Federal Geomatics Bulletin

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No. 7, Spring 1995

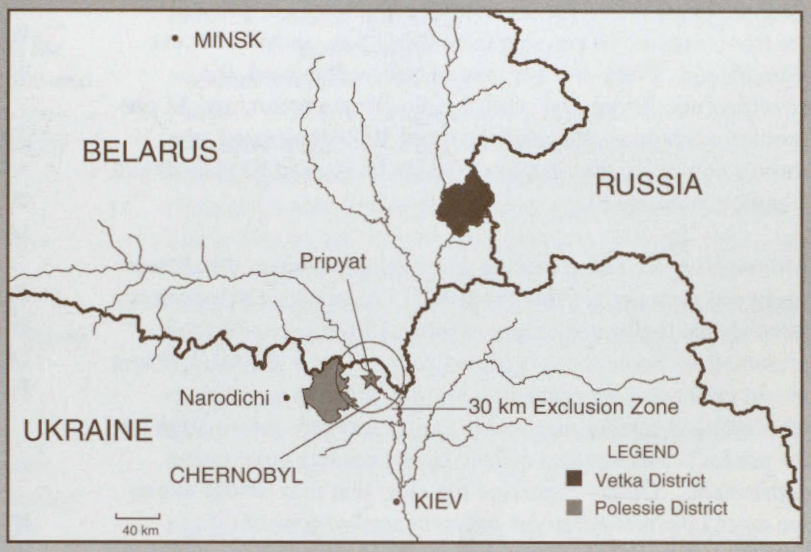
Chernobyl GIS Pilot Project

Following the break-up of the USSR, the governments of Belarus and Ukraine requested Canada's assistance in adapting GIS technologies to deal with the after-effects of the 1986 Chernobyl nuclear power plant disaster. Canada responded in 1993 through the GIS Division of Geomatics Canada, by proposing a joint GIS pilot project to develop a means of managing information on the human, agricultural, and environmental impacts of the catastrophe. Subsequently, the Division obtained approval and funding for the project from the Bureau of Assistance for Central and Eastern Europe, Foreign Affairs and International Trade Canada.

In partnership with Canadian industry (Photosur Géomat Inc. and Intélec Géomatique Inc.) and the governments of Belarus and Ukraine, the pilot project was successfully completed in December 1994. The project deliverables were duplicated for two sites (Minsk, Belarus, and Kiev, Ukraine), and included the installation of Tydac Technologies Inc.'s SPANS GIS packages, on-site training, the development of data bases for environmental assessment applications regarding the current situation, and the formulation of long-term rehabilitation programs to mitigate the disaster's consequences.

The pilot project has demonstrated that GIS technologies in general, and SPANS software in particular, are very suitable for the Chernobyl environmental impact assessment. Activities include:

- automation or improvement of manual tasks and techniques;
- verification of hypotheses using various modelling scenarios;
- provision of valuable information in decision making.



Chernobyl Pilot Project Study Areas

It has also allowed specialists from Ukraine and Belarus to gain hands-on experience using GIS as it relates to data integration, data exchange, data modelling, and map production.

Finally, the project has clearly shown that Canadian expertise and technologies are important commodities that can be successfully exported to benefit both Canada and the receiving countries. As well, the project has provided an opportunity to present the advantages of the Team Canada approach to international projects, consisting of government and private industry partners. Discussions concerning the project's continuation are in progress.

For more information, please contact Stefan Palko, Project Manager, GIS Division, Geomatics Canada, 615 Booth Street, Ottawa, Ontario, Canada, K1A 0E9. Fax: (613) 952-0916; e-mail: palko@cc2smtp.emr.ca

IACG

The FGB Client Satisfaction Survey

The *Federal Geomatics Bulletin* Editorial Board would like to thank all readers who took the time to respond to the client satisfaction survey that was included with the Volume 6, No. 1, Spring 1994 Edition.

At present, 5000 persons and nearly 400 libraries subscribe to the *Federal Geomatics Bulletin*. Eighty per cent of our subscribers are from Canada, 10 per cent from the U.S.A. and 10 per cent from abroad. Forty-five per cent of our readers work for governments, 39 per cent work for the private sector, and 14 per cent for academia. We generally print 7000 copies and any surplus copies are distributed to Geomatics Canada's visitors and at major conferences.

Although we are still receiving some questionnaires, the present study was completed using the first 777 responses. Subscribers seem to like the content, the conciseness of articles and their presentation. Some thought the articles were too technical, others would prefer that we publish more in-depth stories. One resounding comment received is to publish more information on the products and services offered by the various government departments. Others expressed the view that they would like to see more information on the different applications of GIS in Canada. Overall, the response to the Bulletin was very positive.

