NATURAL RESOURCES CANADA

MARKET INTELLIGENCE REPORT ON GEOMATICS FOR THE STATE OF SAO PAULO

BRAZIL

Prepared by: TEAMIC International – Canada

Job NRCan-143/00-MKT

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MARKET INTELLIGENCE REPORT ON BRAZIL

1. INTRODUCTION

1.1. The geomatics industry in Brazil – An overview

These are the consultant's comments when preparing this profile and summary market intelligence study for geomatics in Brazil.

To write this report the consultant travelled to Brazil, specifically to the Greater Sao Paulo area. In order to get a fair and reliable overview four sectors or areas related with the geomatics industry in Brazil were considered:

- Government at federal level, usually the most important client.
- Selected large private companies involved in geomatics, which are the usual providers of services.
- The academia, which is aware of the latest developments and responsible for the formation of suitable operating personnel.
- The media, with knowledge of companies and trends.

It is natural enough to guess that the opinions from these different sectors do not coincide. There is however, a general agreement on the state of the industry and on its potential.

For instance, in the cadastral activity there is a unanimous consensus that there is a lot to be done and in blaming political reasons for not doing it. From the interviews, the consultant has drawn the following conclusions:

Market evolution: Values in US$ million

	Years			
Area	**2000**	**2001**	**2002**	**2003**
Aerial Photogrammetry	19.5	+ 10 %	+ 15 %	+ 15 %
Remote sensing	14.6	+ 15 %	+ 20 %	+ 20 %
Cartography / Photogrammetry	48.6	+ 15 %	+ 15 %	+ 15 %
GIS	19.4	+ 10 %	+ 5 %	+ 5 %
Speciality systems for each type of purpose	58.3	+ 30 %	+ 35 %	+ 35 %
Digital mapping	29.2	+ 30 %	+ 30 %	+ 30 %
Aerial surveys	270	+ 10 %		

Sale of topographic equipment	27	+ 10 %		
Total	**486.6**			

Comments:

1. It is without surprise that Digital Mapping has one of the largest increments between the years 2000 and 2003. This is possibly accounted for the Brazilian need of digital mapping for its 8.5 million of km^2

2. It is also very clear that for Canadian companies to work in Brazil, most especially in the geomatics field, they will need to be associated with Brazilian established companies.

3. Cadastral, although with a poor performance during many years, is going to have a rebirth as a consequence of new federal regulations and also because the new already elected municipal authorities, who will take office across Brazil on January 2001.

4. The largest clients for the near future are utilities with investments of billions of dollars, with telecommunications the most promising activity.

5. Because Brazil continental dimensions and as the engine of the Mercosur, its trucks fleet can be counted in the order of millions of vehicles. This fact, and the very large distances that they travel, for instance to Argentina and Chile, provides a very lucrative field for vehicle tracking devices. There are already Canadian firms in this area operating in Brazil, but the market is so big that there is room for more.

6. To accompany this promising scenario it is necessary to train thousands of people and to transfer methods for data collection and processing.

7. It is believed that, despite government claims, the country does not have a properly working disasters prevention program. Here, again, Canadian expertise can help.

8. If a mission of Canadian entrepreneurs is to come to Brazil, it is suggested its members visit two cities of interest:

    1) Sao Paulo
    2) Curitiba

    In the event of a Canadian mission visit it is believed that June 2001 would be an ideal time, especially considering the business oriented GeoBrasil 2001 event, from June 18 to June 22. Costs for booths are available upon request, but as a guide they start at US$ 215/m^2

9. Most important government clients are:

1) Instituto Brasileiro de Geografia e Estadistica (IBGE) [Brazilian Institute for Geography and Statistics]
2) Instituto Nacional de Pesquisas Espaciais (INPE) [National Institute for Spatial Research]
3) Telebras [Brazilian Telephone Company]
4) Petrobras [Brazilian Oil and Gas Company]
5) Instituto Nacional de Colonizaçao e Reforma Agraria (INCRA) [National Institute for Colonisation and Agrarian Reform]
6) Departamento Nacional de Obras Contra a Seca (DNOCS) [National Department for Works Against Drought]
7) Fundaçao de Ciencia , Aplicaçoes e Tecnologia Espaciais (FUNCATE) [Foundation for Science, Applications and Spatial technology]
8) Departamento de Serviços Geograficos (DSG) [Department of Geographic Services]

10. Organisations contacted to prepare this report:

- Federal Government: INPE – FUNCATE
- Private Industry: Base – Digimapas – Imagem – Multispectral - Nexus
- Media: GeoBrasil
- Academia: Sao Paulo University

1.2. Prognosis

Considering the information gathered from the interviews, the following prognosis is made:

Area	Prognosis
Telecommunications	Excellent
Aerial mapping	Excellent
Cadastre	Very good
Disasters prevention	Uncertain
Oil and gas	Very good
Transportation	Very good
Radar satellite	Uncertain
Agriculture	There is some potential
Training in geomatics	Very good
Complementation	Good

According to some sources the investment in infrastructure projects between 2000 and 2005 will

be as shown:

Field	Number of projects	US$ billion
Electric power	785	91
Oil and gas	149	38
Environment	46	15
Mining	50	9

2. BACKGROUND INFORMATION

2.1. Scope of this study

This market intelligence report on Brazil covers the geomatics and geoscience sectors, mainly in the State of Sao Paulo.

In all cases information is given, when available, on:

- Projects underway and to be initiated
- Needs and areas of interest
- Opinion on Canadian geomatics
- Comments from the interviewed person/s
- Consultant's comments
- Information on interviewed person/s, such as phone and fax numbers, e-mail address, and indication of his/her ability to speak English, French or both languages.

2.2. Background information for this study

1) Since there is a broad scope of goods and services offered by the geomatic and environmental industries in Canada, this study focuses on **what is perceived as needs from Brazil, instead of what is being offered by Canadian firms**. This way it is believed that probabilities of success are enhanced

2) As a second step the study aims to identify potential clients for Canadian geomatics goods and services. From that point of view it is considered that the main potential purchasers are:

- ***Federal Government, in the following areas:***
  - GIS
  - Cartography mapping
  - Cadastral
  - Bio-projects
  - Ports control
  - Water contamination and sewage
  - Disaster prevention and emergency response.
- ***State Governments and Municipalities***
  - Aerial surveys (thematic, crops, damages, etc)

- ***Private firms***

  - Consultants
  - Cartographic firms

  Regarding consultants and firms, it is believed that they could be interested in:

  - Acquiring some technologies in order to complement their activity to offer complete packages to the government

  - Partnering with Canadian firms in order to represent and service their products, and also offering a Brazilian base for project execution

2.3. Summary on organisations contacted

It is believed that there are opportunities in geomatics in Brazil as per the details given in this report.

This market intelligence was conducted in two fronts:

- Government organizations
- Private consulting firms

A.1 Government organisations

In this area were selected those government agencies that normally deal with geomatics, which generally are the sources of geomatics contracts for the private sector. On this regard the following organizations are important:

- **Canadian Consulate in Sao Paulo.** They provide very valuable assistance and advice.

- **Centro de Sensoriamento Remoto** [Remote Sensing Center]**,** a unit of IBAMA , the Brazilian Institute for the Environment and Natural Resources – Laboratory of Topography and Geodesics (LTG)
  Tel: 011-55-011-818-5297

  Contact person:
  Dr. **Denizar Blitzkow**
  Tel: 011-55-011-818-5501
  Fax: 011-55-011-818-5716

- **Sociedade Brasileira de Cartografia**

  This non-governmental, technical and scientific organisation involves different segments of the Brazilian society related with the national cartographic community. Founded in 1958, it relates with the following institutions involved in mapping issues:

  Brazilian Armed Forces
  Brazilian Institute of Geography and Statistics
  Hydrography and Navigation Directorate
  Aeronautic Cartographic Institute
  Geographic Service Directorate
  Petróleos Brasileiros (Brazilian oil company)
  All Brazilian universities with cartographic courses
  All State and municipal organisations related to the mapping area
  Main suppliers for mapping equipment
  All Brazilian companies in airPhotogrammetry.

