



Federal Geomatics Bulletin

the official publication of the Inter-Agency Committee on Geomatics



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of Canada

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SURVEYS, MAPPING AND
REMOTE SENSING SECTOR

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CENSUS DAY • RECENSEMENT

June 4 Count Yourself In! • Soyez du nombre! 4 juin

The Census Is Coming!



The 1991 Census is something that will be heard more and more often as Census Day, June 4, 1991, approaches. Preparations for Census Day have been underway for some time within the Geography Division of Statistics Canada.

Production work within the Division began in April 1987 as 1986 Census maps (digital as well as paper) were updated. Later steps included delineating 43 858 enumeration areas (EAs), digitizing boundaries of the EAs, loading the digital boundaries into a database for editing, producing individual EA collection maps and finally, shipping the maps to the regional offices.

Automated production of Census maps began in 1981 when one per cent of the required maps were produced digitally. The success of the automated production program has enabled Statistics Canada to produce digitally, over 50 per cent of the maps required for the 1991 Census.

This is only the first step of many related to the collection and the release of a wealth of data from the 1991 Census. As well, there will be an expanded range of



The Final One!

Examining the last automated 1991 census collection map produced are, left to right: Victor Glickman, Director, Geography Division; André Boisvenue, Task Manager, Computer-Assisted Mapping; Ivan Fellegi, Chief Statistician; and Gordon Brackstone, Assistant Chief Statistician, Informatics and Methodology.

products suitable for use in Geographic Information Systems. These include a consistent set of area boundary files to support mapping (including EA boundaries for the first time, the street network files, known as the Area Master Files, and an extensive set

of socioeconomic data files in machine-readable form). For further information contact your local Statistics Canada regional office or the Geography Division, Statistics Canada, Ottawa, Ontario, K1A 0T6, Fax: (613) 951-0569.



Surveys, Mapping and
Remote Sensing Sector

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Canada

Development of Interchange Standards Evaluation Criteria



The Canadian General Standards Board's (CGSB) Committee on Geomatics has developed a set of criteria for the technical evaluation of data exchange standards. This document is part of one phase in the process of developing a Canadian Geomatics Interchange Standard.

The criteria will provide the CGSB committee members with a technical evaluation of existing exchange standards. The assessment will be collected through the evaluation of a number of potential Canadian standards against the set of criteria. The analysis is not designed to designate a winner according to a scoring mechanism, but to provide decision makers with the technical information regarding the ability of each product to meet the requirement for a Canadian national standard.

The following standards are undergoing the evaluation process:

- 1) Canadian Council on Geomatics Interchange Format (CCOGIF) formerly that of the Canadian Council on Surveying and Mapping (CCSM);

- 2) Digital Geographic Exchange Standards (DIGEST);
- 3) Committee on Exchange of Digital Data - International Hydrographic Organization (DX-90);
- 4) Map and Chart Data Interchange Format (MACDIF);
- 5) Mapping Data Interchange Format (MDIF);
- 6) Spatial Archive and Interchange Format (SAIF); and
- 7) Spatial Data Transfer Standard (SDTS).

For more information on the criteria for the evaluation of existing exchange standards, please contact: Mr. René Gareau, Chairman, Committee on Geomatics, Canada Centre for Geomatics, 2144 King Street West, Sherbrooke, Quebec, J1J 2E8, Fax: (819) 564-5698.

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 several times 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 Gordon Plunkett (chairman), Brian Cromie, David Ellwood and Joel Yan. Editorial support is provided by Barbara McAulay and Diane Blondin. Submissions for Volume 3 #2, which should be submitted before **May 31, 1991**, are most welcome. Subscription requests, queries, comments or submissions should be sent to:

Federal Geomatics Bulletin
GIS Division, EMR
615 Booth Street
Ottawa, Ontario
K1A 0E9
Fax: (613)952-0916

EMR establishes Geomatics Information Publishing System



One of the recent major breakthroughs in the publishing of geomatics information is the linking of GIS to high resolution digital imaging systems. This permits the processing and publishing of high resolution, large format colour products, such as negatives on demand, or one-off maps.

