC TIN allows users to build complex surface models from a variety of 3D data sources and perform analysis such as surface viewing, contouring, watershed determination, volume and surface area calculations and more.

LRIS is a municipal application for land parcel query and maintenance and analysis including legal notification, zoning, building permitting and more. LRIS is developed in ARC/INFO and ORACLE.

Land Records Management ESRI Canada is partnering with a number of organizations to develop Land Management capabilities. This includes developing a Cadastral Data Management System for the Province of British Columbia, a spatial data base for the Province of Alberta, a Cadastre for the Province of Quebec and a Land Records Management Infrastructure for the Province of Nova Scotia. These systems all manage large data bases and provide on-line access over wide area networks.

CURRENT MARKETING ACTIVITIES

ESRI Canada uses the ESRI international distributor network covering 90 countries to access international markets for Canadian products and services. Distributors provide local marketing and technical support and access to key government officials. ESRI Canada has successfully teamed with distributors on several large international projects.

PARTNERING INTERESTS

ESRI Canada is interested in collaborating in the following areas:

- Building Value-Added Partnerships (VAPs) with forestry consulting companies to provide services, value-added products and support for ArcForest. These partnerships will be in conjunction with ESRI's international distributors.
- Building relationships with companies to develop the Land Records Management Infrastructure markets in South America, Asia and Eastern Europe. ESRI has the international marketing rights for products developed by the LRMI consortium in Halifax, Nova Scotia.
- Seeking companies interested in providing services to School Boards using our new Transportation Optimization and Planning System (TOPS) for school bus route optimization and student planning. This product has a large potential market in the United States.

ESRI CANADA LIMITED

49 Gervais Drive
Don Mills, Ontario
CANADA M3C 1Y9

Telephone: (416) 441 6035
Facsimile: (416) 441-6838

Contact
Alex Miller, President

NATURE OF BUSINESS

ESRI Canada is the exclusive Canadian distributor of GIS software products from Environmental Systems Research Institute Inc. including ARC/INFO, ArcCAD and ArcView.

ESRI Canada also develops value-added software products that are distributed worldwide by ESRI's distribution network.

ESRI Canada's markets include forestry and natural resource management, land records management, municipal, transportation, education, demographic and market analysis.

MAJOR ACHIEVEMENTS

- Developed PC TIN, a DOS-based product for digital terrain modelling, that has been sold in over 100 countries.
- Developed the Oxford County LRIS which won the 1988 URISA exemplary systems in Government award.
- Developed ArcForest, a Forest Management Decision Support System, (FMDSS) in partnership with the Province of Ontario and the Ministry of Natural Resources.
- Teamed with more than 350 organizations across Canada to implement GIS for a wide variety of applications.

COMPANY PROFILE

- Established: 1984
- Employees: 60
 - R&D: 9
 - Consulting and Support: 35
 - Sales: 8
 - Administration: 8
- R&D Expenditures: \$1.1 million

COMPANY BACKGROUND

ESRI Canada is a privately held, Canadian-owned company. The company has averaged over 30 per cent growth per year since its founding in 1984. Head office is located in Don Mills, Ontario, with regional offices in Victoria, Vancouver, Ottawa, Montreal and Halifax. Distributors in over 64 countries sell ESRI Canada's products around the world.

USHER CANADA LIMITED

#101 – 10335-172 Street
Edmonton, Alberta
CANADA T5S 1K9

Telephone: (403) 484-4644
Facsimile: (403) 486-1134

Contact:
Mr. Rager Leeman, President

NATURE OF BUSINESS

Usher Canada Limited (UCL) specializes in geodetic, Global Positioning Systems (GPS), engineering, construction and cadastral surveys. Other services include consulting and project management, high precision industrial metrology and deformation surveys and analysis.

MAJOR ACHIEVEMENTS

- Produced high-precision GPS surveys (2 ppm @ 95% 3D)
- Undertook Kinematic GPS assisted aerial photography
- Completed a feasibility study for the British Columbia Ministry of Environment, Lands & Parks to assess the feasibility of establishing a provincial multi-purpose active control system (ACS) based upon the GPS.
- Developed the RASCAL suite of survey analysis software.

COMPANY PROFILE

- Established: 1928
- Annual Revenue: \$1.5 million
- Employees: 17
 - R&D: 2
 - Administration: 3
 - Sales and Service: 1
 - Production: 11
- R&D Expenditures: \$75,000

COMPANY BACKGROUND

Usher Canada Limited is an independent Canadian company owned and operated by its principals and associates. It has provided professional surveying services on countless projects undertaken for individual owners, multi-national corporations and all levels of government.

PRODUCTS/BUSINESS DESCRIPTION

GPS Surveys

UCL has performed numerous large and small-scale GPS projects in Venezuela, Belize, Vietnam, India, Egypt and Turkey. Currently, the company is pioneering the use of GPS assisted aerial photography.

Engineering Surveys

UCL provides survey consulting services on large construction projects such as thermal generating stations, heavy oil extraction plants, and pulp and paper mills.

Software

The Rascal suite of survey analysis software modules provides enhanced analysis capabilities for 1,2 and 3 dimensional survey networks in a PC compatible or micro-based environment.

CURRENT MARKETING ACTIVITIES

UCL is marketing its survey services throughout Canada, and internationally on a limited basis.

PARTNERING INTERESTS

UCL is interested in:

- Joint ventures or contract work for projects requiring expertise in GPS, geodetic, or engineering surveys.
- Developing authorized dealers for the RASCAL suite of survey analysis software.

PRODUCTS/BUSINESS DESCRIPTION

Universal Systems Ltd. develops, markets and supports three software products:

CARIS (Computer Aided Resource Information System):

CARIS supports the digital cartographer and Geographic Information System (GIS) Manager. CARIS offers an integrated GIS solution with functionality including:

- Data base management
- Attribute inquiries
- Spatial analysis
- Image analysis
- Terrain analysis
- Network analysis
- Top quality map production
- Desktop map publishing

SAMI (Semi-Automatic Mapping Input): SAMI is a fully integrated semi-automatic digitizing system that requires no digitizing table. SAMI converts raster data to vectorized line data semi-automatically and facilitates fast, manual digitization of text, symbols, sounding and spot heights, directly from the graphics screen.

ECMAN (Electronic Chart Manager): ECMAN is a data management system that allows marine equipment manufacturers and system integrators to build their own Electronic Chart Display and Information System. ECMAN, when integrated with navigation sensors, provides an Electronic Chart Display that meets IMO/IHO draft specifications.

Advisory Services: Universal Systems offers advisory services on a range of GIS issues including the creation and management of spatial attribute data bases, system design and analysis, hardware and software technical evaluations, programming, and system installation. Universal Systems also provides its clients with a User Support department, which ensures prompt and comprehensive responses to user inquiries.

CURRENT MARKETING ACTIVITIES

Universal Systems Ltd., markets its software products worldwide. Regional expertise is provided by strategic partners who provide local support for clients in all aspects of implementing GIS technology.

CARIS now runs under UNIX and VMS operating systems. Current marketing activities include the release of CARIS for Windows — a DOS version of CARIS. The software has recently undergone beta testing in New Brunswick and will be released in June 1993.

PARTNERING INTERESTS

Universal Systems would like to establish relationships with strategic partners who will market and support CARIS GIS software.

Universal is also actively seeking to partner with companies in resource management, municipal infrastructure and environmental planning that use digital mapping and GIS.

UNIVERSAL SYSTEMS LTD. (USL)

P.O. Box 3391, Station B
Fredericton, New Brunswick
CANADA E3B 5H2

Telephone: (506) 458-8533
Facsimile: (506) 459-3849

Contact:
Dr. Solem E. Masry, President and CEO

NATURE OF BUSINESS

Universal Systems Ltd. (USL) is a software and systems integration company that develops, supports, and markets Geographic Information System (GIS) and digital mapping software. Universal Systems also carries out GIS research and development projects. The primary product, CARIS (Computer Aided Resource Information System), is a state-of-the-art GIS which has numerous applications in digital mapping and the management of land and marine resources.

MAJOR ACHIEVEMENTS

- CARIS is a highly effective GIS that provides: high mapping accuracy; 2-D and 3-D data representation; raster and vector data integration; the ability to link with many RDBMS; a flexible user interface; and hardware independence.
- Universal's client base now extends to over 300 installations. Universal's software products have been sold in North America, Europe, the Middle East, Africa, Asia, Australia, and the Pacific.
- Universal Systems maintains strong R&D ties with the University of New Brunswick and other academic institutions by carrying out the conversion of academic research into commercially viable, leading-edge technologies and products.

COMPANY PROFILE

- Established: 1979
- Annual Revenue: \$4.5 million (25% from export)
- Employees: 42 (including 30 computer scientists and engineers)
 - R&D: 12
 - Administration: 5
 - Sales and Service: 5
 - Production: 20 (includes user/software support)
- R&D Expenditures: 30% of staff work continuously on product development

COMPANY BACKGROUND

Universal Systems Ltd., incorporated in 1979, is a privately owned Canadian company. Universal Systems is an internationally recognized producer of spatial information systems software. The company has its headquarters and laboratories in Fredericton, New Brunswick. A subsidiary office is located in Vancouver, British Columbia. Universal Systems provides for regional expertise and sales through a number of internationally based strategic partners.

continued

WESTERN PHOTOGRAMMETRY

17007 - 107 Avenue
Edmonton, Alberta
CANADA T5S 1G3

Telephone: (403) 486-7000
Facsimile: (403) 486-7070

Contact:
Mr. Jim Symonds, Manager

NATURE OF BUSINESS

Data capture through aerial photography and linkages to GIS.

MAJOR ACHIEVEMENTS

- 1:20,000 Provincial digital base mapping for Alberta Forestry, Lands & Wildlife
- Digital topographic mapping with cadastral information for communities in the far north. Produced in IGDS and AutoCAD formats
- Digital capture of topographic and cadastral information from aerial photography for the Cities of Mississauga, Brampton, Calgary and Kelowna
- Orthophoto mapping at 1:25,000 for Zimbabwe environmental project

COMPANY PROFILE

- Established: 1961
- Employees: 20
 - R&D: 1
 - Administration: 2
 - Sales & Service: 1
 - Production: 16

COMPANY BACKGROUND

Western Photogrammetry began providing aerial survey services in 1960 and has developed into a mapping company using the latest combination of methods and procedures to generate digital data from aerial photography. Western has a highly skilled cartographic department and a complete photo lab for enlargements and mosaic work.

Western Photogrammetry is a Division of UMA Engineering Ltd., and has an inter-disciplinary approach that enables it to draw support from over one thousand employees.

PRODUCTS/BUSINESS DESCRIPTION

- Control surveys for mapping
- Topographic mapping; DTMs
- Data capture for GIS from aerial photography and satellite images
- Volumes/profiles/cross-sections
- Processing data capture
- Graphics edit for GIS
- Graphics structuring for GIS
- Mosaics
- Reproduction, film processing
- Camera work
- Cartography/drafting

CURRENT MARKETING ACTIVITIES

Western Photogrammetry is presently doing work throughout Canada and is pursuing work around the world.

PARTNERING INTERESTS

Western Photogrammetry is interested in working with other companies to supply digital data for geographic information systems in the resource, environmental and municipal sectors.

UMA GIS

17007 - 107 Avenue
Edmonton, Alberta
CANADA T5S 1G3

Telephone: (403) 486-7000
Facsimile: (403) 486-7070

Contact
Mr. Dale Woodroffe, Director

NATURE OF BUSINESS

UMA GIS is an application specialist in GIS related services for municipal applications, urban and regional planning, environmental planning, resource management, utility and transportation systems, facilities management, cadastral and digital mapping.

MAJOR ACHIEVEMENTS

- Retained by the Town of Sparwood to create a Land Information System for the town
- Development of a Corporate Land Related Information Strategy for the Province of Nova Scotia
- Implemented a Survey Inventory Management System (SIMS) applied to a graphic link to be used in a sewer needs study for The City of Vanier, Ontario
- Retained by Esso Resources Canada to manage their Judy Creek GIS, to provide updates and contour plans and reports on an ongoing basis

COMPANY PROFILE

- Established: 1990
- Annual Revenue: \$750,000
- Employees: 20
 - R&D: 2
 - Administration: 1
 - Sales & Service: 2
 - Production: 15

COMPANY BACKGROUND

The Division is a member of the UMA Group and was formed in 1990 to address the growing GIS market. The Division draws its staff from UMA Engineering, UMA Surveys and Western Photogrammetry. Through UMA's offices throughout Canada and the United States, UMA GIS can provide planners, engineers and economists with GIS application experience.

PRODUCTS/BUSINESS DESCRIPTION

- Needs assessment studies
- System recommendations (hardware and software)
- Pilot project execution
- Automated mapping/facilities management (AM/FM)
- Data capture, conversion and processing
- Full GIS implementation
- GIS training programs and support services

CURRENT MARKETING ACTIVITIES

Presently involved in contracts throughout Canada, in the Caribbean and India

PARTNERING INTERESTS

UMA GIS is looking for alliances with companies which require GIS applications specialists in the municipal, environmental and resource sectors.

CURRENT MARKETING ACTIVITIES

Terra has agent agreements in U.S.A., Kuwait, UAE, Iran and Tanzania. Terra has also formed consortium agreements with major companies in Canada, U.S.A. and Indonesia.

PARTNERING INTERESTS

Terra is interested in collaborating to provide consulting engineering and technical services around the world for surveys and mapping projects. Participation can be at any level, from advisory and supervisory to full responsibility for implementation in partnership/consortium arrangements.

TERRA SURVEYS LIMITED

2060 Walkley Road
Ottawa, Ontario
CANADA K1G 3P5

Telephone: (613) 731-9571
Facsimile: (613) 731-0453

Contact:
Mr. J.W. Milbrath, Executive Vice-President

NATURE OF BUSINESS

Terra Surveys Limited is one of Canada's largest international survey and resource mapping organizations. Terra specializes in the geodetic, hydrographic, cadastral, photogrammetric, GIS and photo reproduction fields.

MAJOR ACHIEVEMENTS

- Provided the geodetic network and large/small scale bilingual (Arabic/English) topographic maps (1.5 million copies) for the entire United Arab Emirates territory.
- Development of an airborne Larsen 500 scanning Lidar bathymeter system.
- Successful completion of international topographic mapping projects in Guyana, Ghana, Tanzania, Nigeria, Zimbabwe, Central African Republic and Indonesia.
- Route location surveys in Paraguay, Morocco and Bhutan.
- Hydrographic surveys, charting and training in Canada, U.S.A., Indonesia and China.

COMPANY PROFILE

- Established: 1966
- Annual Revenue: \$7.5 million
- Employees: 63
 - R&D/Engineers: 5
 - Administration: 4
 - Sales: 2
 - Production: 52

COMPANY BACKGROUND

Terra Surveys Limited is a 100% Canadian-owned company whose shareholders are the professional and technical staff. Headquartered in Ottawa, with branch offices in Sidney, British Columbia; St. John's, Newfoundland; and Abu Dhabi, United Arab Emirates.

PRODUCTS/BUSINESS DESCRIPTION

Hydrographic Services

- Hydrographic surveys (land and airborne)
- Offshore vessel and barge positioning
- Marine geophysics
- Charting

Photogrammetric and GIS Services

- Topographical mapping (digital and conventional)
- Aerial triangulation
- Cross sectioning
- Terrestrial photogrammetry
- Data conversion

Control Surveys

- Control surveys for mapping, route locations, etc.
- First and second order geodetic networks
- GPS surveys and adjustments
- GPS controlled photo (airborne)

Reproduction Services

- A full range of photo-mechanical services

continued

COMPANY BACKGROUND

A member of the Stewart, Weir Group of surveying and engineering companies, Stewart, Weir Land Data has been active in the mapping and land information disciplines throughout North America and worldwide since its incorporation in 1972. The company continues to integrate and apply advanced and innovative technological solutions to its land information portfolio.

PRODUCTS/BUSINESS DESCRIPTION

Mapping: Multi-scale and multi-purpose digital and conventional topographic and cadastral land bases.

Remote Sensing: Digital orthophotography with digital image processing and analysis for resource management, environmental monitoring land use planning and thematic mapping applications using satellite, airborne sensor, conventional and specialized imagery.

Data Conversion: Map, plan and document conversion through raster scanning, raster to vector conversion and automated or manual digitizing.

GIS and AM/FM: Spatial and tabular data base creation, structuring and relational configuration.

Specialized Photogrammetric Services: Digital terrain and surface modelling. Engineering profiles, cross-sections and volume computations. Terrestrial, close range and small format photogrammetric services.

CURRENT MARKETING ACTIVITIES

Stewart, Weir Land Data continues to promote its geomatic services and products in Canada, the United States and worldwide through the direct marketing activities of its full-time business development manager. Throughout the United States, a network of similar companies is used in joint venture and/or sub-consultant arrangements.

