

**NATURAL RESOURCES CANADA**  
**MARKET INTELLIGENCE REPORT ON**  
**MEXICO**



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## MARKET INTELLIGENCE REPORT ON MEXICO

### 1. INTRODUCTION

#### 1.1. Scope of this study

This market intelligence report on Mexico covers the following areas:

- 1) Geomatics and Geoscience
- 2) Water
- 3) Prevention of Natural Disasters

This report does not cover the whole country. The geographical areas considered are:

- S Mexican States in the border with the USA (details only water projects financed by the Nadbank)
- S The State of Nuevo Leon
- S The State of Jalisco
- S The State of Mexico
- S The Federal District (Mexico City)
- S The State of Quintana Roo (only protected areas located in eastern Yucatán Peninsula on the Caribbean Sea)

In all cases, except for the border states, information is given, when available, on:

- S Projects underway and to be initiated
- S Needs and areas of interest
- S Opinion on Canadian Geomatics
- S Comments from the interviewed person/s
- S Consultant's comments
- S 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.

#### 1.2. 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 Mexico, 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:

**S** *Federal Government, in the following areas:*

- C GIS
- C Cartography mapping
- C Cadastral
- C Bio-projects
- C Ports control
- C Water contamination and sewage
- C Disaster prevention and emergency response.

**S** *State Governments and Municipalities*

- C Water treatment plants
- C Aerial surveys (thematic, crops, damages, etc)

**S** *Private firms*

- C Consultants
- C Cartographic firms

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

- S** Acquiring some technologies in order to complement their activity to offer complete packages to the government
- S** Partnering with Canadian firms in order to represent and service their products, and also offering a Mexican base for project execution

### 1.3. Summary on organizations contacted

It is believed that there are opportunities in Geomatics in Mexico as per the details given in this report. As in many other countries, Geomatics in Mexico is driven by the government. On the other hand many government agencies do not carry out Geomatics activities by themselves.

For these two reasons this market intelligence was conducted in two fronts:

- S Government organizations
- S Private consulting firms

#### A.1. *Government organizations*

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 were contacted:

- C **Canadian Embassy and Consulates in Guadalajara and Monterrey.** They provided very valuable assistance and advice. Have complete profiles on private firms in the Geomatics and Environmental areas.
- C **PEMEX /SICORI.** A part of the giant Mexican oil company, charged with Geomatics studies for all Pemex's Directorates.
- C **Mexican Petroleum Institute** (A directorate of Pemex specifically involved in Geomatics, environmental and energy, prevention of disasters and response)
- C **SEMARNAP** (Environmental, Natural Resources and Fishing Secretariat). This is a huge organization. For that reason contacts were made with its Studies Directorate which acts as some sort of a pool for the whole organization in research and in providing solutions, among them, with Geomatics. There were also contacted agencies belonging to Semarnap in the field of protected natural areas.
- C **INEGI**, which is the National Institute for Statistics, Geography and Informatics, responsible for cadastres.
- C **Inter American Development Bank**, which finances some large water as well as Geomatics projects.
- C **CENTROGEO**, which is a private organization dealing with research in Geomatics, but with government economic support.
- C **Ports and Merchant Marine**, since they regulate the vessel traffic in Mexican ports, and which are usually in need of Geomatics solutions

- C **ASERCA**, an organization supporting farm subsidies, which are controlled using Geomatics techniques.
- C **Jalisco State Government**. Through their Institute of Territorial Information, they manage Cartography and Databases
- C **Jalisco State Government**. Through their Urban Development Ministry, they manage urban aspects of the City of Guadalajara, using Geomatics.
- C **SEMARNAP Delegation in Jalisco**. In charge of forestry management.
- C **Monterrey Technological Institute**. Renowned teaching and research institute very active in the Geomatics field
- C **Municipality of Monterrey**. Very active in Urban Planning and using Geomatics
- C **Municipality of San Pedro Garza Garcia**. Urban development Secretariat, very active in using Geomatics.
- C **Ecology Under Secretariat**, Monterrey. Controls air pollution in the city
- C **University of Nuevo Leon**. Faculty of Architecture. It is important because they form people for urban planning

#### 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
- S Water
- S Marine operations
- S Prevention of natural disasters

Contacted firms are:

- C Sistema de Información Geográfica (SIGSA), Mexico City. Probably the largest firm in Mexico, specialized in Cartography and Modelling.
- C IGS, Mexico City.
- C Ingeniería Experimental, Mexico City.
- C IEE Grupo Ingeniería, Mexico City
- C Topografía y Proyectos de Ingeniería, Mexico City
- C Cartodata, specialized in Photogrammetry and Cartography, Guadalajara
- C Clifton Associates, Canadian firm located in Guadalajara. Cartography and GIS analysis

It was not difficult to get information about projects in execution and about those in the drawing board. Interviewed officers were open and ready to give information. These projects or potential opportunities are listed for each organization under the **Projects** and **Opportunities** heading. Every effort has been done in supplying reliable and information as complete as possible.

Private firms quite naturally do not volunteer information about the nature of their projects and opportunities. However, a brief information is given in this study about the company background, main field of expertise, comments, and other information, in order to help the Canadian entrepreneur if he/she is interested in potential strategic alliances. For this reason, Mexican private firms were asked specifically about their willingness on this issue.

#### **1.4. Lessons learnt**

**Without exception all the persons contacted expressed very highly about Canadian Geomatics technology not only for the quality of its products but too because the high degree of sophistication. Most of the people interviewed consider Canada the world leader in this field.**

However, many people compare the way Canadian entrepreneurs make business, especially in promoting their products, when correlated with their main competitors, the American firms.

It was suggested that Canadian firms do not have a consistent approach. It was also mentioned the lack of understanding (not only by Canadians) of the cultural differences between countries such as Canada and the United States, and Mexico. Last, but not the least, is the lack of an aggressive policy towards making Canadian products known, through seminars, conferences, donation of some software to universities, etc.

Apparently, the last suggestion does not apply to some American firms and in some extent to some French products. In other words, Mexicans think that Canadian firms should re-engineer their strategy if they want to penetrate the Mexican market. This strategy can be summarized as follows:

- 1) It is necessary to have a Mexican partner, because he/she knows the market and more important, the decision-makers. With many agencies, a Canadian company can bid alone, even on the Internet, however, for execution it is mandatory to be established in Mexico.
- 2) It is necessary to invest some money in promotion. This promotion can be

materialized in seminars, workshops, donation and explanation of software to universities, with a demonstration of show cases.

- 3) Business in Mexico 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 Mexico. The country has very capable people, with shrewd entrepreneurs and large Geomatics companies. As a consequence, there are Geomatics technologies where the Mexicans are very advanced, while in other areas they are behind, and finally there are some subjects which are simple non-existent
- 5) This is the last point but one of the most important. In Mexico one hears many times in a single day the same word: **integration**. As explained in 4), Mexican firms usually cannot supply a whole package of Geomatics services requested by a client.

As a consequence, they look for outsourcing the technologies they do not have, either from local firms or from foreign countries. There is nothing wrong with this approach, except for the fact that usually takes a long time to make the whole system compatible, and more often than not, the client is asking for turnkey proposals to solve this difficulty, because he/she wants to deal with only one responsible.

However, the same concept applies to foreign proposals, which can follow the same outsourcing procedure as Mexicans. **For this reason a very good sales argument is to present a showcase where the whole package can be seen working smoothly and without conflicts.**

## 1.5. Summary

Information gathered from reliable sources in Mexico reveals that:

- 1) There is potential for Canadian sales of Geomatics technology to Mexico. This potential is because:
  - S** There is a need in Mexico for this type of technology
  - S** The very high opinion existent in Mexico 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. Water
- 2.2. Prevention of natural disasters and emergency response
- 2.3. Geographic Information Systems

- 2.1. Water, being scarce in Mexico is the most pressing necessity. Water is extracted in Mexico City at a greater rate that it is replenished by rainfall. Same happens in Chapala Lake, which supplies water to the second largest Mexican city: Guadalajara..

Water is scarce and depending on rainfall in the third largest Mexican city: Monterrey

Water table is depleting in the Yucatán Peninsula, home of the booming and very profitable Mexican tourism industry, on its Caribbean Coast.

The Comisión Nacional del Agua (CNA) [National Water Commission] is the national organization dealing with water. They have an enormous amount of information, however, they do not have the adequate structure to handle that data.

This is an area where Canadian Geomatics industry could have its better opportunity in helping the Mexican government in improving:

- S Water sources detection
- S Water distribution
- S Water leaks detection

Of course, hand in hand comes the environmental industry with:

- S Water re-use in industrial plants
- S Water reduction in industrial plants
- S Water purification plants
- S Water treatment plants

- 2.2. In the field of prevention of natural disasters and emergency response the main area of interest for Canadian firms appears to be forest fires. Even though Mexico does not have many forests, the few remaining are periodically subject to fires in the dry season. Neither the federal government nor the States have the necessary equipment to fight fires such as water planes, pump trucks and so on,

let alone the expertise to use this equipment, which usually is crewed by Canadians and Americans.

But the most important issue is the lack of policies for forest fires prevention as well as for other disasters such as floods, oil spills, hurricanes, etc. This is an area of excellent opportunities for the Canadian industry, in particular regarding remote sensing and warning, especially using radar and satellite methodology.

- 2.3. The GIS industry is well developed in Mexico with large firms (please see Chapter 4: Information on the private sector), as the main players. Mexican firms are knowledgeable and capable in imaging, digitalization, cartography and photogrammetry. However, their main drawback is the lack of enough expertise in analysing the data, in producing transportable databases, and in using the data to address special needs. **This is another field where Canadian expertise can be invaluable, and badly needed.**

A particular weakness in huge government offices is the failure to disseminate information existent in their databases, so that different parts of it can be used by other users.

Last, but by all means not the least problem, is the lack of integration (**KEY word** in Mexico), of different platforms and technologies to produce workable solutions. This lack of integration reveals itself when Mexican firms do not have the in-house capability to complete a set of products to assemble workable solutions. Often, they outsource or complement with other products and platforms, with results that frequently are not satisfactory.

Because main government offices such as Pemex, Inegi, or Sedesol are asking for turnkey solutions involving a proven and integrated package, local companies try to fill the gap with foreign methodologies, mostly Canadian and American.

What has been said about Mexican companies also apply to Canadian and American companies. In this regard their best strategy is to show the Mexicans how their package has worked in other project and, **very important**, how their product can be adapted to Mexican conditions.

## 1.6. Quick reference on projects, opportunities and needs

Tables in the following pages condense information from the main text body in this report. They have been constructed for the reader to have a quick bird-s-eye information on projects, perceived opportunities, and main areas of interest.

Comments on each subject are given under the following headings:

Chapter 3: **OPPORTUNITIES IN THE PUBLIC SECTOR**

Chapter 4: **INFORMATION ON THE PRIVATE SECTOR**

<i>Organization</i>	<i>Project</i>	<i>Project name</i>	<i>Main areas of interest</i>	<i>Perceived opportunities</i>
<b>Inter-American Development Bank (Mexico City)</b>	Project 1	Sustainability program for rural communities		
	Project 2	Program for sanitation of the Mexico Valley		
	Project 3	National program for drinking water and sewage		
	Project 4	Drinking water supply for the metropolitan area of the Mexico Valley		
	Project 5	Project for States and Municipalities		
	Project 6	Regional project on Geomatics		
<b>Pemex (Mexico City)</b>	Project 1	Determination of contingency roads	. Cartography	
	Project 2	Remote sensing	. Consulting in Geomatics	
	Project 3	Pollution in Azcapotzalco River	. Engineering surveying	
	Project 4	Location of	. Geodetic/Control	

	Project 5	pipelines on the seabed Location of drilling heads	surveying . Image analysis . Land surveying . Training in Geomatics	
<b>Semarnap (Mexico City)</b>	Project 1 Project 2 Project 3 Project 4	National forestry inventory Fishing zone Management system Development of GIS for forest control		. Prevention . Marine applications . Biodiversity (Natural Protected Areas)
<b>Government of Jalisco (Cartography and Databanks) (Guadalajara)</b>	Project 1 Project 2	Contracting satellite technology Cadastral in rural areas	. Solutions for Geomatics projects development	. Use of external consultants in GIS applications . Work in Civil Protection for prevention
<b>Semarnap (Guadalajara)</b>			. Fire fighting equipment . Need for training courses . Need of infrastructure for analysis . Need to create a State centre for fire protection . Need to strengthen structure	. Satellite system . Obtention of thematic maps . Areas of interest: Prevention, Protection, Species inventory . Requirement of external consultants . Purchase of equipment and technology
<b>Government of Jalisco - Institute of Territorial Information (Guadalajara)</b>	Project 1 Project 2 Project 3 Project 4	Forest restoration Rehabilitation & cleaning of Blanco River Prospecting for drinking water in Puerto Vallarta The CFE is considering	. Water leaks and water recycling . Use of Geomatics in the marketing area	. Use of satellites to detect illegal crops . Financing to prevent forest fires

