

Federal Geomatics Bulletin

the official publication of the Inter-Agency Committee on Geomatics

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JAN 1, 1995

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Government
of Canada Gouvernement
du Canada

Vol. 6, No. 1 Spring 1994

Federal-Provincial Partnership Provides a Major High-Tech Breakthrough for the Prairie Mining and Mineral Industry

On November 22, 1993, Anne McLellan, federal Minister of Natural Resources (NRCan), Donald Orchard, Manitoba Minister of Energy and Mines, and Doug Anguish, Saskatchewan Minister of Energy and Mines, announced the unveiling of a major breakthrough for the mining and mineral industry of Manitoba and Saskatchewan during the Manitoba Mining, Minerals and Petroleum Convention '93.

Ms. McLellan noted that it was the first major commercial release of digital data in CD-ROM format by NRCan's Geological Survey of Canada (GSC). The CD-ROM (GSC Open File 2743), which contains an impressive array of geoscientific data sets for the Flin Flon-Snow Lake region, is designed to meet the high technology requirements of the mineral exploration industry and planning agencies. The CD-ROM clearly demonstrates that the latest in digital information technology can be an essential tool to distribute a large spectrum of important scientific results.

Mr. Orchard mentioned that, as a result of strong partnerships with the geological surveys of Manitoba and Saskatchewan and other groups, the mining and minerals industry can use digital information technology to manipulate vast quantities of data faster and more effectively than ever before. According to Mr. Anguish, the introduction of this new product clearly demonstrates the commitment of the Governments of Saskatchewan, Manitoba and Canada to the continued prosperity of northern mining communities.

This event followed an announcement in June of the release of two new maps at a highly successful meeting at Flin Flon-Creighton involving more than 180 representatives from the mineral exploration industry, government and universities. One of these maps represented the first time since 1960 that geological information about this copper- and zinc-rich region has been shared across the provincial border.



Manitoba's Premier, Mr. Gary Filmon, receives a briefing on Canada's first CD-ROM geological data base for the Flin Flon-Snow Lake region from Dave McRitchie, Director of the provincial Geological Services Branch, and Stephen Lucas (GSC), Project Leader of the NATMAP Shield Margin Project.



Surveys, Mapping and
Remote Sensing Sector

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Federal Geomatics Bulletin

This newsletter is intended as a vehicle for the communication of information on geomatics activities within the Canadian federal government. It is published twice a year under the auspices of the Inter-Agency Committee on Geomatics. Articles pertain to the methods, procedures and technology associated with systems for the collection, manipulation, display and dissemination of geographically referenced digital data. The editorial board consists of Martine Couture (chair), Hélène Caza, David Ellwood, Jeffrey Murray and Nick Mosienko. Editorial and production support is provided by Barbara McAulay, Marion McEllistrum and Marguerite Trindade. Submissions for Volume 6, No. 2, which should be submitted before August 12, 1994, are most welcome. Subscription requests, queries, comments or submissions should be sent to: *Federal Geomatics Bulletin*, IACG Secretariat, GIS Division, Surveys, Mapping and Remote Sensing Sector, Natural Resources Canada (NRCan), 615 Booth Street, Ottawa, Ontario K1A 0E9. Fax: (613) 952-0916.

To date, geological maps have been generally available in paper copy (analogue) form only. Therefore, to integrate these maps with other digital data bases, users were faced with the expensive and time-consuming task of digitizing this information for use in geographic information systems (GIS) to support the search for new ore deposits, or to develop plans for infrastructure development and land use. The data sets available on CD-ROM are provided in a number of internationally accepted interchange formats.

Data sets on the CD-ROM include geophysical and satellite imagery, bedrock and surficial geological maps, and economic mineral inventory data, thus offering geoscientific information for the economically critical Flin Flon-Snow Lake region using state-of-the-art information technology.

This CD-ROM represents significant progress by the Shield Margin Project of the GSC's National Geoscience Mapping Program (NATMAP). The Shield Margin Project began in March 1991, and involves more than 50 participants from the GSC, the geological surveys of Manitoba and Saskatchewan, the Saskatchewan Research Council, and university and mineral exploration communities.

For further information on the NATMAP Shield Margin Project, please contact Stephen Lucas, Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario K1A 0E8. Tel.: (613) 995-4534; fax: (613) 995-9273.

For information on the CD-ROM, please contact John Broome, Geological Survey of Canada, 1 Observatory Crescent, Ottawa, Ontario K1A 0Y3. Tel.: (613) 995-6914; fax: (613) 947-1819; or Paul Lenton, Manitoba Energy and Mines Department, 555-330 Graham Avenue, Winnipeg, Manitoba R3C 4E3. Tel.: (204) 945-6553; fax: (204) 945-1406.

Successful Open House at Statistics Canada



David Crockett, an employee of Statistics Canada's Geography Division, demonstrates the use of a geographic information system.