On the negative side, some have commented on the poor timeliness of articles in the Bulletin. This is partly due to the fact that we publish semi-annually. Several libraries have also complained that the Bulletin is not sent at regular intervals and that the numbering system is difficult to understand. The *Federal Geomatics Bulletin* editorial team will make every effort possible to ensure that the next issues are published according to schedule, i.e., May and November 1995. The next issues will be numbered 8, 9, 10 and so on, to simplify ordering.

One third of respondents would be willing to pay a modest subscription fee. However, many of you have indicated that the Bulletin is a working tool and they would expect their agency to pay any fees that might be charged in the future.

The Bulletin is presently financed by the IACG member agencies (see article "A Word on IACG") who contribute annually to the IACG fund administered by Geomatics Canada. The funds are used for all IACG projects, including the *Federal Geomatics Bulletin*. Geomatics Canada pays for the production of the content of the Bulletin. Expenses paid by the IACG include mailing list maintenance, and printing and distribution costs. From now on, the translation of articles, which had been the responsibility of Geomatics Canada, will be assumed by the Agency that submits the article.

The IACG is considering paid advertisements as a means to offset publication costs. Anyone interested in submitting an advertisement should send the material to the IACG Technical Secretariat. The content of the paid advertisements will have to be approved by the IACG.

Fifteen per cent of respondents would prefer to receive their Bulletin electronically. The IACG's Access and Marketing Working Group is presently exploring the idea of a World Wide Web Site on the Internet for the IACG. More news will be available on this subject in the fall issue.

The *Federal Geomatics Bulletin* Editorial Board always welcomes your ideas and suggestions to improve the publication. Please forward your articles or comments to the IACG Technical Secretariat at the address below.

Federal Geomatics Bulletin, IACG Secretariat, GIS Division, Geomatics Canada, NRCan, 615 Booth Street, Ottawa, Ontario, K1A 0E9.
Fax: (613) 952-0916; e-mail: IACG@gisd.emr.ca

Federal Geomatics Bulletin

This Bulletin 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), Geomatics Canada; David Ellwood, Geological Survey of Canada; Jeffrey Murray, National Archives of Canada; Nick Mosienko, Transport Canada; and David Stafford, Geomatics Canada. Editorial and production support is provided by Geomatics Canada employees Diane Blondin, Barbara McAulay, Marion McEllistrum, Ginette Patenaude and Julie Allard. Articles for Number 8 are most welcome and should be submitted before June 30, 1995. Subscription requests, queries, comments or submissions should be sent to: *Federal Geomatics Bulletin*, IACG Secretariat, GIS Division, Geomatics Canada, 615 Booth Street, Ottawa, Ontario K1A 0E9.
Fax: (613) 952-0916; e-mail: IACG@gisd.emr.ca

ACTIVITIES

A Word on the IACG

The Inter-Agency Committee on Geomatics (IACG) was founded in 1988 by the Sector that is now known as Geomatics Canada. As the Agency responsible for establishing baseline positional information concerning Canada's landmass, Geomatics Canada seeks to encourage coordination of federal geomatics activities.

The activities of the IACG are grouped at three levels. At the executive level, a steering Committee oversees the direction and thrust of the IACG. It provides guidance to the IACG as a whole; however, the detailed work of the IACG is undertaken by the four technical subcommittees or working groups.

J. Hugh O'Donnell, Assistant Deputy Minister of Geomatics Canada, heads the IACG Steering Committee, which is composed of Assistant Deputy Ministers from each of the member agencies. The Steering Committee meets once a year to approve the work plan and the IACG budget.

The second level of the IACG is chaired by Dave Carney, Director of Business Development and Marketing, Geomatics Canada. This Committee has representatives from participating federal agencies and meets several times a year to share information, prepare project proposals and make recommendations to the Steering Committee. Lloyd Bowler is the IACG Administrative Secretary.

At the third level of the organization, there are four IACG Working Groups: Coordination and Cooperation, chaired by Phyllis Charlesworth of the Geological Survey of Canada (GSC); Integration and Standardization, chaired by Tim Evangelatos of the Canadian Hydrographic Service of Fisheries and Oceans; Access and Marketing, chaired by Gordon Plunkett of the GIS Division of Geomatics Canada, and finally, Technology and Information Transfer, chaired by Andy Rencz of the GSC, Natural Resources Canada.