PARTNERING INTERESTS

Stewart, Weir Land Data is interested in further developing its export potential through international joint venture or sub-consultant arrangements. No geographic preference is implied. However, opportunities in the Pacific Rim, Eastern Europe and South America are currently being pursued.

STEWART WEIR LAND DATA INC.

11411 - 163 Street
Edmonton, Alberta
CANADA T5M 3Y3

Telephone: (403) 451-6477
Facsimile: (403) 451-3419

Contact: Mr. Brian Dixon, President
Mr. Roy Ferguson, Managing Director

NATURE OF BUSINESS

Stewart, Weir Land Data specializes in the acquisition, integration and applications of survey, mapping and geomatic information products for the mapping, GIS and AM/FM communities. Professional services provided include digital photogrammetry, remote sensing, data conversion and computer science technologies.

MAJOR ACHIEVEMENTS

- Completed control surveys, digital base mapping, utility and infrastructure data conversion and GIS data base development for the Bangkok Metropolitan Authority.
- Completed orthophoto and topographic base mapping for irrigation studies on behalf of the Government of Zimbabwe and the Canadian International Development Agency (CIDA).
- Completed orthophoto and digital terrain modelling for the Nile Valley Irrigation Study Area.
- GIS-ready digital topographic and forest cover base mapping of the western half of the State of Oregon on behalf of the United States Bureau of Land Management.
- GPS survey control, digital base mapping, infrastructure data conversion and generation of facilities management data bases for airport sites throughout Western Canada on behalf of Transport Canada.

COMPANY PROFILE

- Established: 1972
- Annual Revenue: \$3 million
- Employees: 38
 - R&D: 1
 - Administration: 3
 - Sales and Service: 1
 - Production: 33
- R&D Expenditures: \$135,000

continued

CURRENT MARKETING ACTIVITIES

Through the worldwide marketing network of SNC Lavalin, PGI is represented in 40 countries.

PARTNERING INTERESTS

PGI is interested in collaborating with firms to add to its expertise in data acquisition, and systems integration. PGI's experience with cadastral systems are available to support local survey, mapping and consulting firms providing advice to municipalities and other public administrations.

PHOTOSUR GEOMAT (1991) INC.

#300-5160 boulevard décarie
Montréal, Québec
CANADA H3X 2H9

Telephone: (514) 369-5000
Facsimile: (514) 369-5059

Contacts:
M. Ghislain M. Gauthier, President
M. Alain Dombrowski, Director of Business Development

NATURE OF BUSINESS

Photosur Geomat Inc. (PGI) provides specialized professional services in the acquisition and processing of geographic data. Under its original name of Photographic Surveys, Photosur Geomat has been offering mapping and aerial photography interpretation services for over 40 years. PGI's services include engineering, aerial, legal and GPS surveys; topographic and thematic mapping; remote sensing and Geographic Information Systems (GIS).

MAJOR ACHIEVEMENTS

- Development and marketing of a GIS for the management of Montreal's aquaduct systems.
- Modernization of a digital cartography centre for Mexico's Instituto Nacional de Estadística, Geográfica e Informática (INEGI).
- Technology transfer project involving the use of remote sensing and GIS for the management of natural resources in Thailand.
- Installation of a cadastral data centre for Cameroon's Ministère de l'Urbanisme et de l'Habitat.

COMPANY PROFILE

- Established: 1923
- Annual Revenue: \$15 million
- Employees: 48
Professional: 27
Technical: 21

COMPANY BACKGROUND

PGI is a wholly-owned subsidiary of SNC Lavalin Inc. SNC Lavalin is in turn a wholly-owned subsidiary of The Group SNC Inc. which is traded on both the Montreal and Toronto Stock Exchanges. The Group SNC Inc. generates annual sales of more than \$800 million per year. The Group's engineering arm, SNC Lavalin, is the largest engineering consulting firm in Canada and the fourth largest in the world.

PRODUCTS/SERVICES DESCRIPTION

Mapping: The professionals and technicians at PGI carry out mapping projects ranging from conventional maps to the most sophisticated digital cartography products. PGI creates maps on scales ranging from 1:1,000 to 1:1,000,000. PGI's staff work in partnership with clients to deliver projects on time and within budget. As a testimony to the company's high standards, PGI has often been retained by the Surveys and Mapping and Remote Sensing sector of Energy, Mines and Resources, Canada, as well as by the United Nations.

Surveying: PGI's surveying services involve land, airborne and satellite positioning for engineering, cadastral and geodetic surveys. The firm has worked on such diverse projects as surveys for the routing of a gas pipeline, preparation of digital cadastral maps for Yaoundé and training of surveyors in Indonesia.

Consulting: PGI's consulting services include the design, development and installation of spatially-referenced information systems, remote sensing and technology transfer. Activities include all phases of system planning, including feasibility studies, benefit/cost analysis and prototypes. PGI will install fully integrated turnkey systems, populate data bases and set up spatially referenced expert systems. PGI's expertise has been applied throughout the world (including Canada, Mexico, Cameroon, Senegal, Morocco, Thailand and Venezuela) to enhance the capacity of the geomatic and remote sensing centres in these countries with new systems and personnel training.

continued

CURRENT MARKETING ACTIVITIES

PCI serves Canada and the United States through the Richmond Hill, Ontario and Arlington, Virginia offices. Throughout the rest of the world, PCI has developed an extensive network of over 40 resellers of its technology.

PARTNERING INTERESTS

PCI is seeking companies who provide consultancy services in remote sensing and GIS who would be interested in reselling its software, particularly in Europe, South America and Asia.

PCI ENTERPRISES

#100E — 50 West Wilmot Street
Richmond Hill, Ontario
CANADA L4B 1M5

Telephone: (416) 764-0614
Facsimile: (416) 764-9604

Contact: Mr. Robert Moses, President
Mr. Mike Pastushok, European Sales Manager

NATURE OF BUSINESS

PCI develops EASI/PACE™, a software package designed to analyze satellite and airborne images of the earth. Major applications include: forestry, oil/mineral exploration, meteorology, military, and environmental monitoring. EASI/PACE™ is often used as a complement to a Geographic Information System (GIS).

MAJOR ACHIEVEMENTS

- PCI has established itself as the dominant vendor of remote sensing software in Canada, capturing approximately 90% of the market.
- Developed EASI/PACE™ to be hardware independent, allowing the software to operate on PCs, UNIX workstations, and VMS computers.
- Signed software site licence agreements with Canada Centre for Remote Sensing, Energy, Mines and Resources Canada and NASA Goddard, Code 921 (USA).

COMPANY PROFILE

- Established: 1982
- Annual Revenue: \$5 million
- Employees: 35
 - R&D: 12
 - Administration: 5
 - Sales: 10
 - Product Support: 5
- R&D Expenditures: \$1.5 million

COMPANY BACKGROUND

PCI is a privately owned company, founded in 1982. PCI is a leading vendor of remote sensing software, with systems installed in over 70 countries. Headquartered in Richmond Hill, Ontario, PCI has sales and support offices in Ottawa, ON; Victoria, BC; Arlington, VA; Atlanta GA; and Tucson AZ.

PRODUCTS/BUSINESS DESCRIPTION

EASI/PACE™ is used by resource managers to analyze image data of the earth's surface. Data from satellite and airborne sensors can be corrected to fit the earth's surface through visual enhancement and land use classification. The output is typically a map of the area with derived features highlighted.

FLY!™ offers the ability to interactively fly-through an image dataset in three dimensions. Combining image data with elevation data, FLY!™ creates new perspective scenes in real time, allowing for interactive movement through a scene, with user control over speed, altitude, and direction.

RadarSoft™ includes functions to perform analysis on satellite or airborne radar imagery. Correction to the earth's surface, speckle removal, and various filters are supported.

The Truth™ combines Global Positioning System (GPS) technology with a portable PC to allow the scientist to plot field positions within an image. A satellite image or scanned map is displayed on the portable PC in the field. A scientist may then use the GPS to determine exactly where the current field position is within the image displayed on the PC. This is used for ground truth verification.

continued

PAMAP TECHNOLOGIES CORPORATION

#200 - 6772 Oldfield Road
Victoria, British Columbia
CANADA V8X 3X1

Telephone: (604) 652-8895
Facsimile: (604) 652-8896

Contact:
Ms. Alison Malis, International Account Manager

NATURE OF BUSINESS

PAMAP Technologies Corporation is a designer and developer of leading edge spatial analysis tools in the form of Geographic Information Systems (GIS) software, for the resource, land and environmental management sectors. PAMAP Technologies GIS software has application in such diverse fields as forestry, environmental remediation, marine habitat mapping, land-use planning and disaster recovery planning. Members of government, the private sector and public interest groups are enjoying the benefits of PAMAP Technologies GIS software.

MAJOR ACHIEVEMENTS

- Winner of several major United Nations - Food and Agriculture Organization benchmarks
- Developer of the first full featured GIS available under Microsoft Windows
- Developer of the first GIS available with advanced visualization, courtesy of teaming with Advanced Visual Systems, Waltham, MA, U.S.A.
- Teamed with Advanced Visual Systems, Waltham, MA, U.S.A. to develop the first GIS with advanced visualization

COMPANY PROFILE

- Established: 1981
- Annual Revenue: \$3.2 million
- Employees: 45
 - R&D/Consulting: 25
 - Administration: 5
 - Sales/Marketing: 7
 - Support/Production: 8
- R&D Expenditures: \$1.8 million

COMPANY BACKGROUND

PAMAP Technologies is a wholly-owned subsidiary of OCS Technologies Corp., a public company employing over 200 staff and netting over \$20M annually. OCS Technologies is a purveyor of judicial and correctional software, interests also include GIS development, as demonstrated by its purchase of PAMAP Technologies in 1991, and more recently Digital Resource Systems, a developer of municipal GIS. PAMAP has established itself as a world leader in the development of wide-area spatial analysis tools, and boasts successful installations around the globe.

PRODUCTS/BUSINESS DESCRIPTION

PAMAP GIS for Windows

PAMAP GIS for Windows is the first truly full-function GIS available running in the Windows environment.

PAMAP GIS with AVS

CURRENT MARKETING ACTIVITIES

PAMAP Technologies is currently focusing its efforts on North America, with secondary emphasis on Europe and the Far East, both of which are serviced by international manufacturers' agents.

PARTNERING INTERESTS

PAMAP is actively seeking additional agents in these markets, and business relationships with other GIS or GIS-related developers in the United States.

SUBNAV (Submarine Navigation Positioning) for position display of underwater ROV's or submersibles. The first such system, STANS (Sonar Tracking and Navigation System), was developed specifically for the US Navy's Deep Submergence Rescue Vehicle program.

SSS (Side-scan Sonar Route Survey) system. Although PINS 9000 can work with any sonar system, OSL offers a complete Route Survey system. OSL's stabilized towfish is simple and robust, providing a highly stabilized sonar platform. The electronics are packaged in a neutrally buoyant shell made from Kevlar-reinforced plastic.

Electronic Charts

OSL is one of the foremost producers of electronic-chart digital data base for one of the largest manufacturers of electronic chart systems for pleasure craft and the fishing industry.

Research and Development

In addition to its standard products, OSL undertakes contract R&D work in its area of expertise. Major customers include David Taylor Labs (US Navy), Transport Development Canada, Defence Research Establishment Pacific, US Coast Guard, and Canadian Coast Guard.

CURRENT MARKETING ACTIVITIES

OSL has directed its initial marketing efforts towards targeting the following sectors:

- Commercial carriers including oil tankers
- Commercial ferry corporations
- United States and Canadian Coast Guard
- United States and Canadian military

PARTNERING INTERESTS

As a member of the SPIRIT Subsea Systems Corporation, OSL supports the consortium interest in seeking joint or strategic investment partners in advanced subsea technology development.

OFFSHORE SYSTEMS LTD.

#107-930 W. 1st Street
North Vancouver, British Columbia
CANADA V7P 3N4

Telephone: (604) 986-4440
Facsimile: (604) 987-2555

Contact:
Mr. Helmut Lanziner, President

NATURE OF BUSINESS

Offshore Systems Ltd. (OSL) develops and markets electronic chart display and information systems to the marine transportation industry. The products involve radar positioning, acoustic positioning, mine countermeasures, tactical display and mine-hunting side-scan sonar systems, electronic charts, and chart data. ECPINS, a precise navigation display system, is the company's principal product and is the basis for several related systems.

MAJOR ACHIEVEMENTS

Designed, manufactured and installed systems that integrate:

- Electronic chart, radar image, microwave positioning system, gyro and speedlog;
- Electronic chart, radar positioning and gyro;
- Microwave, LORAN C, GPS and acoustic positioning systems with gyro and speedlog data displayed on an electronic chart; and
- Side-scan sonar, winch, electronic charts, microwave positioning system, gyro and speedlog.

COMPANY PROFILE

- Annual Revenue: \$2 million to \$2.5 million
- Employees: 33

COMPANY BACKGROUND

OSL is a provincially-incorporated public Canadian company listed on the Vancouver Stock Exchange. During the past five years, OSL has focused upon the research and development of electronic chart and radar positioning systems.

PRODUCTS/BUSINESS DESCRIPTION

Navigation Systems

ECPINS is OSL's latest addition to its famous series of real-time Electronic Chart Display and Information Systems (ECDIS). It has many new features, including target tracking and radar overlay. Radar returns and the ship's position are displayed in real-time on a high-resolution digitized chart. ECPINS also displays critical information such as bearing, speed and position. Thus ECPINS is an electronic navigation aid that combines the functions of several standard nav aids.

ECPINS offers the mariners many navigational benefits that enhance the safety of a vessel. These benefits include displaying current vessel position in real-time in relation to landmarks and transit routes on an electronic chart. Even for an experienced mariner, navigating a vessel in constricted waters by the traditional method of taking a visual or radar fixes and then plotting the position is a slow process, during which a vessel travelling at 15 knots will cover a quarter of a mile in one minute. Being able to follow the display of a vessel's movements along a pre-set route in real-time can help prevent an accident. Thus OSL's primary product fills a very important niche in the mariner's search for safer navigation.

RANAV (Radar-Assisted Precise Navigation) is a precise navigation system that uses radar returns from a shore network of passive, trihedral twist reflectors. Reflector shore stations, once deployed, require little maintenance or upkeep. A RANAV system has been in use in Port aux Basques, Newfoundland, since 1989. A second vessel of the fleet has since been installed with a system.

continued

PRODUCTS/BUSINESS DESCRIPTION

Remote Sensing: Digital orthophotography, image rectification, image enhancement, land use classification and change detection.

Data Conversion Services: Raster scanning, table digitizing, attribute loading, topological structuring and file conversion.

Surveying: Geodetic surveys, photogrammetric control and precision levelling.

Photogrammetric: Vertical and scenic aerial photography, digital mapping, stockpile and quarry inventories, aerial triangulation, cross sections, profiles and terrestrial photogrammetry.

Digital Terrain Analysis: Contour generation, slope and aspect maps, watershed analysis, volumetric analysis and perspective views.

Photolab: Photographic enlargements, mosaics, camera enlargements and reductions.

Consulting: Feasibility studies, user needs studies, data base design, requirements analysis, data modelling and data dictionary construction.

Distributing: Northway is the Canadian distributor for ERDAS raster GIS and image processing products.

Northway Map Technology Limited is equipped with a number of host computers and workstations operating in VMS, UNIX, PRIMOS and DOS environments. The company is equipped with 10 first-order stereoplotters and digitizing tables. Software includes ARC/INFO, ERDAS IMAGINE, MicroStation, Autocad and translators to convert information to a variety of data formats such as DLG, DGN, DSE, ISIF and others.

CURRENT MARKETING ACTIVITIES

For the past three years, Northway has increased its existing market base by establishing working relationships with firms in the United States and the Caribbean.

PARTNERING INTERESTS

Northway is interested in forming strategic alliances with companies in the Asian, and Central and South American markets offering services in data conversion, imaging and GIS.

NORTHWAY MAP TECHNOLOGY LIMITED

44 Upjohn Road
Don Mills, Ontario
CANADA M3B 2W1

Telephone: (416) 441-6025 or 441-1141
Facsimile: (416) 441-2432

Contacts:
Mr. J.W.L. Monaghan, President
Mr. Tony Sani, Vice-President/General Manager

NATURE OF BUSINESS

Northway Map Technology Limited offers land information services and consulting services in the field of Geographic Information Services as well as thematic mapping, cartographic and photolab services. Northway is the Canadian distributor for ERDAS raster GIS and image processing software.

MAJOR ACHIEVEMENTS

- Design and establishment of large-scale digital data bases at major federal airports in Canada including Toronto's Lester B. Pearson International Airport and Ottawa International Airport.
- Consultant to the Government of Jamaica on the establishment of a data base for a large community development in St. Catharines.
- Consultant to the Washington State Department of Natural Resources on the updating of their resource data base which is used for managing and analysis of approximately five million acres of forest, range and agricultural lands, in addition to two million acres of shareland.