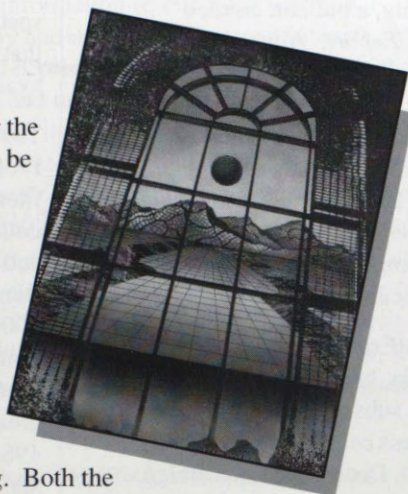
Statistics Canada's Geography Division held its first Open House in Ottawa, on February 3 and 4, 1994. The Open House featured the Division's products and services as well as its computer systems, methods and concepts. It provided information on how the Geography Division supports the Census of Population and Housing, and how the Division's products and services can be utilized for applications such as thematic mapping of attribute data, spatial analysis of demographic data, surveys and market analysis studies. The Open House was attended by an estimated 650 employees from Statistics Canada and outside organizations.

For more information on the Open House or on the Geography Division's products and services, please contact GEO-Help, Geography Division, Statistics Canada, Jean Talon Building, 3rd floor, Tunney's Pasture, Ottawa, Ontario K1A 0T6. Tel.: (613) 951-3889; fax: (613) 951-0569.

A Shared Vision: The Canadian Conference on GIS/ The Symposium of ISPRS Commission II

*from June 6 to 10, 1994,
Ottawa, Canada*

Final arrangements are under way for the 1994 Canadian Conference on GIS to be held at the Ottawa Congress Centre, June 6 to 10, 1994. This will be the Sixth Canadian Conference on Geographic Information Systems to be held in the Nation's Capital, and this year, the organizing committee is pleased to welcome participants from the Symposium of Commission II of the International Society for Photogrammetry and Remote Sensing. Both the Conference and the Symposium are being organized by the Surveys, Mapping and Remote Sensing Sector of the Department of Natural Resources Canada, supported by the Inter-Agency Committee on Geomatics and the Canadian Institute of Geomatics.



The 1994 theme, A Shared Vision, supports the common elements of the two organizations' mandates concerning systems for data processing, analysis and representation. In past years, the Canadian Conference on GIS has been a meeting ground for people and organizations to become educated in geographic information systems, from the basics to the very latest of innovative ideas, and to facilitate the exchange of new information and views. The inclusion, this year, of ISPRS Commission II can only enhance this exchange as a wide range of distinguished guests, delegations, and individuals, including Canadian and foreign government officials and heads of corporations, share their visions of the future.

The technical program has been carefully organized to include as many presentations of papers as possible in plenary and technical sessions. Three poster sessions are also planned. The Exhibit Hall will provide space for over 50 companies and organizations to promote the latest in technology, applications and ideas. The mid-Conference/Symposium technical tours will be a focal point of the week with visits to local agencies and private companies. As well, social programs for the delegates and accompanying persons have been developed to complete the daily activities. Pre-Conference/Symposium training sessions and workshops will also return, by popular demand.

For more information on how to register for this Conference/Symposium, contact the GIS 1994 Conference and ISPRS II Symposium, Room 700, 615 Booth Street, Ottawa, Ontario K1A 0E9, Canada. Tel.: (613) 992-4902; fax: (613) 952-0916.

Why not consider the GIS Conference/ISPRS Symposium in June — one city, one site, two events for the price of one!

CGSB's Committee on Geomatics Votes on Standards

The Canadian General Standards Board's (CGSB) Committee on Geomatics recently conducted a letter ballot to gain the Committee's concurrence that both CGIS-DIGEST and CGIS-SAIF (see Federal Geomatics Bulletin, Vol. 3, No. 1, page 7) should be submitted for National Standard of Canada status as Canadian Geomatics Interchange Standards. The majority supported this viewpoint. There were, however, a few negative ballots, which are being addressed before the two documents are put forward as National Standards of Canada.

For more information, contact Bruce Dodd, Committee on Geomatics Secretary, Canadian General Standards Board, 222 Queen Street, Ottawa, Ontario K1P 5E4. Tel. (613) 941-8674; fax (613) 941-8706.

DIGEST Update and DIGESTView

The Digital Geographic Information Working Group (DGIWG) released Edition 1.2 of DIGEST early in 1994. The new edition employs an improved logical data model, which is fully compatible with the one used by the International Hydrographic Organization (IHO). Previous users of DIGEST need not panic — DIGEST 1.1 is fully compatible with Ed. 1.2. DGIWG has agreed to keep DIGEST frozen at Edition 1.2 for a period of about two years. The Feature and Attribute Coding Catalogue (FACC) has included many new features and attributes, and FACC (DIGEST Part 4) Ed. 1.2 will be published at the same time as DIGEST 1.2 (Parts 1, 2, 3). FACC will continue to evolve as a dynamic document with new editions (FACC 1.3, 1.4, etc.) being published as requirements dictate.

DIGESTView is a three-year project sponsored by National Defence to develop a standard suite of software tools to exploit DIGEST digital data sets. The primary objective is to provide basic tools to import, export, display, and manipulate DIGEST digital raster, matrix, and vector data. As a result of the project, the source code will become available as public domain with accessible modules for anyone involved in manipulating DIGEST data sets.