	Project 5	carrying out prospecting studies on renewable energy Cadastral modernization		
<b>Government of Jalisco - Department of Information System (Guadalajara)</b>	Project 1	Generation of a Risk Atlas		. Integration through Geomatics on applications for territorial classification . Radar-satellite information
<b>Urban Development Secretariat, (Guadalajara)</b>				. Interest in detection of water leaks as well as illegal connections
<b>Municipality of Monterrey</b>	Project 1 Project 2	Forest management Updating cadastral information		. Prevention of forest fires as well as floods
<b>University of Nuevo Leon (Monterrey)</b>	Project 1	Classification of city of Monterrey regarding land use		
<b>Municipality of San Pedro Garza García (Monterrey)</b>	Project 1 Project 2 Project 3	Construction of a technological resource for urban planning using GIS Management of natural resources (Cumbre de Monterrey Park) Master Plan for Monterrey	. Specific programs to exploit urban information	
<b>Mexican Petroleum Institute (Mexico City)</b>			. Access to satellite imagery . Software for dispersion models	

			<ul style="list-style-type: none"> <li>for contaminants</li> <li>. Ship tracking system</li> <li>. Oceanographic monobuoy</li> </ul>	
<b>ASERCA (Mexico City)</b>			<ul style="list-style-type: none"> <li>. Procampo's control program, Phase II</li> <li>. Dissemination of information from cadastral database</li> <li>. Remote sensing</li> </ul>	
<b>Ports and Merchant Marine (Mexico City)</b>				<ul style="list-style-type: none"> <li>. Vessel traffic management</li> </ul>
<b>INEGI (CentroGeo) (Mexico City)</b>				<ul style="list-style-type: none"> <li>. Maps updating in INEGI</li> <li>. Prevention</li> </ul>
<b>Urban Development of the State of Nuevo Leon- Ecology Undersecretariat (Monterrey)</b>	Project 1	Preparation of a map on the forest fire zone for risky areas	<ul style="list-style-type: none"> <li>. Need GIS to prevent forest fires</li> <li>. Need aerial photographs</li> <li>. Need ecology simulation</li> </ul>	<ul style="list-style-type: none"> <li>. Funding from the World Bank to purchase equipment to process images</li> <li>. Potential for water savings and re-use</li> </ul>
<b>SIANKA=AN (State of Quintana Roo)</b>	Project 1 Project 2 Project 3 Project 4	Coastal management Reefs characterization Crocodiles monitoring Monitoring of marine and land species	<ul style="list-style-type: none"> <li>. Tourism development and impact</li> <li>. Water management (Drinking water and sewage)</li> </ul>	<ul style="list-style-type: none"> <li>. Use of remote sensing</li> <li>. Detection of underground water</li> <li>. Use of renewable energy sources</li> <li>. Replacing existing GIS system</li> <li>. Strategies for emergency preparedness and response</li> <li>. Installation of small</li> </ul>

				<p>WTP</p> <ul style="list-style-type: none"> <li>. Determination of rate of salinisation in underground water</li> <li>. Environmental diagnosis in the State</li> </ul>
<p><b>North American Development Bank (NADBANK) (Texas)</b></p>	<p>Project 1</p> <p>Project 2</p> <p>Project 3</p> <p>Project 4</p> <p>Project 5</p>	<p>North and South Wastewater Treatment Plants, for Juarez</p> <p>Wastewater Treatment Plant for Ensenada</p> <p>Sanitation Program for Mexicali</p> <p>Water Supply and Distribution for Nogales</p> <p>Comprehensive Sanitation Project for Reynosa</p>		
<p><b>SIGSA (Mexico City)</b></p>				<ul style="list-style-type: none"> <li>. Partnerships</li> <li>. Mining</li> <li>. Geomatics applications for oil and gas</li> <li>. Vessel traffic management</li> </ul>
<p><b>TYPISA (Mexico City)</b></p>			<ul style="list-style-type: none"> <li>. Consultants in GPS</li> <li>. Orthophoto process in photogrammetry</li> <li>. Marine applications</li> </ul>	<ul style="list-style-type: none"> <li>. Vessel traffic management</li> <li>. Vehicle tracking</li> <li>. Retrieval and processing of information</li> </ul>
<p><b>Ingeniería Experimental (Mexico City)</b></p>			<ul style="list-style-type: none"> <li>.Complementation with Canadian firms</li> <li>. Soil contamination</li> </ul>	

<b>IGS (Mexico City)</b>			. Partnership	. Satellite methods to prevent disasters
<b>Ingeniería de Estudios Especiales (Mexico City)</b>			. Partnerships . Water treatment plants	
<b>Cartodata (Guadalajara)</b>			. Partnership . Radar and laser altimetric applications	. Radar satellite . Marine applications . Drinking water . Forestry and Agriculture
<b>Clifton (Guadalajara)</b>			. Partnership in non-competitive areas . Models for water and soil contamination . Simulation models for disasters prevention	
<b>ITESM (Monterrey)</b>			. Risk prevention and definition of risk	



## 2. MARKET OVERVIEW

### 2.1. General information

#### 2.1.2. Basic description of the country

##### *Population*

Mexico has a population of about 96,000,000 with an elevated growth rate. Last population census is taking place at the moment of this writing (February 2000)

##### *Area*

Mexico has a continental area of 1,980,000 km<sup>2</sup>, with a maritime area (200 miles limit), of about 3,000,000 km<sup>2</sup>

##### *Main resources and activities*

The country's most important industrial activity is perhaps the extraction and processing of oil. Mexico is the fifth oil producer in the world, and its importance to the economy is such that it represents 1/3 of the GDP.

Mexican industry is located mainly in Mexico City and in the State of Nuevo Leon, Monterrey and Saltillo areas, with extensive metallurgy plants, which main clients are USA car manufacturers. Light industry is also allocated along the USA border, called *maquiladoras*, producing in bond products for the USA market, mainly in the light industry segment.

Tourism is a very important activity with main centres in the Yucatán Peninsula, called the *Riviera Maya*, as well as the known centres of Acapulco and Puerto Vallarta on the Pacific Coast.

#### 2.1.3. Basic description of the market

##### C Geomatics and Geosciences

##### *Present day status:*

Geomatics is well developed in Mexico especially in activities such as GIS, GPS, and Cartography. The government agencies are using Geomatics and are well aware of its potentiality, however, it is believed that there is not consensus about how to take the maximum advantage of the information collected. There is a lack of a diffusion mechanism to allow different agencies to share information contained on a certain database. An example, is information gathered for cadastral purposes, which is being employed only for that, not taking advantage of the wealth of information its database contains, and that could be used by other agencies.

### ***Potential***

It is believed that there is a potential for the Canadian industry because:

- 1) Canadian Geomatics industry is regarded, without exception, to be well advanced, innovative, and of the highest level. In some areas, such as those related with forestry, the Canadian advantage is overwhelming especially in forest fires fighting and in forest management. Many people believe that Canadian Geomatics industry is ahead of its similar in the USA, the main competitor
- 2) Mexico has a great need for Geomatics, not only for cartographic projects, but also for such areas as water detection, forest fires, geographical distribution of medicines and healthcare, oil exploration, exploitation and distribution, modelling of contaminant diffusion, simulation for early warnings on flooding, etc

The Governments in its different levels (federal, state and municipal) account for most of the market, with private firms choosing technologies. The major buyers of Geomatics services are municipal and state governments, with 2,419 municipalities in México, about 400 of them large enough to require advanced systems. Teléfonos de México (Telmex), the national telephone Company, is another major private buyer of GIS, as well as Mexican Petroleum (PEMEX).

#### C Emergency response

##### ***Present day status and potential***

This is one of the most important areas of interest for Canadian firms, probably only second to water. There is an acute need for forest fires prevention measures, flooding and selection of alternate road routes in case of disasters such as earthquakes, flooding, hurricanes, etc. As a consequence there is a large potential in this field.

#### C Municipal markets

##### ***Present day status and potential***

Municipal markets used to have a large potential because a program called A100 cities@. This cadastral program is still alive but little has been done since its inception and it is doubtful that something will be done in the future, certainly not before the presidential elections to be held on July 2, 2000.

#### C Cadastral

##### ***Present day status and potential***

There is a new Land Law and a General Law for Human Settlements, which are the legal framework to give the land and the urban development the

opportunity to organise the rural property and to plan the development and growth of cities.

It is not considered that this activity has a great potential for the Canadian industry, not only because what was mentioned in the above paragraph but also because cadastral has been already completed in Mexico, however, it badly needs updating, although it is uncertain when this updating will take place.

Diagnosis from the National Program for Urban Development, shows that in the next 5 years, it will be required to incorporate 151,000 hectares, only in the four metropolitan areas and 116 strategic locations, included in the 100 Cities program, to satisfy housing needs, urban equipment and regional development. About 66% of those lands are municipal and communal lands.

One of the government goals is to continue with the permanent update of the National Rural Cadastre and to modernize its technical infrastructure and data system, in order to convert it in the tool used to plan actions in public, social and private sectors.

## C Environmental

### *Present day status and potential*

Mexico needs to raise its environmental standards. Main problems derive from:

- 3) Air pollution with very serious problems in the largest cities, especially Mexico, DF (20,000,000), Guadalajara (4,500,000) and Monterrey(3,500,000), as well as in the States bordering in the north with the USA. Mexican authorities are preparing a new legal body to reduce the level of emissions. During at least a decade, Mexicans are under the one-other-day system for driving their vehicles, using stickers affixed to the car windshields. However, instead of solving the problem it is believed that it has worsened it, since many Mexican have a second car with stickers allowing them to circulate the days the other car is banned.. There is a public awareness about air pollution since some media inform the people about the level of contamination. In some days activities have been completely paralysed because dangerous levels of pollution.
- 4) Water pollution is another very serious problem in Mexico. It is believed that there could be a large potential for Canadian companies in the following areas:

- S Construction of water treatment plants in smaller municipalities;
- S Working with industrial firms, especially in Mexico City, Monterrey and the border states, establishing procedures to recycle and reduce the use of raw water for industrial purposes. As an example, in Guadalajara there is an important tanning industry where most probably the water consumption could be greatly reduced in their plants using Canadian programs for water savings in the tanning process.

C Energy

***Present day status and potential***

As a large oil producer country it is believed that there is not shortage of energy. However, because oil is the largest revenue producer there is interest in implementing conservation measures and to encourage the use of another sources such as renewable energy

Very recently, in 1999, the Mexican government announced plans for an important revision of the electrical sector, especially because the government needs the private capital to finance the expansion and modernization of the system. In that sense large users such as factories will be able to choose their supplier, and this fact could open a huge market for production, supply and distribution of electricity, which can make the market accesible for Geomatics and environmental applications

As a reference, the price of electricity is:

Industrial use: US\$ 0.05/kWh

Domestic use: US\$ 0.065/kWh

***Renewable energy:***

Renewable energy is being used in ecotourism developments and in small communities to satisfy a part of their power needs. Taking advantage of its high rate of sunny days the State of Quintana Roo is well adapted for this source of energy. Solar energy is used here for water heating and power generation.

In this State renewable energies constitute a sound option, since there always will be enough solar energy, as well as, in some states, wind energy.

As an example, it is interesting to note that in the resort of Xcalak has been installed a system with 234 solar modules which integrates a mixed wind/solar energy system considered one of the largest 10 systems in the world. However, efficiency of the system was less than expected because

problems in the operation and management.

An estimate shows that in the whole of Mexico there are installed more than 60,000 solar cell systems, and about 220,000 m<sup>2</sup> of solar panels (70 % of them used to heat swimming pools).

Wind energy potential is considered high in Mexico. Among applications is water pumping with wind mills, generation of electric power with different applications such as indoor and outdoor lighting, ice production, cool rooms operations and water purification.

At present time there is not a wind map for the whole of Mexico. In the solar case there exist two versions of solar maps. Maintenance costs for solar cells is less than 1 cent/kWh. For wind systems it is about 3 cents/kWh. When these costs are compared with those for diesel installations, with a cost of about 45 cents/kWh, it is immediately perceived the advantage of renewable energy systems.

C Oil and gas

*Present day status and potential*

Mexico is one of the leading oil exporter countries. Its exports are so important that PEMEX (Petróleos Mexicanos), sales account for about 1/3 of the federal government's revenue. In order to improve output foreign companies have been invited to drill in Mexican's oil properties

Production of liquefied gas at September 1999: 50.05 thousands of m<sup>3</sup>/day

Back in 1995 the Mexican Government approved private ownership of natural gas transport, storage and distribution facilities.