- Consultant to J. Trevor Carnegie & Associates on the Texas State Capital historic site preservation project. The project involved the creation and manipulation of cadastral, topographic, utility and drainage data bases.
- Consultant to the Geographic Information Systems Centre, Municipality of Metropolitan Toronto, providing services in connection with establishing street centre-line data for the Toronto area.

COMPANY PROFILE

- Established: 1984
- Annual Revenue: \$5 million
- Employees 45
 - Technical staff: 39
 - Administrative: 5
 - Sales: 1
- R&D Expenditures: \$100,000

COMPANY BACKGROUND

Northway is a privately owned company incorporated under the laws of Ontario in 1984. The company invests a large portion of its profits in research and development. With 15,000 square feet of office space, the company is centrally located in Toronto.

Originally established in 1946 as The Photographic Survey Corporation, Northway Map Technology Limited has its origins in one of the largest privately owned surveying and mapping companies in Canada. Members of Northway staff have participated in surveying, mapping and data conversion projects all over the world. In particular, a large number of Northway staff have been involved in numerous projects in the Middle East, including mapping and pipeline surveys in Oman, construction surveys in Saudi Arabia, and geodetic control surveys in the United Arab Emirates. The company has also been involved in land related information services for the past fifteen years.

continued

PRODUCTS/BUSINESS DESCRIPTION

GPS Positioning: For ten years, Nortech has been supplying GPS services to the oil and gas, engineering and resource industries, including marine, land and airborne applications.

Geographic Information Systems (GIS): Nortech provides a wide variety of GIS related services. Nortech's technical staff provides consulting services related to client need studies, system recommendations and installation. Additionally, Nortech has developed a unique airborne GIS data acquisition system known as the Digital Video Geographic (DVG™) System. DVG™ has been extensively used for route inventory (transmission line, pipeline, roads, etc.), forest inventory and route profiling (engineering). This system has targeted quick data acquisition requirements for both engineering and environmental markets.

Research and Development: Nortech's technical staff has been responsible for various research and development projects in positioning, software development and system integration. Research and development is done for third-party clients and internally.

CURRENT MARKETING ACTIVITIES

Nortech is concentrating its new marketing activities in South America, Africa and Russia, while continuing to service and expand its client bases in the Middle East, South East Asia and Europe.

PARTNERING INTERESTS

Nortech would be interested in developing a working relationship with a compatible development/service company(s) in South America. Specific areas for associative arrangements are:

- Developing authorized dealers for Nortech's HPC and HPM, GPS software packages in the South American market; and
- Establishing working relationship/joint venture relationship with a compatible information technology company to develop markets for Nortech's DVG™ system.

NORTECH SURVEYS (CANADA) INC.

#1 — 820 28 Street NE
Calgary, Alberta
CANADA T2A 6K1

Telephone: (403) 248-5000
Facsimile: (403) 258-5196

Contact:
Mr. Tim J. Crogo, President

NATURE OF BUSINESS

Nortech Surveys (Canada) Inc. offers specialized navigation, positioning and mapping services. Nortech's inertial and satellite surveying systems provide fast and cost-effective survey control in remote areas and the Airborne Laser Terrain Profiler allows for terrain mapping and tree height determination in heavily forested and jungle areas. Nortech also develops proprietary software for in-house use as well as conducts software research and development for clients.

MAJOR ACHIEVEMENTS

- Development of various software packages for the processing of Global Positioning System (GPS) data, including real-time, post-mission and high-accuracy static.
- Development of an airborne GIS data collection system consisting of dual, digital video cameras, laser profile and GPS positioning among other sensors.
- Production of an integrated, real-time differential GPS and acoustic marine positioning system.

COMPANY PROFILE

- Established: 1982
- Annual Revenue: \$8 million
- Employees: 75
 - R&D Engineers: 20
 - Technicians: 35
 - Administration: 15
 - Sales: 5
- R&D Expenditures: \$ 750,000

COMPANY BACKGROUND

Nortech was established in 1982. It is a privately owned company organized under a board of directors responsible for establishing the direction and policies of the firm.

Nortech Surveys (Canada) Inc., maintains a strong research and development component that has earned it an excellent reputation for practical surveying and mapping systems.

Nortech operates worldwide from its head office in Calgary. Regional offices in Muscat, Oman; Sana'a, Yemen; and Dartmouth, Nova Scotia offer worldwide coverage and expertise to the energy, forestry and environmental service industries. Nortech also operates a sales office in Paris, France and in Kuala Lumpur, Malaysia.

continued

PRODUCTS/BUSINESS DESCRIPTION

Geomatics services offered by McElhanney Geosurveys include hydrographic, geophysical and construction surveys, navigation and positioning; digital photogrammetry, imaging and cartography; geodetic surveys using conventional and contemporary ground, airborne and satellite technologies; consulting, data conversion, data capture, applications and software development for GIS; and quality control services in land and marine geomatics.

PARTNERING INTERESTS

McElhanney Geosurveys is interested in associating with other firms to explore general marketing opportunities for GIS, oil and gas exploration and development and marine telecommunications either on a project or long-term basis. The company is particularly focused on Southeast Asia, the Pacific Rim and South America. However, it is receptive to opportunities in other areas and welcomes expressions of interest from other organizations.

CURRENT MARKETING ACTIVITIES

The company's marketing activities are focused on GIS, oil and gas exploration and development, and marine telecommunications projects.

McElhanney Geosurveys is currently pursuing survey projects in the international market directly or through its subsidiary companies, by forming joint-venture agreements with firms that provide complementary services, or subcontracting its services to others on a project by project basis. The company has a wholly owned subsidiary in Singapore and participates in joint ventures in Malaysia and Australia. The company also maintains working arrangements with firms located in Hong Kong, Indonesia, India, Vietnam and in Brazil, Chile and Argentina in South America.

Through these operating groups and associations and its sales offices in Singapore and California, the company markets its services throughout Southeast Asia, the Pacific Rim and the United States.

McELHANNEY GEOSURVEYS

100-780 Beatty Street
Vancouver, British Columbia
CANADA V6B 2M1

Telephone: (604) 683-8521
Facsimile: (604) 683-4350

Contacts:
Mr. Donald B. Thomson, Executive Vice-President
Mr. Philip J. Boase, Vice-President, Special Projects

NATURE OF BUSINESS

McElhanney Geosurveys is wholly owned by a group of senior employees. Specialized skills and services offered by McElhanney Geosurveys include geodetic/control surveys, hydrographic charting, navigation and positioning surveys, route and corridor surveys, photogrammetry, and GIS services including data conversion and structuring.

MAJOR ACHIEVEMENTS

- Developed logistical expertise in mobilizing and operating survey crews and equipment in environments worldwide from the frozen waters of the Arctic to the equatorial tropics.
- Achieved a dominant position in the marine survey field, particularly through its key role in the exploration activities leading to the Hibernia oil and gas development.
- Developed an integrated series of computer software modules which compile high-quality photogrammetric data and convert it to various formats for GIS-ready applications.

- Developed in-house software to store multi-parameter navigation and other sensor data for use in real-time display or for subsequent data reduction and post-processing.
- Pioneered the long-range positioning of exploration vessels in the Atlantic, first using ARGO and more recently using Differential GPS, an application that has significantly increased accuracy.

COMPANY PROFILE

- Established: 1987
- Annual Revenue: \$12 million
- Employees: 111
 - Administration: 9
 - Professionals: 13
 - Technical: 89
- R&D Expenditures: \$300,000

COMPANY BACKGROUND

McElhanney Geosurveys is a member of a group of companies whose founding in 1910 coincided with the development of British Columbia's natural resources industries. The company has grown and diversified over the years and now offers a wide range of services in marine, aerial and land surveying, conventional and digital mapping and Geographic Information System (GIS) services. McElhanney Geosurveys' worldwide reputation is based on an earned record of efficiency, dependability, quality, experience and the commitment to working alongside national firms and government agencies, transferring technology through both formal training and hands-on field programs.

continued

PRODUCTS/BUSINESS DESCRIPTION

- Earth Observation Ground Stations, Satellite Scheduling, Mission Management Software
- Digital Mapping, Resource Management, Spatial Data Systems
- Air Traffic Control (flight data processing), Aircraft Information Systems
- Space and Defence Software and Systems

CURRENT MARKETING ACTIVITIES

Worldwide marketing activities focus on Southeast Asia, Australia and Europe. Offices are located in Australia, Malaysia, the United Kingdom and the United States.

PARTNERING INTERESTS

As MacDonald Dettwiler business is primarily with foreign government institutions, it often teams with local companies or institutions whose expertise, when combined with MacDonald Dettwiler's, best fits the customer requirement. This includes technology transfer programs.

MACDONALD DETTWILER

13800 Commerce Parkway
Richmond, British Columbia
CANADA V6V 2J3

Telephone (604) 278-3411
Facsimile: (604) 278-2117

Contacts:

Mr. John Pitts, President
Mr. Alan Vlemmiks, Director of Marketing

NATURE OF BUSINESS

MacDonald Dettwiler is the established leading commercial supplier of remote sensing ground stations to governments and government agencies around the world.

The company supplies ground reception and processing systems for virtually all civilian remote sensing satellites, such as Landsat, SPOT, ERS-1 and JERS-1. It is the only supplier of remote sensing ground stations that process both optical and Synthetic Aperture Radar data.

MAJOR ACCOMPLISHMENTS

- Selected by the European Space Agency as the prime contractor for the ERS-1 ground segment
- Developed the world's first digital SAR processor
- Major subcontractor to Canada's air traffic control automation system
- Dominant worldwide supplier of earth observation ground stations.

COMPANY PROFILE

- Established: 1969
- Annual Revenue: \$70 million (1992)
- Employees: 690
 - Research and Development: 370 (Scientists and Engineers)
 - Administration/Sales/Service: 232
 - Technical Support: 88
- R&D Expenditures: 6.5% of Net Revenue

COMPANY BACKGROUND

MacDonald Dettwiler is an international leader in advanced systems development for the aerospace, defence, geographical information and advanced airspace management systems. It is the world's largest supplier of ground processing systems for remote sensing satellites and is the only company supplying both Optical and Synthetic Aperture Radar satellite stations (ERS-1, JERS-1, Radarsat). Building on its remote sensing experience, the company expanded into integrated land resource management and digital mapping applications.

MacDonald Dettwiler has also earned the unique position of being Canada's leading systems engineering firm that specializes in spatial information systems. The company supplies computer-based systems and services to government and non-government organizations worldwide, to provide management support in the areas of spatial information handling, planning, operations and administration.

The company's corporate headquarters are located in Richmond, British Columbia, with smaller offices in Ottawa, Ontario. International customers are supported through MacDonald Dettwiler's offices in Australia, Malaysia, the United Kingdom and the United States.

continued

COMPANY BACKGROUND

Linnet Graphics International Inc. is a privately held Canadian company established in 1988. It is headquartered in Winnipeg, Manitoba and has an office in Regina, Saskatchewan.

Linnet was formed to develop one of the world's largest multi-participant GIS projects: the Manitoba Land Related Information System (MLRIS). Linnet provides AM/FM/GIS Systems Integration services to the public sector marketplace and to the utility companies.

PRODUCTS/BUSINESS DESCRIPTION

Data Acquisition & Conversion

- Digital & Image Based Mapping
- Data Collection/Conversion
- Image Processing/Analysis
- Global Positioning Systems (GPS)

Information Utility Operations

- Information Storage & Management
- Packaging Information
- Value-Added Products
- Shared Information Broker

Consulting

- Strategic Planning
- Feasibility Studies
- Cost-Benefit Analysis
- Systems Integrations
- Facilities Management
- GIS Applications Development
- Project Management

Training

- Data Preparation/Data Maintenance
- Quality Control/Assurance
- Hardware and Software
- GIS Applications

Research & Development

- Expert Systems for Spatial Data Analysis
- Integration of Multiple Data Structures within GIS

CURRENT MARKETING ACTIVITIES

Linnet is a 100% Canadian-owned affiliated company of SNC Lavalin and the I.D. Group. Through its affiliations, Linnet has gained access to a worldwide marketing network and a large number of projects in which the GIS technology can be utilized.

The company has targeted the U.S.A., Mexico, Latin America, South East Asia, the Middle East and Northern Africa as the primary areas to focus geomatics marketing efforts.

PARTNERING INTERESTS

Linnet is interested in finding a strategic partner that would be active in the AM/FM/GIS public sector and utility companies marketplace; that could provide complementary services to Linnet; and that is interested in marketing the joint sets of capabilities and services on a worldwide basis.

The partnership could be an alliance between Linnet and another firm interested in developing GIS integration and artificial intelligence technologies.

LINNET GRAPHICS INTERNATIONAL INC.

#600-191 Broadway
Winnipeg, Manitoba
CANADA R3C 3T8

Telephone: (204) 957-7566
Facsimile: (204) 957-7568

Contact:
Mr. Alain Paré, Vice-President, Marketing

NATURE OF BUSINESS

Linnet is an independent company that partners with its clients to plan, design, develop and implement land-based information systems. Linnet has no corporate ties to hardware, software or data conversion vendors.

The company uses systems integrations technologies to implement:

- multi-participant GIS projects
- GIS technology in agriculture and rural development, natural resources and environment management projects
- municipal AM/FM/GIS projects
- utility companies AM/FM projects
- fiscal cadastral projects
- digital and image-based mapping projects

COMPANY PROFILE

- Established: 1988
- Employees: 40 Professionals
- Annual Revenue: \$4 million, 1992
- R&D Expenditures: \$150,000

MAJOR ACHIEVEMENTS

Manitoba Land Related Information System (MLRIS): Linnet is leading the development of the MLRIS, one of the largest multi-participant GIS projects. With the assistance of participating agencies such as the Government of Manitoba, Manitoba Hydro and the City of Winnipeg, Linnet is working to link the GIS-based computer systems of Manitoba's provincial utilities with all provincial and municipal government departments. Once the multi-agency, province-wide MLRIS is in place, GIS information can be exchanged between all agencies linked to the MLRIS.

Land-Based Information Systems (LBIS): Linnet has been working with the City of Winnipeg to develop a comprehensive LBIS. This municipal Facilities Management (AM/FM) system will provide the city with a shared graphics and textual data base of timely and accurate spatial information.

Measurement-Based Cadastral Systems: Linnet pioneered the implementation of the Measurement-Based Cadastral (Property) Information Management System. This system integrates the legal survey information and the property description information from land titles. It creates a survey measurements data base from which survey parcels and property (ownership) parcels are made. These parcels form the basis for the cadastral mapping system and the direct linkage to the Land Titles Systems. Linnet is implementing such a system for Manitoba which involves over 500,000 parcels.

Digital Ortho-Image Based Mapping System: Linnet is developing a digital ortho-image based mapping system for the entire Province of Manitoba. The digital image maps are generated from ortho-photography or satellite imagery. In Manitoba, these digital image-based maps combined with the digital cadastral (property) maps are the basis of the Reference Mapping System for the MLRIS.

Engineering Expert Systems: Linnet is focusing its R&D in the development of decision-making support systems as well as engineering design functions. This has opened tremendous opportunities in the international marketplace for Linnet especially in the field of agriculture, natural resources and environmental management.

continued

PRODUCTS/BUSINESS DESCRIPTION

Spatialist™ technology combines popular graphics sources with industry standard data bases to deliver a seamlessly integrated spatial data management tool that leverages an existing investment in software tools and data sources.

Originally designed as a municipal mapping package, Spatialist has grown to become a full function desktop GIS software product providing a linkage between the industry standard "AutoCAD" environment and the industry standard data bases such as Oracle, R:Base, dBase, SQL Server and SQLBase.

Spatialist technology has been applied to a growing list of Visually Integrated Management Information Solutions including:

- Building and Facilities Management
- Gas and Oil Pipeline Management
- Municipal Mapping
- Power Distribution Analysis
- Municipal Taxation and Assessment
- Real Estate Management

CURRENT MARKETING ACTIVITIES

Kanotech directly markets its products and services in western Canada in addition to building and supporting a growing network of business partners through its offices in Japan, Hang Kong, California and across Canada.

PARTNERING INTERESTS

Kanotech delivers its products and services through a professional distribution and support channel network that provides a consultative approach to ensure that Kanotech solutions meet specific clients needs.

Kanotech wishes to develop additional business relationships with:

Value Added Resellers: comprehensively prepared to distribute and support Kanotech products, the company's VAR channel delivers system integration, training and technical support for the company's Spatialist™ product line.

Geomatics Consultants: fully conversant with spatial data base technology, certified consultants have the resources to build complex custom applications, based on Kanotech products, for clients with even the most sophisticated requirements. Services include needs analysis, custom programming, data base design and implementation; and advanced system integration and training.

International Partners: combining the skills of VAR and consultant, the company's international partners work closely with Kanotech to provide needs analysis, sales support, product training and technical support, as well as custom system development services to clients worldwide.

