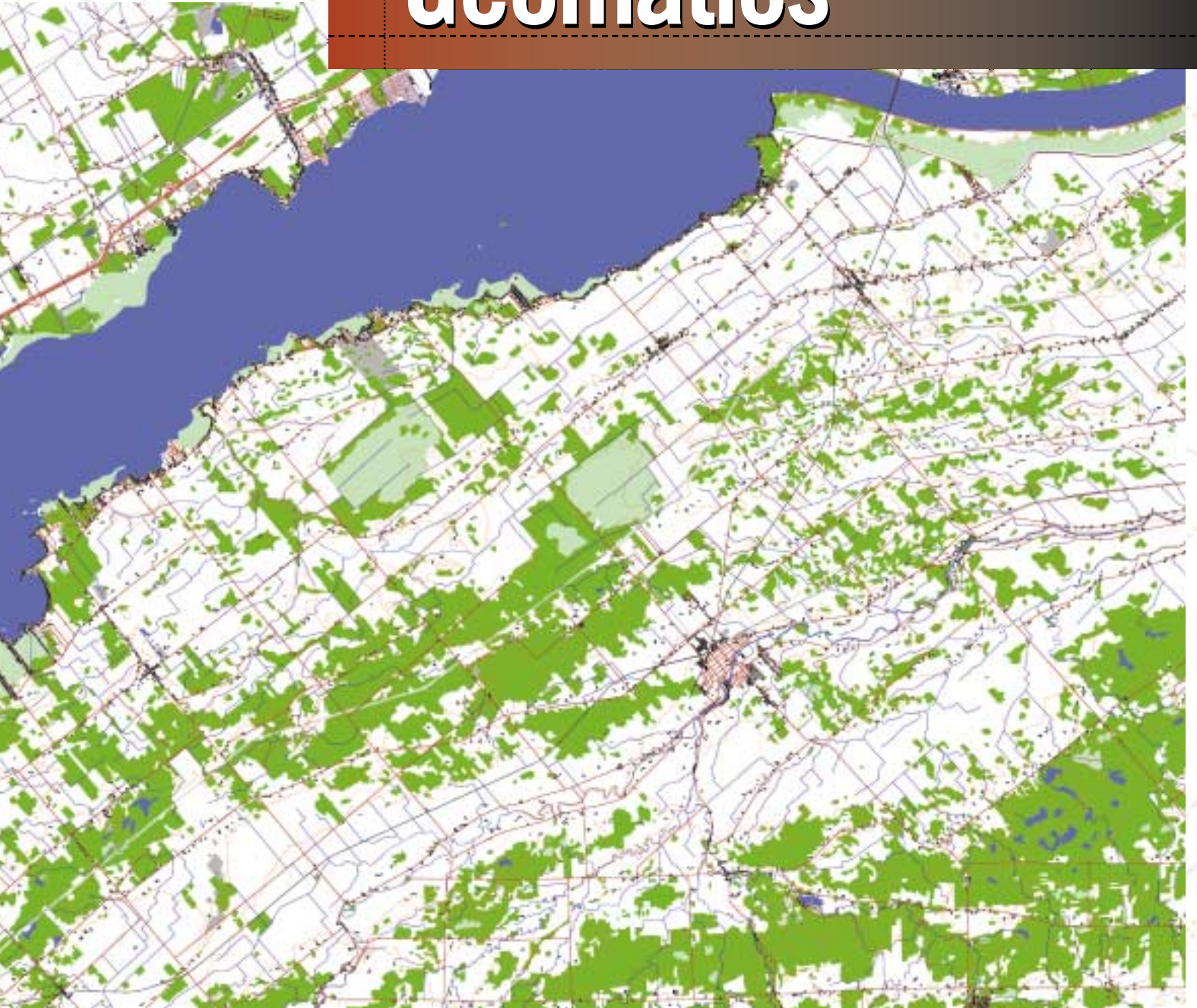


Digital Mapping Technologies

Geomatics



Natural Resources Canada Ressources naturelles Canada

Canada 

What is Geomatics?