The four Working Groups address the aims of the IACG. Put briefly, these aims are: the shared development and exchange of geomatics data; the documentation and dissemination of information about geomatics activities by federal agencies; cooperation in data collection, development of databases and dissemination of geographically referenced information; and consultation on research and educational programs.

Mosaad Allam, Acting Director of the GIS Division, Geomatics Canada, is the Technical Secretary. The *Federal Geomatics Bulletin*, whose editor is Martine Couture, is the official publication of the IACG and is the responsibility of the IACG Technical Secretariat.

The following Agencies are members of the Inter-Agency Committee on Geomatics:

Agriculture and Agri-Food Canada, Research Branch
Environment Canada, Ecosystem Conservation Directorate
Environment Canada, Atmospheric Environment Service
Fisheries and Oceans, Science
Indian and Northern Affairs, Corporate Services
Industry Canada, Spectrum, Information Technologies and Telecommunications Sector
National Archives of Canada
National Defence, Geographic Operations
Natural Resources Canada, Canadian Forest Service
Natural Resources Canada, Geomatics Canada
Natural Resources Canada, Geological Survey of Canada
Public Works and Government Services, Science, Informatics and Professional Services Sector
Public Works and Government Services, Realty Services Branch
Statistics Canada, Informatics and Methodology Field
Transport Canada, Airports Group
Transport Canada, Finance and Administration
Treasury Board Secretariat, Information Management, Systems and Technology Sector

For more information about the IACG, you may consult previous editions of the *Federal Geomatics Bulletin*, or contact Dave Carney, IACG Chairman, 615 Booth Street, Ottawa, Ontario, Canada, K1A 0E9. Fax: (613) 995-8737; E-Mail: IACG@gisd.emr.ca

Canadian GIS Source Book: Version 1 Now Available

The first version of the *Canadian Geographical Information System Source Book*, co-published by the IACG and the Geomatics Industry Association of Canada (GIAC), is now available.

This publication contains profiles of Canadian companies working in the GIS field, summary information on government GIS-related activities and geo-referenced data sets, an overview of institutions and organizations offering GIS training in Canada, and a directory and profile of GIS-related organizations.

The Source Book is available from the Geomatics Industry Association of Canada, 170 Laurier Avenue West, Suite 1204, Ottawa, Ontario K1P 5V5. Telephone: (613) 232-8770; fax: (613) 232-4908.

Digital Geomatics Product Initiatives at DND

Like other allied military agencies, the Directorate of Geographic Operations (D Geo Ops), Department of National Defence (DND), is in the process of a major paradigm shift from paper to digital products. DND recognizes that digital information about the earth is a vital component in planning, for example, peacekeeping missions. Together with our allies, D Geo Ops is part of a collaborative effort to build Digital Nautical Chart (DNC) and Vector Smart Map (VMap) products to cover the entire world. Part of DND's contribution to this massive global undertaking is to provide DNC and VMap products covering all of Canada.

Since DND has no mandate to produce national mapping or charting coverages, the entire Canadian coverage of VMap and DNC is being coordinated by the Canadian Hydrographic Service (CHS). CHS has awarded the initial contract to Nautical Data International (NDI) for the advanced prototypes of both of these products. Existing federal digital coverages will be used. The prototypes will include digital data from Geomatic Canada's National Topographic Data Base and the CHS Natural Resource Map data base.

The VMap and DNC family of products will provide a global, seamless, vector dataset, available in the Digital Geographic Information Exchange Standard (DIGEST) format. Both products are thematically layered with full topology within each layer. Cross tile topology is maintained.

Thematic layers in the VMap product include Boundaries, Data Quality, Elevation, Hydrography, Industry, Physiography, Population, Transportation, Utilities and Vegetation. All coverages will incorporate place names where applicable. Current efforts are focused on providing VMap Level 1 data at the scale of 1:250 000. Subsequent coverages will include the scales of 1:50 000 - VMap Level 2 and 1:10 000 - VMap Level 3. The VMap suite of products will provide a comprehensive digital data set.

The Digital Nautical Chart product contains selected maritime physical features collected from Harbour, Approach, Coastal and General Charts. Features are thematically organized into 12 coverages: Cultural Landmarks, Earth Cover, Environment, Hydrography, Inland Waterways, Land Cover, Limits, Aids to Navigation, Obstructions, Port Facilities, Relief, and Data Quality. DNC will support electronic chart display systems for computerized naval marine navigation.