OEM Relationship: Kanotech's technological strategy also includes a toolset that enables third-party developers to create customized GIS applications based on Spatialist. Already developers have delivered new spatial data management applications to markets that are based on Kanotech's advanced technology.

KANOTECH INFORMATION SYSTEMS LTD.

#105, 13245 – 146th Street
Edmonton, Alberta
CANADA T5L 4S8

Telephone: (403) 455-9197
Facsimile: (403) 452-4183

Contacts:

Mr. J. Lance Maidlow, President
Mr. Paul M. Funston, Vice-President, Operations

International Operations:
575 Park Street
Regina, Saskatchewan
CANADA S4N 5B2

Telephone: (306) 721-2362
Facsimile: (306) 721-2474

Contact:

Mr. L.W. (Len) Exner, Manager, Corporate Regions

NATURE OF BUSINESS

Kanotech Information Systems designs and develops desktop-based GIS Spatialist™ software for a broad range of public and private sector clients involved in engineering, architectural, planning and business analysis functions.

MAJOR ACHIEVEMENTS

- Developed one of the first PC-based Geographic Information Systems.
- Developed a radically new approach to spatial data integration, using less memory, through the implementation of advanced object oriented programming technology.
- Developed a totally seamless spatial data base management system for Desktop Spatial/Geographic Analysis.
- Established a strong reputation with our linkage based Spatialist™ product for integration of various GIS, DEMS and 3rd-party application software products.

COMPANY PROFILE

- Established: 1985
- Annual Revenue: \$2.5 million
- Employees: 27
 - R&D: 8
 - Sales and Marketing: 6
 - Applications and Consulting: 6
 - Administration: 7
- R&D Expenditures: \$500,000 plus customer funded R&D projects

COMPANY BACKGROUND

Kanotech is majority owned by its president and senior employees with the minority owned by a major western Canadian consulting/engineering firm. Kanotech has experienced steady financial growth since 1985. In addition to the Edmonton head office, Kanotech has established a regional office in Regina, and a growing network of national and international business partners throughout North America and South East Asia to support, distribute, market and sell its products and services.

continued

CURRENT MARKETING ACTIVITIES

Through the marketing efforts of their head office in Calgary, ten instruments have now been sold or leased worldwide and are being used in a variety of applications from assessing fish stocks to examining industrial development impacts on the environment. Further improvements are in progress to widen the spectral range of the case and to provide map-transformed (geocoded) image data in a form which can be utilized directly by Geographic Information Systems (GIS). The case instrument has been sold to customers in Canada, the United States and Germany. Short-term rental or lease contracts have been successful in Spain, Australia, Brazil, England, Norway, the former Soviet Union and the U.S. while contacts in France, Ireland, Japan and Central America are currently showing keen interest in the instrument.

PARTNERING INTERESTS

ITRES Research is interested in finding collaborators with good contacts in the international remote sensing field who are interested in marketing the case or using it in specific niches. ITRES is also interested in collaborations which will expand its technology base, furnish related products which can be marketed with the case, or adapt the case system for use in space.

ITRES RESEARCH LIMITED

Suite 155, 2635-37th Avenue NE
Calgary, Alberta
CANADA T1Y 5Z6

Telephone: (403) 250-9944
Facsimile: (403) 250-9916

Contact:
Dr. Clifford D. Anger, President

NATURE OF BUSINESS

ITRES Research Ltd. has been developing high-quality electro-optical instruments for the scientific and remote sensing communities for 14 years. The company conducts research and development in applications of Charge Coupled Devices for cameras and imaging systems which operate in visible light, ultraviolet light or near infrared ranges. ITRES has special expertise in digital electronic camera systems and Charge Coupled Device (CCD) technology.

MAJOR ACHIEVEMENTS

Development of *casi*, (compact airborne spectrographic imager) the first commercially available spectrographic imager for remote sensing and the first user-configurable portable multispectral imaging system.

COMPANY PROFILE

- Established: 1979
- Annual Revenue: \$1 million
- Employees: 15
 - R&D: 6
 - Administration: 5
 - Sales & Service: 2
 - Production: 2
- R&D Expenditures: \$506,000

COMPANY BACKGROUND

Located in Calgary, Alberta, ITRES Research Limited is privately owned and occupies 4,000 square feet of office and laboratory space which houses facilities for electronic and mechanical design, testing and manufacture, electro-optic calibration, spatial and spectral analysis of image data and both high and low level computer language programming.

PRODUCTS/BUSINESS DESCRIPTION

Compact Airborne Spectrographic Imager (casi): Combining the sophistication of satellite imagery with the practicalities of aerial photography, ITRES Research developed the Compact Airborne Spectrographic Imager (*casi*). The first prototype was ready for flight in 1989. The Natural Environmental Research Council in England commissioned a short *casi* campaign and concluded that the *casi* "holds the best potential in the next few years in optical airborne remote sensing".

continued

PRODUCTS/BUSINESS DESCRIPTION

Mapping and Reconnaissance Segment

Includes airborne radar survey and processing services and geographic information system (GIS) products and services which include: STAR-1 terrain mapping surveys; STARMAP; STAR-2 ice reconnaissance; mapping; digital orthoimaging (DOI); SPANS GIS software, and related interpretation and engineering services.

Petroleum and Resource Management

Engineering services and software support products of the exploration and production of oil and natural gas and environment assessments including: quality assurance for seismic acquisition and navigation; exploration consulting and management; regional basin studies; ECLIPSE and InteraView software products; petroleum reservoir engineering and management; economic evaluations; waste management and on-site environmental remediation.

CURRENT MARKETING ACTIVITIES

Intera Information Technologies generates 100 per cent of its sales directly through its offices located in Canada, the United Kingdom, the United States, Australia, Indonesia, and Norway.

PARTNERING INTERESTS

Intera is looking for companies who are interested in distributing their Petroleum Software Products and their GIS products.

Intera is interested in "Associate" relationships with firms or agencies who have the ability to receive a technology transfer of certain Intera expertise. Intera has established a "Registered Intera Associate" ("RIA") program which provides for licensing of technology for providing joint marketing and production business opportunities.

INTERA INFORMATION TECHNOLOGIES CORPORATION

Suite #1000, Encor Place
645-7th Avenue S.W.
Calgary, Alberta
CANADA T2P 4G8

Telephone: (403) 266-0900
Facsimile: (403) 265-0499

Contact:
Mr. Brian L. Bullock, President & CEO

NATURE OF BUSINESS

Intera provides spatial information solutions to its customers in over 90 countries through the collection, processing and interpretation of data using satellite, airborne, ground and subsurface survey technologies. Services are provided through two business segments: the Mapping and Reconnaissance segment and the Petroleum and Resource Management segment.

MAJOR ACHIEVEMENTS

- Government of Alberta Export Award (1986, 1987, and 1989)
- Government of Canada Export Award (1988)
- The University of Calgary International Centre Award in recognition of international business (1988, 1989)
- Alberta Science & Technology Leadership Award for Outstanding Commercial Achievement in Science and Technology

COMPANY PROFILE

- Established: 1974
- Stock Listings: NASDAQ & TSE
- Annual Revenue: \$71 million (USD)
- Employees: 500
 - R&D: 50
 - Administrative: 50
 - Sales/Service: 50
 - Production: 350
- R&D Expenditures: \$4.7 million (USD)

COMPANY BACKGROUND

Intera Information Technologies began operating in 1974 providing environmental consulting services to governments and industry. The company has grown through organic expansion and through a series of strategic acquisitions. Acquisitions include Exploration Consultants Limited (1986), Kenting Earth Science (1988), Aero Service (1989), and Jerry R. Bergeson and Associates (1991). Intera Information Technologies Corporation was incorporated in 1990 for the purpose of the company's initial public offering. Intera also provides consulting services to resource industries and governments, and radar mapping services using the company's proprietary STAR systems.

The company has four divisions, with key offices in various cities: Image Mapping Services Division (Calgary/Ottawa) Exploration and Environmental Divisions (Henley-on-Thames, United Kingdom), and the Petroleum Production Division (Denver, USA). The corporate head office, which is responsible for the orchestration of investments and initiations for all four divisions, is located in Calgary, Alberta.

continued

INTERA TYDAC TECHNOLOGIES INC.

210-2 Gurdwara Road
Nepean, Ontario
CANADA K2E 1A2

Telephone: (613) 226-5525
Facsimile: (613) 226-3819

Contact:
Mr. Richard Higgins, President

NATURE OF BUSINESS

Intera Tydac Technologies specializes in the development of geographic information system (GIS) software and the provisions of related applications solutions. Intera Tydac develops, markets, and supports the SPANS family of GIS products worldwide.

MAJOR ACHIEVEMENTS

- Canada Award for Business Excellence 1989

COMPANY PROFILE

- Established: 1991
- Privately Held Subsidiary
- Annual Revenue: Confidential
- Employees: 50
 - R&D: 24
 - Administration: 6
 - Systems Integration: 8
 - Sales & Service: 12
- R&D Expenditures: Confidential

COMPANY BACKGROUND

Intera Information Technologies Inc., a publicly traded company that provides data collection, processing and interpretation products and services to resource and petroleum companies and governments worldwide, is an equity partner in the company, as well as the IBM Corporation.

PRODUCTS/BUSINESS DESCRIPTION

SPANS: The SPANS product line provides total GIS solutions that perform either as stand-alone systems or in enterprise-wide environments. Offering organizations flexibility in their choice of GIS for different levels of decision-support, SPANS provides users with a broad suite of GIS products and services ranging from easy-to-use desktop mapping to sophisticated data analysis and modelling to customized applications solutions.

The two main products are SPANS GIS, a leader in data and GIS integration and SPANS MAP, an easy-to-use desktop mapping software that performs as a stand-alone or networked visualization and query tool. SPANS can interact and query multiple layers of data. SPANS software products are available for MS Windows, OS/2 and DOS, as well as UNIX workstations including SunSPARC, RS6000, HP, DEC, Silicon Graphics, and DG AVIION.

More than 3,000 SPANS systems have been installed in 63 countries around the world. SPANS is used for a wide range of applications including environmental analysis, mineral exploration, forestry, land use planning, resource mapping, regional planning, defence and intelligence applications, water resources planning, crop entomology, soils research, marine sciences, transportation planning, demographics, marketing research, local government applications and real estate economics.

CURRENT MARKETING ACTIVITIES

The company has sales offices in Canada, the United States, United Kingdom and Switzerland and is represented by a network of distributors worldwide.

PARTNERING INTERESTS

Intera Tydac is seeking distributorships both within and outside of North America and VADS/VARS worldwide.

CURRENT MARKETING ACTIVITIES

Direct sales from branch offices in Edmonton, Calgary and Ottawa.

PARTNERING INTERESTS

ISA seeks partnerships, alliances, or distribution agreements with large GIS product developers.

INTEGRATED SYSTEMS APPLICATIONS CORP.

#835, 10040 – 104 Street
Edmonton, Alberta
CANADA T5J 2V6

Telephone: (403) 420-8081
Facsimile: (403) 420-8037

Contact:
Mr. Grant Lakeman, President

NATURE OF BUSINESS

ISA Corp. is a technology integration company. The company's focus is building and supporting open systems based, distributed network applications, and integrating emerging technologies (e.g. imaging, GIS, etc.) into traditional business systems.

MAJOR ACHIEVEMENTS

- Designed and built a one-way Intergraph to Geovision translator.
- Designed and constructed the Alberta government's Land Related Information System (LRIS) spatial data base transaction monitor. (This module is responsible for the conversion/loading and maintenance of the spatial data base.)

COMPANY PROFILE

- Established: 1985
- Annual Revenue: \$3.7 million (1992)
- Employees: 50
 - R&D: 4
 - Administration: 4
 - Sales: 2
 - Services: 40

COMPANY BACKGROUND

Founded in 1985, Integrated Systems Applications (ISA) Corp. is an Edmonton, Alberta based company with branch offices in Calgary and Ottawa. The company's initial focus was programming services to the utility industry. It evolved through open systems construction and systems integration services to the current focus on technology integration.

PRODUCTS/BUSINESS DESCRIPTION

Consulting Services

ISA's strength is in the design, development and implementation of client/server systems and networks. ISA has built a solid reputation for on-time on-budget delivery using industry standard methodologies and proven development products such as ORACLE and other relational technologies.

Geographic Information Systems

ISA has a long history of work with GIS. ISA has built custom applications for utilities, municipalities and governments, and also has experience with applications from Intergraph, Geovision, and ESRI. As well, ISA has extensive experience integrating these applications with customers' existing facilities.

Enterprise Communication Service

ECS is a comprehensive set of network applications providing e-mail, directory services and electronic library services for heterogeneous systems environments.

continued

PRODUCTS/BUSINESS DESCRIPTION

The experts at HSDS guide customers through the full life cycle of implementation from analysis and consultation to delivery, training and support. They develop automated systems that customize commercial off the shelf hardware and software to support spatial applications in the areas of urban land management, natural resource management, utility facility management, environmental monitoring, emergency response, and public safety services. HSDS' product list includes:

- DataPath Conversion System™ is comprised of a series of customizable software modules. This system automates the process of converting hard-copy maps and diagrams into digital form suitable for GIS, AM/FM and CAD systems.
- GIS Software Customization: The automated GIS systems that Hughes develops enable organizations to correlate and analyze vast amounts of geographic data to meet specific information needs.
- Systems Integration: Hughes successfully implements large, multidisciplinary projects. The collective skill set of Hughes' personnel includes experience with all major GIS's, RDBMS's, operating systems, graphic systems and programming languages.

CURRENT MARKETING ACTIVITIES

HSDS is committed to extending its North American experience to international markets. As well as maintaining offices in Los Angeles and Washington, DC, HSDS has access to Hughes' worldwide network of offices including Rio de Janeiro, Hong Kong, South East Asia, Mexico and Europe.

PARTNERING INTERESTS

HSDS is interested in collaborative arrangements that would:

- complement HSDS's capability to fulfill the requirements of multi-disciplinary projects, particularly World Bank related;
- develop authorized dealers for the DataPath Conversion System™. The authorized dealers should be able to provide local training and support as well as sales; and
- provide in-country representation in GIS for HSDS' international projects.

HUGHES AIRCRAFT OF CANADA LIMITED

Spatial Data Systems Division
Suite 320, 6715 8th Street NE
Calgary, Alberta
CANADA T2E 7H7

Telephone: (403) 295-6600
Facsimile: (403) 295-6607

Contacts:
Mr. Dave Guebert, Chief Financial Officer
Mr. Malcolm MacDonald, Director of Business Development
and Marketing
Mr. Chris Webber, Marketing Representative

NATURE OF BUSINESS

Hughes Spatial Data Systems Division (HSDS) supports each stage of Geographic Information System (GIS) implementation. The company's expertise is in data conversion, commercial off the shelf hardware and software integration with GIS, training, technology transfer, custom software development, data base integration, networking and telecommunications.

HSDS is currently focusing on implementing local and international projects that involve cadastral reform; land information systems; and environmental monitoring.

MAJOR ACHIEVEMENTS

- Implemented a system for the Alberta Land Related Information System (ALRIS) to integrate the province's textual and graphical data. An HSDS subscriber kit was then provided to the ALRIS users which allowed them on-line access to these data bases, for a government-charged fee.
- Developed the DataPath Conversion System™ to aid in the data conversion process of hard copy maps and diagrams to digital files. Emphasis during product development has been on accuracy, reliability, efficiency and ease of use.
- Developed a Computer Assisted Mass Appraisal (CAMA) System to be used by county and township assessors in the United States to assist in the maintenance and calculation of tax appraisals.

COMPANY PROFILE

- Established: 1989
- Annual Revenue: \$100 million
- Employees: 750

COMPANY BACKGROUND

Hughes Aircraft of Canada Limited was established by Hughes Aircraft Company to develop, produce and market high-technology products and services. From offices across Canada, Hughes Aircraft of Canada Limited is developing and providing air traffic systems, spatial data systems and services, acoustic technologies, and optical products for a worldwide client base.

Hughes Aircraft Company, a wholly owned subsidiary of General Motors, is a widely diversified high-technology company with more than 65,000 employees. Hughes' activities span more than 1,700 programs and projects, and include more than 1,200 separate products, services and functions ranging from basic research and engineering to quality manufacturing and field support.

continued

PRODUCTS/BUSINESS DESCRIPTION

HI-VIEW: HII develops and markets the HI-VIEW software system. HI-VIEW is a new solution for terrain data base generation for GIS and other systems requiring topographic data. HI-VIEW automatically generates digital elevation models (DEMs) and enhanced orthoimages from satellite stereo pairs and digitized air photographs. The success of HI-VIEW has been confirmed through rigorous independent evaluation.