C Mining and minerals

*Present day status and potential*

Present day production of minerals:

<b>Mineral</b>	<b>Units</b>	
Gold	thousands of kg	26,111
Silver	thousands of kg	2,877

Zinc	thousands of tonnes	370
Copper	thousands of tonnes	344.9
Manganese	thousands of tonnes	202.5
Lead	thousands of tonnes	176.5

**Source:** Instituto Nacional de Geografía, Estadística e Informática (INEGI)

C Financing

***Present day conditions***

The banking system was very protected in Mexico until recently. Since the early 90's the government developed a policy of bank privatization as well as the installation of new domestic lending institutions. In 1994 banks operating in Canada and in the USA were allowed to also operate in Mexico, in order to improve the availability of credit.

Here in Canada, the Export Development Corporation, has lines of credits in Mexico (see Canadian Agencies, for detailed information)

C *Economic trends*

GDP after 1995 contraction rose:

5.2 % in 1996

7.0% in 1997, the highest in 16 years

4.8% in 1998

Actual GDP annual percentile change in 1997 was 6.8 %

Industrial production has had the following annual percentile change:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.3	2.4	1.7	4.4	3.7	5.4	4.7	4.5	3.5	2.5	n/a	n/a

**Source:** Mexico Selected Economic Indicators, Ministry of Finance and Public Credit of Mexico, Hacienda

Average: 3.41 %

Exchange rate in Pesos/US\$

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10	9.8	9.8	9.4	9.4	9.5	9.4	9.3	9.5	9.4	9.4	9.4



### **3. OPPORTUNITIES IN THE PUBLIC SECTOR**

#### **3.1. Actual and planned projects and intentions for projects**

This section starts with opportunities in the Geomatics and environmental sectors derived from the public sector. These opportunities are updated , since the information was gathered during the consultant's visit to each organization during February 2000, so they represent the opinion of the organizations consulted. Since the information given comes almost verbatim from the officers interviewed, in most of the cases positioned at a high level, it is believed to be accurate. Sometimes the consultant added his own comments, reflecting what he perceived during the interview.

Projects which are underway and where there is a clear intention or commitment to execute them, are numbered. There are however, intentions or plans to develop some particular projects but which are still in the drawing board . It is believed that these projects, ideas or intentions also constitute very good opportunities for Canadian firms, perhaps better than planned or actual projects, since they have not started yet.

Key and important words and concepts which are of particular interest to Canadians entrepreneurs are bolded.



**Organization name:** Instituto Nacional de Estadística, Geografía e Informática (INEGI)

**Background Information:**

INEGI is the agency responsible for integrating Mexico's systems of statistical and geographic information, in addition to promoting and orienting the development of informatics in this country.

In order to provide statistical and geographical information to a country of 96,000,000 inhabitants, scattered over a territory close to 2 million km<sup>2</sup>, INEGI has a central structure of seven general bureaux. Out of them, two are responsible for geographic, ecological and territorial information. Another bureau is responsible for informatics policy and another one of dissemination, as follows:

- C The General Bureau of Geography
- C The General Bureau of Cadastral
- C The General Bureau of Cartography
- C The General Bureau of Informatics Policy
- C The General Bureau of Dissemination

The **General Bureau of Geography** generates information on physical milieu, natural resources, infrastructure and territory. Aerial photography and satellite imagery are used and several field activities are carried out, as well as special projects of interpretation and analysis. This Bureau also coordinates the National System of Geographic Information of Mexico.

INEGI's extensive cartographic collection encompasses basic cartography, hydrograph, communications infrastructure, pipelines and human settlements, as well as thematic cartography including edaphology, current and potential land use, geology, climate and hydrology, among others.

The **General Bureau of Cadastral Cartography** supports the titling of land in property to peasant groups for a surface over 50 % of the nation's territory. As a consequence, it is responsible for cadastral services to over 102 million hectares. In addition, it prepares the blueprints and plans needed to present the property deeds of 4.3 million houses, accounting for 30 % of the nation's population.

The **General Bureau of Informatics Policy** is responsible for elaborating and managing the Mexican Information Development Program. So, it encourages and promotes the use of Informatics, both at national level and at state and municipal levels.

The **Administrative Area** is responsible among others duties for the technical and professional training of personnel, as well as for coordinating INEGI's international relations.

INEGI is engaged in making the most of technological progress in order to modernize the existent infrastructure and equipment. This strategy was implemented placing the accent on Informatics and Telecommunications equipment. INEGI has over 5,000 personal computers, acquired in a period of three years. It also has ten regional computing centres linked via satellite to headquarters, as well as 50 interconnected local networks.

A complete renovated computer technology for GIS was also developed. A new 24 hs. national active geodesic network has also been implemented with an infrastructure including: fixed stations, 600 global positioning systems, 700 local stations, 10 regional centres and 22 auxiliary centres for automated cartography.

Another component of the Modernization Program has been to review the methodology, strengthening traditional projects, enhancing their conceptual base and geographic coverage. New projects among others include the Cadastral Program for titling half of the country's land, and a program that integrates traditional economic accounting, natural resources and the environment to measure economic GDP.

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**Contact person:**

Mr. Ramón Askobereta  
Advisor to the President  
Tel: 011-52-5571-1836

**Organization name: Amigos de SianKa-an, Cancun, Quintana Roo**

**Background information:**

The State of Quintana Roo and the Yucatán Peninsula is one of the most ecological sensitive areas in Mexico. Main reason is the extraordinary boom of tourism in the so called Mayan Riviera, a strip of coastal land facing the Caribbean Sea, from Cancun in the north to the border with Belize in the south. It produces huge economic benefits and spin-offs (10 workers per hotel room), and also produces a lot of pollution and deterioration of the ecosystem.

This 13 years old organization is a NGO with financing from several organizations such as:

- C Another Mexican NGOs
- C Foreign agencies such as the Wild World Fund (WWF)
- C MacArthur Foundation
- C Ford Foundation
- C PNUD
- C Private organizations (no less than 40)

**Expertise:**

Research area:

- . Technical studies
- . Detection and conservation of natural areas
- . Community development
- . Work with research centres
- . GIS (working with CAMRIS)

**Projects**

- Project 1:** Coastal management
- Project 2:** Reefs characterization
- Project 3:** Crocodile monitoring
- Project 4:** Monitoring of marine and earth species

They have several stations located in Cancun, Carrillo Puerto and Chetumal. Data is gathered by visual inspection and by divers. They also use satellite and aeroplane surveys.

**Main problems and potential projects**

- C Tourism development and impacts

C Water management (both potable and sewage)

**Potable water:**

Because Yucatán is a flat area with slight slope from the central part of the peninsula to the seas, there are not surface bodies of water, and rain water percolates through the calcareous soil forming underground rivers.

Water for the Mayan Riviera, specially for Cancun is drawn for the north of the peninsula, and it is feared but yet unknown, the decrease of the watertable level because this extraction of water. On the other hand it is believed that sea water is contaminating the watertable.

Studies have to be done to analyse the consequences of this extraction of water. Besides, there is concern about the quality of the underground water since it carries contaminants, especially from herbicides and fertilizers from neighbouring states up water.

**Sewage:**

There is only one water treatment plant in Cancun and none in the Mayan Riviera. This fact poses the potential risk of contamination of the underground water with sewage percolating from thousands of cesspools. As a matter of fact, the Chetumal Bay is the most contaminated in all Mexico

**People in this organization want to solve this problem**

C Another idea they are working on is the production of a status report as a result of an environmental diagnosis for the whole state of Quintana Roo. This report would cover:

- S Ecosystem
- S Endemic species
- S Sites to be protected
- S Threats to the environment

In order to do this they are going to sign agreements with municipal governments to build water treatment plants.

Funding for these endeavours will probably come from the Mexican Federal Government and the World Bank.

They are also concerned about **prevention of disasters**. There are in Mexico 18 sites which are critical regarding recurrence and intensity of forest fires. The State of Quintana Roo is one of them. There exists and interesting phenomena developing forest fires, with the appearance of a weed which strives with heat, and

it is allopathic, that is to say it impedes the growing of other species. This is an area where Geomatics can help in the identification of these weeds in the soil.

In theory, a policy exists to prevent disasters, but in practice it does not work, and in this regard a State Committee has been established to prevent forest fires. There is a system involving the Federal Government to **facilitate funding** to fight forest fires.

They are **eager to work in this area** of prevention of disasters, and are even thinking in a predictive model, such as one used in Brazil.

**Software used:**

Cambris (from the USA)  
ArcInfo (from the USA)

**Consultant=s comments:**

It is believed that there are many opportunities for Canadian goods and services with this agency. Perceived opportunities are:

- S Use of remote sensing (satellite) to warn about forest fires
- S Use Geomatics to detect underground contamination, probably using satellite transmission by means of certain parameters
- S Use of renewable sources of energy such as solar energy for rural electrification, especially considering the high level and constancy of solar activity in this area.
- S Replacement of their GIS to more modern and efficient platforms.
- S Develop a strategy for emergency response and preparedness.
- S Design and supply of water treatment plants (WTP) for small municipalities.
- S Help them to determine rate of salinisation of underground water.
- S Perform an environmental diagnosis in the State of Quintana Roo.

**Address:**

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C. P. 77500, Cancun  
Quintana Roo, México

**Contact person:**

Mr. Alejandro Vega

Marine Ecologist  
(speaks English)  
Tel/Fax: 011-52-98-48-1618/1593/2136

**Opinion on Canadian Geomatics industry:**

It is not well known to him

**Organization name: Inter-American Development Bank (IDB)**

**Background information:**

The Bank is active in Mexico in the environmental field. It has funded many projects in the country

**Projects underway:**

Area: Water

**Project 1:** Programa para sostenibilidad en comunidades rurales  
[Sustainability Program for Rural Communities]

Scope: See IDB Web Site

There are about 2,000 municipalities in Mexico. Financed projects have a maximum of US\$ 100,000 (for 2,500 inhabitants)

Total amount of project: US\$ 600 million

Bank contribution: US\$ 310 million

Government of Mexico: US\$ 290 million

Executing Agency: States and Municipalities

Duration: 5 years

Starting date: July 1999

Coordinator: Eng. Salvador Cruz Majluff

Tel: 011-52-5481-1240/1

Status: This project in under execution

The States identify and then sign an agreement with Comisión Federal del Agua (CFA) [Water Federal Commission] as follows:

50 % of total cost paid by States and Municipalities

50 % of total cost paid by the Federal Government, financed by the IDB.

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**Contact person:** Eng. Fortunato Lari,  
Especialista Sectorial  
[Sector Specialist]  
(speaks English)  
Tel: 011- 52- 5580-2122  
Fax: 011- 52- 5580-6083

**Organization name: Inter-American Development Bank (IDB)**

**Background information:**

The Bank is active in Mexico in the environmental field. It has funded many projects in the country

**Projects underway:**

Area: Water

**Project 2:** Programa de Saneamiento del Valle de México  
[Program for the Sanitation of Mexico Valley]

Scope: See IDB Web Site

Executing Agency and Owner: Mexico City (9,000,000  
inhabitants) and State of  
Mexico (10,000,000  
inhabitants)

Components: - Drainage (Deep tunnelling, pumping,  
lagoons) (Financed by the IDB  
S Sewage Treatment Plant (Japanese funding)

Total amount: US\$ 1 billion

Financing: US\$ 365 million, by the IDB  
US\$ 450 million, by OECF (Japan). **This loan is not**

**only for Japanese goods and services, it is open to all countries.** However, the project supervisor must be a Japanese national  
US\$ 185 million, by the Mexican federal government

Technical advisor: Comisión Nacional del Agua (CNA)[National Water Commission]  
Its duties are normative and of assessment.

The States identify and then sign an agreement with Comisión Federal del Agua (CFA) [Water Federal Commission] as follows:

50 % of total cost paid by States and Municipalities  
50 % of total cost paid by the Federal Government, financed by the IDB.

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**Organization name: Inter-American Development Bank (IDB)**

**Background information:**

The Bank is active in Mexico in the environmental field. It has funded many projects in the country

**Projects underway:**

Area: Water

**Project 3:** Programa Nacional de Agua Potable y Alcantarillado  
[National Program for Drinking Water and Sewage]

Location: City of Puebla

Scope: See IDB Web Site

Executing Agency: Sistema Operador de Agua Potable de Puebla

Status: This project will finish on November 2000 and has been awarded under the BOT system

**Contact person:** Eng. Castillo  
Tel: 011- 52-22-33-2107

**Organization name: Inter-American Development Bank (IDB)**

**Background information:**

The Bank is active in Mexico in the environmental field. It has funded many projects in the country

**Projects underway:**

Area: Water

**Project 4:** Abastecimiento de Agua Potable a la Zona Metropolitana del Valle de México  
[Drinking Water Supply for the Metropolitan Area of the Mexico Valley]

Scope: See IDB Web Site

Involves the supply of large pipes and a pump system.