  At international level it relates with:

  International Federation of Surveyors
  International Cartographic Association
  International Society for Photogrammetry and Remote Sensing

  Address:
  Avenida President Wilson, 210 - 7° Andar Centro
  CEP : 20030-021 - Rio de Janeiro, RJ
  Tel: 011-55-021 240-6901
  Fax: 011-55-021 262-2823
  Web site: **http://www.rio.com.br/sbcgfsr/hist.htm**

- **Brazilian Geologic Service –** Mineral Reserves Research Company

  This office has performed many projects since 1952, for the following Departments:

  - Departamento Nacional de Produçao Minera; (DNPM) [Mineral Production National Department
  - Comissao Nacional de Energia Nuclear (CNEN) [Nuclear Energy National Commission]
  - Private companies and state organizations

- Petrobras

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Avda. Pasteur 404 – Urca, Rio de Janeiro
Tel: 011-55-21-295-5337/5382
Fax: 011-55-21-542-3647
E-mail: **cprm@cprm.gov.br**

C **Fundaçao Paulista – Centro Tecnologico de Geoprocessamento - Instituto da Terra - Divisao de Processamento de Imagens** [Paulista Foundation – Geoprocessing Technology Centre – Land Institute, Image Processing Division], Sao Paulo, SP

C **Petrobras** - Brazilian oil company

C **Remote Sensing Centre** – Topography and Geodesics Laboratory, Sao Paulo

* **Fundaçao de Ciencia, Aplicaçoes e Tecnologia Espaciais** (FUNCATE) [Scientific Foundation for Applications and Spatial Technology]

Established in 1982 is a non-profit foundation, which mission is to collaborate in research with government organisations.

Since its beginnings this company has been working as a priority in activities related with the area of spatial applications (meteorology, remote sensing and geoprocessing), and with the area of engineering and spatial technology (management, assessment and industrialisation of equipment related with the spatial sector).

` It has also closely worked with the National Institute of Spatial Research (INPE), and has executed hundreds of projects in order to disseminate and transfer to other institutions technologies developed by INPE.

Main areas of activity are remote sensing and geoprocessing.

In the engineering area FUNCATE has worked with INPE in the development of:

- A scientific microsatellite
- Fabrication of an on board equipment for satellites in a Chinese-Brazilian project for the construction of satellites for natural resources

- Industrialisation of equipment developed by INPE, such as: Imagery treatment, GIS, stations for reception and analysis of meteorological images, and automatic meteorological stations.

Address:

Rua Euclides Miragaia 433 – 1er Andar, Edificio Crystal Centre
Centro – San José dos Campos, SP
Tel: (011) 55- 12-342-3566

Contact:
Mr. **Ubirajara Moura de Freitas**
Gerente de Geoprocessamento

Information on results of the interviews with these organizations, their opinions and also consultant's comments can be found in Chapter 4: "Organizations in the public sector related with geomatics".

A.2. Private consulting firms

These firms are normally the executors of government contracts in geomatics. Because there is a broad scope of goods and services offered, this market intelligence report contacted only firms which main activity lies in the following fields:

- **S** Remote sensing
- **S** GIS
- **S** GPS
- **S** Cartography
- \- Prevention of natural disasters

Contacted firms are:

- * Base Aerofotografia
- C Digimapas Sistemas de Informaçoes Eletronicas
- C Imagem Sensoriamento Remoto
- C Multispectral Sistemas e Serviços Ltda.
- C Nexus GeoEngenharia e Comércio

Information on results of the interviews with these firms, opinions and also consultant's comments can be found in Chapter 5: "Information on the private sector"

2.4. Lessons learnt

1) It is necessary to have a Brazilian partner, because he/she knows the market and more important, the decision-makers.

2) It is necessary to invest some money in promotion. This promotion can be materialized in seminars, workshops, donations and explanation of software to universities, with a demonstration of show cases.

3) Business in Brazil cannot be done overnight. It is necessary to spend some time (and money) before a deal materializes.

4) It is essential to understand the geomatics situation in Brazil. The country has very capable people, with shrewd entrepreneurs and large geomatics companies.

2.5. Summary

Information gathered from reliable sources in Brazil reveals that:

1) There is potential for Canadian sales of geomatics technology to Brazil. This potential arises because:

   - There is a need in Brazil for this type of technology
   - The very high opinion existent in Brazil about Canada and its geomatics industry.

2) There are many areas where this technology is needed. However, the following fields, based in **needs and as a consequence related to business opportunities**, are the most important, in the order listed

   2.1. Cadastre
   2.2. Remote sensing
   2.3. Prevention of natural disasters and emergency response
   2.4. Geographic Information Systems

3. MARKET OVERVIEW

3.1. General information

3.1.2. Basic description of the country

Population

Brazil has a population of about 163.9 million.
Main cities are:

Sao Paulo: 9,839,000 (considering the metropolitan area the population reach about 18,000,000)
Rio de Janeiro: 5.551,000
Salvador: 2.211,000
Belo Horizonte: 2,091,000
Fortaleza: 1,965,000
Brasilia (Brazil's capital): 1,821,000

Area

Brazil has a continental area of 8.5 million km^2

Main resources and activities

Brazil agriculture sector is very important and its export products are coffee, sugar, soybeans and cocoa.

The country has a very strong industrial base, with the chemical industry probably being the most significant. Metallurgical and mechanical industries follow, together with food production.

The country is also a large producer of transportation equipment (trains, subway cars, airplanes, buses, trucks and automobiles), as well as electrical equipment, paper, plastic, rubber, textiles, and pharmaceuticals.

Brazilian industry is located mainly in the State of Sao Paulo, as well as in the State of Rio de Janeiro, and in the cities of Belo Horizonte (State of Minas Gerais), and Curitiba (State of Parana). There is also lately a great impulse to establish industries in the northeast. Belo Horizonte is particularly strong in mineral and metal industries.

Tourism is a very important activity with main centres in the city of Rio de Janeiro 1and countless beaches south this city

3.1.3. Basic description of the market

- ***Geomatics and Geosciences***

  Present day status:
  It is believed that geomatics and Geosciences are at this moment in an advanced state of transition from government oriented geomatics projects to private utilities.

  The country has an excellent base, on grounds of the capability and experience of the many firms involved in geomatics.

  Potential
  It is believed that the potential is very considerable for the Canadian industry because:

  1) The privatization process especially in the telecommunications field
  2) The recognized Canadian expertise
  3) The very great potential for cadastral work because it is peremptory for the country to update its information

- ***Emergency response***

  Present day status and potential
  It appears that at present time the advance in this area is not very big, in despite of what the government says. The private industry is in general dubious about the scope and the efficiency of the government action is this activity

- ***Municipal markets***

  Present day status and potential
  At present time cadastral information, albeit existent is completely outdated. Because this fact and also because new regulations and the new mayors who will take offices in Brazilian municipalities on January 2001, it is expected a very considerable potential for cadastral work.

- ***Environmental***

  Present day status and potential
  Brazil needs to raise its environmental standards. Main problems derive from:

1) The Amazon is the largest tropical forest in the world, with also the largest biodiversity. Because population pressure there is a very serious problem of deforestation, mainly produced by burning, which also leads to erosion and desertification. There is also pollution in the Amazon River because of mercury used for gold processing

2) Air pollution is a very serious problem in the largest cities.

3) Water pollution is another hot issue in Brazil. Most of its largest rivers are contaminated, especially in the industrialized south-east. There are very polluted courses of water such as the Tiete River in the State of Sao Paulo, and the Paraiba do Sul River in the State of Rio de Janeiro.

It is believed that there could be a large potential for Canadian companies in the following areas:

- Construction of water treatment plants in smaller municipalities;
- Working with industrial firms, especially in Sao Paulo,
- BOT operation for water treatment plants.

C ***Energy***

Present day status and potential

The power sector is expected to boom in the years to come especially for the privatization policy

The energy sector relies mainly in thermal and hydroelectricity. The country has built the largest hydro-dam in the world, the Itaipú Dam, and is currently seeking to enlarge its capacity. Hydroelectricity is the biggest player in the Brazilian electrical field, considering that it covers about 95 % of the country needs.