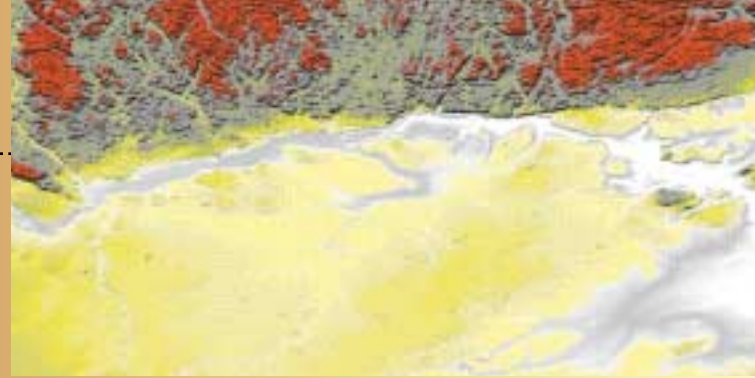
Geomatics is the science and technology of gathering, analyzing, interpreting, distributing and using geographical information. Geomatics encompasses a broad range of technologies that can be brought together on a common spatial reference system to create a detailed but understandable picture of the physical world and our place in it. These technologies include:

- GEOGRAPHIC INFORMATION SYSTEMS;
- GLOBAL POSITIONING;
- REMOTE SENSING;
- DIGITAL MAPPING; and
- CADASTRAL SURVEYING.

A Vibrant Technology Sector

Canada has earned recognition as a world leader in the field of geomatics — one of the fastest growing technology sectors over the last decade. The Canadian geomatics community provides software, hardware and value-added services to help clients resolve problems and seize opportunities in areas such as:

- the earth sciences;
- infrastructure management;
- the environment;
- land management and reform;
- natural-resource monitoring and development;
- development planning; and
- coastal-zone management and mapping.



The Canadian Advantage

Canada's knowledge and expertise in geomatics are the result of decades of research and development, and practical application. Through an understanding of our diverse geography, we are managing our resources and the environment for the benefit of present and future generations.

Canadian-developed geomatics products and services are now being used throughout the world. Our clients range from government agencies in industrialized and developing nations, to large and small businesses, and remote communities.

Partnering with the Canadian geomatics community, which welcomes international collaboration through joint ventures or strategic alliances, will give you full and favoured access not only to these products and services, but to some of the world's leading geomatics experts.

*Why not put the
Canadian advantage to
work for you?*



Digital Mapping Technologies

The Evolution of Digital Mapping

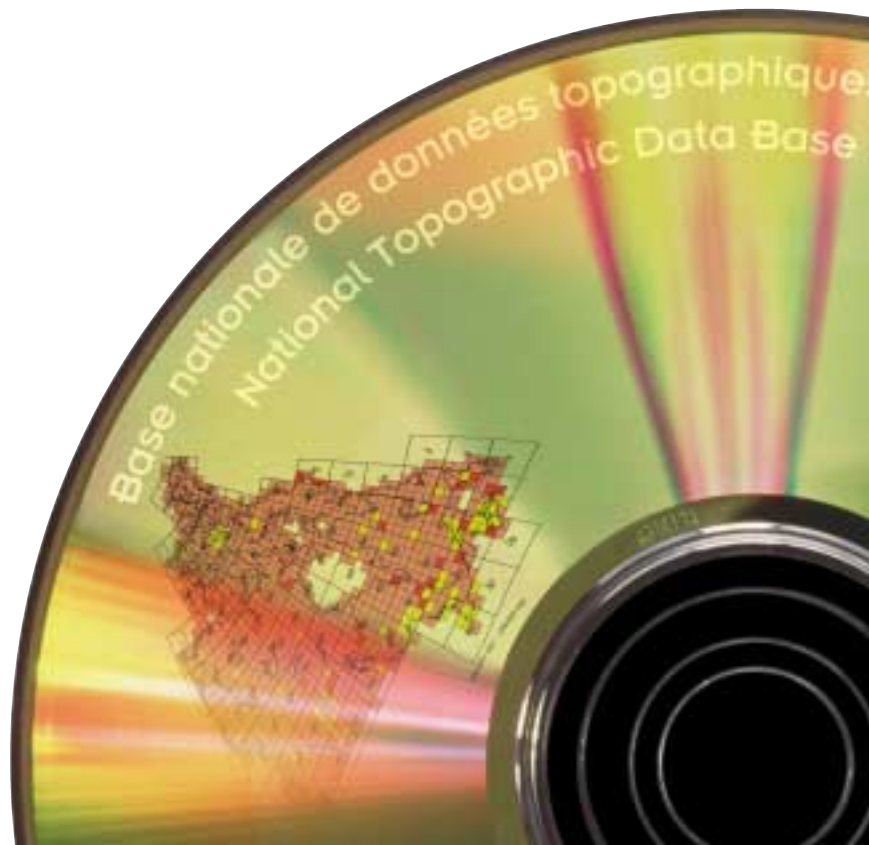
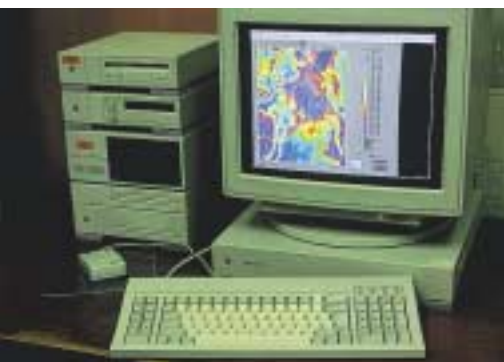
As computers gradually came to be used in mapping and other fields, Canadian cartographers foresaw an increase in the use of digital topographic data. Indeed, an increase in the demand for digital information soon followed.