For more information concerning DIGEST, contact Major Mark Phillips, D GeoOps, Directorate of Geographic Operations, National Defence Headquarters, Ottawa, Ontario K1A 0K2. Tel.: (613) 996-2240; fax: (613) 996-3328.

For more information on DIGESTView, contact Paul Morin, D GeoOps, Directorate of Geographic Operations, National Defence Headquarters, Ottawa, Ontario K1A 0K2. Tel.: (613) 992-7666; fax: (613) 996-3328.

Quality Geomatics Development

Canada has made a commitment to becoming the world leader in the geomatics industry. As a result of Total Quality Management, the Surveys, Mapping and Remote Sensing Sector (SMRSS) of Natural Resources Canada (NRCan) has identified the need for ongoing quality geomatics training for its staff and the community at large. One initiative was the establishment of a Geomatics Professional Development Program (GPDP) by SMRSS in September 1992. Currently, the program is being operationally managed by the Canadian Centre for Training in Geomatics (CCTG) within the Sector.

This program targets a broad clientele: employees in the scientific and technical categories of SMRSS and recent Canadian university graduates. There is also a possibility that the clientele will include the geomatics community in the private sector, provincial governments and foreign countries.

The principal objective of this two-year program is to provide participants with training and practical knowledge in the various disciplines involving geomatics, and to promote the establishment of links between the various Divisions/Centres. As well, it ensures the transfer of technology to the Divisions/Centres, thereby improving the effectiveness of SMRSS, and allows for the transfer of increased technological knowledge to areas external to the Sector including the geomatics industry.

The program is designed to provide SMRSS and the geomatics industry at large with well-qualified, multi-disciplinary geomatics specialists who are dynamic and enthusiastic, and have the necessary technical skills and abilities relating to team building, project management and management of people.

On April 29, 1994, eight participants will have been the first group to graduate from the two-year program. Each subsequent year will see a new generation of well-trained graduates from the program.

For further information concerning the Geomatics Professional Development Program, please contact the Canadian Centre for Training in Geomatics, Surveys, Mapping and Remote Sensing Sector, NRCan, 615 Booth Street, Room 171, Ottawa, Ontario K1A 0E9. Tel.: (613) 947-0147; fax: (613) 947-0146.

CanadExport

The Trade Communications Division (BCT) of the Department of Foreign Affairs and International Trade (DFAIT) publishes, twice monthly, a bulletin entitled *CanadExport*. Aimed at exporters and business-oriented people, this publication contains articles about foreign markets, competitiveness, business opportunities and trade fairs. Every second issue includes an insert on the new DFAIT trade program called Access North America.

CanadExport, which is available in Canada, has a circulation of 38 500. For a subscription, send your business card to: *CanadExport* (BCT), Department of Foreign Affairs and International Trade, 125 Sussex Drive, Ottawa, Ontario K1A 0G2.

Contracting-out Bulletin for the Private Sector

The Surveys, Mapping and Remote Sensing Sector (SMRSS) of Natural Resources Canada has just released its fifth annual *Contracting-out Bulletin for the Private Sector*. This publication provides information on contracts SMRSS expects to award to the private sector during the 1994-1995 fiscal year.

The booklet is available in English (ISBN 0-662-21405-6) and in French (ISBN 0-662-98905-8) from the Office of External Relations, Surveys, Mapping and Remote Sensing Sector, Natural Resources Canada, 10th floor, 580 Booth Street, Ottawa, Ontario K1A 0E4. Fax: (613) 943-8838.

Data from the Latest Census now Available on CD-ROM

GIS users interested in market research, demographic studies or other types of spatial analysis will be pleased to know that the 1991 census data are now available on CD-ROM.

The Canada 1986 and 1991 Census Profiles CD-ROMS contain two types of files: the popular profile series - 2A (data collected from 100% of the population) and 2B (data collected from a 20% sample). Both incorporate more than 500 cultural, demographic, housing, family and economic characteristics for thousands of standard sub-provincial areas on a single compact disc. The 1986 Census Profiles also contain a series of special-interest tables created specifically for this disc. The 1991 profiles disc contains an electronic dictionary. Data files for the 1986 or the 1991 profiles are available at a number of geographic levels, from census subdivisions to enumeration areas. Easy-to-use retrieval software, featuring detailed help screens, allows users to display and manipulate data, or to transfer them to user-owned, commercial software packages.

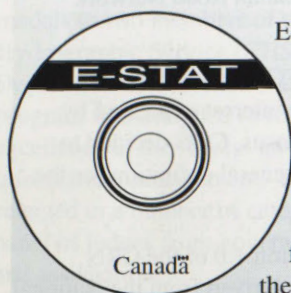
The Geography Information File enables users to identify the relationships between a number of standard political and statistical areas used in the census. Descriptive files provide information on the content of pre-defined census tabulations and the public-use micro data files.

The 1986 Census Profiles CD-ROM is now available for sale at a 70 per cent discount off its commercial price. Prices for the 1991 Census Profiles CD-ROM range from \$500 for one province to \$7500 for all of Canada. Educational discounts of 50 per cent are also available.