It is estimated that the country will necessitate between US$ 4.3 billion and 5.5 billion per year to meet electric demand in the future

C ***Oil and gas***

Present day status and potential

As mentioned Brazil has embarked in a campaign to use more natural gas in every aspect. For that reason gas pipelines have been and are being constructed to bring gas form Argentina and Bolivia (see comments under The World Bank)

From the point of view of oil, the Brazilian government has started auctioning exploration blocks, mainly offshore

C ***Mining and minerals***

Present day status and potential

Brazil is a major producer and exporter of minerals and metals. Although there are deposits in several parts of the country, the heavy production is in

the States of Minas Gerais and Rio de Janeiro

Present day production of minerals:

Mineral	Comments	Production
Iron Ore	There are several massive depots in the country	145 million tons
Bauxite and aluminum		Brazil is the sixth largest producer of aluminum in the world
Manganese		1.6 million tons
Tin	Ten smelters in operation	The second largest producer in the world
Gold		About 100 tons
Nickel		33,000 tons
Zinc		70,000 tons

* ***Financing***

Present day conditions

It appears that there are some Brazilian agencies which can fund their own geomatics projects. Here in Canada, the Export Development Corporation, has lines of credits in Brazil (see Canadian Agencies, for detailed information)

4. ORGANIZATIONS IN THE PUBLIC SECTOR RELATED WITH GEOMATICS

4.1. Brief description of main agencies

Instituto Nacional de Pesquisas Espaciais (INPE) [National Institute for Spatial Research]

Brazil, with continental dimensions, has a great need of management information suitable to urban and rural planning and the environment.

One of the main engines in the development of geomatics in Brazil is INPE (National Institute for Spatial Research), with 20 years experience in this area. Its mission lies in the contribution for training and for qualifying users in the public, private and non-governmental sectors. They are looking to encourage new developments in the service area as well as to facilitate the construction of a national infrastructure for spatial information.

They take an active part as:

Citizenship information service:
- On monitoring burning in the Amazon region
- Monitoring climate change in the north east
- Social dynamics and social inclusion in Brazilian Cities

New Solutions:
- Integrated Municipal Management
- Interchange of geographical data in Brazil

Formation of Human Resources:
- Courses on advanced formation in geotechnologies
- Introduction to geoprocessing
- Spatial analysis
- Geographic databanks
- Digital processing in imagery from remote sensors

Research:
- Technology on geographic information systems
- Geographic databanks
- Spatial analysis
- Interoperability in GIS

Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais (IBAMA) [Brazilian

Institute for the Environment and Natural Resources]

IBAMA is a division of the Ministry of the Environment. Its mission is the execution of national policies in the environment.

For that purpose it is involved in the promotion of the following actions, amongst others:

1) Establishing norms and guidelines for environment quality
2) Evaluation of environmental impact
3) Implementation of technical cadastre for polluting activities
4) Management, integration and dissemination of information related with the environment.
5) Management and protection of the ecosystems
6) Environment control
7) Executions of programs for environment training
8) Recovery of degraded areas
9) Establish the use of forest natural resources
10) Promote the research, diffusion and technical-scientific development, aimed to environmental management

Directoria de Gestao do Uso de Recursos Naturais [Management of Natural Resources Directorate].

Contact:
Dr. **Antonio Carlos Prado**
Tel: 011-55-61-225-4443
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E-mail: **acprado@sede.ibama.gob.br**

IBAMA has many decentralised units. For this report, the most important are:

Centro de Sensoriamento Remoto (CSR) [Remote Sensing Centre]

Was established to study and monitor the Brazilian ecosystems The CSR has developed many projects, one of them is the "Associated Network for Remote Sensing" (RASR)

The objective of this project which started in 1993, was to give the National System of the Environment (SINAMA), technology in remote sensing and a GIS to increase the efficiency and quality of the organisations dealing with the environment, and also to create a Network for Spatial Information aimed to the Brazilian natural resources.

Projects under way:

1) Survey on deforestation in several States. Contact: Mr. Célio Paiva
2) Mapping of extractive reserves. Contact: Mr Eduardo Lacerda
3) Mapping of national forests. Contact: Mr. Marquez Fernandes
4) Digitalisation of IBAMA's Federal Conservation Units in several States and wild reserves. Contact: Mr. Divino Antonio da Silva.
5) Survey of gas emissions due to greenhouse effect.

Laboratorio de Produtos Florestais (LPF). [Forest Products Laboratory]

It is a research centre in IBAMA, producing and transferring technologies to promote sustainable development in the forestry sector, addressing issues such as:

1) Natural forests sustainability
2) Planted forests performance
3) Environmental protection
4) Utilisation and transfer of technologies for forestry products.

From this point of view these are priority programs such as:

- Wood technology characterisation
- Products and processes development
- Construction wood
- Biomass energy
- Normalisation and quality control
- Natural rubber program
- Technology diffusion

Projeto Corredores Ecológicos [Ecological Corridors Project]

At the present time conservation of Nature in Brazil has been done in the untouched virgin areas, as Natural Parks and other public and private Conservation Units.

The Project Ecological Corridors of Brazilian Tropical Forests, pretends to restore genetic interchanges between the Amazon and Atlantic forest ecosystems. These corridors represent almost 25 % of Brazilian tropical forests and must preserve 75 % of animal and vegetable species. There are seven priority corridors:

1) Centro - Amazon corridor
2) North - Amazon corridor
3) West - Amazon corridor

4) South - Amazon corridor
5) Closed Amazon corridor
6) Central Atlantic Forest corridor
7) South corridor of Atlantic forestry and Serra do Mar corridor

Instituto Nacional de Colonizaçao e Reforma Agraria (INCRA) [National Institute for Colonization and Agrarian Reform]

To help reduce irregularities in rural cadastre they are now implementing a large network of geodesic frames.

It has been called "Reed Incur de Bases Comunitarias" (RIBAC) [Incra Network of Community Bases], and has 23 frames in the main cities of Brazil. This number will increase to 44 by year end. All data will be available through Internet.

According to INCRA the new geodesic frame has been designed to guaranty precision to the centimetre for analysis performed by GPS receptors in 200 km radii.

Empresa Brasileira para Agricultura (EMBRAPA) [Brazilian Company for Agriculture]

It is involved with the survey regarding land occupation and the characterisation of different production systems.

Embrapa understands that both processes can be greatly facilitated using satellite imagery, which data can be integrated, related and spaced in GIS. Putting together the potential of remote sensing with GIS capability, facilitates the formulation of a set of efficient techniques.

Employs geoprocessing in the preservation of wildlife in the Pantanal Area (SOS-Taquari Project), which started in 1999 with a duration of three years.

Embrapa has at present time many projects underway as follows:

1) Alternatives for burning practices in agriculture.
2) Characterisation of land use and agriculture in the municipal district of Jaguariúna
3) Dynamic of vegetation south of the Amazon with satellite imagery
4) Environment impact of sugar cane
5) Orbital monitoring of burning in Brazil
6) Associated network for remote sensing (IBAMA)
7) Information system on Amazonian activities
8) Agriculture Sustainability in the Amazon

4.2. Government organisations interviewed

Name: **Instituto Nacional de Pesquisas Espaciais (INPE)** [National Institute for Spatial Research]

Organisation's comments:

This is the main government organisation dealing with geomatics in Brazil, and reports to the Ministerio de Ciencia e Tecnologia [Ministry of Science and Technology]. Its mission is to promote the technological development in the spatial area, research and formation of human resources.

They have three large institutional programs:

1) Missiao Espacial Completa Brasil (MECB) [Brazilian Complete Spatial Mission]

2) Missiao Sino-Brasileira (CBERS) [Brazilian-Chinese Mission]
In this context they have developed two environment satellites with China, the first two with a 30 % Brazilian content. Another two satellites will have each a 50 % Brazilian content, with participation of the Brazilian industry and international firms.

3) Programa Institucional Amazonia [Amazon Institutional Program]

a) The interviewed person believes that there are excellent groups in private firms

b) Regarding cadastral activity he also recognises that the activity is stalled because politics.

c) With respect to risk monitoring, IBAMA has a program, for monitoring risk areas in forest fires. There is also a project by INPE called PROARCO which objective is the determination of heat spots during drought periods in Brazil. It supplies information on heat, meteorological data, data on vegetal covering and administrative units, allowing the establishment of areas of potential risks.

There is also a program for hydrological purposes to forecast flooding, and also a survey program for river basins. Apparently both systems are working.

d) They have good relationships with Canadian firms and are working together with Radarsat in a project. However, they believe that even as good as the Canadian technology is, Canada does not have experience in tropical forests.

e) At present time they are using Radarsat to perform environment monitoring and also exploration in geological and water sediments. At the same time, they have research groups working on pollution.