Total amount: US\$ 1 billion

Financing: By the IDB and the Government of Mexico

**Contact person:**

Eng. Fortunato Lari  
Especialista Sectorial  
[Sector Specialist]  
Tel: 011- 52-5580-2122  
Fax: 011- 52- 5580-6083

**Organization name: Inter-American Development Bank (IDB)**

**Background information:**

The Bank is active in Mexico in the environmental field. It has funded many projects in the country

**Projects underway:**

Area: Water

**Project 5:** Programa de Estados y Municipios  
[Program for States and Municipalities]

Scope: See IDB Web Site

Financing: The IDB finances and the loan goes directly to the States and Municipalities **for any type of project**

**Contact person:**

Mr. Luis Suarez  
Tel: 011- 52-5580-2122

**Organization name: Inter-American Development Bank (IDB)**

**Background information:**

The Bank is active in Mexico in the environmental field. It has funded many projects in the country

**Projects underway:**

Area: Geomatics

**Project 5:** Instituto Panamericano de Geografía e Historia  
[Pan-American Institute of Geography and History]  
Project Number: ATNSF - 5750-R6

Scope: See IDB Web Site  
Main issues is the execution of a GIS with an amount of US\$ 400,000

This is a regional project and it is an agreement between the IDB as the administrator of the **CANTAP 2 (Canada Technical Assistance Program)**

Financing:

US\$ 512,000 by the IDB  
US\$ 96,000 by Fondo  
US\$ 70,000 by **CIDA**  
US\$ 116,000 by Mexican government  
US\$ 44,000 by Instituto Panamericano de Geografía e Historia

Status: Started on February 1998 with a duration of 3 years.  
Completion date: Abril 21, 2000

Destination of funds: Professional services and Consultants

**Contact person:** Mr. Carlos Carballo  
Tel: 011- 52-5515-1910

**Organization name: Petróleos Mexicanos (PEMEX)**  
**[Mexican Petroleum]**

**Background information:**

This is the giant government oil company which generated a large part of Mexican hard currency. It is broadly divided into the following areas which are autonomous enterprises:

1. Pemex Refinery
- C Pemex Gas and Basic Petrochemicals
- C Pemex Exploration and Production
- C Pemex Petrochemicals

There is a Department called Sistema Corporativo de Información Geográfica (SICORI) [Corporate System for Geographic Information], which operates as a pool agency to serve the above mentioned areas. This Department is called Pemex Sicori. As a subdivision it offers corporative services, gives support to the four autonomous areas (clients), in Geomatics and Research. As a consequence, **this is the agency Canadian companies should contact** to offer their goods and services in the areas of Geomatics, water and emergency response.

Sicori has several projects where they have developed the initial feasibility reports for its clients, reports that supposedly will lead to concrete projects. Projects are as follows:

**Organization name: Pemex Sicori**

**Projects underway:**

**Project 1:**

Project for Pemex/Refinery to determine contingency road routes. They want to use GIS techniques to determine these contingency roads and want to know scope of services Canadian companies can offer and estimate of costs.

There will be a contractor who will process satellital information which will be handed over to Pemex/Refinery

**Project 2:**

Pemex Sicori is in the initial stages for projects using **remote sensing**. They already have cartography that has to be updated using remote sensing, regarding assets, communication roads, human settlements, gas and oil pipelines, and soil analysis for environmental issues, such as land use, soil contamination and surface water. Sicori is very interested in the operational aspects, but mainly about costs.

The area to be analysed is located in the south-west region of the country, with an approximate surface of about 200 km<sup>2</sup>. They have cartography in scales 1:50000 and 1:250000. Sicori is using an Integra platform and utilizing Geomeds and Oracle as a RDBM.

This project is intended to be started about April/May/June 2000. They will like to **receive cost estimates, among others, for imagery and processing.**

**Project 3:**

The Government of the State of Veracruz had claims and complaints from people, especially fishermen, about pollution in the Azcapotzalco River, produced by Pemex plants as well as private chemical and petrochemical plants. This government asked Pemex and Semarnap (Secretariat for the Environment, Natural Resources and Fishing) to lead a study, already made by Sicori, to solve this problem.

The project was called **Proyecto de Ordenamiento Ecológico** [Ecologic Organization Project], being the executing agency the Instituto Mexicano del Petróleo [Mexican Petroleum Institute]

The report has already been delivered, **and it is believed that a decision to go ahead with the implementation could take place after the presidential elections**

**on July 2000**

**Project 4:**

Pemex/Refinery has a department in charge of maritime operations. They work an area, located about 80 km offshore the Yucatán Peninsula, on the Gulf of Mexico, where there are in operation hundreds of oil platforms, drilling with an average depth of about 80 metres.

There is a constant movement of ships between platforms, as well as criss-crossing pipelines lying on the sea bed. They need perhaps a GPS which can pinpoint pipe locations and warn ships about their positions, in order not to damage them when dropping anchors.

**Project 5:**

Pemex is worried about the exact location of oil platforms in the Gulf of Mexico, in the area where Mexican maritime rights meet the USA maritime rights. This area lies approximately on the parallel which is the continuation of the discharge of the Bravo River. They would like to have a system able to pinpoint the exact location of drill heads for both Mexican and USA operations

Coordinator for all these projects is:

Eng. Armando Madera Sosa  
(speaks English)  
Tel: 011-52-5726-1338  
e-mail: [amadera@pemex.com](mailto:amadera@pemex.com).

Sicori has a listing of Canadian companies with their respective expertise, and they have established the Geomatics areas they are more interested on. They are:

- C Cartography
- C Consulting in Geomatics
- C Engineering Surveying
- C Geodetic/Control Surveying
- C Image Analysis
- C Land Surveying
- C Training in Geomatics

**Organization name: Centro de Investigación en Geografía y Geomática AIng.  
Jorge L. Tamayo@ (CentroGeo)**  
[Research Centre on Geography and Geomatics AEng. Jorge L. Tamayo@]

**Background information:**

This is a private organization but receiving funding from the government. The interviewed person Dr. Carmen Reyes, used to work for INEGI in a top position and as a consequence knows this organization very well. INEGI is very important to Canadian entrepreneurs not only because what it is, but also because they are using Canadian software for GIS. Dr. Reyes has worked from the very beginning with its operation, so she is well aware about it, and because she was also educated in Canada and maintains frequent contact with this country, she is acquainted of what Canadian industry can offer.

CentroGeo is a consulting organization and has close links with Canada which Geomatics industry they consider midway between the very practical American approach and the theoretical European approach. As a consequence they find easier for them to adapt to Canadian technology, however, as much as the like Canadian Geomatics they **think that this country did not follow an adequate strategy**

It is their understanding that Mexican Geomatics is well advanced, however there are areas where they lag far behind. So, one of the solutions is the determination of where the Canadian entrepreneurs should position themselves.

At the present time, the Instituto de Estadística, Geografía e Informática (INEGI) [Statistics, Geography and Informatics Institute], which is mainly cartography, **needs to update its maps in paper**, which were **developed** between 1968 and 1982 en 1:50000 scale. This update involves also the developing of **thematic information** of about 2,300 maps in 1:50000 scale.

Some progress has been made in INEGI such as scanning, but the **bottom line is that the whole process has to be reviewed**. At the present time Geomatics activity is null. They are wrapping up in order to be able to deliver the house in good order when the new authorities installed by the government as a result of the July 2 elections decide what to do.

Regarding preparedness for detection and prevention of disasters, there have been attempts to develop emergency response by the Secretaría de la Gobernación [Government Secretariat], especially for earthquakes, and in Pemex, but in general it is not enough.. Also Secretaría de Desarrollo Social (SEDESOL)[Secretariat of Social Development], stated the need to do something on this respect



**Consultant=s comments:**

This consultant mentioned some niches where the Canadian Geomatics industry could offer definite advantages in terms of edge technology and also from the point of view of unique solutions. Ms. Carmen Reyes, agreed with this issues and said that **she could think on many more niches available in Mexico to the Canadian Geomatics industry.**

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<http://www.centrogeo.otg.mx>

**Contact person:**

Dr. Carmen Reyes  
Director General  
(speaks English)

**Organization name: Organization name: Apoyos y Servicios a la Comercialización Agropecuaria (ASERCA)**  
[ Support and Services to Farming Marketing]

**Background information:**

This organization is responsible for the PROCAMPO program which provides financial direct support to 2.9 million farm producers over 14 million hectares yearly. The nature of this project requires control tools for the right application of this support.

ASERCA uses GIS which allows to integrate in a computer system:

- C A rural cadastre where the country estates reporting to PROCAMPO are identified.
- C Through satellite imagery for the country estates reporting to the Program.

ASERCA's Geographic System is called SIGA (Sistema de Información Geográfica de ASERCA) [ASERCA's Geographical Information System], is a computer system involving digital maps, databases associated to geo-referenced elements and satellite images, in order to carry out Procampo's control program.

This program has practically finished its first stage through the integration to the rural cadastre of the country estates belonging to this program.

The second stage is analysis of sowing and eligibility. One result was for instance the detection of 1,681 Has which requested support but which were not sowed.

This organization maintains agreements with Pemex, Inegi, Semarnap, and many other government agencies.

**Consultant's comments:**

It is interesting to note that this organization is managed with an entrepreneurial approach; its Director General, Eng. Alberto Lepe Zúñiga, is an engineer and a very well known figure in the Mexican government. He also had his own GIS firm with activities in the Geomatics field. Eng. Lepe has worked extensively with Canadian firms to provide solutions to forecast harvests.

He also brought to Mexico some Canadian software such as Terrasoft, which is a GIS software, as well as Prime Meridian, also a Canadian GIS program, which is currently in use and PCI software for image analysis.

One important comment from Mr. Lepe, that this consultant has heard before, is that in Mexico there is a **lack of integrated solutions**, since firms are proposing products and not integral solutions.

Mr. Lepe said that in some areas Mexico is well advanced, and considerable behind in others. These areas that are behind are complemented with an array of different software which sometimes are not compatible. It is this lack of integral solutions that preclude Mexican firms to compete for large Geomatics contracts, since the client prefers to deal with foreign companies offering a complete and compatible package.

On the other hand, he believes that the professional resource is becoming a salesman, the Mexican supplier wants to sell products but the client does not find that the solutions provided by these products are adequate to his/her needs. For that reason preparation is needed. As a matter of fact there is not a career in Geomatics in Mexico.

Eng. Lepe thinks that the solution to this riddle **is not to sell products but solutions, and at the same time not to train specific technicians, but to prepare them with criteria to integrate solutions.**

As an example, the Comisión Nacional del Agua [National Water Commission] bought from American suppliers enough software to install six regions and trained 40 persons during a whole year. Only two persons remain. One of the reasons was that, in spite of all the equipment bought to store, process and disseminate data, they did not have equipment for data acquisition.

For all these reasons the Mexican market is open to external suppliers of Geomatics services.

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**Contact persons:**

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Director General Administrativo y Finanzas  
[Director, Administration and Financing]  
Tel: 011-52-5626-0700/0749/0750  
Fax: 011-52-5661-9298  
(speaks English)

and

Eng. Alan Ortega  
Director de Cartografía  
[Director, Cartography]  
(speaks English)

**Organization name: Instituto Mexicano del Petróleo (IMP)**  
[Mexican Petroleum Institute]

**Background information:**

This organization develops research and deliver services. They work mainly with Pemex to solve its problems, although also work for private oil companies. The interviewed person, Biologist Sergio Gasca manages the environmental area.

They are interested in **having Canadian support**, since the Institute is now trying to deliver solutions. Until recently, separate studies were conducted but now they are involved in the development of tools allowing them the integration of studies.

**Opportunities:**

**Opportunity 1:**

In the environmental sector in IMP they require increasingly, with greater frequency, the **access to satellite imagery**. Regarding this need they want to have access in real time to satellite imagery from their own computers, since nowadays the Institute does not have such a system, and as a consequence they have to wait up to two months to get an image.

**They are very interested in software for models of contaminant dispersion in water, soil and air.**

**Opportunity 2:**

Because Pemex manages its own oil shipping company, they are interested in tracking systems for their ships, using GPS technology.

**Opportunity 3:**

IMP needs a device which they call **oceanographic monobuoy** with the ability to transmit information, acquired by sensors and using GPS.