RESORS: HII operates RESORS (Remote Sensing Online Retrieval System) which is the world's foremost online bibliographic data base on remote sensing, owned by the Canada Centre for Remote Sensing (CCRS). RESORS contains almost 90,000 references backed up by a comprehensive library collection. RESORS services are available from HII, Infopro Technologies through the Orbit Search Service, and via the European Space Agency's Information Retrieval Service.

Geomatics Consulting Services: HII provides consulting services in remote sensing, GIS, natural resources and the environment, and provides GIS data base building services from remotely sensed images. Products include geocoded images, enhanced and classified images, digital terrain models, catchment basin maps and forest change maps.

The company also provides services relating to the management of remote sensing and GIS technologies. These services are designed to facilitate the practical use of remote sensing and GIS as cost-effective solutions for organizations that manage geographic information. Services include technology reviews, feasibility assessment for new applications, consulting on the establishment of facilities, equipment specification and procurement, and project management.

A further activity is systems consulting in remote sensing and GIS. HII has handled projects through all the phases of implementation, on hardware ranging from personal computers to supercomputers. The company has designed and implemented software systems for geographic data base management, image processing, terrain data base generation, image display, and other geographic applications.

FORGE: FORGE (Superstructure Format Generating System) is a software system to generate descriptions of remotely sensed imagery that conform to the CEOS/LGSOWG Superstructure Format convention. FORGE greatly simplifies the process of aligning data to the standard in a friendly, comprehensible, highly interactive manner.

Satellite Image of North America on CD-ROM: HII distributes AVHRR (Advanced Very High Resolution Radiometer) imagery on CD-ROM that covers the entire continent of North and Central America for Global Change Monitoring. It was developed by DATAQUEST INC. of Dartmouth, Nova Scotia, in co-operation with the Canada Centre for Remote Sensing (CCRS) and the USGS EROS Data Centre. It offers various image display and export capabilities.

The Radarsat Tutor: HII also distributes The Radarsat Tutor, a new computerized tutorial designed to address the need for low-cost, accessible educational media on topics relevant to radar remote sensing. Developed by Vantage Point International of Ottawa, the tutor is the result of extensive research and consultation within the remote sensing community.

CURRENT MARKETING ACTIVITIES

HII markets its products and services directly. The company is also setting up distribution channels for its HI-VIEW software.

PARTNERING INTERESTS

HII is actively seeking distributors and value-added resellers who specialize in GIS and remote sensing to market the HI-VIEW software.

The company is interested in partnering with companies for GIS and remote sensing consulting projects.

HORLER INFORMATION INC.

1006, 130 Albert Street
Ottawa, Ontario
CANADA K1P 5G4

Telephone: (613) 594-4115
Facsimile: (613) 594-8679

Contact:
Dr. David Horler, President

NATURE OF BUSINESS

Horler Information Inc. (HII) specializes in the development and application of remote sensing and Geographic Information Systems. The company's activities encompass software development, online information services, geomatics and environmental management consulting services, and research.

MAJOR ACHIEVEMENTS

- Development and marketing of the HI-VIEW software system, a DEM and orthoimage generation software system.
- Operation and maintenance of the worldwide services of the Remote Sensing Online Retrieval System (RESORS).

COMPANY PROFILE

- Established: 1984
- Annual Revenue: \$700,000
- Employees: 12
 - R&D: 3
 - Administration: 2
 - Sales and Service: 2
 - Consulting: 5
- R&D Expenditures: \$200,000

COMPANY BACKGROUND

Horler Information Inc. (HII) was founded in 1984 as a company dedicated to applying new technologies of geographic information management. The company has maintained its focus on the development and applications of remote sensing and GIS. HII is committed to enhancing its leading position in developing the practical applications of these technologies through its consulting and research divisions.

continued

CURRENT MARKETING ACTIVITIES

Hauts-Monts has two full-time marketing people onstaff to promote the company's services at home and internationally in countries including Mexico, Saudi Arabia and Iran. The company also staffs a branch office in the state of Delaware to handle marketing efforts in the United States.

PARTNERING INTERESTS

Hauts-Monts is looking to build a distribution network of value-added retailers in the United States and Europe as well as establish transfers of technology agreements in Eastern Europe and the former Soviet Union.

HAUTS-MONTS INC.

1924 avenue Cheminot
Beauport, Québec
CANADA G1E 4M1

Telephone: (418) 667-1913
Facsimile: (418) 667-4606

Contact:
M. Paul Grenier, President

NATURE OF BUSINESS

Hauts-Monts is one of Canada's leading suppliers of aerial photography services and also concentrates its resources on mapping and software development. The company provides a complete range of professional geomatic services, including aerial photography with GPS kinematic positioning, photo laboratory, geodesy, photogrammetry and remote sensing services.

MAJOR ACHIEVEMENTS

Forest Inventory

Completed 8,000 line kilometres of aerial forestry photography in Cameroon for the Canadian International Development Agency (CIDA).

Land Resource Evaluation Studies

Completed aerial photography of all the windward and leeward islands in the Caribbean for the Canadian International Development Agency.

Completed aerial photography for agricultural studies in Maui and for forest inventory purposes in the Ivory Coast.

COMPANY PROFILE

- Established: 1960
- Employees: 100
 - Sales and Service: 10
 - Research & Development: 10
 - Production: 75
 - Administrative: 5
- Annual Revenue: \$7 million
- R&D Expenditures: \$6 million (over five years)

COMPANY BACKGROUND

Originally established to do large-scale forest inventory work in 1960, Hauts-Monts has since expanded to become one of Canada's premier companies providing aerial photography services. Hauts-Monts also offers digital and ortho photo mapping services and has grown significantly in the past five years.

PRODUCTS/BUSINESS DESCRIPTION

Mapit™: Mapit™ is a technical desktop mapping application that runs on the MicroStation platform. Along with functions for creating and maintaining a geographic data base, the application is unique in allowing the user to manipulate and seamlessly integrate images with vector and descriptive data.

GPS Photogrammetry: Hauts-Monts is the only Canadian company approved by the federal government to provide GPS photogrammetry services in Canada. It is used to integrate GPS Kinematic in aerial photography, thereby eliminating the need for ground control.

Desktop Mapping Software: Hauts-Monts has designed mapping software with characteristics that make it compatible with inexpensive IBM personal computers.

continued

PRODUCTS/BUSINESS DESCRIPTION

VISION*2.0

VISION*2.0 is a set of 12 software modules for building, deploying and accessing spatially-referenced data sets. The VISION*2.0 modules utilize Oracle and other leading RDBMS's leveraging the functionality and full features of each of these environments to better protect the data.

VISION* is the first GIS product line to deliver a full set of features and functionality for enterprise GIS. Architected for corporate-wide distributed data access, VISION*'s data base and management software resides on data base servers and UNIX workstations. VISION* application modules for updating, analyzing and compiling information run on UNIX workstations, X Windows terminals or personal computers. VISION* allows users to add a spatial dimension to existing corporate data, and automate and integrate operational maps and records into common applications. It features a unique symbology which allows users to visualize the same set of data in different ways, depending on users or applications.

- Comprehensive relational data base capabilities with ORACLE ® embedded;
- Continuous surface;
- Thematic layers, networks, topology and geographic relationships;
- Information at the fingertips with GeoVision's Geographic Query Language;
- Intelligent Symbology incorporates drawing rules for flexible and powerful display;
- Image Integration (including orthophotos, photographs, maps, and drawings);
- Digital Terrain Modelling;
- Application development toolkit in the hands of users; and
- Tools for Data Administrators (content management, data base integrity and security).

VISION*2.0 modules are grouped into five categories:

Input/Revision: Builder, Builder+, Image, CoGo and Edit Modules

Applications: Developer Module

Analysis: Digital Terrain Modelling and Polygon

Data Management: Manager and Administrator Modules

Output: Plot and Query Modules

VISION* 2.0's features:

Leverage RDBMS: The All-Relational Architecture: At the core of VISION*2.0 is a new All-Relational architecture which allows all VISION* functions to fully utilize a relational data base technology. In this way, VISION*2.0 takes full advantage of all the RDBMS's advanced functionality, including:

- scalability
- data integrity
- data security
- data base administration
- rollback/recovery
- distributed data base implementations

Client/Server Architecture: Architected for corporate-wide distributed data access, VISION*'s data base and management software resides on UNIX data base servers and workstations. VISION* application modules for updating, analyzing and outputting information run on UNIX workstations, X Windows terminals or personal computers. VISION* operates in a LAN environment, and provides location transparency, allowing a user to invoke GIS functions from anywhere on the network as if the GIS data base were local.

Open Systems Based: Access to other Technologies Written in C for UNIX, VISION* supports UNIX workstations and servers from DEC, IBM and Sun Microsystems and the Oracle RDBMS. Other SQL relational data bases including Sybase, Ingres, Informix, IBM's DB2 and SQL/DS can be interconnected with VISION*. VISION* utilizes the X Windows/Motif graphical user interface standard under UNIX and Windows 3.1 in the PC environment.

CURRENT MARKETING ACTIVITIES

GeoVision's business is conducted primarily through a direct sales force in each of its four major offices in Canada, the U.S., the United Kingdom and Australia. GeoVision also has active marketing agreements with IBM, UNISYS, SUN, and DEC; as well as a network of distributors in Latin America, Asia and the Middle East.

PARTNERING INTERESTS

Opportunities to apply GeoVision's technology into emerging applications and markets are assessed on a case-by-case basis, in the context of existing marketing activities and arrangements.

GEOVISION SYSTEMS INCORPORATED

#200-1600 Carling Avenue
Ottawa, Ontario
CANADA K1Z 8R7

Telephone: (613) 722-9518
Facsimile: (613) 722-5385

Contact: Mr. Daug Seaborn, President
Ms. Darleen Finnamore, Marketing Coordinator

NATURE OF BUSINESS

GeoVision is a leading geographic information software and services vendor, providing open systems-based solutions for enterprise-wide GIS applications. GeoVision's VISION* product line allows progressive organizations to enrich their "business resource" information (customers, markets, events, facilities, conditions) with geographic location, proximity relationships and visualization to strategic information systems.

COMPANY PROFILE

- Established : 1985
- Annual Revenue: \$20 million
- Employees: 180
- R&D Expenditures: \$3.4 million

COMPANY BACKGROUND

GeoVision is a privately held company, owned jointly by its employees and two Canadian technology investment companies. GeoVision's major offices are located in Ottawa, Canada; Denver, U.S.A.; Sydney, Australia; and London, U.K.

Founded in Ottawa in 1976, GeoVision has become a world leader in the application of geographic information systems software for world-leading utilities (electric, water, gas), telecommunications firms (telephone, cable, cellular) and local governments. GeoVision technology is deployed in applications as diverse and strategic as customer service, asset and resource management, public safety and network engineering.

With R&D headquarters in Ottawa, GeoVision services over 100 major corporate accounts in 20 countries through offices in Denver, Colorado; Sydney, Australia and London, England, supported by business and technology partners such as DEC, IBM, SUN and UNISYS. With a staff complement of 180, GeoVision offers a full spectrum of long-term implementation and support services to its clients.

continued

PRODUCTS/BUSINESS DESCRIPTION

GeoLab & The GPS Environment

This software package allows surveyors using the Global Positioning System (GPS) or any other survey technique to combine their results into one homogeneous three-dimensional least squares adjustment. This unique capability of combining different methodologies is just one reason why GeoLab is the world standard in GPS/Conventional network adjustments.

HeliKin

GEOsurv developed and currently uses this new technique in GPS surveying. An external boom with a detachable GPS antenna is attached to any Bell 200 series helicopter. With this configuration, GPS points can be surveyed in less than one minute and with great accuracy. The HeliKin method is especially suitable for quick ground control surveys or any other application that involves attaching a sensor (video cameras, heat sensors etc.) to the GPS antenna allowing the system to provide coordinates to the images.

GPS Photogrammetry

This revolutionary technique allows the photogrammetrist to map large areas with minimal or no ground control. The system operates using a GPS antenna mounted on an airplane equipped with a metric camera and a GPS receiver. During flight, the GPS receiver will assign X, Y, Z coordinates to the perspective centre of each photograph. These coordinates are then integrated into the aerotriangulation in order to control the different models of the flight mission.

Training

In a training capacity, GEOsurv has completed training courses for many organizations around the world. These courses have ranged from one-day workshops to complete seven-day courses covering a variety of topics related to GPS surveying and geodetic theory.

CURRENT MARKETING ACTIVITIES

GEOsurv is currently opening markets for its products in Russia, Europe and South America through a network of dealers and agents.

PARTNERING INTERESTS

GEOsurv's primary interest in collaboration is to partner with local mapping and surveying companies to support them through specialized GPS, photogrammetry and training services.

GEO SURV INC.

#6 – 1050 Baxter Road
Ottawa, Ontario
CANADA K2C 3P1

Telephone: (613) 820-4545
Facsimile: (613) 820-9772

Contact:
Mr. Paul Mrstik, President

NATURE OF BUSINESS

GEOsurv Inc. specializes in the provision of GPS surveying services, software and training to the survey community.

MAJOR ACHIEVEMENTS

- Developed the GPS Environment for GeoLab™, the world standard for GPS Network adjustments using three-dimensional least squares procedures.
- Developed the patented HeliKin system, which uses kinematic GPS in a helicopter with an external boom to survey fast and accurate control points.
- Developed GPS Photogrammetry (patents pending), a technique that allows the elimination of ground control which is normally required in a photogrammetric project.
- Have surveyed over 6,500 GPS points of first, second and third order in the United States, Portugal, Australia, Venezuela and Nigeria.

COMPANY PROFILE

- Established: 1985
- Annual Revenue: \$1.2 million
- Employees: 8
 - R&D: 6
 - Administration: 2
 - Sales: 3
 - Production: 6
- R&D Expenditures: \$120,000

COMPANY BACKGROUND

GEOsurv Inc. was incorporated in 1985 to specialize in the provision of GPS surveying services, software and training to the survey community. Since 1985, the company has been involved in surveying over 6,500 survey points using GPS technology. It is the exclusive distributor of GeoLab, a least squares adjustment package. GEOsurv is also involved in leading-edge research and development in areas such as GPS photogrammetry and airborne helicopter kinematic GPS techniques.

continued

PRODUCTS/BUSINESS DESCRIPTION

DOLPHIN is designed for use both domestically and internationally as an ocean surveying platform. It is suitable for performing tasks too costly or too dangerous for manned vessels, such as minesweeping. As a hydrographic surveying tool, DOLPHIN can dramatically increase productivity, attaining reductions of up to a factor of five in ship time costs. At the same time, the system provides total bottom coverage. Geo-Resources staff are trained in engineering, maintenance and operating of the DOLPHIN.

Geo-Resources is an expert in the mapping services field, and provides services such as:

- Using GPS satellite technology in support of precision topographical and photogrammetric mapping, hydrographic, geophysical and offshore positioning.
- Performing advanced bathymetric surveys using sophisticated multi-beam swath echo sounders.
- Using automated hydrographic data acquisition and processing systems.

CURRENT MARKETING ACTIVITIES

Geo-Resources is marketing its DOLPHIN applications in Southeast Asia, northern South America, Europe, the Caribbean and the South Pacific.

PARTNERING INTERESTS

With an increase in international business expected due to the ratification of the United Nations Law of the Sea, Geo-Resources anticipates an increased demand for its ocean mapping services. Participating nations have ten years to produce detailed seabed maps of their 200-mile offshore exclusive economic zone. These surveys can be completed at dramatically reduced costs with DOLPHIN.

Geo-Resources is looking for opportunities to establish a complementary partnership with firms involved in different areas of ocean development. Companies that offer an integrated package requiring the services of Geo-Resources are of primary interest.

GEO-RESOURCES INC.

P.O. Box 2516, Station C
St. John's, Newfoundland
CANADA A1C 6K1

Telephone: (709) 747-5599
Facsimile: (709) 747-8881

Contact:
Mr. E.C. (Carl) Granter, President

NATURE OF BUSINESS

Geo-Resources is a surveying and engineering company, specializing in ocean mapping and geomatic applications.

The company's strength emanates from its experience with state-of-the-art technology including the utilization of the Canadian developed remotely operated vehicle DOLPHIN. DOLPHIN is integrated with a multibeam bathymetric system that is operated from shore or from a ship of opportunity. A specialized handling system developed in Canada to launch and recover the DOLPHIN in up to sea state 5 further enhances this unique and cost-effective system. All data is collected and processed in digital form and is referenced to the Navstar Global Positioning System (GPS).

MAJOR ACHIEVEMENTS

- As the leading contractor, and in conjunction with other Canadian companies, Geo-Resources developed the DOLPHIN Ocean Mapping System, a unique and revolutionary cost-effective system for conducting sea floor mapping surveys.

COMPANY PROFILE

- Established: 1986
- Employees: 9
Professional/technical: 7
Administration: 2
- Revenue: \$500,000 (May-Sept. 1992)

COMPANY BACKGROUND

Geo-Resources Inc. is a privately owned Canadian company, which was established in 1986 to provide ocean mapping services domestically and internationally. The company principals have a well-established reputation based on over 30 years in the surveying business. Its experienced personnel are well-experienced in conducting multi-beam echo sounding surveys and related hydrographic operations.