Address:

Avenida dos Astronautas, 1758 – Sao José dos Campos, SP

Contact person:

Dr. Joao Roberto dos Santos (speaks English)
Main Researcher

Tel: 011-55-12-345-6427
Fax: 011-55-12-345-6460
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Name: **Fundaçao de Ciencia, Aplicaçoes e Tecnologia Espaciais (FUNCATE)**
[Foundation for Science, Applications and Spatial Tecnology]

Organisation's comments:

This is not for profit organisation working very closely with INPE. According to FUNCATE, INPE is now working on remote sensing in the environment, owning one climate satellite and two remote sensing satellites.

a) According to them there are not problems in Brazil for integrating technologies to prepare a package on Geomatic issues, since there are very capable Brazilian companies.

b) Joining efforts with Canadian companies is possible, however, they also think that the methodologies should be adapted to the Brazilian market and conditions, through a rationalisation process.

c) They support the development of technical areas in the spatial arena, working in these definite disciplines:

- Meteorology
- Geomatics
- Spatial projects
- Spatial engineering, and in this capacity as contract manager.

d) They also work with private firms and government at the three levels.

e) Responding to a question about which are the most important government sources for geomatics contracts, the interviewed person stated that probably is the **"Agencia Nacional da Agua" (ANA)** [Water National Agency]

f) One of the latest projects is the implementation of a raw water project, where users will be charged by the volume of water used (now it is free, even for industries)

g) There is also another project dealing with mapping and urban cadastre. Confirming everybody opinion FUNCATE believes that the lack of a very much needed cadastral projects, is linked with politics, since if the result would increase urban revenues, it also will have a negative effect on the population (voters). There is however new legislation which will put cadastral and hydrological information on hands of the municipal government.

h) Regarding disasters prevention, FUNCATE stated that since 1998 there is in place a system to fight forest fires as well as flooding, and it appears that there is a control system for the whole country.

Consultant's comments

This fact has been confirmed by INPE, however, the private sector is in doubt of the implementation results of this program. As a counterpart, FUNCATE believes that there is not in place a suitable technology and that there is not either adequate equipment.

i) According to them there exist many opportunities for geomatics projects in Brazil, especially cadastre, and which have financing available.

j) They would be willing to consider some sort of partnership with Canadian companies, although not acting as their representatives, but perhaps in complementing technologies.

k) FUNCATE stated that for Canadian companies to compete for bids in the Brazilian market, it is practically mandatory the association with an already established Brazilian company in the geomatics field

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http://www.fatorgis.com.br
http://www.geodecision.com

Contact person:

Mr. **Ubijara Moura de Freitas**
Gerente de Processamento
e-mail: **bira@geo.funcate.org.br**

4.3 Academia interviewed

Name: **Universidade de Sao Paulo - Escola Politécnica** [Sao Paulo University – Polytechnic School]

Department: **Laboratorio de Geoprocessamento** [Geoprocessing Lab]

Department's comments:

a) There exists the "Rede Brasileira de Monitoreamento Continuo" (RBMC) [Brazilian Network for Continuos Monitoring]. It has nine stations and will add more than three stations in the Amazon region. Work is being done by IBGE (Instituto Brasileiro de Geografia e Estadistica) [Brazilian Institute for Geography and Statistics], together with this University

b) In the Amazon region there is a project called "Sistema de Vigilancia da Amazonia" (SIVAM) [Amazon Watch System], operated by the Brazilian Air Force, using satellite and radar tracking.

There are 25 automatic stations which gather on site information on rivers, and then transmitted via satellite. This type of information relates to quality, pollution, temperature, etc, and it is very important in the Amazon region because the existing large quantities of mercury in the water, as a consequence of gold exploitation. It is intended that SIVAM will also check pollution, forest burning and air traffic. The SIVAM project was won by Raytheon.

c) Brazil does not have a disaster prevention system, except perhaps for a small program for prevention in the city of Sao Paulo.

d) The country has communication satellites and for remote sensing, but does not have its own satellite.

e) According to these scientists there is a substantial potential in Brazil, however, until today there is a lack of data as well as scarcity of systematization and digitalization, as a consequence, it appears that the country needs policies, regulations and especially know-how about data gathering, processing and dissemination. They stated that Canada is well known in this area of expertise.

f) Financing for geomatics projects seems not to be a problem in Brazil. The following government organizations have their own financing:

- Instituto Brasileiro de Geografia and Estadistica (IBGE) [Brazilian Institute of Geography and Statistics]
- Instituto Nacional de Pesquisas Espaciais (INPE) [National Institute for Spatial Research]
- Telebras (Brazilian telecommunications company)

g) From the forestry point of view nothing is being done, although there are private investments. INPE is in charge of projects related with forests burning, so it is believed that this organization is a good source of information and potential business.

h) Other government organizations involved in geomatics are:
- SOS Mata Atlantica, in Sao Paulo
- Companhia Vale do Rio Doce [Company of the Doce River Valley], located in the state of Rio de Janeiro. Geological projects, since it is a mining company.
- Companhia de Pesquisas de Permisos Minerais (CPRM) [Mineral Permits Research Company], locate in Rio de Janeiro.
- Empresa Brasileira para a Agricultura (Embrapa) [Brazilian Company for Agriculture], located in Brasilia.

i) Brazilian geomatics industry is advanced but built in sectors. They believe that the Brazilian industry is very willing to complement with foreign technologies, in order to be able to offer a complete package of services.

j) One of the main problems for the further advance in geomatics is the scarcity of people trained in this discipline, and most of them with limited knowledge.

Address:

Cidade Universitaria
Av. Prof. Almeida Prado – Trav. 2 / no. 83
Sao Paulo, SP

Contact persons:

Prof. Dr. Denizar Blitskow (speaks a little English)
Full Professor
Tel: 011-55-11-3818-5501
Fax: 011-55-11-3818-5716
E-mail: **dblitzkow@usp.br**

Dr. José Alberto Quintanilha
Director, Geoprocessing Lab

Tel: 011-55-11-3818-5504
Fax: 011-55-11-3818-5716
E-mail: **jaquinta@usp.br**

5. INFORMATION ON THE PRIVATE SECTOR

5.1 Introduction

This section provides information on private firms contacted in Sao Paulo The purpose for this contact is two folds:

1. To learn about the geomatics situation in Brazil from the private or supplier point of view.

2. Give the Canadian entrepreneur an idea of the capabilities of each interviewed firm, in case the Canadian firm is interested in having a partner or a representative in Brazil.

When possible, information is given about the firm expertise, background, and most especially their comments on the geomatics industry in Brazil, problems encountered, and their willingness to establish strategic alliances with Canadian firms.

The same set of questions were posed to each firm, and the responses reflect the opinions of Brazilian private geomatics companies on important issues such as:

a. Canadian expertise on geomatics
b. Willingness to establish strategic alliances
c. Competition from other countries
d. Type of work they specialize
e. Experience with the Brazilian government
f. Etc.

The consultant wants to stress the fact that he only conveys what was told in the corresponding interviews.

The information given on each firm in this report, comes from the interviews and from the companies brochures. As a consequence he is not endorsing or recommending any particular firm or system. However, if requested, the consultant will gladly establish telephone contacts with these firms in order to fix meetings with interested Canadian firms while they are in Brazil.

Brazilian firms in geomatics are grouped according the following criteria:

- Aerial surveys
- Precision agriculture
- Surveying
- Digital cartographic bases
- Cadastre

- Consulting
- Digitalization
- Geodesic survey
- Topographic survey
- Marketing
- Environment
- Vehicles tracking
- Routing
- Remote sensing
- Telecommunications
- Aerial Photogrammetry
- GPS
- Topography and geodesics

The following Table lists the Brazilian firms in these fields. Those companies in the Sao Paulo area that have been interviewed are detailed in 5.3. "Information from interviewed firms"

5.2. Electronic addresses of Brazilian firms in geomatics

Name	Location	Home Page	E-Mail
AEROCONSULT S/A Aerolevantamentos e Consultoria	Curitiba, PR		administracao@aeroconsult-sc.com.br
AEROFOTO CRUZEIRO S/A B Aerofotogrametria, Projetos de Engenharia			**aerofoto.cruzeiro@biohard.com.br**
AEROSAT B Arquitetura, Aerolevantamento, Engenharia	Curitiba. PR	**http://www.aerosat.com.br**	**info@aerosat.com.br**
AEROSUL S/A B Levantamentos Aeroespaciais e Consultoria	Curitiba, PR		**aerosul@ifnet.com.br**
ALTAVISAO Imagens Aéreas S/C Ltda.	Sao Paulo, SP	**http://www.altavisao.com.br**	**aerolevantamentos@altavisao.com.r**
ARATEC B Araguaia Tecnologia Ltda.			**aratec@xpnet.com.br**
ARQUIDRAW Projetos e Servos Ltda.	Sao Paulo	**http://www.arquidraw.com.br**	**arquidraw@ arquidraw.com.br**