Initially, cartographers thought that producing digital documents would make paper maps quicker and easier to produce. While this didn't happen, the technological advances provided a gateway to many other applications for digital data.

At the outset, the proliferation of computer-aided drafting (CAD) software justified the need for digital data. The demand led to the production of unstructured vector data (points and lines), called "spaghetti" data. Gradually, paper maps were converted into

digital data. In the 1970s, maps were stereodigitized from aerial photographs. With the digital standards being directly tied to the map, the process yielded unstructured vector data. In the 1980s, Canada turned to the mass acquisition of digital data using electro-optical scanning. Scanning was much less costly, allowing the acquisition of data directly from existing paper maps.

The early 1990s saw the advent of geographic information systems, which required structured digital topographic data. Canada embarked on a program to develop a National Topographic Data Base (NTDB) and associated digital standards. NTDB digital data are now structured for use in GIS.



World-Class Data Production

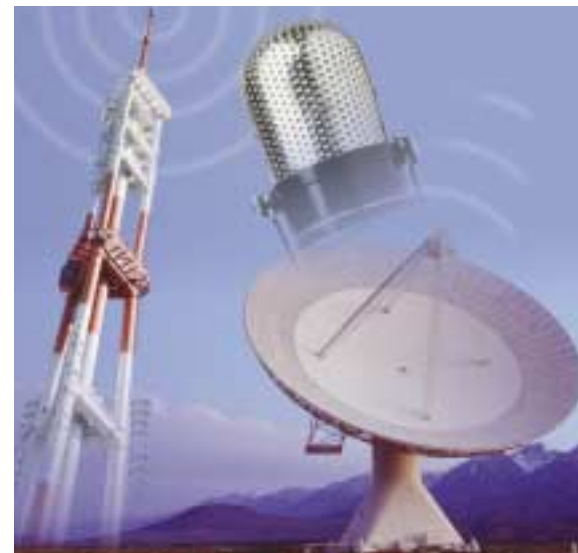
Canada's National Topographic Data Base is a digital data base that contains all the information normally found on a conventional topographic map, such as watercourses, urban areas, roads, railways, vegetation and relief.

NTDB files can be manipulated and enhanced to perform specific functions, and the data base lends itself to a much wider field of application than conventional paper maps. The NTDB covers the entire Canadian landmass and contains the features normally found on topographic maps at the scales of 1:50 000 and 1:250 000 (hydrography, hypsography (contours), vegetation, the road network, roads, the rail network, the electric-power network, designated areas, land forms, wetlands and man-made features). The organizational unit of the NTDB is the National Topographic System (NTS), based on the North American Datum



of 1983 (NAD83). Each data-set is free of all spatial inconsistencies, such as overshoots, undershoots and area misclosures.