The company has played the lead role in developing a Canadian Ocean Mapping System, a major initiative to provide a revolutionary Ocean Mapping System to map Canada's coastline and territorial waters. Geo-Resources has also made this service available to the international market. During 1992, Geo-Resources was contracted by the U.S. Navy and demonstrated the effectiveness of the system on a mapping project at Norfolk, Virginia, U.S.A.

continued

PRODUCTS/BUSINESS DESCRIPTION

Gendron Lefebvre provides geomatics services in the following sectors:

- Land surveying (siting, tax maps, setting of boundaries, property staking, cadastral surveying, certificate of location, condominium plans, technical drawings and description measurements of rental space, cadastral compilation and renovation).
- Engineering and GPS surveys (construction of major engineering projects, siting of municipal infrastructure, photogrammetric control, microgeodesy and volume determination).
- Photogrammetric mapping (analytical triangulation, digital terrain modelling, digital mapping, thematic cartography, map updating, laboratory reproduction, plotting).
- Data conversion (scanning, digitizing, data structuring).
- Geographic information systems (GIS) and technical development (training, consultation, cost/benefit analysis, feasibility studies, inventory of existing data, data base modelling, videodisk applications, information systems, conception, development and implementation and system installation integration).

CURRENT MARKETING ACTIVITIES

Gendron Lefebvre has a direct sales force network covering 45 countries. The company has also established cooperative geomatics research and development initiatives with the Canadian Geomatic Center in Sherbrooke, Quebec and Laval University in Sainte-Foy, Quebec.

PARTNERING INTERESTS

Gendron Lefebvre is seeking partnership arrangements in the following areas: aerial photography, GPS, engineering surveys, photogrammetry, mapping, conversion and GIS.

GENDRON LEFEBVRE INC.

#200-1 Place Laval
Laval, Quebec
CANADA H7N 1A1

Telephone: (514) 384-1260
Facsimile: (514) 629-8737

Contacts:
Mr. Marc Gendron, President
Mr. Daniel Fortin, General Manager

NATURE OF BUSINESS

Gendron Lefebvre is a multi-disciplinary firm offering a complete range of professional services in engineering including urban engineering, transportation, engineering, construction engineering and management, and environmental studies and assessments.

In the field of geomatics, Gendron Lefebvre provides numerous services including land surveying, geodesy, Global Positioning System (GPS) surveys, topometry, photogrammetry and mapping, videodisk mapping, orthophoto, remote sensing, data conversion and Geographic Information Systems (GIS) conception, development and implementation.

MAJOR ACHIEVEMENTS

- Implementation of geodetic and altimetric networks at different precision levels.
- High-precision survey for the construction of the Olympic complex tower in Montreal.
- Aerial photography, implementation of photogrammetry controls, aerotriangulation, small, medium and large-scale conventional and digital mapping (millions of hectares), and road and transmission line corridor profiles in Canada and abroad.
- Cadastral renovation, inventory of data, development and installation of a geographic information system (GIS) including cadastral themes and geographic basis for the City of Salaberry-de-Valleyfield.
- Optical scanning, digitizing and data structuration of map sheets at scales of 1:250 000, 1:50 000, 1:20 000, 1:2000, and 1:1000.

COMPANY PROFILE

- Established: 1958
- Annual Revenue: \$13 million
- Employees: 165 (60 in geomatics)
 - R&D: 5
 - Administration: 5
 - Sales and Service: 5 (geomatics & engineering)
 - Production: 50
- R&D Expenditures: \$1 million

COMPANY BACKGROUND

As a new subsidiary of the Tecsalt Group, Gendron Lefebvre is a privately owned firm with access to a pool of more than a thousand employees around the world. The Tecsalt Group staff a number of permanent international offices and represent the company in more than 45 countries.

PRODUCTS/BUSINESS DESCRIPTION

As a systems consulting company, DMR offers a full range of services and skills for GIS clients including:

- Strategic planning of information technology (IT)
 - IT architecture
 - IT benefits management
 - Technology/knowhow transfer
 - Applications development outsourcing
 - Systems development
 - Systems integration
-
- DMR Productivity Plus™ is a proprietary system development methodology that is being marketed around the world. More than 175 licences have been issued since 1988 to users such as Alcan, The Boeing Company, United Airlines, CIBA-Geigy, Liberty Mutual Group of Companies, Australia Post, the State of Massachusetts and the Montréal Urban Community.

CURRENT MARKETING ACTIVITIES

With offices throughout North America, Europe, Australia and New Zealand, DMR offers a wide range of GIS services including:

- GIS master plans and directional studies
- Context studies
- Technological alternative studies
- Architecture of spatial information reference systems (data, process and technology)
- Integration of spatial information
- GIS design, development and implementation
- GIS development support and pilot projects
- Research and development profiles
- Market studies

PARTNERING INTERESTS

DMR will work with firms worldwide to provide integration services for GIS and other systems technologies. Arrangements are made on a project-by-project basis.

DMR GROUP INC.

2300 — 1200 McGill College Avenue
Montréal, Quebec
CANADA H3B 4G7

Telephone: (514) 877-3301
Facsimile: (514) 866-0423

Contact:

Mr. Serge Meilleur, President and Chief Operating Officer
Mr. Michel Gélinas, Director, Public Affairs and Communications

NATURE OF BUSINESS

DMR is a leading international provider of information technology services to business and public enterprises. Employing more than 2,300 professionals in Canada, the United States, Australia and Europe, DMR offers services including information technology planning, enterprise architecture, technology transfer, outsourcing, systems development and systems integration. With a technological focus on Geographic Information Systems (GIS) and land information systems, DMR's geomatics practice date back to the early 1980s.

MAJOR ACHIEVEMENTS

- In December 1992, DMR won Canada's largest civilian geomatics contract ever awarded. The \$27.2 million systems integration contract was granted by Québec's Department of Energy and Resources to develop and operate its cadastral reform information systems.
- DMR has completed more than 100 GIS assignments for clients in Canada, the U.S. and Europe such as the Government of British Columbia, Canada Post Corporation, the City of Edmonton, the City of Montreal, the Los Angeles County Transportation Commission and Shell-Nederlandse Aardolie Maatschappij.

COMPANY PROFILE

- Established: 1973
- Annual revenue: \$212 million (May 31, 1992)
- Employees: 2,300
 - R&D: 60
 - Administration, Sales and Services: 155
 - Production: 2,085
- R&D Expenditures: \$13 million (gross)

COMPANY BACKGROUND

Founded in Montréal in 1973, DMR is an acknowledged leader in its field. The company's goal is to be one of the top 25 industry leaders in the global information technologies services market by the end of the century. The commitment to R&D and associated training is a cornerstone of the company's vision.

Its commitment to research puts DMR at the leading edge of IT innovation. DMR has researched the critical issues of IT direction and information management as experienced by some 5,000 organizations. These business and technology studies provide DMR with a broad view of current competitive reality and an in-depth understanding of how IT shapes effective solutions.

DMR's emphasis on methodologies distinguishes it from competing information service providers. The company stresses a process engineering approach that applies DMR methodologies to a specific process, with standards, tools, procedures, and expertise to depend on. This combination of methods, tools and training is recognized as one of the most complete and effective implementation guides for information technology.

With offices throughout North America, the United States, Europe and Australia, DMR offers a wide range of GIS services including:

- GIS master plans and directional studies
- Context studies
- Technological alternative studies
- Architecture of spatial information reference systems (data, process and technology)
- Integration of spatial information
- GIS design, development and implementation
- GIS development support and pilot projects
- Research and development profiles
- Market studies

continued

PRODUCTS/BUSINESS DESCRIPTION

TerraSoft Mapping and Analytical Modules: This software is used to create and maintain an inventory of spatial information and to provide forecasts of future events related to the data. TerraSoft is widely used for applications in forestry, hydrology, agriculture, environmental impact assessment, transportation, risk analysis, surveying and map production, urban planning and land redistribution. An Application Program Interface allows an organization or value-added reseller to link its application to TerraSoft.

TerraSoft Digital Terrain Module: This software product is used for three-dimensional modelling. This provides perspective views of terrain and allows the user to conduct viewpoint analysis.

EPS Prime Meridian: This is a powerful data base builder for developing seamless integration of spatial data in any geographic related application. EPS Meridian provides automatic and dynamic linking to associated "attribute" data in any third-party relational data base.

Consulting and Training Services: DRS conducts a variety of consulting assignments using its software, and carries out implementation and support activities for TerraSoft clients. These include training for new customers and advanced learning for existing customers.

CURRENT MARKETING ACTIVITIES

DRS has over 300 clients worldwide. Marketing of the TerraSoft products is done through local dealers and distributors in Europe, Malaysia, Australia and New Zealand.

PARTNERING INTERESTS

DRS would like to expand its dealer network and establish new distributors in Latin America, Europe and Pacific Rim countries. The company is also interested in relationships with value-added resellers wishing to link TerraSoft with their own applications to provide total solutions.

DIGITAL RESOURCE SYSTEMS LIMITED

402 — 495 Dunsmuir Street
Nanaimo, British Columbia
CANADA V9R 2V2

Telephone: (604) 753-7122
Facsimile: (604) 753-1700

Contact:
Mr. Jim Spencer, President
Mr. Bob Bostrom, Marketing Manager

NATURE OF BUSINESS

Digital Resource Systems (DRS) Limited develops and markets land and resource management software for forestry and municipal government applications.

MAJOR ACHIEVEMENTS

- Winner of an Award of Excellence from the Software Association of British Columbia.
- Winner of an award for success in export sales from the British Columbia Ministry of Regional and Economic Development.
- Clients include the Canadian Coastguard; Canadian Forest Products; and Howard Humphries Surveying, London, England.

COMPANY PROFILE

- Established: 1981
- Employees: 31
 - Technical: 21
 - Sales & Administration: 5
 - R&D: 5

COMPANY BACKGROUND

DRS was founded in 1981 by its current principals. With extensive experience in surveying, mapping, geology, forestry, computer science and engineering, DRS staff are uniquely qualified in all aspects of software development and implementation for GIS. The company has extensive experience with survey and natural resource applications of GIS in Canada, the United States, Europe and the Pacific Rim.

The DRS client base includes the School of Economic Forestry in Scotland; the Harvard Humphries School of Surveying, London, England; and users in Australia, New Zealand, Spain, Norway, Egypt, Sweden, Malaysia and China.

DRS is a wholly-owned subsidiary of OCS Technologies, a developer of leading-edge software solutions. OCS Technologies has over 200 employees and is listed on the Toronto Stock Exchange.

continued

CURRENT MARKETING ACTIVITIES

Béliveau-Couture has undertaken projects in the United States, Europe, Africa and Southeast Asia. With the help of local companies, Béliveau-Couture is marketing its services in South East Asia, South America and Eastern Europe.

PARTNERING INTERESTS

Béliveau-Couture is eager to export its expertise to countries throughout the world. The group is interested in partnerships with foreign companies that are well-established in their country and are targeted toward the geomatics and surveying market.

THE BÉLIVEAU-COUTURE GROUP

2797, rue Watt
Ste. Foy, Quebec
CANADA G1P 3X3

Telephone: (418) 656-1572
Facsimile: (418) 656-6910

Contact:
Mr. Guy Béliveau, President

NATURE OF BUSINESS

The Béliveau-Couture Group is the largest surveying and mapping firm in Quebec and one of the largest in Canada. Béliveau-Couture and its subsidiaries offer complete, professional services in geomatics including remote sensing, digital and conventional mapping and hydrographic and oceanographic expertise.

MAJOR ACHIEVEMENTS

- Developed, through one of its subsidiaries, a master plan for an urban Geographic Information System for the City of Montreal.
- Provided a pilot project, test benching and geomatics training for the Régie des Assurances Agricales du Quebec.
- Produced a preliminary analysis for a Geographic Information System for the Services Industriels de Genève in Switzerland through one of its subsidiaries.
- Carried out hydrographic, geodetic and topographic surveying and mapping of part of the Manitousuk Strait as well as an extensive tidal study of the area to establish the Quebec-Northwest Territories border.

COMPANY PROFILE

- Established: 1966
- Annual Revenue: \$5 million
- Employees: 69
 - R&D: 2
 - Administration: 5
 - Sales: 2
 - Production: 60
- R&D Expenditures: \$200,000

COMPANY BACKGROUND

Béliveau-Couture is a privately owned corporation with eight Canadian subsidiaries working in the fields of geodesy, mapping, geomatics and computer sciences. A high-level consulting firm, Béliveau-Couture specializes in planning and implementing large-scale projects as well as developing and applying cutting-edge technology in the fields of geomatics and all surveying sciences.

PRODUCTS/BUSINESS DESCRIPTION

Béliveau-Couture's strength is in geomatics as well as the different survey sciences. In offering its services, different products can be delivered:

- Digital and conventional maps of all types and scales (including hydrographic charts)
- Fully established and controlled geodetic networks by Global Positioning System and conventional methods
- Geographic Information Systems applied to specific or general applications (forestry, municipal management, environment, etc.)
- Surveys of all types (legal, engineering, construction, deformation, mining, etc.)
- Feasibility studies
- Project management to bring multidisciplinary resources together

continued

PRODUCTS/BUSINESS DESCRIPTION

BCGT provides a broad range of professional services, from education and consulting to research and development.

Consulting

- strategic and master plans
- feasibility and impact studies
- educational programs
- pilot projects and prototypes
- management assistance
- technical audits
- turnkey GIS project management

Development of Geographic Information Systems (GIS)

- preliminary analysis
- system architecture
- functional analysis
- technical realization
- implementation
- system integration

Technical services

- development of graphic data bases, georeferenced data bases, and application software
- optimization of user interfaces
- management of geomatic systems

Specialized education programs

- introduction to GIS concepts
- introduction to GIS-related technologies

BCGT also customizes existing GIS technology to meet specific client needs in developing personalized applications and optimizing user interfaces.

To achieve its consulting, research and development mandates, BCGT has access to a wide selection of geomatics technologies and GIS software. Direct access to these technologies allows BCGT to maintain its practical knowledge of GIS-related technologies.

CURRENT MARKETING ACTIVITIES

The company has completed and is currently pursuing different projects in Europe, North Africa and South America.

PARTNERING INTERESTS

BCGT is interested in pursuing partnership arrangements with firms that provide general expertise as well as high-level geomatics consulting services. The partnership would be of a complementary nature to increase the competitiveness of all involved firms.

Strategic alliances can be arranged on a project-by-project basis or in specific geographic markets such as Central and South America, Europe and Asia.

BCGT INC.

#295-710 rue Bouvier
Quebec City, Quebec
CANADA G2J 1C2

Telephone: (418) 622-8411
Facsimile: (418) 622-0427

Contact:
Mr. Louis Bh  rer, President

NATURE OF BUSINESS

BCGT Inc. primarily focuses on geomatics consulting and research and development. BCGT specializes in Geographic Information Systems (GIS) for municipal applications, public utilities, natural resources, environment, agriculture, and transportation.

The company assists organizations in the conception, development and implementation of GIS projects and in the integration of specific geomatic technologies.