The Products and Services Division of EMR is developing a digital publishing system centred around a Scitex editing and plotting system, for large format applications, and an IRIS direct digital colour ink jet plotter, for photographic quality hard copy applications. Geomatics data input from DOS, Macintosh and SUN platforms is being developed.

The Postscript publishing standard is being utilized as it offers superior text handling, carries colour information and is both resolution and device independent. For further information contact: John Handy, Products and Services Division, Surveys, Mapping and Remote Sensing Sector, EMR, 615 Booth Street, Ottawa, Ontario, K1A 0E9, Fax: (613)952-8641.

GIS Conference - An Enormous Success



The Third Canadian Conference on GIS, held in Ottawa from March 17 to March 22, 1991 was another success in this annual series of GIS conferences. Organized by the Canadian Institute of Surveying and Mapping in cooperation with the Inter-Agency Committee on Geomatics and the Surveys, Mapping and Remote Sensing Sector of EMR, this conference was attended by a large number of delegates from government, industry and universities.

Seven pre-conference workshops were held that focused on topics ranging from natural resources to standards. The conference was officially opened by the Minister of EMR, The Hon. Jake Epp. Dr. Robin Farquhar, President of Carleton University also participated in the opening session. Dr. John McLaughlin, President of the Champlain Institute, gave a provocative keynote address entitled "Towards a National Spatial Data Infrastructure".

The technical program consisted of plenary addresses by René Gareau, John Houweling, David Rhind, Roger Tomlinson, Hugh O'Donnell and Jack Dangermond. Three panel discussions were held on topics including GIS Data Costing, Positioning Canada in the International Marketplace and on GIS Technology Trends. Four concurrent sessions, poster sessions and time for visiting the exhibits filled out the program.

For a copy of the GIS 1991 conference proceedings or for information on the GIS 1992 conference, please contact the Canadian Institute of Surveying and Mapping, Box 5378, Station F, Ottawa, Ontario, K2C 3J1, Fax: (613) 224-9577.

GIS'91 delegates were treated to an abundance of information, interesting exhibits, demonstrations, signing ceremonies, presentations and poster sessions.





Conservation and Protection Develops GIS Management Strategy



The Conservation and Protection (C&P) Service of Environment Canada recently hosted a workshop for GIS users. The workshop attracted about 85 people from all regions of the country, and from all sections of C&P, including the Canadian Wildlife Service, the Inland Waters Directorate, Environmental Protection, and the State of the Environment Group. Participants included GIS users, potential users, and managers. Attendees participated in discussions of future needs, while several demonstrated the use of micro-based GISs in projects addressing current issues.

The effective use of technology was evident in the demonstrations of C&P applications, which illustrated the important contribution GIS systems are now making to environmental programs. Perhaps this is not surprising considering that about 65 GIS systems are now in operation in C&P, and about 100 in Environment Canada.

A series of technology demonstrations was provided by industry representatives. These included an interesting example of the use of a GIS to model various development scenarios as part of a sustainable development exercise.

Workshop participants discussed how to maximize the utility of GIS for C&P. The result was a general conclusion that, with the expansion of systems and applications, there is a need for more effective cooperation between users. This is essential to avoid duplication and maximize the sharing and exchange of information between directorates and disciplines. The result will be improved program effectiveness.

A series of recommendations and a preliminary Geographic/Environmental Information management strategy for C&P have emerged from this discussion. The following recommendations were made:

I. A formal structure of regional and headquarters GIS user groups and a C&P National Coordinating Committee should be established:

- 1) to encourage data exchange, sharing and integration within C&P, and between C&P and its partners;
- 2) to improve awareness of needs, technology and applications to avoid duplication of efforts, and to encourage cooperation;
- 3) to advise C&P regional and headquarters informatics committees on

GIS hardware and software needs and contract specifications;

- 4) to improve integration and application of data and information through training, discussion and development of standards relating to quality, reliability and compatibility of data and information; and,
- 5) to assist new users in the application and use of GIS.

Several regions (e.g. Atlantic provinces, Ontario, Western and Northern Canada) have already established user groups.

II. A National GIS Coordinating Committee would coordinate regional groups and would be composed of regional user group chairpersons plus a national coordinator.

This committee would:

- 1) serve as an information exchange between regions;
- 2) provide advice to C&P informatics managers on guidelines for use and acquisition of GIS; and,
- 3) prepare or update a C&P GIS strategy.