BMP Info Projetos em Meio Ambiente Ltda.	Rio de Janeiro, RJ	**http://www.geocities.com/bmpinfo**	**bmpinfo@hotmail.com**
CANADAS Assesoria e Serviços Técnicos Ltda.	Floriano-polis, SC	**http://www.canadas.com.br**	**canadas@canadas.com.br**
COTASUL Engenharia de Geoprocessamento			**cotasul@pro.via-rs.com.br**
DIGICART Cartografia e Consultoria Ltda.			**digicart@netpar.com.br**
DIGICARTA Digitalizaçao e Cartografia Ltda.	Belo Hori-zonte, MG	**http://www.digicart.cjb.net**	**digicart.bhz@zaz.com.br**
DIGIMAPAS Sistemas de Informaçoes Eletronicas Ltda.	Sao Paulo, SP	**http://www.digimapas.com**	**digimapas@digimapas.com.br**
EMBRAFOTO Empresa Brasileira de Aerofotogrametria S/A			**embrafot.bhz@aza.com.br**
ENGEFOTO Engenharia e Aerorelevamentos S/A		**http://www.engefoto.com**	**engefoto@sul.com.br**
FGM Consultoria e Assesoria Técnica		**http://www.roadnet.com.br**	**fcomeira@roadnet.com.br**
FOTOMAPA B Engenharia e Planejamento Ltda.			**fotomapa@svn.com.br**
GEDESIGN Informatica Ltda		**http://www.geodesign.com.br**	**rchohfi@geodesign.com.br**
GEODIGITAL Geprocessamento Ltda.	Maceió, AL	**http://www.geodigital.com.br**	**geodigital@mac.sol.com.br**
GEOID Ltda.			**geodid@task.com.br**
GFMI Consultoria Logistica Software House Ltda.		**http://www.gfmi.com.br**	**mk@gfmi.com.br**
GEODADOS Consultoria S/C Ltda.			**geodados@floripa.com.br**
IMAGEM Sensoriamento Remoto S/C. Ltda.	Sao Paulo, SP	**http://www.img.com.br**	**info@img.com.br**
INFOGRAPH Consultoria e Representaçao Comercial Ltda.			**oabib@zaz.com.br**
INTERMAP Projetos Florestais e Cartográficos Ltda.			**intermap@netpar.com.br**

LANNDSCHAFT Consultores Associados S/C			**lands@ibm.net**
LEBRE Tecnologia e Informatica Ltda.	Sao Paulo, SP	**http://www.lebre.com.br**	**mail@lebre.com.br**
LOGIT B Logística e Transportes Ltda.	Sao Paulo, SP		**comercial@logit.com.br**
M & C Goemática Ltda.			**emelloni@oul.com.br**
MAPLAN Aerolevantamentos S/A	Victoria, ES	**http://www.maplanbrasil.com.br**	**maplan@tropical.com.br**
MARKEYCAD B Comércio e Serviços			**markeycad.geo@uol.com.br**
MAXIDATA Tecnologia e Informática Ltda.		**http://www.maxidata.com**	
MULTISPECTRAL Sistemas e Serviços Ltda.	Sao Paulo, SP	**http://www.multispectral.com.br**	**multimkt@multispectral. com.br**
NEXUS Geo-Engenharia e Comércio Ltda.	Sao Paulo, SP	**http://www.nexusbr/com**	**vendas@nexusbr.com**
OCEANSAT Tecnologia Espacial para Monitoreamento Ambiental			**oceansat@netvale.com.br**
OCE-BRASIL Comércio e Industria Ltda.		**http://www.ocw.com**	**oce@nutcnet.com.br**
PENNA GRAPHICS			**lui@netpar.com.br**
PERSPECTIVA Serviços de Cartografia Ltda.			**perspectiva@netpar.com.br**
POWERCOM Engenharia	Sao Paulo, SP		**powercom@uol.com.br**
PRO-SYSTEMS Informática Ltda.			**prosystemas@brnet.com.br**
SANTIAGO&CINTRA Ltda	Sao Paulo, SP	**http://www.santiagoecintra.com.br**	**faleconcosco@santiagoecintra.com.r**
SENAGRO Sensoriamento Remoto S/A Ltda.	Curitiba, PR	**http://www.senagro.com.br**	**senagro@senagro.com.br**
STK Serviços Consultoria e Serviços Ltda.			**pericles@mcanet.com.br**
TERRAMAP S/A B Aerolevantamentos			**terramao@tecsat.com.br**

Restituçao Fotográfica			
TECMAPA B Tecnologia em Mapas		**http://www.tecmapa.milenio.com.br /tecmapa**	**tecmapa@milenio.com.br**
TECNOCOOP Sistemas Coop. Trab. Prof, de Dados Ltda.			**tecnologia@tcoop.com.br**
TRIMBASE - Com. Rep. e Serviços Téc. Ltda.	Rio de Janeiro, RJ	**http://www.trimbase.com.br**	**trimbase@trimbase.com.br**
UX CONSULT Ltda.		**http://www.ux.com.br**	**progis@ux.com.br**
VR & Consultores Associados de Informática Ltda.	Salvador, BA	**http://www.vrconsult.com.br**	**vrcba@zaz.com.br**

5.3. Information from interviewed firms

The information about interviewed firms, government agencies, academia and media, was given to the consultant in personal meetings with the personnel mentioned in each case. The comments from these firms and organisations are reproduced almost verbatim, so the Canadian entrepreneur can have a feeling of what these people think about the Brazilian geomatics industry. Only in a very few cases, the consultant has included his own comments (in *cursive*).

The same set of questions were asked to the interviewed person/s, in order to get a fair set of responses for each question, and as a consequence be able to draw an average response.

The set of questions were as follows:

1) What do you think about the current status of geomatics industry in Brazil?
2) Which is the main activity of your firm?
3) Which are the main government organisations involved with the geomatic activity?
4) Which are the main projects in geomatics nowadays?
5) Which is the strategy you recommend to enter the Brazilian market and which are the regulations for Canadian firms to bid?
6) How is the status of the Brazilian firms regarding preparation of integrated packages, involving different software and from different suppliers?
7) How is the Brazilian status regarding GIS, GPS, Cadastral and water?
8) What about remote sensing?
9) What are your expectations about radar satellite?
10) What has been done regarding disaster prevention?
11) What is being done to protect forests?
12) What about financing of geomatics projects?
13) How do you rate the Canadian geomatics industry?
14) Would you consider a potential association with a Canadian firm?
15) Do you speak English or French?
16) Do you have any printed or electronic material about your company. (this material, when given, is in Mr. Lloyd Bowles office, in NRCan)

Firm name: **DIGIMAPAS Sistemas de Informaçoes Eletronicas Ltda.** [Electronic Information Systems]

Company's comments:

a) Most important government organisations related with geomatics are:

1) Instituto Brasileiro de Geografia e Estadistica (IBGE) [Brazilian Institute of Geography and Statistics]
2) Instituto Nacional de Pesquisas Espaciais (INPE) [National Institute of Spatial Research]
3) Departamento de Serviços Geograficos (DSG) [Geographic Services Department]

b) Until 1995 many geomatics activity was aimed at municipal cadastre. Brazilian vision was cadastre and strategic mapping. Since 1995 and because of cellular telephony there has been a jump for activities related to digital technology for networks, and heavily working on mapping. Since 1995 private companies have aimed their efforts to raster and vector activities

c) There is no any doubt that it is necessary for Canadian companies to work together with Brazilian firms, otherwise it is almost impossible.

d) The geomatics market is at its beginnings, it is very incipient. Cadastral activity is important, however, this activity is more difficult than in Canada because the chaotic growth of Brazilian cities, repeated street names, and no uniformity in the numbering system.

e) It seems that there are not integrated solutions offered in a package, besides, there is a lack of data sharing between government agencies. The problem is often political not technical.

f) There is very little experience in GPS and GIS

g) There is practically no experience in risk prevention and protection. Nothing has been done to apply geomatics to protect forests. There is however, an important project with seven corridors, which has been sponsored by the federal government, its is however, practically inactive.

h) Remote sensing activity is scarce and as Brazil does not have its own satellite it has to rely in foreign technology, especially from France and the USA. They think that radar satellite is a very good solution to their problems because its characteristics and affordable price.

i) This firm would be interested in contacting Canadian firms involved in geomatics.

j) From the financing point of view there are some government agencies, namely Petrobras, which puts in place its own financing. The balance of projects is financed by international lending organisations such as the World Bank and the IDB.