**Opportunity 4:**

IMP is interested in disaster prevention, however, since Pemex is a partner of the Asistencia Recíproca Petrolera en Latino América (ARPEL) [Mutual Oil Assistance in Latin America], they believe that Pemex has access to the management plans of all oil companies in Latin America. Nevertheless, there could be opportunities for the Canadian industry on this issue.

**Financing**

Since they work for Pemex and other major oil companies, **financing is not a problem.**

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México, D.F.

**Contact person:**

Biologist Luis Morán  
Lider the Proyectos Ambientales  
(Leader, Environmental Projects]  
Tel: 011-52-5333-8456

**Organization name: Secretaría del Medio Ambiente, Recursos Naturales y Pesca  
(SEMARNAP)**

[Environment, Natural Resources and Fishing Secretariat]

**Background Information:**

Semarnap is divided in several areas as follows:

**S** Dirección General de Estudios  
[General Studies Directorate]

Gives support to other Directorates such as:

**C** Training courses

**C** Act as a pool for information retrieval for other Directorates of Semarnap

**C** Produces thematic maps as required from other Directorates

**C** Produces mega indices (data on data)

**S** Dirección General de Pesca  
[General Fishing Directorate]

**S** Dirección General de Programas Regionales  
[Regional Programs General Directorate]  
They do the ecological analysis of priority areas, and work extensively with GIS.

Contact person:

Mr. Javier Apodaca

Tel: 011-52-5628-0804

**S** Dirección General de Inventario Forestal  
[Forestry Inventory General Directorate]

Address:

Avenida Progreso 5

Viveros de Coyoacán, México, D.F.

Contact person:

Geographer Rutelio Castro

Deputy Director, GIS

Tel: 011-52-5658-6389

**S** Procuraduría Federal de Protección al Ambiente

[Federal Agency for Environmental Protection]  
This Directorate is also involved in **forest fires prevention**

- S Zona Federal Marítima-Terrestre (ZOFEMAT)  
[Federal Maritime and Land Zone]  
Involved in the regulation of the maritime zone

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México, D.F.

Contact person:  
Eng. Rubén Cerame  
Director  
Tel: 011-52-5524-8648

- S Comisión Nacional de la Biosfera  
[National Commission for the Biosphere]  
They control and manage the bio-diversity

- S Instituto Nacional de Ecología (INE)  
[National Ecology Institute]

- S Comisión Nacional del Agua (CNA)  
[Water National Commission]  
This is a key agency in Mexico on water resources.

Contact:  
Act. Rosario Peyrot  
Deputy Manager  
Privada de Redox 16 - PB - Ala A Norte  
Tel: 011-52-5481-1103

- S Dirección Nacional de Acuicultura  
[Acuicultura General Directorate]  
Conducts fish studies on fresh water. Also deals with the organization of fishing operations. Use **Geomatics extensively** for the organization of co-ops.

Contact:  
Mr. Javier Mugica  
Tel: 011-52-5681-4813



## Projects in Semarnap:

**Project 1: Inventario Nacional Forestal**  
[National Forestry Inventory]

Executing Agency: Universidad Nacional Autónoma de México  
(UNAM)  
[National Autonomous University of Mexico]

Project will be executed by the GIS and Remote Sensing Laboratory, in the Institute of Geography.

Contact person:  
Dr. José Luis Palacios Prieto  
Director  
Tel: 011-52-5622-4334

also

Mrs. María Elena Garcia Villagomez  
Tel: 011-52-5628-0863  
(speaks English)

Status: Project will be started on March 01, 2000

**Project 2: Ordenamiento de Zonas de Pesca**  
[Organization of Fishing Zones]

Contact person:  
Mrs. Alma Luz Cabrera  
Project Consultant  
Tel: 011-52-5681-4813

Status: This project has not started yet

**Project 3: Sistema Gerencial de Ordenamiento Ecológico**  
[Management System for Ecologic Organization]

Executing Agency: Instituto Nacional de Ecología  
[National Ecology Institute]

Contact person:  
Mrs. Araceli Vargas  
Director  
Tel: 011052-5624-3579

also

Mr. Jorge Carranza  
Tel: 011-52-5624-3579

Status: No information available

**Project 4: Desarrollo de un Sistema de Información Geográfica para control de predios forestales**  
[Development of a Geographic Information System to Control Forest Estates]

Owner: Semarnap=s Delegation in the State of Mexico

Executing Agency: Universidad Nacional Autónoma de México (UNAM)  
[National Autonomous University of Mexico]

Project will be executed by the GIS and Remote Sensing Laboratory, in the Institute of Geography

Contact person:  
Dr. Gabriela Gomez Rodriguez  
Project Director  
Tel: 011-52-5622-4334

### **Perception about Canadian Geomatics industry:**

They are using GIS software from PCI, which they consider very good and complete. Believe that Canadian Geomatics industry is different from that in the USA, since in Canada it is more academic while in the USA is more business oriented. They are also working with Canadian technology in the forestry area

### **Address:**

Periférico Sur 4209 - PB  
México, D.F.

**Contact persons:**

Geographer Clotilde Arellanos  
Mrs. María Guadalupe Rivera Reyes  
Mrs. María Elena García Villagomez  
(the three of them speak English)

**Organization name: Coordinación General de Puertos y Marina Mercante -  
Dirección General de Puertos**  
[Ports and Merchant Navy General Coordination - Ports General  
Directorate]

**Background Information:**

Their function is the monitoring of ports operators, in eight administrations across the country. **They are interested in vessel traffic management technology, using GPS.**

**Address:**

Municipio Libre 377 - 4to piso AA@  
México, D.F.

**Contact person:**

Lic. Hugo Diaz Alberto Cruz Valdes  
Director General  
(speaks English)  
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**Organization name: Gobierno del Estado de Jalisco - Instituto de Información Territorial**

[Jalisco State Government - Territorial Organization Institute]

This government Institute is of recent formation (1998), but has already established the basis and has carried out photogrammetric flights with production of cartography. at scale 1:4500 for metropolitan urban areas, and orthophoto at scale 1:10000 for rural areas, with levels of definition of block polygons at 1 metre in the urban area and each 2 metres in rural ones.

There are 74 human settlements in Jalisco including the metropolitan area of Guadalajara. They are starting a project in the metropolitan area consisting in field survey, digitalization and attributes assignment. The Institute posses 3 GPS equipment, one permanent and 2 stations part time.

**Projects:**

The Institute is developing several projects to bring information into the Web in order to share approaches with other government agencies, and are thinking in **hiring external consultants for GIS applications..**

The Institute is thinking in the following projects and opportunities:

**Project 1: Use of radar satellite**

There is a French company trying to sell them the satellite photographic service. However, they want to contract satellite technology, including radar. Decision will be taken within six months time.

**Project 2: Basic cartography**

There is a body integrated as follows:

- C Finance Secretariat
- C Institute of Territorial Information
- C Municipalities
- C Urban Development Secretariat (SEDEUR)

which is working from basic cartography from outsources. They have already finished 43 municipalities in the urban area, but the rural area (population plus thematics), has not been commenced yet

This plan will start in a year from now (February 2000), and **might require external consultants.**

**Opportunities:**

**Opportunity 1:**

Need training courses on platforms such as Windows NT and new technologies.

**Opportunity 2:**

The Institute is developing an application for the Public Health Secretariat, consisting in the determination of the road network linked with attributes in order to determine the shortest distance between 2 points.

**Opportunity 3:**

There is an agency called **Protección Civil** [Civil Protection], which manages the prevention subject. There is potential for Canadian firms to work on this scheme.

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Pedro Moreno 281 - 6to piso  
Guadalajara, Jalisco, México  
C.P. 44100

**Contact person:**

Eng. Valdemar Hinojosa Chavolla  
Coordinator  
(speaks English)  
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Fax: 011-52-668-1765

The Director General and the Director of Geomatics are working with the University De Laval, in Quebec, to bring the University De Laval Master Program in Geomatics to Guadalajara.

**Organization name: Secretaría de Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP)**

[Environment, Natural Resources and Fishing Secretariat]

**Background Information**

In this Guadalajara branch of the Secretariat they work in a State program from a diagnosis. Its mission is to protect 3,000,000 Has of forests with high fire risk, with vegetation pertaining to the semi-arid zone, tropical forest and forest in the temperate climate, starting from 3,000 metres of altitude upwards.

The fire subject is a serious one, since the State of Jalisco is considered within the 10 States with high forest fires risk. In forestry production (Volume/Ha), Jalisco is in the fourth place, and with a hilly country of difficult access.

There are several needs as follows:

- 1) It is necessary to have a minimum crew of 100 brigades with 13 men each;
- 2) Need all terrain vehicles (they have none)

At the present time they operate a radio communications system with a total of 20 watch towers and they estimate that they need 30 more.

As suggested by the consultant, the use of a satellital system would solve many of their problems. Right now they are using satellital services, provided by the University of Colima, **but there is no doubt that there is some potential here for Canadian Geomatics industry.**

They can also access the risk image (93 maps), of a Canadian satellite, but they do not have the necessary infrastructure at local level (digitalization, processing and data storage).

**Needs and opportunities:**

**Opportunity 1:**

Installation of a State Centre for fire prevention. At present time, for forest fighting they use Canadian and American crews and helicopters.

**Opportunity 2:**

Need to strengthen their infrastructure through equipment, special pumps and water trucks. They think it would be ideal if they could install satellite equipment.

**Opportunity 3:**

From the data point of view they are interested in thematic maps. Image could be used to remediate and restore damaged forests.

As a consequence it is perceived that there are three areas of interest:

- S Prevention
- S Protection (remediation and restoration)
- S Species inventory

Sometimes they also **require external consultants, and they are willing to purchase equipment and technology.**

**Perception about Canadian Geomatics industry:**

They think that Canadian technology is first class especially in monitoring and in training.

**Financing:**

Usually there is no problem in financing because availability of own funds or from Banobras (the Mexican Government Bank for Public Works)

**Address:**

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Col. Vallarta San Lucas  
Guadalajara, Jalisco, México

**Contact person:**

G.T.F. Miguel Angel Corona Vallejo  
Jefe del Programa de Sanidad y Protección Forestal  
[Chief, Sanitation and Forestry Protection Program]  
(speaks English)  
Tel: 011-52-3-818-1725



**Organization name: Gobierno del Estado de Jalisco - Instituto de Información Territorial del Estado de Jalisco**

[Jalisco State Government - Territorial Information Institute, State of Jalisco]

**Background Information:**

Main subject they are involved with is related with leaks in the water mains, as well as water recycling. They are concerned with water use and the distribution in the non-urban area. There has been a policy in the State where there are no restrictions in areas where water is abundant, but water is restricted where this element is scarce.

There is a record at federal level when the Comisión Nacional del Agua [Water national Commission] in Querétaro, **started a project to detect underground sources of water using Geomatics techniques.**

From the point of view of contamination, Chapala Lake, close to Guadalajara, is the highest polluted lake in the country because discharge of industrial and domestic sewage

**Project 1:**

This project is related with the rehabilitation and cleaning of the Blanco River, as well as prospecting for drinking water in Puerto Vallarta.

**Project 2:**

The Comisión Federal de Electricidad (CFE) (Federal Electricity Commission), is considering carrying out prospecting studies on energy including renewable sources. Wind energy is important in the State of Oaxaca, especially in an area called **ALa Ventosa@**, located on the highway between Mexico City and Tehuantepec.

Contact person:

Eng. Espinosa, in the CFE

**Project 3:**

There is a plan called **Acadastral modernization@** with available funding from the Government, however, this plan has not shown advance

Regarding disasters prevention the people in charge of that issue is **AProtección Civil@** [Civil Protection], reporting to the Jalisco Government. This Agency reports to Secretaría General de Gobierno del Estado de Jalisco [General Secretariat of Jalisco State]. **There is also some financing for this type of studies.**

**There are specific needs which could use Geomatics for companies in the marketing**

**area.** Contact: Chamber of Commerce.

**Address:**

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Guadalajara, Jalisco, México, C.P. 44100

**Contact person:**

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**Organization name: Gobierno de Jalisco - Ministerio de Desarrollo Urbano -  
Departamento de Sistemas de Información  
[Government of Jalisco - Urban Development Ministry - Department of  
Information Systems]**

**Background Information:**

Key words in the State of Jalisco are: water and public safety. The interviewed person, Arch. Fernando Camacho Iñigues, thinks that the use of the appropriate Geomatics tools can help them to have a better government.

His Department manages Territorial Organization for Sustainable Development.

They want to have a complete integration through Geomatics on applications about territorial organization, natural protected areas, road infrastructure and transportation. In parallel, they can better serve the public, for instance in the issuing of construction permits.

From the water contamination point of view, it is of special concern the situation in Chapala Lake which tributaries pass through four States, with a lot of contaminants being discharged in them. Contamination is being treated in nine water treatment plants, with a program for construction of another 14.