For more information, contact any Statistics Canada Regional Reference Centre, or the Marketing Division, Statistics Canada, R.H. Coats Building, 9th Floor, Ottawa, Ontario K1A 0T6. Tel.: (613) 951-8200; fax: (613) 951-1134.

ATTENTION: SCHOOLS, COLLEGES AND UNIVERSITIES!

2nd Edition of E-STAT Electronic Learning Package Now Available



E-STAT, now in its second edition, is an excellent computer information resource for teaching geography and other social science subjects. More than 600 copies have already been sold to schools, colleges and universities. E-STAT represents a new approach to the tasks of manipulating data and teaching valuable computer skills. Access to this data forms the heart of this valuable teaching resource, but the imagination is what truly allows its versatility and

strengths to shine. Educators and students can make use of these

statistics to create maps, graphs, and tables that bring topics of interest to life right in the geography classroom. E-STAT includes fully bilingual Canada-wide 1991 Census community, county, provincial, and country level information, plus a current and historical record of 300 000 social, geographic, historical, and economic subjects.

The documentation for the 1993 edition of E-STAT contains an all new Teacher's Resource package containing 49 ready-to-use lesson plans written by teachers. These lesson plans cover a variety of grade levels and subjects, and can be used in the single subject or cross-curricular classroom. The Teacher's Resource is divided into seven sections: Business and Industry, Labour, Economics, Demographics, Health and Welfare, Crime and Justice, and Multiculturalism. All lesson plans contain graphs, maps, and tables with appropriate questions and activities for each.

The equipment needed to use this package is an IBM or 100% IBM-compatible personal computer, a colour monitor with EGA graphics card or higher, a CD-ROM player, a mouse, and MS-DOS with CD-ROM extensions. E-STAT will be available for the Macintosh computer in the fall of 1994.

The price is \$495 for a stand-alone version and \$750 for a network version. A discount is given for multiple copy purchases, with subsequent stand-alone copies costing \$295. In Alberta, Saskatchewan and New Brunswick, the education ministry has purchased a provincial licence, to bring the price down to \$100 for a stand-alone copy. Costs for an update from the 1992 version are \$295 for a school site network licence, \$195 for the first stand-alone copy, and \$120 for subsequent stand-alone copies. **Note: E-STAT is only sold to educational institutions.**

For further information, call or visit Statistics Canada's nearest office. Regional offices are located in Halifax, Montreal, Ottawa, Toronto, Winnipeg, Regina, Edmonton, Calgary and Vancouver.

Or contact Joel Yan, University Liaison Program, 3-Coats Bldg., Statistics Canada, Ottawa, Ontario K1A 0T6.

Fax: (613) 951-4513;

Internet: YANJOEL@STATCAN.CA

Mark Oliver, a geography teacher at the Napanee District Secondary School, Lennox and Addington County Board of Education in Ontario, uses E-STAT both as a source of data and as a mapping/graphics tool to introduce students to geographic information systems

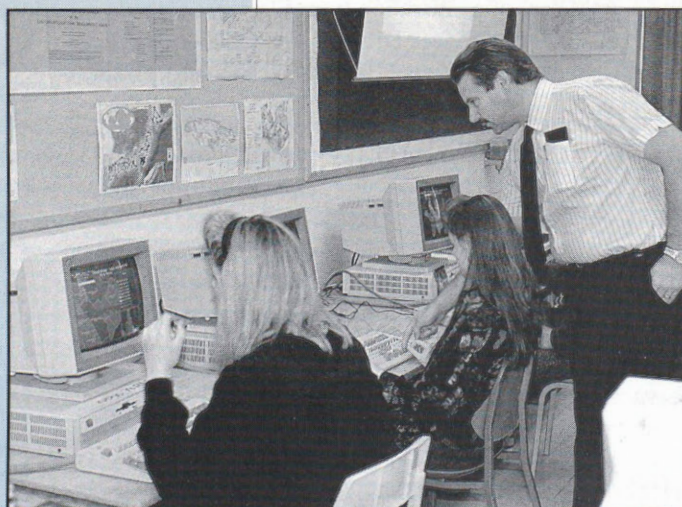
The Future of the National Topographic Data Base

The Canada Centre for Geomatics (CCG) of Natural Resources Canada will soon complete its data conversion program for populating the National Topographic Data Base (NTDB). In 1994, all of Canada will be covered by data extracted from the 1:250 000 scale maps. By 1996, the regions of interest identified by users will have been covered from the 1:50 000 scale maps.

Data revision is the next step. CCG already knows that this process is expensive and that it will have to innovate. To face this challenge, CCG is establishing the long-term orientations of the NTDB and will make sure it satisfies users' needs.

The future of the NTDB depends on more specific, up-to-date products that better meet users' needs. To do so, CCG must look towards integrating multiple data sources. CCG will thus look for partnerships with depositories of data that may be of interest to users, in order to minimize duplication of efforts and to offer more useful products.

For more information, please contact Daniel Clavet, Canada Centre for Geomatics, 2144 King Street West, Suite 010, Sherbrooke, Quebec J1J 2E8. Tel.: (819) 564-4833; fax (819) 564-5698.