Accompanying the VMap and DNC products is a graphical, user friendly interface called VPFVIEW. VPFVIEW provides tools for the user to display a selected combination of features and themes for a selected geographic area of interest. This public domain interface provides the user with the flexibility to display and evaluate the datasets directly from CD-ROM, or other media, without converting the data. In the near future, more advanced tools will be developed to fully exploit the raster, vector, matrix and text representations of data in DIGEST format.

The DNC and VMap products are part of the family of digital products that began with the Digital Chart of the World(DCW). These new digital GIS products will initially supplement the existing paper charts and map products that DND currently distributes to its military users. As with the Digital Chart of the World, DND will place no restrictions on the public release of these products covering Canada.

Global coverage in VMap Level 1 is scheduled for completion by the year 2000, while the DNC product will be completed by 1997. A new release of DCW (VMap Level 0) will be available in the spring of 1995.

For futher information, please contact: David McKellar, Directorate of Geographic Operations, National Defence Headquarters, 615 Booth Street, Ottawa, Ontario K1A 0E9. Telephone: (613) 995-4239; fax:(613) 996-3328.
E-mail: mckellar@ncs.dnd.ca

Natural Resources Canada Annual Reports

The three Sectors of Natural Resources Canada that are members of the IACG announce the availability of their Annual Reports/Reviews.

The Geological Survey of Canada (GSC) has published its 1993-94 Annual Report entitled, *New Directions for Geoscience*. The 36-page document is available through the Communications Office of the GSC, 601 Booth St., Room 244, Ottawa, Ontario, K1A 0E8. Fax: (613) 996-8059.

Geomatics Canada's *Annual Review for 1994-95* will be available by mid-summer. You may obtain copies by contacting Geomatics Canada, ADM's Office, 615 Booth St., Ottawa, Ontario K1A 0E9. Tel: (613) 992-7362; fax: (613) 995-0842.

The Canadian Forest Service publishes an annual report entitled *The State of Canada's Forests*. The fifth report will be available in late June. Copies can be obtained from the Policy, Economics and International Affairs Directorate, Place Vincent Massey, 19th Floor, 351 St. Joseph Blvd., Hull, Quebec K1A 1G5. Tel: (819) 997-1107; fax: (819) 953-7048.

A New Digital Product: The Canadian Road Network

In the spring 1994 issue of the *Federal Geomatics Bulletin* (Vol 6, no.1, p.6), the Canada Centre for Geomatics (CCG) informed readers of its intention to produce the Canadian Road Network (CRN), version 1.0, from the National Topographic Data Base. The CCG is pleased to announce that this product is now available.

The Centre is now working with Canada Post Corporation to determine the feasibility of enhancing the CRN version 1, with a faster revision cycle and the addition of attributes. The Centre should be able to offer increased geometric accuracy of data for a number of Canada's major cities this year.

All information requests or data orders should be sent to the NTDB Customer Support Group, Canada Centre for Geomatics, Geomatics Canada, 2144 King Street West, Suite 010, Sherbrooke, Quebec J1J 2E8. Telephone: 1-800 661-2638; fax: (819) 564-5698. Internet: ntdb@ccg.nrcan.gc.ca

Egyptian Water Resource Management Project

The GIS Division of Geomatics Canada recently completed a Water Resource Management Project in partnership with the Survey Research Institute (SRI) of the Water Research Center, and the Ministry of Public Works and Water Resources of Egypt. The project, which was partly funded by Canada's International Development Research Centre, demonstrated the application of Geographic Information Systems to issues related to irrigation and water management.

The main purpose of the project was to transfer technical knowledge to SRI and to develop its GIS capability. To demonstrate the technology and to provide a context for the training, a real development problem — the management of water resources in irrigated regions — was selected and addressed. This interesting application is critical in Egypt and other irrigated regions, due of the costs of pumping water, the risk of salinization of the soil from surface evaporation of excess water, and the need to monitor institutionalised water rationing.
A test area known as Beni Magdoul was selected for the pilot project. This region, lying southwest of Cairo, had already been subjected to a variety of studies from which useful data was available.
The major project tasks were:

1. Selection of a suitable GIS software package. The PC Arc/Info system was eventually chosen for its applicability to irrigation networks and cadastral mapping that met the practical platform constraints.

2. Definition of the themes for the different GIS data layers. The most significant layers developed for analytical work were the cadastre of lot boundaries, soil texture, sodium absorption ratio, salinity, and depth to water table. Irrigation and transportation networks as well as cultural features were added to support simple queries and cartographic referencing.

3. Design of the database queries. A sample set of plausible queries were programmed into Simple Macro Language to demonstrate its ease of use.