Experience:

- Digimapas has apparently a lot of experience, in data conversion and retrieval of information for digital environments, and claims to posses 20 % of the Brazilian domestic market, with continuous state of the art investments technology. They also claim expansion into the international market and developing of specialised training and research

Areas:

- Electronic documents management
- Digital mapping

  This is the main activity. The firm offers solutions in the fields of telecommunications, planning, infrastructure and marketing. These maps involve federal, state and municipal maps

  In these categories Digimapas offers:
  - Digital site model showing elevation related to sea-level
  - Land use
  - Vector files
  - Orthoimagery
  - 3-D models
- Remote checking of structures and monuments
- Execution of turnkey projects
- Training
- Digital elevation maps for telephony (DEM)
- Thematic maps (land use, highways and hydrographic networks)
- Forests and soil treatment studies
- Urban studies for city planning
- Environmental effect report
- Geoprocessing
- GEO patrimony
- GEO health

Address:

Rua Rego Freitas 289 – 5° Andar, Sao Paulo, SP

Tel: 011-55-11-3224-9070
Fax: 011-55-11-3224-9071
E-mail: **digimapas@digimapas.com.br**
Website: **digimapas@digimapas.com.br**

Avda. Tancredo Neves 1543, Sala 303, Salvador, Bahia
Tel: 011-55-71-341-1114
Fax: 011-55-71-341-3427

Contact person:

Mr. **Paulo Roberto Cortez** (speaks a little English)
Account Manager
e-mail: **paulo@digimapas.com.br**

Mr. **Guillermo Pinho**
Commercial Director

Mr. **Osmar Olivieri**
Commercial Manager

Firm name: **BASE – Aerofotogrametría e Projetos** [Aerial Photogrammetry and Projects]

This is a company specialised in aerial Photogrammetry, maps production, and charts aimed to territorial planning.

Company's comments:

a) According to this firm there are state-of-the-art technologies in Brazil, and they think that the market is enormous, because there is nothing done.
Main culprit appears to be the Government. Geomatics industry in Brazil is small. Until very recently (1998), the main client was the government through its different organisations. Starting on that date things have drastically changed because the private utilities, being telecommunications the most important.

b) The main government organisations which have needs for geomatic services are:

* Petrobras: This is the Brazilian giant for oil exploration, production and distribution.

* SUDENE: Superintendencia de Desenvolvimento do Nordeste [North East Development Superintendence]

* DMOCS: Departamento Nacional de Obras Contra a Seca [National Department for Works Against Drought] North East Brazil is a very dry land, so the problem of finding new water resources is very acute

* INCRA: Instituto Nacional de Colonizaçao e Reforma Agraria [National Institute for Colonisation and Agrarian Reform]

* Secretaria de Accion Regional [Secretariat for Regional Action]

Most of these organisations are financed by the Brazilian government, and eventually will be financed by the World Bank.

c) They think that there is a potential for Canadian companies. **There is no problem of funding, but political will.** They are associated with a Vancouver firm.

d) To pinpoint how bad the cadastral situation is in Brazil, they pointed out that Sao Paulo, the third or second city in the world, with more than 18 million people does not have an updated cadastre, since the city latest map was done in 1972.

e) One of the main problems in Brazil from the geomatics point of view is data conversion. It is not going well, and it is assumed that the reason is lack of political will, since it appears that the Brazilian government is not particularly interested in cadastre. This consultant expressed surprise to this comment since it is his belief that it will develop in more revenues for the cities, however he added that because this lack of interest there are not geomatics regulations in Brazil

f) There is increasing activity now on GPS, as well as remote sensing.

g) Unfortunately this company has had some problems with Canadian geomatics equipment.

h) Brazil has practically nothing done in radar, especially in the Amazon region where it is in its first stages.

i) This company is in principle interested in establishing contacts with Canadian firms should a mission come to Brazil.

j) Nothing has been done in forestry and prevention is no existent. The only company with a modest plan is Petrobras, because risk of pollution, breakdown of pipelines and spills.

k) In general there are not large geomatics projects in Brazil, however, it was mentioned that the Sao Paulo region produces between 55 and 60 per cent of the Brazilian GDP, roughly equivalent to Mexico's GDP, and it is without appropriate mapping.

Experience:

The company was funded in 1974 and possesses state-of-the-art cameras and, according to them, the most advanced aerial Photogrammetry lab in Latin America, for black and white and colour images.

The firm has experience in digital vector maps and orthoimages, from 1:250 to 1:50000

Their experience also covers cadastral work either for urban and rural areas. In the latter activity they have performed more than 60 projects for human settlements and irrigation, especially in the DMOCS [National department for Works Against Drought] area.

Address:

Rua Marques de Lages, 1027
Sao Paulo, SP

Tel: 011-55-11-6946-9191
Fax: 011-55-11- 6946-4059

Contact person:

Mr. Ivan Valeije Idoeta (speaks a little English)
Vice-president
ivan@baseaerofoto. com.br

Firm name: **Imagem Sensoriamento Remoto e Informatica** [Remote Sensing and Informatics]

Company's comments:

a) According to them there are segments of Brazilian companies with well advanced technologies, while it is also true that there are another segments that are far behind.

b) According to its president Imagem has had and increase of 300 % in its income in the last years, so, some companies such as his show an impressive growth

c) Main clients are utility companies, and of course it is necessary to have very good contacts with the government.

d) He agrees that cadastral projects, although very necessary, are stalled for political reasons. In his words: "The government do not want to give answers".

e) He rates INPE as the most important government organisation as a source for geomatics projects.

f) He boasts that his company is the largest firm in South America in relation with orthoPhotogrammetry.

g) Agrees in the formation of partnerships with Canadian companies and he rates Canadian technology as very good.

h) It appears that the geomatics industry in Brazil is able to use remote sensing technologies, wherever they come from, but not for producing remote sensing technology, except in Photogrammetry.

i) He feels that he would be interested in a partnership with Canadian companies, in order to establish a co-operation in airborne radar remote sensing in Brazil. Apparently Radarsat does not have the capability of too much detail in Photogrammetry, and also shows a lack of flexibility.

j) He does not think that integrating several techniques to build a package is a problem in Brazil.

k) When asked about disasters prevention, he said that INPE has a model for

l) Fire fighting, but his information is that it is not working. Financing for this project came from the World Bank, and there is also financing available, at least in the

past, for some projects in geomatics, by the same institution. He also stated that nothing has been done to prevent flooding (which is not INPE's opinion).

m) He said that to do business in Brazil it is his belief that confidence and time are needed, in order to develop sound relationships. It appears that it is mandatory to be associated with Brazilian companies, except for some projects financed by the World Bank.

n) He believes that prior to coming to Brazil, Canadian companies should let it know who they are and what they do.

Experience:

1) Urban cadastre
2) Satellite Imagery
3) Mappings

Address:

Rua Itororó, 555 – Vila Bandeirantes, Sao José dos Campos, SP
Tel: 011-55-12-346-8933
Fax: 011-55-12-346-8919
e-mail: **info@img.com.br**
Web site: **http://www.img.com.br**

Contact person:

Mr. Enéas Rodrigues Brum (Fluent in English and colloquial French)
Director President

Firm name: **Nexus Geoengenharia e Comercio** [Geoengineering and Commerce]

Company's comments:

a) They think that the geomatics industry in Brazil is taking off with the federal and municipal governments. For instance, at present time they have a contract with the federal government for mappings at a scale of 1:50000. Added that municipal work is good, especially in the Greater Sao Paulo area where nothing has been done since 1972. There already exists a project which is just beginning.

b) They would be interested in meeting Canadian representatives to talk about potential partnerships, including representations.

c) According to them the main government clients are:
- Instituto Brasileiro de Geografia e Estadistica (IBGE) [Brazilian Institute of Geography and Statistics]
- Instituto Nacional de Pesquisas Espaciais (INPE) [National Institute for Spatial Research]
- Instituto Nacional de Colonizaçao e Reforma Agraria (INCRA) [National Institute for Colonisation an Agrarian reform]
- Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais (IBAMA) [Brazilian Institute for the Environment and Natural Resources]
- Petrobras
- Utilities such as Electro Paulo and telephone companies.

d) Financing is apparently no problem with the main lender being the Banco Nacional de Desenvolvimento (BNDES) [Development National Bank]

e) They think that the Brazilian geomatics industry needs complementation.

f) His feeling about the Canadian geomatics industry is good.