Election 93 — Digital Mapping Meets the Media

Do you remember your first job interview? Was it frustrating because the job required experience and experience required a job? The National Atlas Information Service (NAIS) of Natural Resources Canada faced similar prospects regarding map distribution to the mass media — its staff was enthusiastic, but lacked a track record.

With the cooperation of many partners, the Canadian Federal Election (Oct. '93) provided a golden opportunity to gain experience in turnaround time and distribution — reaching a much wider audience than ever before. Three significant “firsts” were involved: a pre-election map (newspaper), real-time maps via satellite (TV), and a results map printed within 24 hours.

NAIS approached *The Ottawa Citizen* and other English and French newspapers about publishing a pre-election map. During election week, maps were sent on floppy disk to various newspapers across the country. The *Citizen* published the pre-election map the Saturday before the vote. This single publication (170 000 copies) established a distribution record for National Atlas maps. For its part, NAIS gained a much better insight into the publisher's requirements, including timing, exchange formats, colour selection, and map content.

In early September, NAIS contacted national television networks to gauge their interest in real-time mapping. Global was interested in pursuing the project. It was a long shot, but NAIS felt it was achievable with the help of many cooperating partners. Riding results were obtained via modem from Elections Canada and Canadian Press. These results fed a digital data base to generate a series of national and regional maps. The screen images of these maps were converted to video signals and transmitted to television via Canada's Anik E1 satellite hovering some 35 000 kilometres away in space. Ultimately, Global showed two of the NAIS maps, which were seen by an estimated 250 000 viewers.

In the midst of all of this, NAIS cartographic staff were involved in another challenge — publishing a digital map of election results within 24 hours of the voting. This involved contingency planning and a great deal of cooperation from Elections Canada and from the Products and Services Division, the Communications Branch and the Canada Map Office of Natural Resources Canada.

Apart from the technical achievements, these three products involved a number of common elements — partnerships, risk, innovation, and teamwork. The result was the beginning of a new track record for NAIS — a new set of media contacts and experience that it now has the opportunity to build upon. The next time NAIS bids for a job involving map distribution via television or newspaper, it will be applying with experience. In the highly competitive media world, that means a lot.

For additional information, please contact Peter Paul, National Atlas Information Service, Surveys, Mapping and Remote Sensing Sector, 615 Booth Street, Ottawa, Ontario K1A 0E9. Tel.: (613) 943-0572; fax: (613) 943-8282.

Canadian Road Network

In the fall of 1993, the Surveys, Mapping and Remote Sensing Sector of Natural Resources Canada conducted a survey on the digital data requirements for the Canadian Road Network (CRN).

The Canada Centre for Geomatics (CCG) compiled and analysed the answers. In view of the interest expressed by users and the clearly emerging consensus, CCG decided to pursue its analysis and to propose a general definition for the ideal CRN product.

CCG also drafted what could be version 1.0 of the CRN product. This first version would be derived from the National Topographic Data Base (NTDB), for which CCG is fully responsible.

However, the CRN components identified by users are not entirely defined in the NTDB. This is why CCG started discussions with partners such as Statistics Canada, Elections Canada and Canada Post Corporation to complete the ideal CRN product that would meet users' needs.

CCG understands the importance of having a CRN in place very soon, and is working on a plan of action for the implementation of version 1.0 by the end of 1994.

For more information or to obtain the documents, *Survey Findings, Product General Definition and Main Characteristics of Version 1.0*, please contact the Canada Centre for Geomatics, 2144 King Street West, Suite 010, Sherbrooke, Quebec J1J 2E8. Tel.: (819) 564-5600; fax: (819) 564-5698.

The Canada Centre for Geomatics Excellence Award



The Canada Centre for Geomatics of Natural Resources Canada took the initiative to grant, at the end of each fiscal year, an Excellence Award to a key representative in the field of digital data conversion, as determined by the Centre's employees.

This choice is based on the results of consultation at the supervisory level for the administrative aspects, at the technical officer level for adherence to contract requirements, and at the operator level for the quality of the data supplied. All firms registered on the Canadian Government's Supplier List in the area of digital data conversion, which produced at least 25 data sets, are eligible for the award.

The Canada Centre for Geomatics is pleased to announce that the winner of its Excellence Award for fiscal year 1992-1993 is *Mr. Pierre Richard* of Groupe Info Consult of Sainte-Foy, Quebec.

For more information, please contact the Canada Centre for Geomatics, 2144 King Street West, suite 010, Sherbrooke, Quebec J1J 2E8. Tel.: (819) 564-5600; fax: (819) 564-5698.

Canadian Hydrographic Service Employees Win Award for Excellence in Information Management

The 1993 Federal Awards Program granted medals to two members of the Canadian Hydrographic Service (CHS) of the Department of Fisheries and Oceans. This program was designed to recognize excellence in the federal government's information management. Recipients were selected in a number of categories by a panel of judges from government, industry and associations.