For further information please contact: John Power, Water Resources Branch, Inland Waters Directorate, Environment Canada, Ottawa, Ontario, K1A 0H3, Fax: (819) 997-8701.

Developments in Geomatics



- A survey of Canadian private sector activity in ocean information systems is being undertaken for Industry, Science and Technology Canada, which has identified the field of ocean information systems as an area of interest under its Ocean Industries Sector Campaign initiative. For further information, please contact: Champlain Institute, Priestman Centre, Suite 204, 565 Priestman Street, Fredericton, N.B., E3B 5X8, Fax: (506) 453-4943.
- A Soviet technical and trade delegation, which visited Canada in January, 1991, was led by Dr. V. Jashenko, President of the Main Administration of Geodesy and Cartography of the Council of Ministers of the USSR. The other officials included specialists in remote sensing, cartography and geographic information systems. The visit was a follow-up to a visit led by Mr. J. Hugh O'Donnell, Assistant Deputy Minister, Surveys, Mapping and Remote Sensing Sector, to the Soviet Union in November, 1990. It is hoped that the vis-

its will lead to additional business opportunities for Canada. For further information please contact: Office of External Relations, Surveys, Mapping and Remote Sensing Sector, 580 Booth St., Ottawa, Ontario, K1A 0E4. Fax: (613) 995-0842.

- The Geography Division of Statistics Canada developed and gave a five-week course on census cartography for the United Nations to 20 African participants, during October and November, 1990. The course was given in English and French to 20 delegates from 19 African countries. Topics included an overview of the census, geographic concepts, definitions of maps, introduction to geographic information systems, computer-assisted mapping and the use of satellite imagery in the production of base maps for the census.

If you would like additional information pertaining to the course, or are interested in learning more about Statistics Canada geography courses, contact: Greg Maika, Geography Division, Statistics Canada, Ottawa, Ontario, K1A 0T6, Fax: (613) 951-0569.

Policy on the Management of Information Technology Is Released



Treasury Board recently published the Management of Information Technology Policy manual. The objective of government information technology management is to ensure that technology is used as a strategic tool to support government priorities and program delivery, to increase productivity and to enhance service to the public. Geomatics data is covered by this policy and GIS centres are encouraged to review the policy and assess its impact on their operations.

For further information on the Management of Information Technology Policy, please contact: The Treasury Board Liaison Officer responsible for your department (if you do not know your liaison officer, call (613) 957-2459), or write to Treasury Board of Canada, Administrative Policy Branch, Information Technology Management, Ottawa, Ontario, K1A 0R5. This volume of the Treasury Board Manual and its amendment service is available from the Canadian Government Publishing Centre, Ottawa, Ontario, K1A 0S9, Fax: (819) 994-1498.

IACG Completes Federal Networks Requirements Study



As part of its 1990-91 work plan, the Data Communications and Networking Subcommittee of the IACG has completed a study of the federal Geographic Information Systems (GIS) network requirements. The two major objectives of the study were to assess the potential of communications technology in responding to the needs of the GIS community within the federal government and to stimulate any appropriate action. The work was carried out under contract by IDON Corporation, who conducted an extensive dialogue with officials from seven different federal agencies who are active in the field of geomatics. The final report will receive wide circulation within the IACG. The following are IDON's major findings:

In regard to the first objective of assessing the potential use of communications technology, the majority of those consulted believe that:

- communications technology can, in the longer term, respond to the needs of the GIS community within the federal government;
- communications technology can do little, in the shorter term, to respond to the needs of the GIS community within the federal government.

The concern that little can be done in the shorter term is a reflection of their perceptions that:

- government departments that could use GIS networking now do not know enough about its advantages to demand it;
- departments who know the importance and utility of GIS systems do not yet realize the importance of GIS networking; and,
- departmental officials responsible for creating GIS databases do not have a mandate to accommodate the needs of other departments for information sharing (i.e. networking).

To address these short-term concerns and longer-term issues, recommendations are made based on two important assumptions, which are:

- the process must begin now to facilitate the networking and telecommunications of GIS data because, without proper guidelines, this process will become increasingly unmanageable as the installed base of GIS systems expands; and,
- the telecommunications technology can be used to facilitate the networking of GIS

systems, thus enabling federal departments to co-operate for long-term benefits.

