



re-map all of the cities included in the *Programa de las 100 Ciudades*, the 100 Medium Cities Program. *Banco Nacional de Obras y Servicios Públicos (BANOBRAS)*, the National Bank of Construction and Public Works, contributes half of the funds. Under that program alone, approximately US \$200 million will be spent by states and municipalities on cadastral projects by 1997.

The Mexican geomatics industry is underdeveloped, and lacks the capability and capacity to undertake all of this work. While the number of companies in the industry has grown, only a handful of them have the expertise and technology to bid on government tenders for integrated projects. In particular, only the largest firms have a capability for aerial mapping and surveying. These services are prerequisites for many projects, and the companies that provide them have a strong influence in the selection of geomatics technologies and services.

Canadian firms have the advantage that *INEGI* has agreed to adopt Canadian industry standards for cadastral services. Only about half of the municipalities involved in the regional development plan have digitized data of any kind, so there is a substantial opportunity for Canadian firms.

There are no reliable estimates of the size of the Mexican geomatics market. According to *BANOBRAS* officials, the cadastral update program has a budget of N \$240 million pesos in 1995 and N \$320 million pesos in 1996. Industry observers estimate that this program constitutes half of the public sector market, which is 80 percent of the total market. This implies a total 1995 market of about N \$600 million pesos. Depending on where the peso stabilizes, that will be roughly US \$120 million.

THE MEXICAN GEOMATICS SECTOR

The Mexican geomatics industry has grown significantly over the past few years, and now consists of almost 50 companies. Seven companies dominate the municipal cadastral industry. The largest of these, *Sistemas de Información Geográfica (SIGSA)*, has 300 employees, and is widely regarded as the industry leader.

The market is segmented mainly by the level of integration of the product. No more than eight Mexican companies have the ability to provide a "total solution" package. For this reason, the market is characterized by a large amount of subcontracting. The largest companies also offer software packages to clients. In most cases, they are exclusive suppliers of particular packages, which are mostly imported.

The state and municipal market is by far the largest market component. It is oriented towards cadastral surveys and has traditionally required relatively low levels of technology and service integration. Nonetheless, sophisticated methods and materials are beginning to find applications in this field. Federal government agencies are also important customers. Their needs are mainly for large databases.

Relatively complex offerings are normally required by state enterprises such *Petróleos Mexicanos (PEMEX)*, the national oil company, and the *Comisión Federal de Electricidad (CFE)*, Federal Electricity Commission. They need finely-tuned information systems to support strategic and logistical planning.

Innovation and development of specialized applications occurs mainly in the private sector, which tends to attract the most talented professionals. Industry observers believe that the private geomatics sector employs about 3,000 people.

According to one expert, there are only about 250 geomatics specialists with advanced skills in Mexico.

The most popular software package is ARC-INFO. Standard Queries Language (SQL) is also widely used to develop applications. A Spanish-made package, distributed by *Estudios Topográficos de México (ESTOMSA)* has also been successful. *Digitalización y Cartografía Urbana (DICARTU)* is the only Mexican company that markets its own geographical information systems (GIS) package, under the name of *AUDOS*. Another company, *Sistemas Ortofotogramétricos Ingeniería Aplicada (SOFIA)* is reportedly developing another Mexican software package.

Advanced photographic and remote sensing equipment is scarce in Mexico. In general, photographic and production equipment is European, and software/technology is from the United States. Satellite services are entirely imported, and generally come from French or American sources. Two companies are active in the remote sensing and spatial data markets. *NIVELES* distributes Landsat satellite imagery and *COSMOCOLOR* provides Spot satellite imagery. Neither uses domestic technology.

THE ROLE OF IMPORTS

There are no reliable data to indicate the size of the import market for geomatics goods and services, or the market shares of the various competitors. Goods are not segregated in the official trade data, and services are not counted at all.

Industry participants believe that the import share of goods is about 90 percent. The principal sources of imports are the United States, France, Germany, Austria and Switzerland. One expert estimated the Canadian share of imports at about 5 percent.