The two CHS winners were:

- **Neil Anderson**, who was awarded the gold medal in the *Building Partnerships - Team Effort, Industry/Government* category, in recognition of his contribution to an agreement between Nautical Data International Inc. of St. John's, Newfoundland, and the Canadian Hydrographic Service.
- **Dave Pugh**, who received the bronze medal in the *Distributing Computer Power to Managers and Staff - Training and Education* category for his work in developing a technology-assisted learning and coaching program for CHS.

The CHS/NDI Agreement

While the collection, management and distribution of hydrographic information are the responsibility of the federal government, the escalating demands for electronic charts go beyond the capabilities of existing government infrastructure at a critical time for the electronic chart industry. Accordingly, the Canadian Hydrographic Service has entered into an agreement with Nautical Data International Inc. (NDI) that gives NDI the sole right to license the use of CHS certified digital products, including electronic navigation charts and digital product updates, for an initial three-year period. This agreement provides the CHS with a private sector partner that will market and distribute its digital data products worldwide.

NDI's goal is to become a major international player in the production and distribution of electronic charts and other nautical digital data products. NDI will also provide customized products and services to support end users, marketers of value-added products, and foreign hydrographic offices.



Andy Macdonald (left), Chief Informatics Officer, Treasury Board Secretariat, presents Dave Pugh (right), Canadian Hydrographic Service, with the bronze medal in the category of Distributing Computer Power to Managers and Staff - Training and Education of the 1993 Federal Awards Program.

The CHS/NDI model of public and private sector cooperation in building the new electronic chart infrastructure is being studied by hydrographic offices in other countries.

For more information on the CHS/NDI agreement, contact, G.R. Douglas, Director General of the Canadian Hydrographic Service, Department of Fisheries and Oceans, 615 Booth Street, Ottawa, Ontario, K1A 0E6. Tel.: (613) 995-4413; fax: (613) 996-9053.

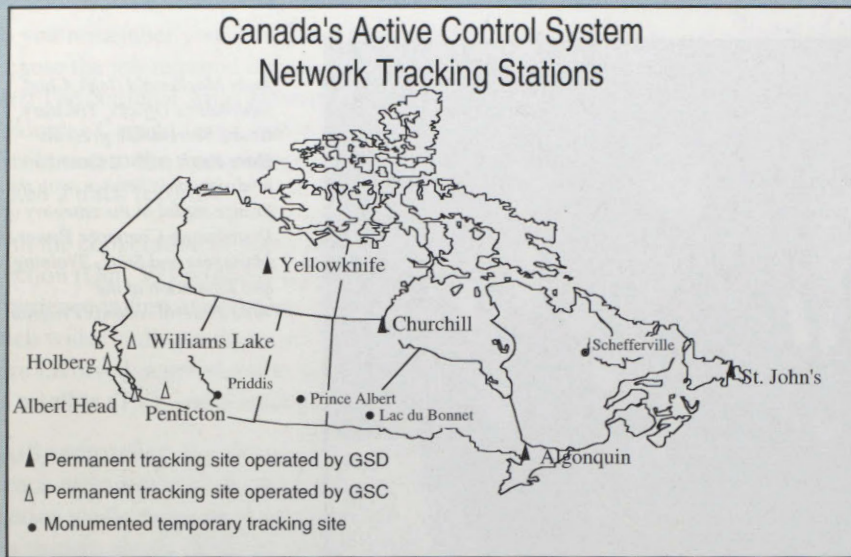
Technology Assisted Learning and Coaching (TALC)

The staff of the Canadian Hydrographic Service (CHS) needs specialized knowledge and skills to provide charts and their related products such as sailing directions and tide tables required by the marine community. In the past, conventional classroom instruction was successfully used to provide this training. However, that teaching process does not meet the current training needs of CHS.

To facilitate the training of its staff, CHS is producing computer-based multimedia training modules for instruction on topics such as geographic information systems, the Global Positioning System, and quality assurance. These modules are designed to be user-centred for the efficient and effective delivery of information. From pilot evaluation, it has been demonstrated that TALC provides a 75 per cent decrease in the time required by CHS staff to obtain the necessary training and, when combined with structured coaching through tutorials, rapidly builds the required knowledge.

TALC is available for distribution. For more information on TALC, contact Dave Pugh, Chief of Training Development, Canadian Hydrographic Service, Fisheries and Oceans Canada, 615 Booth Street, Ottawa, Ontario K1A 0E6. Tel.: (613) 943-1366; fax: (613) 996-5053.

Canadian Active Control System: Toward a Survey Control Network in the Sky



The Geodetic Survey Division (GSD) of Natural Resources Canada (NRCan), in partnership with the Geological Survey of Canada, is presently operating a Canadian Active Control System (CACS) to provide a modern, precise positioning capability for the Canadian surveying and geophysical community. The system consists of unattended tracking stations, referred to as Active Control Points (ACPs), which continuously record measurements for all satellites of the Global Positioning System (GPS) above the local horizon. Presently, ACPs are located in Algonquin Park, Ontario; Yellowknife, Northwest Territories; Penticton, Victoria, Williams Lake and Holberg in British Columbia; St. John's, Newfoundland; and Churchill, Manitoba. The data collected at each ACP are retrieved on a daily basis by a central processing facility located within GSD in Ottawa.