The study details fourteen recommendations regarding how best to achieve the establishment of GIS networking and the utilization of communications within government departments. These recommendations, which are particularly relevant to shorter-term projects, are required in order to ensure the long-term objectives are met.

The three prime recommendations are:

- (1) that the Inter-Agency Committee on Geomatics (IACG) nominate one lead federal department to define, develop, establish, operate, and manage a government GIS network or networks to facilitate exchange of Geomatics data;
- (2) that the lead department appoint a champion who can make this happen and provide enough resources to permit it to happen; and,
- (3) that the lead department provide telecommunications/computer access to the soon-to-be-completed IACG survey on federal GIS databases, and work with other federal departments to ensure that the information is kept current.

The eleven secondary recommendations supporting the three primary recommendations are that the IACG:

- (4) assist the lead department in obtaining/re-allocating adequate resources to achieve its mandate to the degree permitted within the committee's terms of reference;
- (5) recommend that normal departmental cost-recovery policies be held in abeyance for the first two years of establishing the GIS telecommunications network;
- (6) make a concerted effort to understand the obstacles faced by operational staff who desire to participate in GIS network activities, and then to recommend actions which encourage such participation;
- (7) encourage individual federal departments involved in the creation and management of GIS databases to support and implement educational and training programs and projects which will focus on:

- the need to establish easy telecommunications access to such databases,

- the benefit and obstacles of such access, and
 - the appropriate telecommunications standards and networking technologies to study and to implement in order to realize such benefits and avoid such obstacles;
- (8) encourage individual members to actively participate in Canadian General Standards Board and Treasury Board GIS standards initiatives, primarily to maintain a knowledge and awareness of the Boards' current activities.

That the lead department,

- (9) in conjunction with one other federal department, establish a pilot GIS network;
- (10) after consultation with interested federal departments, work with appropriate companies (carriers, equipment manufacturers, and GIS suppliers) to establish a demo network using available standards and, as well, newer technologies such as the Integrated Services Digital Network (ISDN);
- (11) write needed standards format converters/translators and make them available to members of IACG;
- (12) work with IACG members and other federal departments and agencies, to recommend to the IACG relevant GIS standards for inter-departmental GIS network applications;
- (13) participate in international committees which are developing international GIS standards such as DIGEST by DGIWG, and monitor developments of relevant international data communications standards such as X.500 and ISDN;
- (14) take into account developments in other related national and international standards bodies, work with appropriate federal departments and national agencies to create a national GIS standard.

For further information please contact: Robert Baser, Manager, Applications and Policy Development, Communications Applications, Dept. of Communications, 300 Slater St., Ottawa, Ontario, K1A 0C8, Fax: (613) 957-8839.

Postal Code Conversion File



Statistics Canada has announced that the January 1991 Postal Code Conversion File (PCCF) is expected to be released in June 1991. The PCCF provides a link between Canada Post Corporation's six-character postal codes and the standard geographical areas for which Statistics Canada produces data.

The file contains over 710 000 postal code records linked to the 1986 Standard Geographical Classification and other geo-statistical areas of the 1986 Census. Compared to the January 1990 release, this version of the PCCF will contain an additional 19 390 new postal codes.

The file is available for Canada, the provinces and territories, or any standard or nonstandard user-defined geographic area. Data can be obtained on tape or diskette.

For further information, contact your nearest Statistics Canada Regional Reference Centre or Marketing and Client Liaison, Geography Division, Statistics Canada, Ottawa, Ontario, K1A 0T6, Fax: (613)951-0569.

SMRSS Announces an Electronic Information Distribution Policy



The Surveys, Mapping and Remote Sensing Sector has a new distribution policy for electronic information. The policy, which covers the sale of SMRSS geographic information stored in computer-readable form, specifically excludes satellite or airborne remote sensing products or data. The policy allows SMRSS to sell its geographic information to "End Users" and to "Licensees" under specified terms and conditions.

"End Users" are those who purchase the information for their own use, and can not resell, redistribute or give away the information to others. "Licensees" are those who purchase the right to modify, add or delete information and resell it. Licensees give the Government of Canada full credit for data used through the use of a copyright note on the product.