**There will be an important workshop in Guadalajara on 2/5 August 2000, about AThe city, past, present and future@, where Canadian firms will be invited to attend.**

They are using the following software:

- S AutoCad Map Editor
- S Oracle
- S Modem server Discovery (from Bentley, USA). This company (Bentley), is strong in Mexico.

Although it is realized that new authorities will take over after the presidential election of July 2, they want to leave projects already in their initiation stage.

**Opportunities:**

**Opportunity 1:**

They are interested in consulting services from Canadian firms as well as implementation on how to incorporate several technologies.

**Opportunity 2:**

Regarding prevention of natural disasters they want to generate a Risk Atlas. The

required information is already available, but it is not dispersed. They are also working in the Jalisco Atlas on Territorial Information. In this regard they have:

- 1<sup>st</sup> stage: scale 1:500000 (at regional level)
- 2<sup>nd</sup> stage: scale 1:50000 (at municipal level)
- 3<sup>rd</sup> stage: scale 1: 5000 (at plot level)

This project will start on July 2000.

Also interested in radar satellite information and on support for integration.

**Financing:**

Monetary resources are assigned by project and in accordance with priorities. There is already financing in place for the project **Modernization of the Information System@**

**Perception about Canadian Geomatics industry:**

He believes that nothing can be better than Canadian technology, when compared with that of the USA, France and the Netherlands. They have received a lot of support from Canada, especially from De Laval University. In this regard, on March 27 it will be initiated the course on Master in Geomatics, with professors from this University.

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Fax:011-52-3-854-0509

**Contact person:**

Arch. Fernando Camacho Iñiguez  
Managing Director  
(speaks English and French)  
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**Organization name: Secretaría de Desarrollo Urbano, Dirección de Informática,  
Ayuntamiento de Guadalajara**

[Urban development Secretariat, Informatics Directorate, Guadalajara City  
Hall]

**Background Information:**

This office is involved with drinking water distribution in the city of Guadalajara.  
Most serious problem is the water leaks in the system as well as illegal connections.

They believe that Geomatics tools can be very useful to solve this problems as well as to  
prevent illegal breaks into the system.

**Contact person:**

Eng. Rodolfo Gonzáles Díaz  
Tel: 011-52-3-650-0619

**Organization name: Presidencia Municipal de Monterrey - Secretaría de Desarrollo Urbano y Ecología**  
[Monterrey City Hall - Urban Development and Ecology Secretariat]

**Background Information:**

In the risk field the forest fires issue is permanent. Forest fires occur mainly in February involving 177,000 hectares of pine forests. Some sort of alliance has been established between private firms and the State Government in order to fight forest fires. Private firms and municipalities have protection equipment with watch towers.

The main issue is that, because the type of tree species a fire can be out of control in a couple of hours, so prevention is extremely important. They are in need of equipment such as water planes, helicopters and personnel training.

Prevention is not only needed for forests, it is necessary for floods too, as well as for chemical releases from many industrial plants surrounding Monterrey, especially Chlorides. In this regard there is also a high risk in air and soil pollution produced by heavy metals.

There are not many forests in Mexico, and in this area they are of paramount importance in keeping the ecologic equilibrium in the region.

**Projects:**

**Project 1:**

There is a plan for forest management in its final preparation stage which will be launched in a few weeks (in two weeks the corresponding bill will be in force). It will be managed jointly by the Semarnap and by the State Government.

Regarding cadastre, pertinent information has been handed over to the municipalities, albeit it is believed that it has a limited use. However, cadastral information has to be updated.

There exists a commission formed by 9 municipalities in the Greater Monterrey area and the State Government to tackle this problem, **with funding available.**

**Perception about Canadian Geomatics industry:** Excellent

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**Contact persons:**

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Secretary, Urban Development and Ecology

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**Organization name: Instituto Técnico y de Estudios Superiores de Monterrey (ITESM)**

[Monterrey Technical and Advanced Studies Institute]

**Background Information:**

This famous high level institute (the Mexican counterpart of MIT), is probably the best in Mexico.

This consultant interviewed Arch. Leonardo Quintanilla, a well-known authority in Geomatics. In his opinion, **Canadian strategy to penetrate the Mexican market is erroneous**, because the application of these systems in Mexico needs a different mentality.

GIS in Mexico is a broad subject and the Mexican mind is not yet ready to think in terms of integration. As an example, there are some methodologies that are well advanced in Mexico. Others, are well behind and yet others do not exist. Of course, the solution is to take advantage of what is already developed and outsource the technologies which are not developed here.

This is done, however, the system does not work. Why?

Because the States and municipalities have only partial responsibilities and cannot take a system as an integral solution. The problem is approached isolated and this occurs because each office does not have the whole responsibility. There is not an unique database, and part of the problem is that there is not quality in the planning process.

Quality must be associated with responsibility, and then, an advanced well planning will pay out in more efficiency.



Regarding prevention measures the problem lies in the fact that there is not a definition of risk. Besides, in the case of forests for instance, they are not managed scientifically. Forests do not belong to the State, albeit most of them do, others belong to municipalities and even to particular owners. Because of this plurality in ownership, policies are difficult to apply.

**Where does the Canadian strategy fail? It fails because it assumes that many Canadian companies, producing many different techniques, can be directly translated to the Mexican reality, without a previous stage of Latinization. Which is the solution?**

According to Arch. Quintanilla there are several steps that have to be taken. Please see 5.1.) Strategy for market entry

**Address:**

Sucursal de Correos AJ, C.P. 64849  
Monterrey, N.L., México

**Contact person:**

Arch. Leonardo Quintanilla Cárdenas  
Director, Programa de Desarrollo-Urbano Regional, Centro de Estudios Estratégicos  
(speaks English)  
[Director, Regional Urban Development Program, Strategic Studies Centre]  
Tel: 011-52-8-328-4274, ext 3974  
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**Organization name: Universidad Autónoma de Nuevo Leon - Facultad de  
Arquitectura**

[Autonomous University of Nuevo Leon, Department of Architecture]

**Background Information:**

There is a development plan originated in the Urban development Secretariat and the Municipality to be discussed with stakeholders. It consists in an organization of the city of Monterrey considering land use, green areas, transportation, etc.

The interviewed people, Arch. Guillermo Wah and Arch. Ainej Wolberg agree that Geomatics play a very important role in this scheme, albeit they do not know the details of the plan. They consider that one of the most serious problems facing the region is the scarcity of water, aggravated because water leaks in water trunks.

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**Persons interviewed:**

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**Organization name: Ayuntamiento de San Pedro Garza García -Secretaría de Desarrollo Urbano y Ecología**

[Municipality of San Pedro Garza García - Secretariat of Urban Development and Ecology]

**Background Information:**

This is a municipality which is a part of the Monterrey Metropolitan Area. The two persons interviewed, Arch. José Luis Ortiz and Arch. Andrés Garza Ayala flew last year to Canada where they visited Montreal, Ottawa and Toronto in order to have a look of what is being done in Canada regarding urban planning.

They have the idea of building a technologic resource to facilitate urban planning (using GIS for planning urban development), and urban administration (for processes, issuing of licences and permits, etc.). Regarding the later one, they are trying to install a database of urban information.

The general idea is to have all urban information about infrastructure in a database. The main problem appears to be how to ensemble the information or how to build an integrated database. The integration is important, but also it is critical to have the ability to analyse the data.

GIS is starting to be used in Mexico for urban planning, and they believe that this Canadian Mission can encourage the use of GIS for that purpose.

Regarding water, there is no planning for the long term involving water catchment or collection, distribution and effluent disposal. Water services are metropolitan, however, drainage and sewer belong to the State. This is very efficient since it is managed with a criterium of a private enterprise, but again, the main problem is structural.

This municipality is a part of the metropolitan area, with a very affluent community and with the lowest value of the Amarginality@index, and as a consequence with a very high per capita income.

**Projects**

**Project 1:**

In the forestry sector there is a project to be approved about management of natural resources, specifically the rehabilitation of Parque Cumbre de Monterrey, involving 177,000 hectares of forest to establish a management program

**Project 2:**

Plan Director del Area Metropolitana [Master Plan for the Metropolitan Area]

It is in process for approval and includes:

- S Zoning
- S Land use
- S Roads
- S Transportation
- S Infrastructure

**Opportunity****Opportunity 1:**

The City Hall is very interested in remote sensing methodologies to detect underground water sources. Main supply of water to the city (80%) is from rainfall. Main surface body of water relatively close by is the Bravo River forming the border with the USA, and it is heavily polluted.

**Perception about Canadian Geomatics industry:**

Both persons believe that Canadian technology is outstanding and superior to that from the USA

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**Contact persons:****Arch. José Luis Ortiz Duran**

Secretary - Urban Development and Ecology

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Arch. Andrés Garza Ayala

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**Organization name: Subsecretaría de Ecología - Dirección de Mejoramiento Ambiental**

[Undersecretary of Ecology - Directorate of Environmental Improvement]

**Background Information:**

The federal agency dealing with environmental protection is the Procuraduría Federal de la Protección Ambiental (PROFEPA) [Federal Agency for Environmental Protection].

They work jointly with Semarnap and register firms producing emissions to the atmosphere. This office issues licences to operating firms and controls emissions from stationary and from mobile sources for the 750,000 vehicles in metropolitan Monterrey.

Since 1998 they have tried to get response to forest fires. In their opinion they need GIS, and have requested to the World Bank funding for purchase of equipment to process images, such as those produced by LandSat. They are also in need of aerial photographs for forest restoration purposes in areas with fire risk.

**Projects:**

**Project 1:**

There is a project to prepare a map for areas with propensity to produce forest fires. This project is being managed by Centro de Calidad Ambiental [Centre for Environmental Quality] in the ITESM.

The University of the State of Nayarit has been monitoring the area through satellite. Semarnap is in charge of fire brigades at a federal level and Profepa at the State level.

Regarding floods produced by heavy rainfalls, they are thinking in creating a risk area which will be under Protección Civil [Civil Protection]. They think that help of using GIS as a tool will be enormous, and perhaps the best example is the monitoring of Areas Naturales Protegidas [Protected Natural Areas]

They also need ecologic simulation to simulate different conditions.

Their most important problem is the conservation of forests, in order to keep water. The Comisión Nacional del Agua [Water national Commission] monitors the whole country and establishes areas where water is not allowed to be extracted. However, the biggest problem lies in the Monterrey Metropolitan area where live 85 % of the States= population.

A very interesting fact is that only 10 % of available water is used for human consumption, 30 % for agriculture and 60 % for industry. This bring the attention about possibilities for the Canadian environmental industry in offering methods and techniques for re-using and reducing water consumption in industrial processes.

**Address:**

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Col. Regina, Monterrey, México, C.P. 64290

**Contact person:**

Biologist Héctor Villalón  
(speaks English)  
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**Project 1:**  
**Ciudad Juarez, Chihuahua, Mexico**

**Name:** North and South Wastewater Treatment Plants Project and Supplemental Wastewater Collection Projects, Ciudad Juarez, Chihuahua

Type: Wastewater  
Total Cost: US\$ 31,180,000  
BECC Certification: 9/30/97  
Residents to benefit: 1,100,250

***General Description:***

Construction of two waste water treatment plants (north and south), collectors, sewer lines and pumps to convey wastewater to the plants for treatment, and the rehabilitation and replacement of sanitary sewer lines in the city.

***Outlook:***

Construction of the treatment plants started in October 1998. The South Plant will be operational in January 2000; the North Plant in April 2000.

Nine contracts for the supplementary works have been awarded.

**Project 2: Ensenada, Baja California, Mexico**

**Name:** Wastewater Treatment Plant

Type:	Wastewater
Total Cost	US\$ 8,194,000
BECC Certification:	9/28/95
Residents to benefit:	250,000

***General Description:***

Rehabilitation of the existing wastewater treatment facilities and construction of a new wastewater treatment facility with a capacity of 5,000 litres per second, primarily for urban residential use, as well as some industrial purposes.

***Outlook:***

For the execution of the new project the sponsor has expressed interest in accessing alternative sources of funding, leaving the possibility of Bank assistance for a later stage in the development of the utility. If a Bank loan is requested, the new project will have to be certified by the BECC. EPA has determined that Ensenada does not qualify for BEIF support.

**Project 3: Mexicali, Baja California, Mexico**

**Name:** Sanitation Program for the City of Mexicali

Type:	Wastewater
Total Costs:	US\$ 50,395,757
BECC Certification:	12/5/97
Residents to benefit:	635,000

***General Description:***

Rehabilitation of existing wastewater treatment facility and construction of a new wastewater treatment facility. Rehabilitation of collectors and construction of sanitary sewage

***Outlook:***

The amount of the BEIF and loan components are being determined with the state authorities and the utility based on the financial analysis performed by the Bank and in accordance with the funds contributed to the project by the Mexican national Water Commission (CNA), the state government, and local authorities. Construction began in February 1999.