Experience:

1) Manpower allocation using CAD with generation of files for prototypes
2) Implementation of CAD systems in industry
3) Electronic management of documents
4) Implementation of GIS for:
   - Exchange of georeferenced data
   - Aerial fotography
   - Water supply networks
   - Sewage networks
   - Road applications

5) GIS services with linking to databases
6) Data collection

Address:

Rua Artur de Azevedo, 2124 A, Sao Paulo, SP
Tel: 011-55-11-3816-0204
Fax: 011-55-11-3819-0170
Web site: **http://www.nexusabr.com**
E-mail: **pinheiro@nexusbr.com**

Contact person:

Mr. **José Pinheiro** (speaks English)
Partner-Director

Firm name: Multispectral

Company's comments:

1) The geomatics industry in Brazil is now in expansion, albeit it passes over a critical period. Everything is now being activated.
There are a lot of expectations for the use of satellite imagery, and although until now it is believe that these services are expensive, it is expected that in the future their cost will decrease. Today it is not competitive and they think that the cost should show a decrease of 50 %.

2) Prospects in Brazil are enormous. The country, with 8.5 million km^2, has a lack of appropriate cartography, since the actual one is not only outdated but also inaccurate

3) INPE, the government body in charge of providing Brazil with advanced cartographic mapping does not have the necessary experience.

4) There is a great potential for satellite images, and even with the greater accuracy than those offered by the satellite Ikonos 2

5) On top of this very essential and needed cartographic service, the main clients are of course the privatised utilities such as those engaged in telecommunications, power, and oil and gas

6) He does not know too much about the Canadian geomatics industry, however, he learnt about a Brazilian company, producing alcohol and sugar, that is using Canadian technology in agriculture with good results.

7) Regarding the work of Canadian companies in Brazil, he states that it is mandatory to be associated with a Brazilian company for mapping work. On top of that, the Brazilian law establishes a partnership of a maximum of 20 %.

8) This company would be very interested not only in complementing its activity with Canadian expertise, but also they are actively engaged in the research of foreign companies they could associate to.

Experience:

1) Aerial Photogrammetry
2) Cartography
3) Systems development
4) Digital mapping
5) Geoprocessing

6) Cadastral surveys
7) Cadastral orientation
8) Market analysis

Address:

Rua Edson, 1441, Campo Belo, Sao Paulo, SP
Tel: 011-55-11-5096-5220
Web site: **http://www.multispectral.com.br**
e-mail: **dirgeral@multispectral.com.br**

Contact person:

Mr. **Valdir Donizete Grossi**
Partner

5.4. Projects with the World Bank

A huge gas pipeline of about 3,000 km long is being constructed to transport natural gas from Santa Cruz de la Sierra, Bolivia, to Sao Paulo and then to Porto Alegre. It has a cost of US$ 2.0 billion. This is a project that could be very interesting for Canadian companies, not only in the environmental assessment but also for the large necessary geomatics component. A partial credit guarantee of about US$ 180.0 million is being considered (October 2000) for the project company in Brazil. Board documentation is being prepared, and a lead arranger has already been selected. Board presentation is tentatively schedule for the fiscal year 2001.

Project # 0018507

Its goal is to help improve Brazilian capacities in monitoring and management of natural resources, particularly in tropical rain forests settings.

CIDA was involved in this project in order to provide funds for technical assistance, training, equipment, services and evaluation.

The primary executing agency is Energy, Mines et Resources Canada (EMR)

5.5. Information on geomatics firms (not interviewed)

Firm name: **AEROSAT – Arquitetura, Aerorelevamento, Engenharia** [Architecture, Airsurveys, Engineering]

Experience in:

* Claim 30 years experience in:

  - Geoprocessing
  - Aerial photography

Contact person:

Eng. **Peterson Martinski**, Director Superintendent

Tel: 011-55-41-253-2724
Fax: 011-55-41-252-0291

==========

Firm name: **ALTAVISAO Imagens Aéreas** [Air Images]

Experience in:

- Developed a system called "Altavisao" for 3-D airphoto
- Graphical computing
- Air photography
- Cadastre

Address:

Avenida Jamaris 441 Andar, Cj. 101, Sao Paulo, SP

Tel: 011-5051-1004
Fax: 011-5051-0306
E-mail: **aerolevantamentos@altavisao.com.br**

Firm name: **ARQUIDRAW Projetos e Serviços Ltda.** [Projects and Services]

Experience in:

- Digitalisation. GIS for urban and regional areas, planning, environmental and agriculture

Address:

Rua Fidalgo 515 – Casa 5, Vila Madalena, Sao Paulo
Tel: 011-55-011-816-0986
E-mail: **arquidraw@arquidraw.com.br**

==========

Firm name: **BMP Info Projetos em Meio Ambiente Ltda.** [Environment Projects]

Experience in:

- Management of digital files for cadastral, topographic and geographic charts
- Thematic mapping
- Digital cartography
- Geoprocessing and remote sensing
- Cadastre

Contact:
Tel: 011-55-21-9179-0559
E-mail: **bmpinfo@hotmail.com**

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Firm name: **EMBRAEC Empresa Brasileira de Engenharia Cartografica** [Cartographic Engineering]

Experience in:

- Monitoring the whole Amazon region
- Monitoring borders, jointly with the Brazilian Armed Forces, also construction of navigation and aeronavigation charts
- Worked with INPE in environmental issues, through topographic surveys
- Worked for Petrobras, in data digitalisation

- Research for new technologies
- Worked for the Institute Estadual de Terras de Sao Paulo
- Worked for the Brazilian Institute of Forest development

Areas:

- Photogrammetry
- Remote sensing
- Surveys (geodesic, topographic, aerial Photogrammetry, batymetry)

Address:

Contact person:

Dr. **Antonio Joao de Oliveira**
President

Tel:
Fax:
E-mail: **embraec@embraec.com**
Web: **http://www.prudente.uesp.br/dcartog**

==========

Firm name: **GEODESING Informática Ltda.**

Experience in:

- GIS
- Remote sensing
- Environment
- Urban issues
- System integration

Address:

Avenida Cap. Messias Ribeiro 419, Centro – Lorena, State of Sao Paulo
Tel: 011-55-12-552-7527
E-mail: **rchohfi@geodesign.com.br**

Firm name: **GEODIGITAL Geoprocessamento Ltda**.

Experience in:

- Geoprocessing
- Digitalisation
- Electronic maquettes
- Graphic computing
- Training

Address:

Tel: 011-55-02182-336-5771
Fax: 011-55-02182-326-4048
E-mail: **geodigital@mac.sol.com.br**
commercial@getcad.com.br

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Firm name: **LEBRE Tecnologia e Informática Ltda.** [Technology and Informatics]

Experience in:

- Databases
- GIS

The firm represents Hewlett Packard, Microsoft, 3 Com, Cisco Systems and Bentley

E-mail: **mail@lebre.com.br**

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Firm name: **MAPLAN Aerorelevamentos S/A** [Air Surveys]

Experience in:

- Topography and GIS
- Photogrammetry
- Orthophoto charts
- Orthomosaics
- Remote sensing
- Air surveys

Contact person:

Eng. Cart. **Lecio Passos Narciso**
Director Presidente

Tel: 011-55-27-223-2188
Fax: 011-55-27-223-2188
E-mail: **maplan@zaz.com.br**

==========

Firm name: **SANTIAGO&CINTRA Ltda.**

Experience in:

- Topographic automation systems

Address:

Rua Vieira de Morais 420 – 12° Andar - Campo Belo, Sao Paulo

Tel: 011-55-011-543-3433
E-mail: **faleconosco@santiagoecintra.com.br**

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Firm name: **SENAGRO Sensoriamento Remoto S/C Ltda.** [Remote Sensing]

Experience in:

- Remote sensing

- Environment
  - Risk areas
  - Water resources
  - Forest remainders
  - Deforestation
  - Ciliate forests
  - Environmental degradation
  -
- Municipal and regional planning
  - Land use
  - Highways, rail, transmission lines
  - Municipal highways
  - Agrarian structure

- Risk in urban areas
-

- Natural resources
  - Natural resources handling
  - Geo-botanical studies in soil associations, rock and vegetal
  - Geology mapping and mineral research

- Agriculture
  - Agriculture aptitude mapping
  - Agriculture zoning
  - Crops production
  - Erosion control
  - Land use planning