A private sector company has been contracted to provide the reproduction of the information for end users and licensees. This became effective on April 1, 1991.

For the purposes of demonstrating the database contents and allowing potential users to explore possible applications, SMRSS will make available sample

datasets at nominal cost, under certain conditions.

For further information, please contact the Director of Strategic Planning, Surveys, Mapping and Remote Sensing Sector, EMR, Room 1446, 580 Booth Street, Ottawa, Ontario, K1A 0E4, Fax: (613) 995-0842.

CISM/CRSS 91 Conference



The Canadian Institute of Surveying and Mapping (CISM) and the Canadian Remote Sensing Society (CRSS) are holding a joint Conference at the Calgary Convention Centre from May 6-10, 1991. This will mark the 84th annual convention for the CISM and the 14th symposium for the CRSS. It is the first time that the two societies have held a joint conference. The theme of this year's conference is **Evolution Through Integration.**

Organizers have planned an excellent program of papers, special seminars, social programs and commercial exhibits. For further information please contact: Dave McLintock [CISM], Shell Canada Limited, 400-4th Avenue S.W., P.O. Box 100, Station "M", Calgary, Alberta, T2P 2H5, Fax: (403)262-9537 or Diane Thompson [CRSS], INTERA Technologies Ltd., #2500, 101-6th Avenue S.W., Calgary, Alberta, T2P 3P4, Fax: (403) 265-0499.

Canada Assists in Gulf Oil Spill Disaster



Prime Minister Brian Mulroney announced that Canada will provide GIS technology to the states of Bahrain and Qatar, in order to help these countries deal with the massive oil spill in the Arabian Gulf. In addition to providing spill-response technical expertise, bird-cleaning facilities, oil skimmers and spill containment booms, Canada will provide technical assistance and GIS systems. The GISs are being provided by Canadian industry with assistance from the Surveys, Mapping and Remote Sensing Sector of EMR.

Bahrain and Qatar have asked for Canada's assistance in this disaster, since Canada has considerable expertise in GIS. The GISs will be used to:

- 1) monitor and predict the extent of the oil spill;

- 2) assess the environmental impact; and
- 3) assist in the direction of the spill cleanup.

For further information on the EMR contribution contact: the Director, Geographic Information Systems Division, Surveys, Mapping and Remote Sensing Sector, EMR, 615 Booth Street, Ottawa, Ontario, K1A 0E9, Fax: (613) 952-0916.

Inventory of Federal Geomatics Data Available



The Government Data Bases and Data Dissemination sub-committee of the IACG has contracted Tomlinson Associates Ltd., of Ottawa with the task of compiling an inventory of federal government geomatics data holdings. The objective of the survey is to identify data sets that can be used in Geographic Information Systems.

To limit the scope of the study, the following criteria are to be noted:

- 1) the data sets must be held by a federal government department or agency;
- 2) the data sets must be descriptive of some part of Canada;
- 3) the data sets must be directly georeferenced;
- 4) the map data scale must be smaller than 1:500; and
- 5) the data must be in digital form now, or there must be plans to convert the data to digital form within the next ten years.