**Project 4: Nogales, Sonora, Mexico**

**Name:** Water Supply and Distribution

Type:	Water
Total Cost:	US\$ 39,000,000
BECC Certification:	1/18/95
Residents to benefit:	215,000

***General Description:***

Construction of a new aqueduct, regulating tanks and peripheral waterlines; and rehabilitation of the existing aqueduct and several water and sewage lines. Estimated project cost of the first phase is approximately US\$ 21 million

***Outlook:***

A contract for the operation, maintenance and development of the system was bid and awarded in November 1997. Final contract negotiations between the contractor and the State authorities are in progress. A US\$ 9 million loan for this first phase of the project is being negotiated between the Bank, the Comision de Agua Potable y Alcantarillado del estado de Sonora (COAPAES), and the private contractor, who will contribute 10 % of the total cost of the project as equity.

**Project 5: Reynosa, Tamaulipas, Mexico**

**Name:** Comprehensive Sanitation Project for the City of Reynosa, Tamaulipas

Type:	Wastewater
Total Cost:	US\$ 83,400,000
BECC Certification:	3/31/98
Residents to benefit:	473,500

***General Description:***

Rehabilitation of the existing wastewater treatment plant, construction of two treatment plants, and rehabilitation and expansion of the sewage system.

***Outlook:***

The first disbursement of BEIF funds took place in July 1999. Construction of the first stage of the project is expected to start in March 2000. The design of the urgent works is underway.

The Bank is finalizing the recommendation of BEIF funds, as well as the loan component, for the second stage of the project, which includes construction components to be developed over a five-year period.

### 3.2 Public sector potential customers

- C **Secretaría de la Reforma Agraria (SRA)** (Agro Reform Secretariat)
- C **Secretaría de Desarrollo Social (SEDESOL)** (Social Development Secretariat)
- C **Comisión de Regulación de la Tenencia de la Tierra (CORETT)** (Commission to Regulate Land Ownership)
- C **Program de Incorporación del Suelo Social (PISO)** (Program to Incorporate Social Land)
- C **Asociación de Municipios de México** (Mexican Municipal Association). Tel: 687-3898, Mexico City
- C **Comisión Reguladora de Energía** (Energy Regulatory Commission). The Agency regulates the construction, operation and ownership of power generation, natural gas transportation, storage and distribution
- C **Secretaría del Medio Ambiente y de Recursos Naturales (SEMARNAP)** (Environment and Natural Resources Secretariat)
- C **Instituto Mexicano del Petróleo** (Oil Mexican Institute)
- C **Subsecretaría de Ecología, Dirección de Mejoramiento Ambiental** (Monterrey) 011-52\8-331-0598

#### **4. INFORMATION ON THE PRIVATE SECTOR**

This section provides information on private firms contacted in the cities of Mexico and Guadalajara. The purpose for this contact is two folds:

1. To learn about the Geomatics situation in Mexico 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 Mexico.

When possible, information is given about the firms expertise, background, and most especially their comments on the Geomatics industry in Mexico, 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 Mexican private Geomatics companies on important issues such as:

1. Canadian expertise on Geomatics
2. Willingness to establish strategic alliances
3. Competition from other countries
4. Type of work they specialise
5. Experience with the Mexican government
6. Etc.

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

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



**Firm name: Sistemas de Información Geográfica S.A. (SIGSA)**  
[Geographic Information Systems]

**Background Information:**

Established in 1980 to supply integrated photogrammetric and cartographic services. In order to provide these integrated services for cadastral, rural and urban systems they are representatives and authorized distributors of:

- S Arc/Info
- S EOSAT Satellite images
- S ERDAS software for image processing
- S KORK software for photogrammetric applications
- S ASHTECH Global Positioning System

SIGSA operates in its own building in Mexico City and also from five regional offices, and has a roster of 450 employees, including 150 analytical operators, 90 photogrammetric digital equipment, and 50 programmers in Visual Basic.

The company offers services of acquisition, processing and display of geographical information to fulfil needs in these areas:

- S Photogrammetry
- S Geodesics
- S Photointerpretation
- S Cartography
- S Photomechanics
- S Systems

Experience covers:

- S Urban cadastre
- S Rural cadastre
- S Urban infrastructure
- S Land inventories
- S Ecologic evaluations

According to them Mexico has a mosaic of 26,000 maps in scale 1:20000. They said that SIGSA has already completed 30 % of the 26,000 maps, either in orthophoto or in digital format.

The company is also working in Detection and Prevention of Disasters. In that regard they are now working in such a system to prevent flooding from Cazonas River in the city of

Poza Rica Veracruz This consultant was given a demonstration of this application with different rainfall scenarios. Nevertheless their progress, it is believed that they would be willing to receive some assistance from Canadian companies in this regard

### **Perception about Canadian Geomatics Industry**

According to this firm, perception about Canadian technologies in mapping was and is excellent. Because the Mexican government thought that Canadian technology was well advanced, they gave contracts to Canadian firms. SIGSA says that Canada is the natural partner of Mexico.

### **Potential areas of interest for Canadian technology**

According to SIGSA Canada has a definite advantage in some segments such as:

- C Geomatics applied to forestry, which could be an area of interest for Mexico (*this statement was later confirmed by the consultant, especially in Guadalajara and in Monterrey*).
- C The mining sector. (*the agency in charge of the mining sector in Mexico is the Secretaría de Energía y Minas*) [Energy and Mining Secretariat]
- C Applications in oil and gas [See Pemex and Pemex/Sicori]
- C In the cadastral activity they think that there is not too much money [*this was also confirmed by the IDB*]
- C Vessel traffic management

### **Address:**

San Francisco 1375  
Col. del Valle  
C.P. 03210, México, D.F.  
Tel: 011-52-5575-2190/2184/1351/2000/2049  
Fax: 011-52-5575-2146  
<http://www.geocentro.com>

### **Contact persons:**

Eng. Carlos Salmán González  
Director General

(speaks English)

e-mail: [74173.524@compuserve.com](mailto:74173.524@compuserve.com)

Eng. José Luis Peña Martínez

Technical Director GIS Projects

e-mail: [csalman@mailier.data.net.mx](mailto:csalman@mailier.data.net.mx)

They could be interested in partnerships with Canadian firms especially in the vehicle tracking area.

**Firm name: Topografía y Proyectos de Ingeniería S.A. (TYPISA)**  
[Topography and Engineering Projects]

**Background Information:**

Their main activity is in the fields of:

- S Photogrammetry
- S Image Processing
- S Videogrammetry

The firm owns new digital equipment for digital compiling (softplotters), as programs and equipment which perform automatized or manned compilation.

For digital models for elevations (DEM) they use the Canadian GWN System especially designed for photogrammetry. This system allows the use of digital base images from different suppliers, such as SPOT, with resolutions of 1 metre, LandSat, with resolution of 20 metres, and KVR with resolutions of 2 to 3 metres.

TYPISA has systems and equipment to process images from satellites, radar and conventional photogrammetry. For digitalization they use scanners from 20 micron to 80 microns.

They are using software ER Mapper from Australia to produce orthophoto images. Images can be hybrid raster and vector and printed in plotters of 600 points per inch.

By the name of Videogrammetry this firm ensemble devices and proprietary systems developed in-house to acquire photos or videos of high productivity, using photogrammetric, geodesic and remote sensing techniques.

According to TYPISA, this system has been used with high efficiency to develop plans for rights of way on roads, ducts, railway tracks, and in general applicable to any project with a lineal development.

This firm has also been active in detection of optic fibre networks. Today they have covered 6,500 km. There is a total of 25,000 km and only 1/3 has been done. They do not need assistance for acquiring information, **but for preparation of the database.**

## **Potential areas of interest for Canadian technology**

The interviewed person, Eng. Emigdio Soberon pointed out that from his point of view there are the following needs in Mexico:

- S There is a lack of proficient professionals, which translates in needs for training
- S Consultants are required, especially in GPS.
- S TYPISA specializes in GPS and is interested in contacting Canadian companies active in the Remote Sensing field

His company is interested in contacting Canadian companies specialized in:

- S Traffic vessel management
- S Vehicle tracking devices
- S Definition of territorial maritime limits according to UN Resolution
- S Information retrieval and processing

## **Perception about Canadian Geomatics Industry**

Eng. Soberon believes that Canada is a definite leader in Geomatics. From his point of view Canada is ahead the USA, its main competitor. TYPISA was worked in the past with NORTEC Geomatics and with VIASAT Geotechnology, both from Canada.

## **Relations with the Mexican Government**

They are well connected with PEMEX, especially in the marine sector.

## **Funding:**

Regarding Mexican funding for projects, Eng. Soberon stated that there are funds available from Banobras (The Mexican Bank financing Public Works), for the execution of projects and purchase of technology, but not for purchasing equipment. Regarding compensation for consulting work, he estimates that Mexican firms compared with Canadian or American firms quote 10 times less that foreign firms.

## **Address:**

Olivo 4 - 401 Col. Florida

San Angel, C.P. 01030, México, D.F.

Tel: 011-52-5663-2182/2488/

Fax: 011-52-5661-7779

**Contact person:**

Eng. Emigdio Soberon Cueto

Director General

(speaks English and French)

**Firm name: Ingeniería Experimental S.A.**  
[Experimental Engineering]

**Background Information:**

Interviewed the General manager, Eng. Luis Pliego Rodriguez. The firm is located in its own eight story building in downtown Mexico City.

Eng. Pliego travelled to Canada in 1995 invited by the Canadian Embassy in Mexico. Visited St. John's, Halifax and Fredericton. Talked with a large number of Canadian entrepreneurs but unfortunately without success.

His company is interested in complementation, since such large Mexican agencies such as PEMEX consider only integral solutions which his company cannot deliver. For this reason he would like to consider some type of strategic alliance with Canadian firms, in order to complement his offer for services.

According to Eng. Pliego the most important requirement for his company is the topographic measurement of the seabed (some sort of bathymetry), in order to determine its composition for foundations of wharves, oil platforms, etc.

**Funding:**

He states that his clients finance their own projects

**Perception about Canadian Geomatics Industry**

His words: It is impressive@

**Address:**

Plaza Villa de Madrid 2  
Col. Roma. C.P. 06700, México, D.F.  
Tel/Fax: 011-52-5207-7077  
e-mail: [lpliego@cdebuen.com.mx](mailto:lpliego@cdebuen.com.mx)

**Contact:**

Eng. Luis Pliego Rosique  
General Manager

**Firm name: IGS de México**

**Background Information:**

Interviewed person: Mr. Luis Manuel Morán Moguel

This firm is already associated with:

- S NOETIX (Ottawa), Soil, Marine and Farm Applications
- S IGS (Vancouver), Geomatics applications in farming
- S INTERA, Geomatics applications in farming
- S Canadian firm (Vancouver), Forest fires prevention

He prefers to work with Canadian firms because they are more approachable than Americans.

He says that the Free Trade Agreement with Canada and the USA hurt Mexican companies, since foreign companies come to Mexico where they could work with their base software and then with much cheaper labour than in their countries. This of course created a stiff competition with local firms which have a lack of integrated solutions.

In other words, the Mexican comparative advantage of qualified and cheap labour was used by foreign firms.

**His company is interested in representing Canadian firms.**

**Address:**

Juventino Rosas 58  
Guadalupe Inn, México 01020, D.F.  
Tel: 011-52-5660-5323  
Fax: 011-52-5593-5005  
e-mail: [moranigs@infosel.net.mx](mailto:moranigs@infosel.net.mx)

**Contact person:**

Eng. Luis Manuel Morán Moguel  
President  
(speaks English)



**Firm name: IEE Grupo Ingeniería S.A.**  
[IEE Engineering Group]

**Background Information:**

This is a firm established in 1972 in the field of Civil Engineering. They have completed more than 300 projects in the construction area, and with a roster of 160.

Although their main activity is civil construction and basic engineering, they are also very active in water treatment plants. At the same time they are interested in working in Geomatics and in the conservation of natural resources

One positive aspect of this firm is that they are experienced in providing turnkey services, and so, they are used to this type of contracting which is being sought by large government agencies such as PEMEX.

**They want to establish some sort of alliance with a Canadian Geomatics firm.**

**Address:**

San Marcos 130  
Col. La Joya, Tlalpan, México, D.F.