- Forestry
  - Forest inventory
  - Forest zoning
  - Forest fire prevention
  - Forest management
  - Wood stock control
  - Reforestation

E-mail: **senagro@senagro.com.br**

==========

Firm name: **TRIMBASE – Com. Rep. e Serviços Téc. Ltda.** [Commercial Representations and Technical Services]

Experience in:

- Satellite communications
- GIS
- Claim more than 1500 clients

Address:

Avenida das Americas 500 – Bloco 15 – Sala 204
Rio de Janeiro

Tel: 011-55-21-491-7000
Fax: 011-55-21-492-2588
E-mail: **trimbase@trimbase.com.br**

==========

Firm name: **VR & Consultores Associados de Informática Ltda.** [Associated Consultants in Informatics]

Experience in:

- Strategic use of information for social and economic policy management
- GIS development and implementation for institutional strengthening in public institutions
- Urbanisation
- Hydro resources
- Sustainable development

Projects developed:

- Empresa Baiana de Agua e Saneamento [Baia Water and Sanitation Company]
- Secretaria de Recursos Hídricos de Baia [Baia Water Resources Secretariat]
- Companhia de Engenharia Rural de Baia [Baia Rural Engineering Company]
- Planejamento Municipal, Sao Salvador [San Salvador Municipal Planning]
- Superintendencia de Recursos Minerais da Baia [Baia Mineral Resources Superintendence]
- Companhia Baiana de Pesquisa Mineral [Baia Mineral Research Company]

Contact:

Tel: 011-55-71-347-3822
E-mail: **vrcba@zaz.com.br**

6. MARKET ACCESS

6.1. Strategies for market entry

It has been said by many Canadian firms that they have had presence and contacts in Brazil for years and nevertheless there were not able to close a deal in this country. There is a set of conditions that have to be met in order to be successful in Brazil. They are:

- Necessity to have a partner, representative or associate in Brazil, knowledgeable in his/her respective field, who can show years of activity and a proven record, and with enough capability and expertise to maintain the systems sold.

- The Brazilian company should be capable and proficient in one or several technologies, so that the products or technologies offered by a Canadian company can complement and support the Brazilian company and its existing capability.

- It is necessary for the Canadian company to bear in mind that a product or package working well and efficiently in Vancouver, Toronto or Halifax does not necessarily mean that it is going to perform so well in Brazil. It means that Canadian technology should adjust to local conditions.

6.2 Media Interviewed

This consultant interviewed the Director of the most important magazine on geomatics in Brazil. It is called "InfoGeo".

Comments:

a) Brazil is behind other nations regarding cartography which is a very important field of activity for the private industry. It is true that until 1998 practically the only client was the Brazilian government. Some firms such as BASE grew up with the government, others such as Imagem, grew up very recently because the private industry.

b) According to this gentleman there are eighteen Photogrammetry companies in Brazil, with eight of them located in Curitiba. Main firms in Photogrammetry are:

- BASE
- ESTIO
- Engefoto
- Aeroimagem
- Engemapa

c) Main firms for satellite imagery are:

- Imagem
- Geoambiente
- Multispectral

d) Main government clients are:

- Instituto Nacional de Pesquisas Espaciais (INPE) [National Institute of Spacial Research]
- Petrobras (main oil and gas Brazilian company]
- Telephone companies
- Instituto Nacional de Colonizaçao e Reforma Agraria (INCRA) [National Institute for Colonisation and Agrarian Reform]
- Sistema de Vigilancia da Amazonia (SIVAM) [Amazon Watch System] (working with Raytheon)
- Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais (IBAMA) [Brazilian Institute for the Environment and Natural Resources]
- Large municipalities

d) Because municipal elections that took place on October 2000, it is very likely that in January 2001 there will be funding available for about US$ 1.6 billion for administrative modernisation.

e) **Market has never been so good**. There is a tremendous lack and needs for data. **Service sector is growing at a rate of 30 % per year**.

f) Next year there will be in Brazil three main events in geomatics:

* Sao Paulo: Business oriented in all markets
- Foz de Iguaçu: Satellite technology and academia
- Porto Alegre: Cartography, academia and cadastre.

This people are organisers of the GeoBrasil event in Sao Paulo, and **offered some slot for a one person presentation, from a qualified Canadian company**

g) Opinion on Canadian goods and services is excellent

Some copies of InfoGeo magazine are available in Mr. Lloyd Bowler office, Business Development Earth Science Sector, (613-992-4332) for consultation by Canadian entrepreneurs in order to get an idea of the quality and information provided by this magazine.

Address:

Rua Des. Hugo Simas, 1231 – St. 03, Curitiba, PR
Tel/Fax: 011-55-41-338-7789
Web site: **http://www.infogeo.com.br**

Contact persons:

Mr. **Emerson Zanon Granemann** (speaks English)
Director
E-mail: **emerson@infogeo.com.br**

Mr. **José Dangheri** (speaks English)
E-mail: **projetos.jose@uol.com.br**

6.3 Geomatics events in Brazil:

Event: GEOBrasil 2001 Feira e Congresso Internacionais da Geoinformaçao [Geo-information Trade and International Congress]
Date: 18 to 22 June 2001
Place: Sao Paulo
Information: 11-826-9111 or **http://www.geobr.com.br** or **info@geobr.com.br**

Event: XX Congresso Brasileiro de Cartografia (XX Brazilian Congress of Cartography]
Date: 7 to 12 October 2001
Place: Porto Alegre

Event: Simpósio Brasileiro de Sensoriamento Remoto [Brazilian Symposium of Remote Sensing]
Date: 21/26 April 2001
Place: Foz do Iguaçu

This event is being promoted by INPE , the National Institute for Spatial Research, to encourage participation of the academic and scientific communities and users of remote sensing, involved in surveying and monitoring of natural resources and environment.

Information: Tel: 12 345-6932/6441, Fax: 12 345-6460/6449.
E-mail: **sbsr@ltwww.dsr.inpe.br/sbsr2001.**

7. CANADIAN POSTS AND AGENCIES

Canadian Consulate in Sao Paulo
[Consulado Geral do Canada]
Avenida Paulista, 854 – 5° Andar
01310-913 Sao Paulo, SP, Brasil

Contact:
Ms. **Mariangela Olivieri de Lima,** Commercial Officer
Tel: 011-55-11-253-4922
Fax: 011-55-11-253-4944

Canadian Commercial Corporation
1100-50 O'Connor Street, Ottawa, Ont., K1A 0S6
Tel: (613) 992-8945
Fax: (613) 995-2121

Contact:
Mr. **Americo Roman,** Account Executive, International Business
E-mail: **americo@ccc.ca**

Export Development Corporation (EDC)
151 O'Connor Street, Ottawa, Ont., K1A 1K3.
Tel: (613) 598-2992
Fax: (613) 598-3098

Contact:
Mr. **Claudio Escobar**
Regional Manager for Brazil
Tel: (613) 598-2860

Electronic address: **http://www.edc.ca**

EDC is a self-funding Crown Corporation that helps Canadian exporters compete in foreign markets by providing insurance, financing and guarantees. It works with the following banks in Brazil, which can finance Canadian goods and services:

8. REFERENCE MATERIAL

8.1 Useful Internet sites

http://www.ccc.ca
Canadian Commercial Corporation
http://www.dpl.inpe.br
Geoinformation for the citizen (in Portuguese)
http://www.funcate.org.br
FUNCATE presentation (in Portuguese)
http://www.ibama.gov.br
Monte Pascoal National Park "Vegetation and Anthropism" (in Portuguese)
http://www.ibama.gob.br
Remote sensing associate network (in Portuguese)
http://www.fatorgis.com.br
Information on Brazilian geomatics companies (in Portuguese)

8.2. In print:

a) **Brazil: Country Profile**. The Economist Intelligence Unit (CIDA Library)

b) **GEOBrasil:**
This twice-monthly magazine deals with the following aspects of Geoinformation:
Topographic automation
GPS
Mapping
Remote sensing (satellite imagery)
GIS
Geomarketing
Vehicles tracking
Precision agriculture

Circulation: 10,000 copies sold on subscription across Brazil
The magazine is backed-up by the INPE (National Institute for Spatial Research), GITA (Geospatial Information & Technology Association), and CITS (International Centre for Software Technology)

Contact person:
Director General: **emerson@infogeo.com.br**
E-mail: **infogeo@infogeo.com.br**