The CACS substantially improves the effectiveness of GPS applications. It has four main objectives: (1) to provide fiducial sites for GPS; (2) to compute precise satellite ephemerides (orbital parameters) for geodetic positioning using data from the Canadian ACPs

and selected globally distributed tracking stations; (3) to monitor and verify GPS integrity and performance by analysing data acquired through continuous tracking; and, (4) to facilitate differential GPS positioning in the NAD83 reference frame.

The availability of precise ephemerides and permanent tracking sites data offers significant benefits for Canadian users carrying out geodetic surveys. Whereas errors in GPS baseline determinations due to ephemerides broadcast by the satellites can be as high as 3 parts per million, by using CACS precise ephemerides all orbit-related errors are reduced to about 0.1 ppm. As systematic scale and orientation errors are reduced, the number of control points required for a survey project may be reduced, thereby increasing the efficiency of field operations and data processing. Furthermore, since ACP sites are integrated with the national survey framework, users with only one GPS receiver can establish a direct tie to the national survey framework by using observations from ACP stations in their data processing. Recent tests, combining CACS data and precise ephemerides, achieved

positioning precision of a few centimetres in each of the tridimensional components for distances up to 600 km. It is therefore possible to position any point in Canada, in relation to the national survey framework, with a precision level of a few centimetres without actually occupying an existing control monument.

The CACS also contributes data and acts as an analysis centre for the International GPS Geodynamics Service (IGS), thus having access to the data from globally distributed fiducial sites used in the computation of precise satellite ephemerides. Through the IGS, CACS data and products generated by NRCan are made available to international organizations such as the International Earth Rotation Service (IERS), the NASA Crustal Dynamics Data Information System (CDDIS), the U.S. National Geodetic Survey (USNGS), the U.S. Naval Observatory (USNO) and other organizations interested in Earth dynamics. The precise observations of the satellites made from the fiducial stations are used to establish the Earth Orientation Parameters (EOP) and derive inter-station baseline lengths and orientation for regional monitoring stations. Changes over time in baseline components provide quantitative data for studies of geodynamics, natural hazards and global change.

Recently, at the request of the IGS Governing Board, the Geodetic Survey Division has assumed the responsibility for the Analysis Centres' coordination. There are presently seven international analysis centres contributing to the IGS. This responsibility includes generation of combined precise ephemerides and other products from data submitted by the seven centres.

Products Available

Data validation is performed for each individual ACP to monitor GPS system performance and the status of selective availability. CACS raw data consist of dual frequency calibrated satellite code and carrier phase observations from continuous tracking of up to eight satellites, currently at a 30-second sampling interval. Data are archived daily in the RINEX format (version 2). Station files contain data collected over a 24-hour period (0:00:00 to 23:59:30 GPS Time) and are generally available on-line 4 hours after the end of the day.

The precise ephemerides, also available from GSD, are computed from data collected at Canadian stations augmented by up to 12 globally distributed core stations of the International GPS Geodynamics Service (IGS). Ephemeris data are computed in the International Earth Rotation Service's (IERS) International Terrestrial Reference Frame (ITRF), which agrees with NAD83 and WGS84 within 0.2 parts per million. Based on IGS orbit comparisons, the NRCan precise ephemerides have precision better than 0.5 metre (one sigma) in each coordinate. Precise ephemerides are provided as daily files (0:00 to 23:45 GPS Time) and are available typically within a week following the observations. They are currently distributed in the internationally accepted NGS-SP3 format which contains all satellite X, Y, Z positions and clock information at 15-minute intervals. PC compatible utility programs are also available for the interpolation of the ephemerides to user specified epochs or conversion from SP3 to other formats (SP1, SP3 with or without satellite velocities) and for merging up to 7 daily ephemeris files into a single file.

For more information, contact the Information Services Section, Geodetic Survey Division, 615 Booth Street, Ottawa, Ontario K1A 0E9. Tel.: (613) 995-4421; fax: (613) 995-3215.

Canadian Geoscience Information Centre

The newly formed Canadian Geoscience Information Centre (CGIC) marked its official opening with an open house on June 4, 1993, at the Geological Survey of Canada (GSC) in Ottawa, Ontario. The CGIC was formed through the amalgamation of the Geological Survey of Canada Library (including the Main, Map, Geophysics and Photo Libraries) and the National GEOSCAN Centre.

Designed to provide the geoscience community with a single contact point for their information needs, the new CGIC integrates the delivery of traditional library-based services with newer technology-driven information products and services. While supporting the core Library and GEOSCAN programs, the new unit provides greater emphasis on special collections, data base and product development, and the technical enquiries service.

The automated CGIC catalogue provides access to the holdings of the Main Library and the Map and Geophysics Libraries. The majority of the holdings are available for loan to registered borrowers and through interlibrary loan.

GEOSCAN, a bibliographic data base of Canadian geoscience literature, is produced by the CGIC in cooperation with federal, provincial, academic and professional geoscience organizations throughout Canada. References to data from provincial surveys, industry assessment reports, and coverage of GSC publications make GEOSCAN an important data base for the geoscientific community.