The Canadian Digital Elevation Data (CDED) is a digital data base representing Canada's relief as points on a regular grid. These data can be used in a variety of areas, such as communications, forestry and agriculture.





A Wide Range of Applications

In conjunction with Canadian industry, the production and application of Digital Topographic Data (DTD) is rapidly expanding, with new applications coming from all sectors of economic activity. Whether alone or in combination with other data, structured DTD data can be used for carrying out analyses in a multitude of diverse fields.

Environmental applications include managing national parks, natural resources, vegetation and wildlife, and protecting against ecological accidents such as oil spills. They are used to record the effects of natural disasters, such as floods or severe storms.

DTD are used in Canada for forest-fire prevention and management, as well as for planning, harvesting and reforestation management.



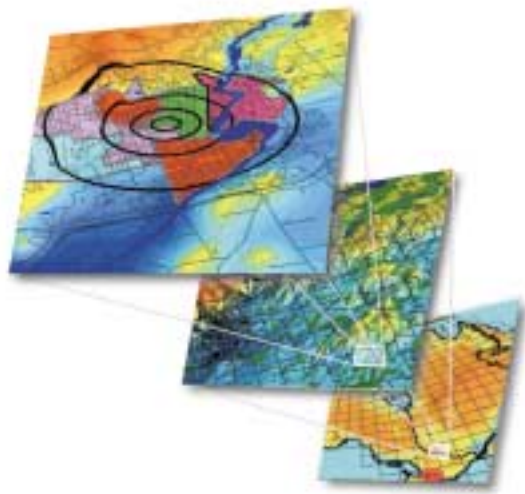
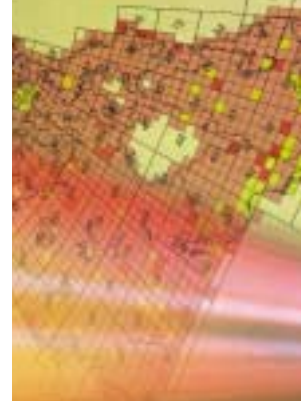
In transportation, topographic data are used for monitoring the fleets of trucking companies and for planning safer, more efficient school-bus routes.

Many companies use DTD for planning mining operations and tailings management.

A number of municipalities have used the digital topographic base data to complete their emergency service to rural and semi-urban areas.

Topographic and elevation data support the placement of telecommunications equipment for the most efficient signal transmission.





Dissemination of Digital Data

Canada offers its clients excellent service by producing and making available many thousands of data-sets in the most popular formats and on the most popular media. The NTDB provides complete coverage of the Canadian landmass at the 1:250 000 scale, and files at the 1:50 000 scale are available upon customer request.

Canada directly distributes its products and uses a network of private distributors. Distributors hold commercial licences for digital topographic products that may or may not be modified. Distributors can also create specific products for their customers by using NTDB data in conjunction with whatever other information they require.

Data Integration

Human activities are closely linked to geographic location. Governments and business capitalize on this fact by creating digital geospatial data — data based on location — for analysis, management and policy. Since the basis for this analysis is information technology, governments and industry are collaborating to develop the infrastructure to collect, manage and disseminate geospatial data using the emerging Information Highway.

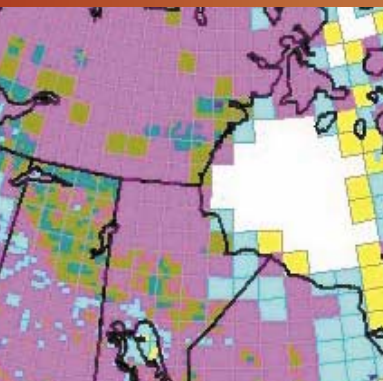
Governments, academia and industry are working together to make integrated geospatial information available at the click of a mouse. The Internet will provide fast, easy, consistent and harmonized access to geographic information and services. Data alignment information is also available to allow users to simultaneously access digital geospatial data from various sources, at different scales and in different formats. Diverse applications such as business, natural resources and environmental concerns will be able to easily and rapidly obtain and use geospatial data.



Why a Canadian Geomatics Solution?