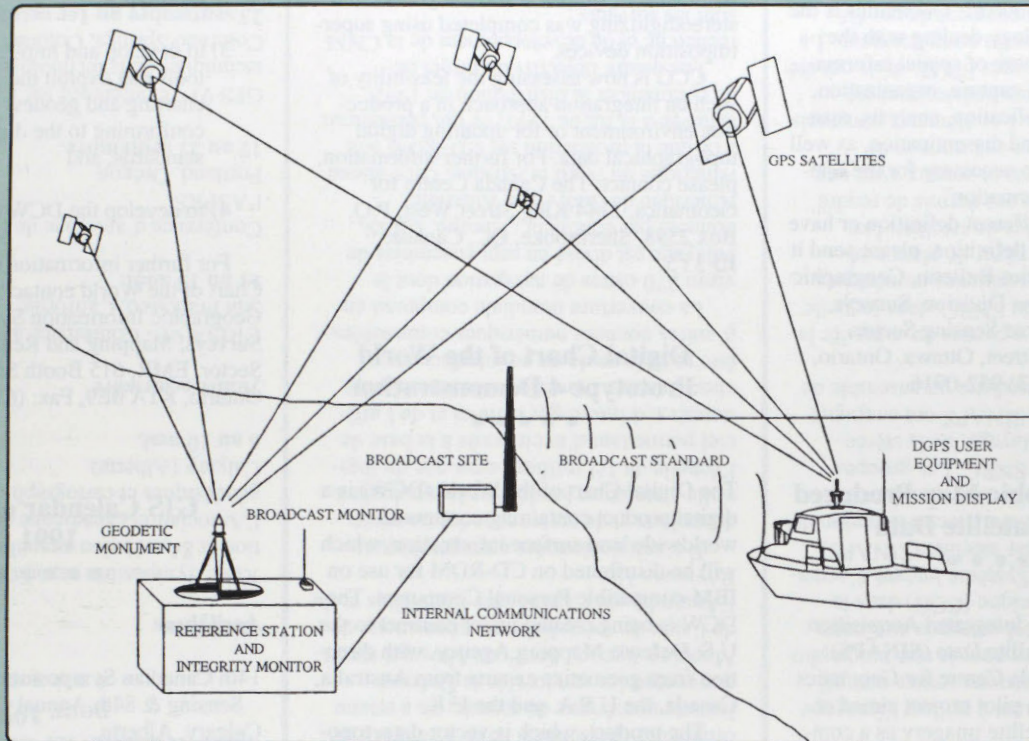
Over 300 data sets have been identified by the various survey respondents. A report analysing the results of the survey and a data base containing information on the data sets will be available for distribution in the second quarter of 1991.

For more information on the survey, please contact: Gordon Plunkett, IACG Geomatics Data Sets Survey, Geographic Information Systems Division, Surveys, Mapping and Remote Sensing Sector, EMR, 615 Booth Street, Ottawa, Ontario, K1A 0E9, Fax: (613) 952-0916.

A Revolution in Positional Technology



DIFFERENTIAL GPS SERVICE



This diagram shows the major elements of a differential GPS service. The user receives both GPS signals and reference signals to obtain high positional accuracy.

The Global Positioning System (GPS) is a revolutionary satellite-based positioning system currently being deployed by the United States Government. Work began to develop this passive navigation system in 1973 and it should be fully operational before the end of 1993.

When fully developed and operational, the GPS will provide continuous positional information for many diverse applications, through the use of compact and inexpensive receiver equipment. With the addition of a communications link and a microcomputer, the position of land, sea and air vehicles can be accurately monitored. By integrating positional technology with digital maps, the changing locations of vehicles can be displayed on computer monitors.

Taxi and trucking companies will be able to determine the location of every vehicle in their fleet at any time. The locations of emergency vehicles such as those used by police, ambulance and fire services can be closely monitored to allow faster response to particular locations. Collectors of land-related data will have readily avail-

able positioning information during their data collection. Surveyors and mappers will benefit from the consistency of reliable positional data.

The satellite segment of the GPS will consist of a constellation of 21 operational satellites plus three in-orbit spares. Each satellite transmits two radio frequencies for positioning purposes.

The control system consists of monitor stations around the world and a master control station in Colorado. The purpose of the control system is to monitor the health of the satellites, determine their orbits and the behavior of their atomic clocks, and inject a broadcast message into the satellites.

Users with appropriate receivers can track the satellite codes, and by aligning them with a receiver-generated replica, the range to the satellite can be determined. If the ranges to four satellites are combined with the orbit descriptions, the receiver position (latitude, longitude, height and user clock error) can be determined.

Military and civilian users have access to positioning services at two levels of pre-

cision. Precise positioning service is restricted to authorized users. Standard positioning service provides the capability to obtain horizontal positioning accuracy to within 100 metres with a 95 per cent probability.

EMR Canada is carrying out a pilot project to study a method of improving the GPS positional accuracy calculation. Known as Differential GPS (DGPS), this method determines GPS navigation errors and communicates these errors to users. EMR is currently operating four GPS tracking stations to determine precise GPS satellite orbits, and is developing, in cooperation with other government departments, provinces, universities and industry, a system for providing differential corrections to users.

