



Mexico has more than 11,000 kilometres of coastline and claims an exclusive economic zone (EEZ) of almost three million square kilometres. Its territory includes 1.5 million hectares of lagoons and estuaries, some of which harbour delicate ecosystems. There are officially 371 islands, reefs and keys, as well as 336,000 square kilometres of continental shelf.

Considering the expanse of its maritime resources, it is not surprising that Mexico has needs in virtually every aspect of ocean and marine technology. Canadian companies are expert in several areas of this industry. They are especially strong in low-volume, high-value and custom-engineered solutions, which can be adapted to Mexico's unique needs.

The ambitious economic reforms that have swept Mexico over the past decade have increased the demand for ocean and marine technologies. An enormous increase in foreign trade has put pressure on the nation's marine transportation systems to modernize. The growth of intermodal transportation has placed emphasis on sophisticated systems for ship loading and unloading. Public alarm about the rapid deterioration of Mexico's environment has drawn attention to technologies for ocean environmental assessment, protection and remediation. And, as Mexico's land-based petroleum reserves have been depleted, offshore reserves are playing a more and more important role.

Mexico lacks the technologies needed to tackle many of these problems. Canada has a proven track record in many of Mexico's areas of greatest need. These include hydrographic services, oceanographic instrumentation, subsea robotics, remote sensing systems, navigation and communications systems, and "smart ship" technology. Geomatics and coastal-zone management are other areas of strong expertise. Where appropriate matches

of needs and capabilities can be found, there will be continuing opportunities in Mexico for Canadian suppliers of ocean and marine technology.

THE MEXICAN OCEAN AND MARINE SECTOR

Ocean and marine shipboard technology is a highly diverse field, which is difficult to describe as a single industry. It includes traditional activities such as offshore oil and gas, fishing, shipbuilding and marine science. Growing environmental awareness has expanded the scope of this sector to include the control of ocean pollution and the management of coastal marine resources. Technological change has also created new opportunities in such areas as "smart ship" technology and multimodal port systems.

Mexico's scientific capability in all of these areas is very limited. Marine science is primarily the responsibility of university research centres or government agencies. The most important is the *Instituto de Ciencias del Mar y Limnología (ICML)*, Institute of Marine Science and Limnology, at the *Universidad Nacional Autónoma de México (UNAM)*, National Autonomous University of Mexico. This institute does considerable contract work for the *Secretaría de Marina Armada de México (SMAM)*, Mexican Navy, which is responsible for protecting marine resources and monitoring environmental impacts.

In spite of relatively modest technical capability, Mexico derives substantial income and a large part of its export earnings from its ocean resources. Petroleum is the nation's largest industry and the most important source of foreign exchange for the government. Three-quarters of oil production comes from marine sources. Tourism is also a leading

industry, heavily based on seafront resorts. The fisheries, including aquaculture, are another source of export earnings.

About 95 percent of new fishing permits issued to member companies of the *Cámara Nacional de la Industria Pesquera (Canainpes)*, National Chamber for the Fishing Industry in 1995 were for shrimp. The rest were for tuna, sardines and anchovies. Total production is approximately 1.3 million tonnes per year. About 80 percent of the catch comes from the continental shelf, which falls entirely within Mexico's exclusive economic zone (EEZ). Mexico has a significant aquaculture industry, which is based mainly on traditional methods, such as small-pond cultivation of freshwater species. Total aquaculture production is in the order of 200,000 tonnes per year.

Mexican shipyards are almost entirely devoted to maintenance, repair and construction of small boats. In mid-1995, there were just under 2,000 commercial vessels registered in Mexico. But only about 200 of them exceeded 1,000 registered tonnes.

In 1993, Mexican commercial ports handled 29 million tonnes of cargo, which was less than one-third of the nation's total commercial ocean traffic. The port of Houston, Texas handles more Mexican cargo than all of the ports in Mexico combined. Privatization is seen as the principal remedy for this challenge, and the government is in the process of awarding concessions for the nation's 22 major ports.

CUSTOMERS

Customers for ocean and marine shipboard technologies are found in both the private and public sectors. Government users include universities, *Petróleos Mexicanos (Pemex)*,