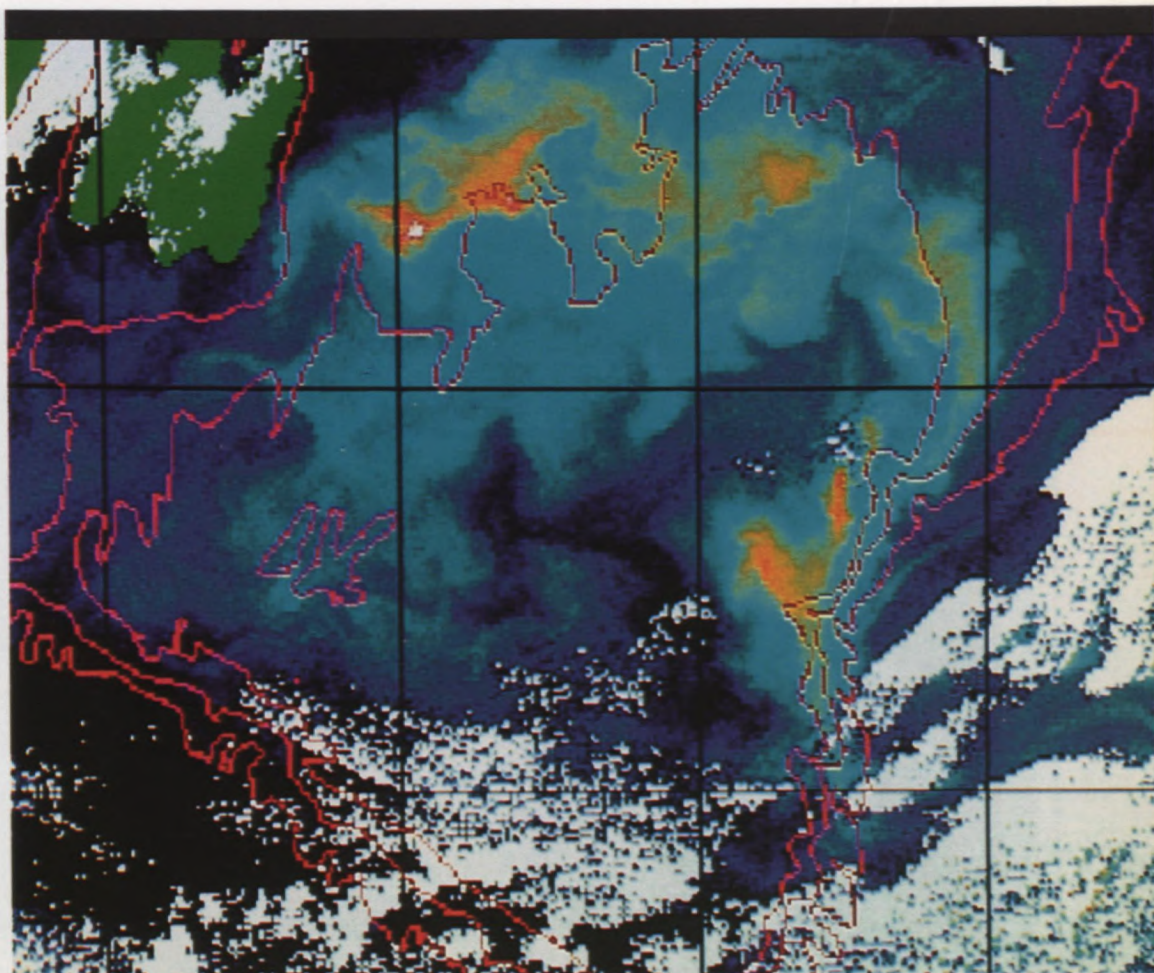


Looking at the sea

Canada is an oceanic nation. For more than 100 years, Canadians have had to deal with the special problems of a small population with the world's longest coastline. Activities in locating, developing and exploiting resources, from often remote and hostile environments in three oceans, have produced cost-effective solutions. In the process, Canadians have learned to be flexible, to adapt technology for the job at hand, and to design appropriate methods for each task. From the tropics to mid-latitudes and the high Arctic, Canadians continue to put their skills and experience to work on behalf of others who are not yet able to do it all for themselves.

With the establishment by coastal states of Exclusive Economic Zones (EEZ), many are looking seawards to obtain more resources and to add to their traditional fisheries. The tools and techniques of airborne and spaceborne remote sensing are now speeding up the process of surveying and monitoring coastal and deeper-water zones. The secrets of the oceans can be displayed for a wide variety of critical applications and ocean resources development.

Using such tools as multispectral imagers and lasers developed in Canada, infrared radiometers and scanners mounted in aircraft, Canadian companies are flying missions in many countries. When this new information is combined with data from satellites, guesswork is almost eliminated.



Water's colour "signature" — obtained by capture of as many as 288 colours in up to 8 spectral bands — gives information on the availability and distribution of phytoplankton, the primary food for marine life. This is shown through chlorophyll fluorescence. Marine plant abundance and animal distribution are identified with great accuracy. Sea surface temperature can be interpreted for water column stratification and circulation. Inorganic sediments and land-originated dissolved materials are measured to locate and trace water masses and currents. Maps or images of water colour variations can also be used to infer biological productivity at higher trophic levels.

World recognition for Canada's oceanographic skills is matched by outstanding accomplishments in hydrography and cartography. The new EEZs of the world in most cases are not surveyed to modern standards — charts from the nineteenth century are still in use. Canada is one of the few countries with international capabilities in nautical charting and has the willingness to share these skills and technologies with others.

In Canada, the laser beam is being flown to carry out coastal hydrographic surveys — faster and more cheaply than ever before. The work of years can be carried out in months. Laser radar, often termed Lidar (Light Detection and Ranging), is used to detect particles hundreds of

The colour signature of water in this photo from Borstad reveals phytoplankton and inorganic sediment concentrations off the east coast of Canada.

times smaller than are detectable with radar. Not only accurate water depths but also water quality can be measured, from ships or aircraft. Other applications include atmospheric diagnostics, pollution monitoring, terrain profiling, wave height measurement and range finding.

These newest remote sensing instruments and services are typical of the cost-cutting innovations that Canada offers the world.