For more information on the use of the Global Positioning System, contact: David Boal, Director, Geodetic Survey Division, Canada Centre for Surveying, EMR, 615 Booth Street, Ottawa, Ontario, K1A 0E9, Fax: (613) 995-3215.

What is Geomatics?



Many readers have asked for a definition of Geomatics. The following is a definition from an unknown source: "Geomatics is the science and technology dealing with the character and structure of spatial information, its methods of capture, organization, classification, qualification, analysis, management, display and dissemination, as well as the infrastructure necessary for the optimal use of this information".

If you have a different definition or have a reference for this definition, please send it to: Federal Geomatics Bulletin, Geographic Information Systems Division, Surveys, Mapping and Remote Sensing Sector, EMR, 615 Booth Street, Ottawa, Ontario, K1A 0E9, Fax: (613) 952-0916.

Test Topographic Map Produced Using Satellite Data



The System for the Integrated Acquisition Procedures for Satellite Data (SINAPS) project at the Canada Centre for Geomatics (CCG) undertook a pilot project aimed at utilizing SPOT satellite imagery as a complementary data source for photogrammetric compilation. NTS map sheet 62J/13, located in the Laurier region of Manitoba, was selected as the test site. The SINAPS, stereodigitizing and scanning groups teamed their efforts to produce the test data set.

This pilot project compiled the first NTS map sheet where digital map data was produced using satellite data and aerial photography. The satellite data rendered linear and area features with an accuracy meeting stereodigitizing standards. Point features and small linear features were identified in the SPOT images and were positioned during field completion. The positional accuracy of these features was less than that obtained using stereodigitizing; hence the stereodigitized positions were used.

SPOT images were geometrically corrected with software developed jointly by CCG and the Canada Centre for Remote Sensing. Topographic features were identified both automatically and manually. Results were validated and integrated, and stereodigitizing was completed using superimposition devices.

CCG is now assessing the feasibility of such an integration approach in a production environment or for updating digital topographical data. For further information, please contact: The Canada Centre for Geomatics, 2144 King Street West, P.O. Box 2598, Sherbrooke, QC, Canada, J1J 3Y5.

Digital Chart of the World Prototype 4 Demonstration



The Digital Chart of the World (DCW) is a digital product containing continuous worldwide land surface information, which will be distributed on CD-ROM for use on IBM-compatible Personal Computers. The DCW is being created under contract to the U.S. Defense Mapping Agency, with direction from geomatics experts from Australia, Canada, the U.S.A. and the U.K.

The product, which is vector data, topologically structured at a scale of 1:1M, consists of cartographic, attribute and textual data along with the software needed to access, query and display the database. The DCW can be used as a stand-alone product or it can be interfaced to other compatible digital data.

World coverage consists of approximately 270 navigation charts. The scanning of these charts is being split into seven continental datasets, which are: Europe, USSR, South America, Asia, Australia, North America and Africa. CD-ROM production is expected to be complete by the end of 1991, for distribution in 1992.

The four goals of the DCW research and development project are:

- 1) to develop, refine and establish the Digital Geographic Exchange Standards (DIGEST) family of standards, which enable the exchange of digital mapping, charting and geodesy data;

- 2) to implement DIGEST standards using information found on 1:1M scale maps and by performing digital data exchanges through the development of incremental product prototypes;

- 3) to develop and implement software tools that exploit the digital mapping, charting and geodesy information conforming to the digital exchange standards; and

- 4) to develop the DCW database.

For further information on the Digital Chart of the World contact: Jennifer Hum, Geographic Information Systems Division, Surveys, Mapping and Remote Sensing Sector, EMR, 615 Booth Street, Ottawa, Ontario, K1A 0E9, Fax: (613) 952-0916.

GIS Calendar of Events 1991



April-June

14th Canadian Symposium on Remote Sensing & 84th Annual CISM Meeting, Calgary, Alberta, **May 6-10.**

July-September

URISA '91 - Annual Conference, San Francisco, California, **August 11-15.**

ACSM-ASPRS Fall Convention, Portland, Oregon, **September 17-21.**

GPS '91 - Engineering Applications of GPS Technology, Colorado Springs, Colorado, **September 23 - October 1.**