The CGIC holds Canada's largest geoscience collection of books, serials, maps and photos, and is the second-largest geoscience collection of its type in North America. Main interest areas are geology, economic geology, petrology, geodynamics, geochemistry, geochronology, geomorphology, mineralogy, structural geology, volcanology, and environmental geology.

The CGIC's Special Collections include the Geophysics Library, the Map Library, the Photo Library and the Book and Map Archives.

The Geophysics Library is the principal source in Canada of information on solid earth geophysics in the areas of seismology, gravity, geomagnetism, global dynamics, planetology, mathematics and physics.

The Map Library's collection of more than 250 000 map sheets and related material is both national and international in scope. While the emphasis is on geoscientific maps, the Map Library also has extensive Canadian topographic coverage. Reflecting the ever-changing needs of the geoscientific community, the holdings include an increasing number and variety of cartographic data bases and digital maps. The Map Library also houses the GSC Open File Collection.

The Photo Library contains more than 500 000 negatives which are available to the public for research and/or reproduction. Both historical and contemporary, the photographs cover a wide range of topics including geology, geodynamics, astronomy, ethnology, anthropology, history and biology.

Public access to the CGIC bibliographic data bases through Internet and dial in modem is planned for the spring of 1994.

For further information, contact the Canadian Geoscience Information Centre, 601 Booth Street, Ottawa, Ontario K1A 0E8. Tel.: (613) 996-3919; fax: (613) 943-8742; Internet: Library@gsc.emr.ca

GIS Calendar of Events 1994

May 31 - June 3, 1994

ISPRS Commission IV Symposium, Mapping and Geographic Information Systems (GIS), Athens, Georgia, U.S.A. Contact Dr. Roy Welch, President of Commission IV, Center for Remote Sensing and Mapping Science (CRMS), Department of Geography, University of Georgia, Athens, Georgia 30602-2503, U.S.A. Fax: (706) 542-2358.

June 1-3, 1994

4th National Workshop of the Canadian Society for Landscape Ecology and Management, Quebec Environment Ministry and Laval University Faculty of Forestry and Geomatics, Sainte-Foy, Quebec, Canada. Contact Jean Falardeau. Tel.: (418) 528-9257.

June 6-10, 1994

6th Canadian Conference on Geographic Information Systems, and Symposium of ISPRS Commission II Systems for Data Processing, Analysis and Representation, Ottawa, Ontario, Canada. Contact Dr. Mosaad Allam, Chairman, 615 Booth Street, 7th floor, Ottawa, Ontario, Canada K1A 0E9. Tel.: (613) 992-4902; fax: (613) 952-0916.

August 7-11, 1994

URISA '94, Milwaukee, Wisconsin, U.S.A. Contact the Urban and Regional Information Systems Association, 900 Second St. N.E., Suite 304, Washington, DC 20002, U.S.A. Tel.: (202) 289-1685.

August 15-17, 1994

Global to Local: Ecological Land Classification, Canadian Forest Service and Ontario Ministry of Natural Resources, Thunder Bay, Ontario, Canada. Contact Dr. R.A. Sims, Canadian Forest Service-Ontario Region, 1219 Queen Street East, Box 490, Sault Ste. Marie, Ontario, Canada P6A 5M7. Tel.: (705) 949-9461; fax: (705) 759-5700.

September 5-9, 1994

SDH 94 Sixth International Symposium on Spatial Data Handling, Edinburgh, Scotland, U.K. Contact Thomas C. Waugh, SDH 94, Department of Geography, University of Edinburgh, Drummond Street, Edinburgh, EH8 9XP Scotland, U.K. Tel.: (44)-(31)-650-2530/2531; fax: (44)-(31)-668-2104.

September 20-23, 1994

Coastal Zone Canada '94 International Conference, Cooperation in the Coastal Zone, Halifax, N.S., Canada. Contact CZC '94 Conference Secretariat, Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, N.S., Canada B2Y 4A2. Tel.: (902) 429-9497; fax: (902) 429-9491.

October 23-28, 1994

GIS/LIS'94 Annual Conference and Exposition and ACSM/ASPRS Fall Convention, Phoenix, Arizona, U.S.A. Contact ACSM, 5410 Grosvenor Lane, Bethesda, MD 20814-2122 U.S.A. Tel.: (301) 493-0200; fax: (301) 493-8245.

FGB Client Satisfaction Survey

The *Federal Geomatics Bulletin* has been published for five years now. In an effort to offer its readers the most useful information on geomatics, the Editorial Board has decided to conduct a client satisfaction survey. A questionnaire has been inserted in this issue. It would be greatly appreciated if readers would answer the questionnaire and return it to: *Federal Geomatics Bulletin*, IACG Secretariat, GIS Division, Surveys, Mapping and Remote Sensing Sector, NRCan, 615 Booth Street, Ottawa, Ontario K1A 0E9, Canada. **Please answer the first question if you wish to continue receiving the *Federal Geomatics Bulletin*.**



Mark your calendar!

**The 7th Canadian
Conference on
Geographic
Information Systems**

June 10-15, 1995

Ottawa, Canada

Ottawa Congress Centre