MAJOR ACHIEVEMENTS

BCGT has completed over 200 GIS assignments for over 40 organizations (federal, provincial and municipal governments, and public utilities in Canada, South America and Europe) including:

- Support to the *Minist  re de l'  nergie et des Ressources du Qu  bec* in the evaluation process of the financial, management and technical aspects of the Qu  bec cadastral reform program (Canada)
- Geomatics master plan for the City of Montr  al
- Preliminary analysis and development of a GIS for *Services industriels de Gen  ve* (Switzerland)
- Geomatics feasibility study for a municipal reform program for the Government of Ecuador
- Strategic planning of the automated mapping activities for Hydro Qu  bec.
- PROGERT, a \$32 million R&D geomatics project

COMPANY PROFILE

- Established: 1986
- Annual Revenue: \$1.5 million
- Employees: 20
- R&D Expenditures: 5% to 10% of annual revenue

COMPANY BACKGROUND

BCGT Inc. is a privately owned Canadian company dedicated to GIS consulting and research and development. With company affiliates, BCGT has access to a pool of 100 professionals and technicians who specialize in GPS services, aerial photography, surveying, photo interpretation, mapping, geodetic control and field data acquisition.

continued

DESCRIPTION OF RESEARCH

Examples of the research conducted in the Department's research centres include:

- Application of GPS satellite positioning to geodesy, real-time navigation, deformation measurements and engineering surveys
- Development, testing and refinement of data collection and visualization systems for ocean mapping
- Requirements analysis, performance testing and component design for a national spatial data infrastructure
- Use of finite element method in the physical interpretation and prediction of deformations
- Integration of digital image and digital mapping data
- Object-oriented implementation of spatial data modes and development of an object-oriented interface to a conventional GIS
- Representation and visualization of uncertain or "fuzzy" data
- Metric evaluation of remote sensor data
- Browsing of distributed spatial data bases
- Kinematic visualization of very large datasets
- Physical Geodesy

CURRENT INDUSTRIAL INVOLVEMENT

Examples of recent collaborative research efforts include:

- Ongoing refinement, extension and testing of commercial GIS software (with Universal Systems Ltd., Fredericton, N.B.)
- Design of control and deformation monitoring surveys for the Superconducting Super Collider project in Texas (with John E. Chance and Associates, Dallas, Texas, U.S.A.)
- Generalized methodology for the design and analysis of deformation surveys (with the New Brunswick Electric Power Commission, Fredericton, N.B.)
- Application of remote sensing to improved soil surveys (with Agriculture Canada and the Canada Centre for Remote Sensing)
- Integration of airborne and satellite imagery with submarine remote sensing (with Canadian Space Agency and Universal Systems Ltd.)
- Prediction of tropospheric delay of GPS signals (with Usher Canada Ltd. and NSERC)
- Development of a real-time sea-floor classification system (with Questor Tangent Inc., British Columbia)
- Canadian Hydrographic Service and Finland National Board of Navigation
- Investigation of the speed and accuracy of semi-automated digitizing systems and procedures (with Department of National Defence)
- Development of land information and land administration arrangements and support for informal economies in developing countries (with the Instituto Y Democracia, Lima, Peru)

INDUSTRIAL INVOLVEMENT SOUGHT

Staff in the Department's research centres are interested in strategic joint ventures in the areas of shared research and development, personnel exchanges, co-operative development of offsite educational programs and commercialization or refinement of research software.

UNIVERSITY OF NEW BRUNSWICK

Department of Surveying Engineering
P.O. Box 4400
Fredericton, New Brunswick
CANADA E3B 5A3

Telephone: (506) 453-4698
Facsimile: (506) 453-4943
E-Mail: SE@UNB.CA

Key Personnel:

Dr. A.C. Chrzanowski, Chairman
Dr. E. Derenyi
Dr. W. Faig
Dr. A. Kleusberg
Dr. R.B. Langley
Dr. Y.C. Lee
Dr. L.A. Mayer
Dr. J.D. McLaughlin
Dr. S.E. Nichols
Mr. J. Secord
Dr. P. Vanicek
Dr. D.E. Wells

NATURE OF RESEARCH

The University of New Brunswick is involved in research and development related to:

- Ocean Mapping
- GIS Development and Implementation
- Land Information Management
- Multipurpose Cadastral Systems
- Precise Engineering Surveys and Deformation Measurements
- Remote Sensing/GIS Integration
- Satellite Positioning

MAJOR ACCOMPLISHMENTS

- Over 65 ongoing projects involving various aspects of geomatics research - many involving collaboration with outside partners.
- Over 240 post-graduate degrees conferred to individuals from over 40 countries since 1961.
- Establishment of an NSERC Chair in Ocean Mapping funded jointly by government and industry.
- Initial development of numerous positioning, computational and GIS software products which have since been successfully commercialized.

RESEARCH GROUP PROFILE

- Established in 1961
- Includes 12 faculty members and over 90 graduate students, full-time research associates and post-doctoral fellows
- Annual research budget of over \$1.5 million
- Special research labs in the Department covering GIS development and implementation, geodetic research, ocean mapping, remote sensing, engineering & mining surveys and resource & environmental information management.
- Equipment and Software
 - Computing hardware includes numerous UNIX workstations, Macintoshes, PCs and associated storage and output devices;
 - Other equipment includes 6 GPS receivers, ocean mapping equipment and state-of-the-art distance and angle-measurement systems;
 - Major software includes CARIS GIS software, PCI image processing software, plus a wide range of statistical processing and visualization packages.

continued

RESEARCH GROUP PROFILE

- Established: 1979
- Staff: 11 faculty members
40 full-time graduate students
5 research associates and post-doctoral fellows
- Key personnel:

Dr. J.A.R. Blais	Dr. M.E. Cannon
Dr. M.A. Chapman	Dr. P. Gang
Dr. E.J. Krakiwsk	Dr. G. Lachapelle
Dr. R. Li	Dr. A.C. McEwen
Dr. K.P. Schwarz	Dr. M.G. Sideris
Dr. W.F. Teskey	
- Annual research income: \$1.4 million
- Several research labs in the Department:
 - Automatic Vehicle Location Lab
 - Gravity Lab
 - Inertial Systems Lab
 - Navigation Lab
 - Precise Engineering Lab
 - Remote Sensing Lab
- Equipment and Instrumentation:
 - Numerous PC computers
 - Sun SPARCstation plus peripherals
 - Numerous Macintosh computers
 - Associated storage devices
 - Printers and plotters
- GPS receivers and a GPS attitude determination system, strapdown inertial navigation system, digital array cameras, Loran-C receivers, state-of-the art electronic distance measuring systems and theodolites

DESCRIPTION OF RESEARCH

- Satellite and inertial positioning and navigation
- Gravity field by terrestrial and airborne methods
- Satellite altimetry methods
- Airborne and marine integrated navigation systems
- Automatic vehicle location systems
- Digital mapping and on-line photogrammetry
- Remote sensing and digital image analysis
- Standards, specifications and quality assurance
- Optimization of surveying and mapping operations
- Specialized measurement and alignment technology
- Land registration and cadastral systems
- 3-D geographical information systems
- Position-based Spatial Information Systems (SIS)

CURRENT INDUSTRIAL INVOLVEMENT

The following projects have been sponsored in part or in whole by North American industrial groups:

- VISAT—Mobile Road Inventory System
- Helicopter-borne GPS/INS
- SAR Motion Compensation
- Dynamic Alignment Project using digital imaging and laser scanning

INDUSTRIAL INVOLVEMENT SOUGHT

Industrial partnerships are sought in remote sensing, precise survey engineering and geographic information as well as in the following areas:

- 3-D Geographic Information Systems
- Airborne remote sensing
- Application of satellite navigation methods in agriculture and environmental protection, sponsored by federal and provincial government agencies
- Airborne gravimetric and gradiometric systems development for geophysical applications, sponsored by industrial groups
- Precise Kinematic Positioning using GPS and GPS/INS
- Gravity field estimation to improve the knowledge of the geoid for mapping and other purposes, sponsored by federal and provincial government agencies.

THE UNIVERSITY OF CALGARY

Department of Geomatics Engineering
2500 University Drive N.W.
Calgary, Alberta
CANADA T3H 1Z2

Telephone: (403) 220-5834
Facsimile: (403) 284-1980

Key Contacts:
Dr. Klaus-Peter Schwarz,
Head, Department of Geomatics Engineering

NATURE OF RESEARCH

The Department is involved actively in five research areas, namely positioning and navigation, gravity and reference systems, photogrammetry and remote sensing, precise engineering surveys, and geographic information systems.

MAJOR ACCOMPLISHMENTS

Over 50 ongoing research projects involving numerous aspects of geomatics research and sponsored by Canadian and foreign corporations and government agencies. Examples of such projects are:

- Precise aircraft positioning for remote sensing applications using Global Positioning System (GPS) and/or INS navigation, sponsored by government and industrial groups.
- Precise shipborne positioning and azimuth and attitude determination using GPS, sponsored by government and industrial groups.
- Precise aircraft and aircraft-to-aircraft positioning with GPS, sponsored by U.S. government agencies.
- Commercialization of various software products which have resulted from research projects in positioning and navigation. These include SMIKIN™ and C3NAV™, which are being licensed on a worldwide basis through University Technologies International, a wholly owned subsidiary of The University of Calgary, and an emerging Intelligent Vehicle Highway System data base.
- KINGSPAT: A software program for position and attitude determination using GPS/INS.
- CANADAS: A software program for computer-aided network adjustment and deformation analysis which consists of two sub-programs namely, MONALYSA and GEODEAN.

continued

CURRENT INDUSTRIAL INVOLVEMENT

- Working with Canadian Space Agency to develop high-density data recorder for application in radio astronomy
- Working with Applied Physics Specialities to develop the next generation of fourier transform spectrometers for measuring the intensity of hydroxyl air flow
- Working with CamDev Ltd. in the development of a ground-based radiometer for passive microwave remote sensing applications
- Worked with CAL Corporation on the development of a Wind Imaging Michelson Interferometer for use in upper atmospheric research satellite
- Working with SPAR Aerospace Ltd. and other member companies on the development of infra-red sensor technologies.

INDUSTRIAL INVOLVEMENT SOUGHT

ISTS is interested in proposals and opportunities which may involve collaborative research and development, in-kind programs and third-party contracting in any of the eight special theme areas mentioned earlier. Limited amounts of seed funding for specific strategically important projects which meet strict criteria may be available from a special Project Opportunities Fund.

INSTITUTE FOR SPACE AND TERRESTRIAL SCIENCE

4850 Keele Street, 2nd Floor
North York, Ontario
CANADA M3J 3K1

Telephone: (416) 665-3311
Facsimile: (416) 665-2032

Contact:
Mr. Richard D. Worsfold, Director of Business Development

NATURE OF RESEARCH

The Institute for Space and Terrestrial Science is involved in research and development related to:

- Space Science
- Space Technology
- Remote Sensing
- Geographic Information Systems
- Robotics

MAJOR ACCOMPLISHMENTS

- Establishment of several world-class research projects in eight theme areas (see description of research).
- Establishment of a standards laboratory for electro-optical systems.
- Establishment of a research facility for deep space studies at the former NRC research facility in Algonquin Park.
- Establishment of a major education facility called the Algonquin Space Campus for teenagers, educators and adults.

RESEARCH GROUP PROFILE

- Established in 1988
- One of Ontario's Centres of Excellence
- 65 researchers and support staff
- Affiliation with six academic institutes
- Current collaborative industrial membership of 39 companies
- Three internal laboratories and six supported laboratories in academic institutes

UNIVERSITY/INSTITUTE INVOLVEMENT

ISTS is a private, non-profit organization which acts as a catalyst to bring together academic research groups and private companies to pursue specific research contracts in eight different theme areas. While not officially attached to any one particular university, ISTS does enter into project-specific agreements with different academic institutes for specific research and development initiatives.

DESCRIPTION OF RESEARCH

Research and development carried out in relation to the eight theme areas:

- Environmental Change
- Remote Sensing for Resource Management
- Human Performance in Space
- Structures, Materials, Robotics
- Deep Space
- Instrumentation
- Small Satellite Payloads
- Closed-Cycle Environmental Systems

continued

CURRENT INDUSTRIAL INVOLVEMENT

The Institute has a research agreement with the National Institute of Standards and Technology to support areas related to geographic and land information systems such as SQL/GIS extensions, expert systems, knowledge-based approaches to geographic information management, information resource dictionary systems, and geographic data exchange. The agreement includes opportunities to work with industry representatives on related topics.

Through an ongoing research agreement with Northway Map Technology, the Institute is developing new approaches to managing long duration transactions in a GIS environment and techniques for geographic information resources management using intelligent systems.

INDUSTRIAL INVOLVEMENT SOUGHT

ILIM is interested in short and long-term projects or agreements with a significant strategic research component in the areas of intelligent geographic information systems, ecosystem modelling, environmental and land information management, and applications of remote sensing technology. The types of involvement sought are research contracts, consulting agreements, software donations, and hardware acquisition/upgrades. Specialized training in areas of research expertise may also be arranged.

INSTITUTE FOR LAND INFORMATION MANAGEMENT

University of Toronto, Erindale College
South Building
3359 Mississauga Road
Mississauga, Ontario
CANADA K5L 1C6

Telephone: (416) 828-5459
Facsimile: (416) 828-5273

Contact:
Dr. Vincent Robinson, Director

NATURE OF RESEARCH

ILIM conducts multi-disciplinary research into the design and development of land/geographic information management systems and their application to management of the land and its resources. Emphasis has been on research directed towards building of intelligent land/geographic information systems.

MAJOR ACCOMPLISHMENTS

In a landmark modelling study, ILIM collaborated with private firms to apply the ANSI/FIPS standard for Information Resources Dictionary Systems to geographic information and facility alterations at a major international airport.

ILIM worked with firms such as Computervision GIS, Geovision and ESRI, to extend the SQL data base language to support management of geographic/land information. This is part of a research agreement with the National Institute of Standards and Technology (U.S. Department of Commerce)

ILIM's prototype Knowledge-based Land Information Management System uses an object-oriented representation approach to support the management of forested ecosystem simulations and visual queries on a geographic data base. This is used by researchers to integrate artificial intelligence, distributed GIS, environmental modelling, and spatio-temporal information.

RESEARCH GROUP PROFILE

- Established in 1987
- Number of researchers: 5
- R&D Annual Budget: \$250,000 (approx.)
- Major Equipment/SOFTWARE
 - Network of Engineering Unix Workstations and X-terminals
 - Logic Programming Development Environment
 - Object-Oriented Data base Management System
 - GIS Software Packages: System 9, ARC/Info, GRASS

DESCRIPTION OF RESEARCH

- Knowledge-based approaches to managing geographic data
- Visualization of land surface/atmospheric interaction processes
- Integration of spatial data bases and simulation models
- Integration of remote sensing data and terrain information
- Decision support for regional scale ecosystems and environmental research
- Geographic information technology standards for data exchange, query languages, and information resources dictionary systems

CURRENT INDUSTRIAL INVOLVEMENT

- Working with Parks Canada on developing more effective methods for maintaining and updating National Park data bases using an integrated GIS/Remote Sensing approach
- Collaboration with Seaconsult Ltd., the Centre for Cold Ocean Resources (C-CORE) and others on the use of GIS and remote sensing in oil spill monitoring and recovery
- Collaboration with Newfoundland Department of Fisheries and a local development authority on using remote sensing techniques to identify kelp proliferation in coastal areas
- Working with an international oil company on developing techniques for determining the nature and scope of iceberg "scouring" on seabeds off the coast of Newfoundland.

INDUSTRIAL INVOLVEMENT SOUGHT

Laboratory staff are interested in strategic joint ventures or shared research and development in the application of GIS and remote sensing technology in coastal zone management, fisheries and land use planning.

GEOGRAPHICAL INFORMATION AND DIGITAL ANALYSIS LABORATORY (GEOIDAL)

Department of Geography
Memorial University of Newfoundland
St. John's, Newfoundland
CANADA A1B 3X9

Telephone: (709) 737-7417
Facsimile: (709) 737-4000

Contact:
Dr. Elizabeth Lambert
Director, Assistant Professor, Remote Sensing

NATURE OF RESEARCH

- Teaching and research in remote sensing, GIS and cartography
- Applications in natural resources assessment and monitoring

MAJOR ACHIEVEMENTS

- Recognized as the principal centre for GIS/Remote Sensing research in Newfoundland and Labrador.
- Awarded major research project with Seacansult Ltd. investigating the use of remote sensing for the management of oil spill containment operations along the entire west coast of Newfoundland.

RESEARCH GROUP PROFILE

Dr. Elizabeth Lambert, Director, Assistant Professor, Remote Sensing
Joan Luther, Science Technician
Dr. Alvin Simms, Assistant Professor, GIS and Quantitative Methods
Dr. Scott Freundsuh, Assistant Professor, Cartography and GIS

- Major Equipment:
SUN SPARCstation IPC
Microvax 4000
10 personal computers (386s and 486s)
2 digitizing tables
Tektronics Phaser IISX printer
ARIES III image analysis system
SPANS and SPANsmap

UNIVERSITY/INSTITUTE INVOLVEMENT

Situated in the Department of Geography, the laboratory was established through university funding to serve the GIS and remote sensing requirements of various departments on campus.

DESCRIPTION OF RESEARCH

- Analysis of satellite and airborne imagery for coastal studies, oil spill sensitivity analysis, kelp beds inventory, and balsam fir forest assessment
- GIS data base development and analysis for the study of salmonid and waterfowl habitats, and aquaculture site evaluation
- Integration of caribou migration data and topographic map information
- Integration of remote sensing to GIS data bases for environmental monitoring and coastal studies
- Design of GIS user interface.

continued

DESCRIPTION OF RESEARCH

Over the last year, research projects have included:

- The analysis of ice textures on glaciers in Spitzbergen
- Habitat type analysis for a lemming study at Pearce Pt. N.W.T.
- TM vegetation analysis associated with a snowshoe hare study at Kluane, Yukon
- GIS/TM analysis of the influence of land use patterns on waterfowl use of agricultural fields in the Fraser Delta
- A small area urban park GIS data base requirements with emphasis on forest damage
- Analysis of MEIS data for air pollution effects on forests
- Assessment of mountain pine beetle current attack interpretation
- Preparation of chapter on vegetation for the New Manual of Photo Interpretation to be published by the American Society Photogrammetry and Remote Sensing
- DTM terrain analysis for hi-lead aerial logging
- Identification and quantification of moose habitat
- The ambrosia beetle stand susceptibility attack model
- Viewshed analysis before harvesting
- Considerations for the extraction of forest inventory information from satellite data
- Green Forest Landuse Environment issues
- Integration of remotely sensed image analysis data into a GIS for forest damage information extraction
- Biological and image analysis considerations for application of high-resolution airborne MEIS data for forest damage monitoring
- Vancouver Island GIS/Remote Sensing integration for the analysis of Canada Land Inventory Forest Capability maps

CURRENT INDUSTRIAL INVOLVEMENT

In the past FIRMS has worked on co-operative projects with private firms, governments and other research centres.