**Contact person:**

Mr. Victor Gonzáles de Arce Castaño  
Vice President of Installations  
(speaks English)  
Tel: 011-52-5655-5200  
Fax: 011-52-5655-1111  
e-mail: [iee@data.net.mx](mailto:iee@data.net.mx)  
e-mail: [costiee@prodigy.net.mx](mailto:costiee@prodigy.net.mx)

**Firm name: Cartodata S.A.**

**Background Information:**

This is a consulting firm specialized in Photogrammetry and GIS. They also produce their own software called AUS.win, which is a tool for implementing land and cadastral information systems, requiring frequent changes and continuous graphic and alpha numeric database updating, working with different operating systems such as Windows 95, Windows NT, or Unix, with versions in Spanish, English and French.

They also produce AU3-win which is a softcopy stereoplotter designed for the mapping industry, and for small and large mapping firms.

The interviewed person, Eng. Henri Audirac Lass, educated in De Laval University in Quebec, **expressed his interest in establishing strategic alliances with Canadian firms.**

He says that in the Geomatics area in Mexico there is an important infrastructure, and he believes that in photogrammetry they are even with Canadian technology.

**Opportunities:**

This consultant asked him about some particular satellite uses for instance to detect illegal crops. He is not entirely convinced that a satellite can detect those illegal crops, since a large definition is needed, and since in Mexico the illegal plots are about 500/1000 m<sup>2</sup> and located in the slope of mountains, they are very difficult to detect.

- C He believes that with the use of radar forestry volumes can be measured, which is of interest, not from the commercial point of view, but to monitor the status of forests and for ecosystem conservation (*this necessity was later confirmed in Monterrey*). There is a big need in Mexico for this type of technology in order to have also a yearly inventory.
- C There is a demand of software for marine application, such as vessel traffic management, but he also stresses that it is necessary to consider the **political will**. **In many cases sales strategy fails because it does not consider the human factor.** (*also confirmed by other people*).
- C Drinking water in cities is also a very important problem. There are lots of leaks, theft of water, and problems to collect the corresponding fees (*also confirmed by other sources*). He believes that Geomatics can help in solving these problems.

C There are opportunities in forestry and in agriculture regarding control of subsidies and water use. (*confirmed with other sources*)

Although he accepts the fact that integration is of paramount importance, he is not very keen in turnkey projects, because the human resource is often neglected (such as **A**political movement@), i.e., the complete change of key personnel when there is a change in the government.

Regarding foreign technology he has seen Canadian and American technology fail - such as that used for cadastre - , because local conditions were not considered, and it was assumed instead, that this conditions were the same as in the their countries of origin. For instance, a Spanish company sold a system for automatic control of traffic lights. The system failed because they did not consider voltage fluctuations.

**He is interested in representing Canadian firms.**

Regarding prevention of natural disasters his company has tools to identify risk zones, but in the issue of prevention **practically nothing has been done in Mexico.**

**Address:**

Avda. Circunvalación Ote. 689  
Col. Granja, Zapopan  
Jalisco, México, C.P. 45010

**Contact person:**

Eng. Henri Audirac Lass  
President  
(speaks English and French)  
Tel: 011-52-3-627-1552  
Fax: 011-52-3-627-1424  
<http://www.cartodata.com>

**Firm name: Clifton Associates Ltd.**

**Background Information:**

This is a Canadian firm devoted to environmental consulting on different issues such as Environmental Impact Assessment (EIA), environmental risk, and diagnosis before implementation (previous phase to EIA).

Their opinion about their experience in Mexico is that Geomatics has been very useful for evaluation, and for reducing costs. For instance the State Government database to evaluate projects is of a large scale and does not permit the efficient evaluation of projects. In other words, there is information at a macro level (scale: 1:50000), which does not allow to work at plot level. Clifton uses GIS to solve this problem, and to prepare a thematic database for the client and the government.

The finished database is a manifestation of the environmental impact and is complemented with site reporting.

The interviewed person, Eng. Jesús R. Corral Verdugo, believes that radar satellite images can give valuable information, especially in wetlands and flooded areas, showing the soil profile which cannot be achieved by using conventional satellite imagery.

From the point of view of disasters prevention he believes that models simulating disasters such as the release of Ammonia could be extremely useful to analyse its effects in the urban nucleus. The area surrounding Guadalajara is contaminated with industrial pollutants mainly from the electronic, tanning and textile industries.

As a consequence, models for hydro and soil contamination are of interest. For instance it is needed a tool to visualize contamination in the Chapala Lake (south of Guadalajara).

They are a Canadian firm, however, they could be interested in representing in Mexico another Canadian firm which offers complementary technology to their own.

**Address:**

Av. Hidalgo 1830, 10mo A  
Tel.Fax: 011-52-013-616-2624  
011-52-013-630-2099  
Guadalajara, Jalisco, México, C.P. 44650

**Contact person:**

Eng Jesús R. Corral Verdugo (speaks English)  
e-mail: [jcorral@clifton.com.mx](mailto:jcorral@clifton.com.mx)

## 5. MARKET ACCESS

### 5.1. Strategies for Market Entry

It has been said by many Canadian firms that they have had presence and contacts in Mexico for years and nevertheless there were not able to close a deal in this country.

According to information and comments gathered in preparing this report, it is believed that the main culprit is **not poor planning but a mistaken strategy**.

There are conditions that have to be met in order to be successful in Mexico. They are:

1. Necessity to have a partner, representative or associate in Mexico, 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.
2. The Mexican 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 Mexican company and its existing capability.
3. 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 Mexico City, Guadalajara or Monterrey.

In order to understand this apparently illogical situation the Canadian company needs to understand the concept of **Latinization**. It means to bear in mind that Mexico is a country with cultural differences and conditions when compared with Canada, with a different attitude, a country where resources are not widely available as in Canada, a different political structure and rules, and because it is importing technology, and working with many different platforms and systems.

As an examples we have: the reliability of existent data in Mexico, the scale of available cartography, the shortage of diffusion of data from the government, the lack of expertise in the production of efficient databases, their weakness in the analysis process, even the reliability and quality of the electrical supply, etc.

4. The Canadian entrepreneur has to make sure that his client understands the purpose, scope and limitations of his/her product.
5. One of the most important aspects for the Canadian entrepreneur to consider is to offer an integrated package with components interacting smoothly.

6. Mexican clients such as the large government agencies are wary about companies (Mexican and foreign alike) offering their products. The reason is, again, **integration**, or the lack of it.

This word has been used many times in this report, because the consultant has heard it mentioned constantly by government officers and private firms alike. Canadian companies should bear in mind **not to only offer their products, but solutions achieved with their products.**

7. It is suggested for Canadian companies to donate to Mexican universities and technical institutes copies of their software, as well as to keep a frequent contact with engineering students through conferences, seminars and demonstrations. It is necessary to remember that in a short period of time these students will be in positions that probably will not involve taking decisions on purchase of software or Geomatics equipment, however, they can most probably have influence in the decision making process because their knowledge of the system. If they do not know of have not heard about it, how can they make their recommendations and/or suggestions to their principals?. This is a policy followed, and with success, by some American companies.
8. It is strongly suggested that the Canadian company present showcases with the use of its technology, but more important is to **show how it interacts with other platforms and systems, as well as results achieved.**

## **5.2. Foreign investment regulations**

The Law allows 100 % of foreign participation in the equity of a Mexican company. However, this allowance is only for some areas. Many other areas are reserved for the state, such us: oil, hydrocarbons, and basic petrochemical, communications and nuclear power

## 6. CANADIAN POSTS AND AGENCIES

### **Canadian Embassy in Mexico**

Schiller 529, Col. Polanco

Tel: 011-52-5724-7900

Fax: 011-52-5724-7982

Contact: Ms. Laura E. Hernandez

Commercial Officer, ext. 3354

e-mail: [laura.hernandez@dfait-maeci.gc.ca](mailto:laura.hernandez@dfait-maeci.gc.ca)

### **Canadian Consulate in Guadalajara**

Hotel Fiesta Americana, Local 31

Aurelio Aceves 225

Tel: 011-52-3-615-6270

Fax: 011-52-3-615-8665

Contact: Eng. Fernando Baños Francia

Commercial Officer

e-mail: [banosfb@canada.org.mx](mailto:banosfb@canada.org.mx)

### **Canadian Consulate in Monterrey**

Kevin Sinott

Consul and Commercial Officer

Edificio Kalos, Piso C-1, Local 108

Tel: 011-52-8-344-3200

### **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](mailto: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. Luc Dupont**

Regional Manager for Mexico

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 Mexico, which can finance Canadian goods and services:

**Banca Serfin**

Mexico City

Signing amount: US\$ 20 million

Repayment terms: 5 years

Contact: Mr. José Carrassó, VP International Division

Tel: 011-52-5512-1009

**Bancomer S.A.**

Mexico City

Signing amount: US\$ 75 million

Repayment terms: 5 to 8 years

Contact: Mrs. Cecilia Sáenz y Sáenz, VP Import Financing

Tel: 011-52-5621-3861/ 3491

**Nacional Financiera SNC**

Mexico City

Signing amount: US\$ 28 million

Repayment period: 5 to 8 years

Contact: Mr. Jorge Muñoz Cuevas, Manager Bi-lateral

Tel: 011-52-5325-7022/ 7023

**Banco Nacional de Comercio Exterior SNC (Bancomex)**

Mexico City

Signing amount: US\$ 125 million

Repayment terms: 5 to 8 years

Contact: Mrs. Rosamaría Solís, VP International Banking, North America

Tel: 011-52-5481-6051

**Banco Nacional de México S.A. (Banamex)**

Mexico City

Signing amount: US\$ 125 million

Repayment terms: 5 to 10 years

Contact: Ms. Mariana Lerdo de Tejeda Sanchez, Comercio Exterior

Tel: 011-52-5720-7077



**Banco Nacional de Obras y Servicios Públicos SNC (Banobras)**

Mexico City

Signing amount: US\$ 20 million

Repayment terms: 5 to 8 years

Contact: Lic. Abelardo Bravo Herrera, Gerente de Operaciones  
Bancarias Internacionales

Tel: 011-52-5723-6000

**Petróleos Mexicanos (Pemex)**

Mexico City

Signing amount: US\$ 50 million

Repayment terms: 3 to 10 years

Contact: Ing. Eduardo Ito, Deputy Manager, Trade Finance

Tel: 011-52-5250/6478

The Export Development Corporation also publishes a quarterly magazine entitled **A Export Wise**, which can be obtained in the 4<sup>th</sup> floor of EDC in Ottawa.

If more information is needed please call 1-800-532-2220

Early this year, EDC developed an Environmental Review Framework that formalizes and strengthens its environmental review practices for projects it supports

**Ministry of Economic Development and Trade**

There is a program called **APEMD** for Export Market Development, which helps Canadian companies to export their products.

Electronic address: [www.infoexport.gc.ca](http://www.infoexport.gc.ca)

Go to **APrograms and Services**, then to **APEMD**

## 7. KEY CONTACTS AND SUPPORT SERVICES

- C Sistemas de Información Geográfica (SIGSA), Mexico City. Tel: 011-52-5575-4585
- C Digitalización y Cartografía Urbana (CARTODATA), Guadalajara. Tel: 011-52-3-627-1552
- C Servicios Catastrales (ASERCA), Mexico City. Tel: 011-52-5626-0750
- C Topografía y Proyectos de Ingeniería, Mexico City. Tel: 011-52-5663-2182
- C IGiS de México, Mexico City. Tel: 011-52-5660-5323
- C IEE Grupo Ingeniería, Mexico City. Tel: 011-52-5655-5200
- C Fotogrametría XXI
- C Ingeniería Experimental, Mexico City. Tel: 011-5207-7077
- C Instituto Tecnológico y de Estudios Superiores de Monterrey, Monterrey. Tel: 011-52-8-328-4274

## 8. BIBLIOGRAPHY

Print

MEXICO - Country Profile, The Economist Intelligence Unit, 1999 - 2000  
Gaceta Oficial

## 9. OTHER REFERENCE MATERIAL

### 9.1 Useful Internet sites

<http://www.ccc.ca>

Canadian Commercial Corporation.

<http://rtn.net.mx/comprenet/>

<http://compranet.gob.mx>

This is the sites for the **AGaceta Oficial**, the Government of Mexico official publication. Here are published on Tuesdays and Thursdays all tenders, national and international

<http://www.pa.gob.mx/programa/ordena01.htm>

Information about arrangement and regularization of rural property from the cadastral point of view.

<http://www.presidencia.gob.mx>

Information on the Mexican economy, at April 1999.

<http://www.ammac.org.mx>

Information on Mexican municipalities

<http://www.cre.gob.mx>

Information on power, gas, water

<http://www.inegi.gob.mx>

Statistical information on Geography and Informatics

<http://www.shcp.gob.mx>

Economic information on the Mexican economy

<http://www.imp.gob.mx>

Information on the oil industry in Mexico