The Canadian geomatics community is a respected and competitive player in international geomatics markets. The more than 1500 Canadian geomatics firms provide nearly \$2 billion worth of geomatics products and services annually, and many firms maintain offices and support capabilities abroad to meet the needs of clients.

At the federal government level, the Centre for Topographic Information (CTI) of Natural Resources Canada provides leadership in developing digital mapping applications and technologies. In addition, the Geomatics Industry Association of Canada (GIAC) assists its members in developing new business in Canada and around the world through promotional, educational and advocacy activities. The Canadian geomatics community can provide the expertise to respond to international geomatics project opportunities.



Canada offers you:

- ***A PARTNERSHIP APPROACH TO GEOMATICS APPLICATIONS***

The geomatics industry, along with federal and provincial governments and the academic sector, often work in teams to develop technology and expertise and to deliver services.

- ***FLEXIBILITY, RESPONSIVENESS AND CREATIVITY***

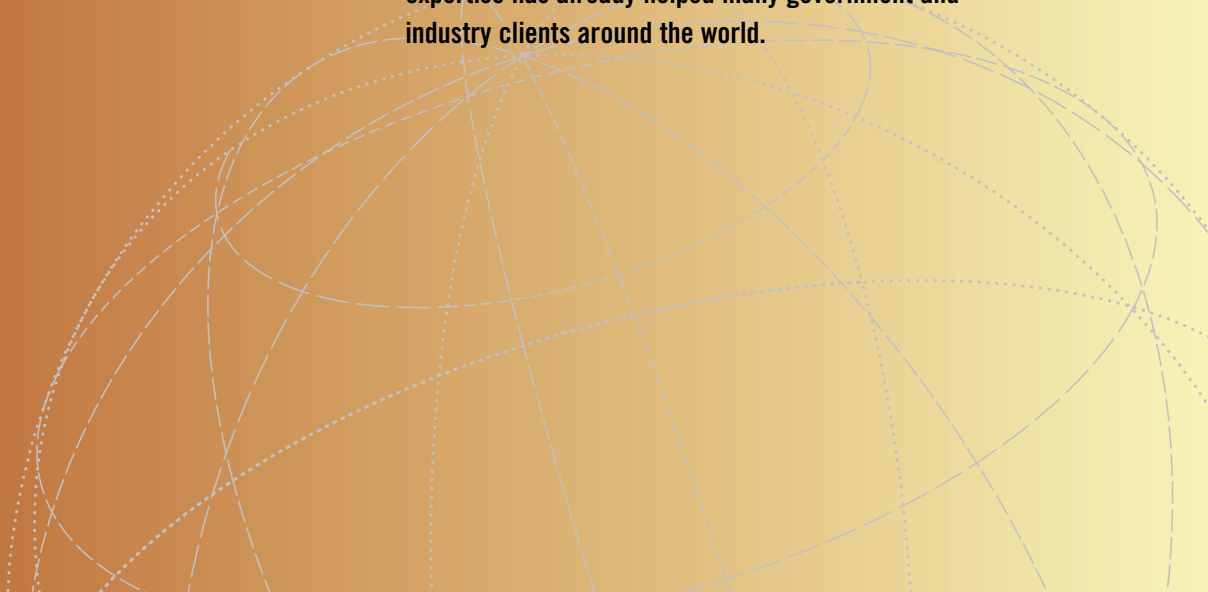
The industry can provide value-added products and services that are tailored to the unique requirements of individual clients. Technology transfer and skill-sharing are important elements of many export arrangements.

- ***A COMMITMENT TO TECHNOLOGICAL INNOVATION***

Working together, government, industry and universities continue to explore and develop new geomatics applications and technologies through cooperative research and development.

- ***A FOCUS ON SOLUTIONS***

Canada can provide multi-disciplinary, integrated solutions to problems related to the natural and the developed environment. Canadian geomatics expertise has already helped many government and industry clients around the world.





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Series includes:

Geographic Information Systems
(GIS) Technology
Global Positioning Technologies
Remote Sensing Technology
Digital Mapping Technologies
Cadastral Surveying

Cover image:

Map generated from the National
Topographic Data Base.



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