Two environmental groups have projects based at FIRMS: the Earth-Life BC Club, and WILD.

FOREST INFORMATION RESOURCE MANAGEMENT SYSTEMS (FIRMS)

Department Forest Resources Management
Faculty of Forestry
University of British Columbia
Vancouver, British Columbia
CANADA V6T 1Z4

Telephone: (604) 822-4148
Facsimile: (604) 822-9106

Contact:
Dr. Peter A. Murtha, Director

NATURE OF RESEARCH

Forest Information Resource Management Systems research focuses on:

- Remote sensing/GIS integration for resource management
- Project specific GIS/RS training
- Remote sensing for vegetation health
- Forest management systems
- Technology transfer

MAJOR ACCOMPLISHMENTS

- GIS/TM analysis of forestry in NE China
- IDRISI cartographic training in Argentina
- Spectral analysis of seedlings for nutrient status and chlorophyll content
- Effects of varying reflectance on interpretation of large scale aerial photographs
- Analysis of MEIS data for air pollution effects on forests

RESEARCH GROUP PROFILE

- Established 1989
- 3 professional, 5 graduate students, 30 associated students
- Cumulative experience - 45 years for professionals
- Annual research budget \$30M
- Equipment
 - 14 workstations on Novell network including nine micro and mini computers
- Software
 - Image Analysis: EARTHPROBE, IDRISI, PCI
 - GIS: TERRASOFT, ARC/Info, IDRISI
 - Utility software: Dbase, Word Perfect, Lotus 123, etc.

continued

DESCRIPTION OF RESEARCH

- Temporal change and variability in the atmosphere-cryosphere-ocean system in the Canadian Arctic
- Cryospheric parameters
- Canada/U.S.A. BOREAS program
- Radar imagery for an agricultural monitoring system
- Forest ecosystem classification and forest species remote sensing

Equipment

Compact Airborne Spectrographic Imager (CASI)
Li-Cor ground-based spectroradiometer
DEC Station 5000/200
12 Macintosh Quadra and II Series microcomputers
12 gigabytes of disk storage
Sun SPARC II Workstation
Dipix ARIES III image analysis system
Scanner, film recorder, printers
PCI EASI/PACE image analysis software
Dipix ARIES III software
PAMAP GIS software
Intera Tydac SPANS GIS software
Access to ESRI ARC/INFO software through the School of Urban and Regional Planning

CURRENT INDUSTRIAL INVOLVEMENT

- For the past three years the Laboratory has co-ordinated the Sea Ice Monitoring and Modelling Site (SIMMS) project in the high Arctic. This involves ISTS collaboration with Norland Scientific, Arktos Limited, the Ice Centre of Environment Canada, the Atmospheric Environment Service, the Canada Centre for Remote Sensing, the Department of Fisheries and Oceans, the National Research Council, Energy Mines and Resources through the Polar Continental Shelf Program, the AES/York microwave remote sensing group and the Jet Propulsion Laboratory of NASA.
- Study of cryospheric parameters involves collaboration with the Electro-Optics Laboratory of ISTS, ITRES Research and the Canada Centre for Remote Sensing.
- The radar and agriculture project has major collaboration with Land Resource Science at the University of Guelph; the Laboratory is also working with the Provincial Remote Sensing Office of the Ontario Ministry of Natural Resources, the Canada Centre for Remote Sensing, Agriculture Canada and the Universities of Laval and Sherbrooke.
- Collaboration in forestry studies is with Geomatics International, ITRES Research, the Petawawa National Forestry Institute and the Provincial Remote Sensing Office of the Ontario Ministry of Natural Resources.

INDUSTRIAL INVOLVEMENT SOUGHT

The Laboratory is interested in personnel exchanges and/or collaborative research efforts centred around environmental remote sensing applications.

EARTH-OBSERVATIONS LABORATORY

Institute for Space and Terrestrial Science
Department of Geography
Waterloo, Ontario
CANADA N2L 3G1

Telephone: (519) 885-1211 x6070
Facsimile: (519) 888-6768

Contacts:
Dr. Ellsworth LeDrew, Director
Dr. Philip Howarth, Principal Investigator

NATURE OF RESEARCH

The research focus of the Earth Observations Laboratory at the Institute for Space and Terrestrial Science is:

- Determination of geophysical parameters from remote sensing data
- Applications of remote sensing in the environmental sciences
- Part of the Earth-Observations Laboratory of ISTS is located in the Department of Physics at York University; co-director is Dr. John Miller. There is active collaboration between the two sections of the Laboratory on almost all projects.

MAJOR ACCOMPLISHMENTS

The Earth-Observations Laboratory at the University of Waterloo is part of the Institute for Space and Terrestrial Science (ISTS), one of the Centres of Excellence established by the Government of Ontario. In January 1993, ISTS commenced its second five-year phase of research.

Production of the "Canadian Sea Ice Atlas: from Microwave Remotely Sensed Imagery July 1987 - June 1990" for the Atmospheric Environment Service and the Canadian Space Agency. Also, production of the sea ice portion of the "Canadian Global Change Encyclopaedia" on CD-ROM for the Canadian Space Agency.

Development of the Sea Ice Information System for the Ice Centre of the Atmospheric Environment Service.

Development of a methodology to incorporate SPOT satellite imagery, zoning information and GPS data in a GIS to provide information on land use change at the rural-urban fringe.

Undertaking of overseas projects in land use monitoring and environmental change using remote sensing data; studies in Bali and Nigeria.

RESEARCH GROUP PROFILE

- Established in 1988
- Two faculty members
- Three research scientists
- Approximately 15 graduate students
- Annual research income of \$500,000

DEPARTMENT OF GEOGRAPHY - UNIVERSITY OF VICTORIA

P.O. Box 3050
Victoria, British Columbia
CANADA V8W 3P5

Telephone: (604) 721-7329
Facsimile: (604) 721-6216

Contact:
Dr. P. Keller, Associate Professor

NATURE OF RESEARCH

The research focus of the Spatial Sciences Laboratory is the implementation and application of GIS and remote sensing to problems in transportation, forestry and land-use management.

RESEARCH GROUP PROFILE

Dr. P. Keller, Associate Professor
Geographical Information Systems Implementation
Dr. O. Niemann, Assistant Professor
Remote Sensing Applications

- Graduate Students: 10
- The Spatial Sciences Laboratories have a suite of software and hardware designed for teaching and research into remote sensing and GIS. The processing is centered on IBM RISC-6000 architecture (1 IBM 550, 10 IBM 320H). The software includes PCI EASI/PACE, SPANS, GENASYS, and PAMAP.

DESCRIPTION OF RESEARCH

- Assessment of airborne imaging spectrometry for forestry applications
- Assessment of airborne imaging spectrometry for coastal applications
- Investigation into image texture for forestry applications
- Investigation into upscaling and the effects on the information structure of images

UNIVERSITY/INDUSTRIAL INVOLVEMENT SOUGHT

The laboratory is located in the Department of Geography, but laboratory staff collaborate with other research groups on campus in both the Faculty of Earth and Ocean Sciences and the Centre for Forest Biology.

CURRENT INDUSTRIAL INVOLVEMENT

- Working with B.C. Ministry of Forests on assessment of the Compact Airborne Spectrometry Imager (CASI) for coastal and marine monitoring applications
- Collaboration with B.C. Ministry of Environment, Lands and Parks investigating the potential use of CASI in mapping and interpretation of flora in coastal and inter-tidal areas
- Collaboration with Forestry Canada project to develop a hierarchy of expert systems for forest mapping and management
- Working with Pamap Technologies Inc. in the extension and refinement of a commercial GIS software package
- Ongoing arrangements with such software vendors as Pamap Technologies, Intera Tydac, Genasys and PCI Ltd. for the presentation of GIS software training courses to commercial users in government and industry

INDUSTRIAL INVOLVEMENT SOUGHT

Laboratory staff are interested in pursuing opportunities related to co-operative GIS training and collaborative GIS and remote sensing applications research in forestry, transportation and land-use planning applications.

DESCRIPTION OF TRAINING

Training programs focus on the philosophy of graduating students with a solid theoretical background with a high degree of technical skill in operating industry standard equipment and software in their field of specialization.

Many professionals choose to upgrade their technical skills by returning to the College for one of these high-intensity training programs in emerging technologies.

Students starting programs at the university entrance level may graduate as technicians or technologists. Those who decide to proceed to professional level education at university receive substantial course and time credit.

Universities accepting transfers of this nature include:

- University of New Brunswick
- Acadia University
- University of Waterloo
- Nova Scotia College of Art and Design
- Technical University of Nova Scotia

The majority of students originate from the Atlantic Provinces of Canada, however, as a number of the College programs have national and international stature, students regularly enroll who originate from all Canadian provinces and many other countries such as:

Argentina	Botswana
Cameroon	Czech
China	Ethiopia
Greece	India
Indonesia	Iran
Lesotho	Libya
Malaysia	Nepal
Nigeria	Peru
Poland	Slovak Republic
Thailand	Trinidad
United States of America	
Zimbabwe	

COLLABORATIVE ARRANGEMENTS

- Co-operation agreements (MOUs) with 14 universities and colleges
- Technology transfer and applications research agreements (MOUs) with 12 corporations and research centres
- Joint ventures with other post-secondary institutions and industry for collaborative national and international projects
- Cooperative projects with industry and government agencies. Over 350 completed since 1980 with such organizations as:

Agriculture Canada - Ottawa
ESRI - Redlands, California
Fisheries & Oceans - Halifax
Jacques Whitford Assoc. - Halifax
DIPIX Systems Ltd. - Ottawa
Statistics Canada - Ottawa
ACCUGRAPH Ltd. - Toronto
Earth & Oceans Research Ltd. - Halifax
GeoVision Corp. - Ottawa
TYDAC Technologies Ltd. - Ottawa
Canadian Wildlife Service - Sackville
MacMillan Bloedel Ltd. - Nanaimo

Agriculture Canada - Kentville
Parks Canada - Halifax
PCI Inc. - Richmond Hill
Alies Research Inc. - Toronto
Canpalar Consultants Ltd - Toronto
USL - Fredericton
J.D. Irving Ltd. - Saint John
BIO - Dartmouth
Fraser Inc. - Edmundston
Martec Ltd. - Halifax
Ducks Unlimited - Sackville
Oceanroutes Canada - Bedford

TRAINING OPPORTUNITIES SOUGHT

The College welcomes the opportunity to respond to the specific training requirements of:

- International aid agencies
- National governments
- NGOs
- Development banks
- Industry partners for short or long-term courses both in Canada or where required worldwide.

COLLEGE OF GEOGRAPHIC SCIENCES

50 Elliott Road
Lawrencetown, Nova Scotia
CANADA B0S 1M0

Telephone: (902) 584-2226
Facsimile: (902) 584-7211
e-mail: Query@cogs.ns.ca

Contacts:

John F. Wightman, Principal
Charles J. Williams, Vice-Principal
John A. Belbin, Head, Mapping Department
David L. Colville, Head Computer Department
David F. Woolnough, Head, Survey Department

NATURE OF TRAINING

One and two-year highly technical programs at the post-secondary and post-graduate levels in such specializations as:

- Surveying
- Cartography
- Urban and Resource Planning
- Remote Sensing
- Scientific Computer Programming
- Geographic Information Systems
- Environmental and Land Information Systems
- Information Technology
- Seminars, workshops and correspondence courses are also offered

MAJOR ACCOMPLISHMENTS

- Selected by Maritime Provinces Higher Education Commission as sole regional technology training centre in surveying and related disciplines.
- Established the first post-secondary technical training programs in Canada in:
 - Surveying
 - Cartography
 - Photogrammetry
 - Remote Sensing
 - Geographic Information Systems
- Presently and historically the largest total supplier of technical graduates in these fields in Canada.
- Selected by The Canadian Centre for Training in Geomatics to develop and deliver Geomatics courses to international professional groups.

COLLEGE PROFILE

- Established in 1948
- One hundred hectare campus
- Fourteen classrooms and eight fully equipped teaching labs
- State-of-the-art computer centre
- Includes twenty-three professionals and nine support staff
- Two hundred full-time and one hundred part-time students
- Annual training budget is \$2.6 million
- Forty major technology transfer/research projects completed annually with industry or government co-operative recipients.

ALBERTA RESEARCH COUNCIL

Spatial Information Management and Applications (SIMA)
6815 - 8th Street N.E., 3rd Floor
Calgary, Alberta
CANADA T2E 7H7

Telephone: (403) 297-7557
Facsimile: (403) 297-2339

Contact:
Mr. Breen M. Liblong, Manager

NATURE OF RESEARCH

The mission of SIMA is to focus on development, application, and transfer of technology related to spatial information processing and management.

MAJOR ACCOMPLISHMENTS

In collaboration with Hughes Aircraft of Canada Limited's Spatial Data Systems Division, SIMA developed a predictive mapping system for ecological site classifications according to existing forest cover, topographic, and soils maps. The system accommodates both spatial and attribute uncertainty in its reasoning.

In collaboration with DataSpan Technologies Limited, and now under licence to Hughes Aircraft, SIMA developed an automated toolkit of spatial data conversion tools, including raster to vector conversion capabilities, editing capabilities, and prototype intelligent icon recognition and interpretation capabilities.

In collaboration with Applied Terravision Systems Limited, SIMA has developed a system to extract elevation data from SPOT stereo images to generate perspective displays.

RESEARCH GROUP PROFILE

- Established in 1988, under 2 separate departments
- Number of Researchers: 3 principal, 5 associate, plus others
- R&D Annual Budget: \$1 million (approximately)

DESCRIPTION OF RESEARCH

- Spatial Decision Support Systems
- Spatial Information Interpretation
- Spatial and Attribute Uncertainty
- Application of Artificial Intelligence to Spatial Information

CURRENT INDUSTRIAL INVOLVEMENT

In addition to Hughes Aircraft, the Alberta Research Council is currently involved in other collaborative ventures including:

- CD PubCo: development of CD ROM integrated spatial data base tools.
- Pedocan Land Evaluation: development of soils mapping technologies
- Geodessy Limited: porting and integration of Hipparchus into VMS and Windows environments


COLLABORATIVE ARRANGEMENTS

The SIMA program aims to leverage the application of its multidisciplinary expertise (principally in Artificial Intelligence, GIS, and environmental domains) to the natural resource sectors through collaboration with industrial sector partners.

OPPORTUNITIES IN GEOMATICS

INSTITUTE/RESEARCH GROUP

	System Engineering	Application Development	Mapping	Remote Sensing	Surveying and Positioning	Land Info. Management	Hydrography
Alberta Research Council Calgary, Alberta		X	X				
Centre de recherche en géomatique Université Laval Ste. Foy, Quebec	X	X	X	X	X	X	X
College of Geographic Sciences Lawrencetown, Nova Scotia	X	X	X	X	X	X	
Department of Geography University of Victoria Victoria, British Columbia		X	X	X			
Earth-Observations Laboratory University of Waterloo Waterloo, Ontario		X	X	X			
Forest Information Resource Management Systems (FIRMS) University of British Columbia Vancouver, British Columbia		X	X	X			
Geographical Information & Digital Analysis Lab, Memorial University St. John's, Newfoundland	X		X	X			
Institute for Land Information Mgmt. University of Toronto (Erindale College) Mississauga, Ontario	X		X	X		X	
Institute for Space & Terrestrial Science York University North York, Ontario				X			
Surveys Mapping and Remote Sensing Sector Energy, Mines and Resources Canada Ottawa, Ontario	X	X	X	X	X	X	
Université de Sherbrooke Centre d'applications et de recherches Sherbrooke, Quebec			X	X			
University of Calgary Department of Geomatics Engineering Calgary, Alberta	X	X	X	X	X	X	
University of New Brunswick Department of Surveying Engineering Fredericton, New Brunswick	X	X	X	X	X	X	X



Sponsored by:

- Energy, Mines and Resources Canada
- External Affairs and International Trade Canada
- Fisheries and Oceans
- Geomatics Industry Association of Canada (GIAC)
- Industry, Science and Technology Canada
- Investment Canada

For additional information contact:

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Ottawa, Ontario
Canada
K1P 6A5

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Synthetic Aperture Radar (SAR)
Image of Mount Pinatubo. Courtesy
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