4. Identification of a key water management issue and selecting a predictive modelling software package. The issue selected was the modelling of water requirements for given crops, and soil and climatic conditions. Two software solutions were implemented: a customised Excel-based adaptation of water requirement algorithms published by the U.N. Food and Agriculture Organisation; and the integration of a self-contained water modelling package called SWATRE.

The Egyptian team learned to develop GIS applications through a combination of training, hands-on experience, and co-operative work on the project. The majority of the digitizing, attribution, and associated tasks were completed at SRI. Most design and programming was done in Canada. At the same time, the GIS Division learned more about GIS applications in developing nations, and the means and techniques of technology transfer.

While the recognized purpose of the project was primarily to transfer knowledge about GIS application development in general, valuable specific capabilities for the management of water resources were acquired by both nations. The pilot project was officially completed and this useful knowledge disseminated through an International Seminar hosted by the Survey Research Institute in November 1994. Representatives of many arid Middle-East nations attended and learned of the new capabilities.

The GIS Division and the Survey Research Institute are presently developing a proposal for a large-scale implementation of the technology.

For further information, please contact Dr. Mosaad Allam, GIS Division, Geomatics Canada, 615 Booth Street, Ottawa, Ontario, K1A 0E9.
Fax: (613) 952-0916; E-mail: Allam@emr.ca

Geomatics Canada Implements the Geographic Information Systems Development Program (GISDP)

On April 11, 1994, J. Hugh O'Donnell, Assistant Deputy Minister of Geomatics Canada, announced the creation of the Geographic Information Systems Development Program (GISDP). Initially, the GISDP established a fund within the GIS Division for the development of GIS applications and technology under partnership arrangements. Future funding for the GISDP will be considered depending on resource availability and program interest.

The GISDP was designed to help strengthen the competitiveness of the Canadian geomatics industry. It supports the development of applications and the transfer of technology while increasing the use of Geomatics Canada data for Geographic Information Systems (GIS).

By the deadline of October 31, 1994, the GISDP successfully attracted a number of excellent proposals for consideration. Proposals were evaluated by a selection committee under four prime areas: scientific and technical content; management approach; financial elements; and overall program relevance. Selected projects were provided funding to a maximum of 50 per cent.

After evaluations were completed, the following three projects were selected for funding:

(1) **GIS Trainer Software**: this project will produce a self-paced animated software program with matching instructional documentation. The trainer will provide GIS beginners with the fundamentals of GIS and hands-on learning using Geomatics Canada data and other data products. The project is being carried out by Universal Systems Limited (USL) and the University of New Brunswick (UNB), both located in Fredericton, New Brunswick.

(2) **Package Courier Business Analysis**: this project will develop GIS applications to maximize the routing, delivery, pick-up, location and business expansion opportunities in the package courier business. The project will integrate Geomatics Canada and corporate client data to provide an analysis of business and operational activities. The project is being carried out by Geomatics International, Burlington, Ontario.

(3) **Multiple Impact Environmental Assessment Model**: this project will develop a stakeholder model and a multiple impact assessment model of an aboriginal community in Northern British Columbia. The project will integrate Geomatics Canada's 1:250 000 topographic data, cultural information, and forestry coverage data with the development of environmental assessment models. The project is being carried out by Facet Decision Systems, Richmond, British Columbia.

For further information concerning the GISDP, please contact Gordon Plunkett, GIS Division, Geomatics Canada, 615 Booth Street, Room 753, Ottawa, Ontario Canada K1A 0E9. Telephone: (613) 992-0389; fax: (613) 952-0916; Internet: Plunkett@emr1.emr.ca

Canadian Earth Observation Network (CEONet)

The Canadian Earth Observation Network (CEONet) is an initiative by the Canadian government to create a national infrastructure for providing access to earth observation data and other complementary spatial databases. This initiative is being driven by the requirements of Canadian users for better access to earth observation data and by the opportunities for Canadian industry, made possible by the rapid growth of the international market for earth observation data, services and network systems.

To better understand the needs of the user community and the issues associated with the development of interoperability infrastructures such as CEONet, a requirements and conceptual design study was completed by MacDonald Dettwiler in October 1994.

Requirements and design concepts identified and documented in this study provide an essential foundation for planning the CEONet program. Stakeholders from all sectors of government, private industry, and academia have benefitted from the study due to the strong emphasis on active user involvement throughout the project.

For more information on CEONet contact Terry Fisher, Canada Centre for Remote Sensing, Geomatics Canada, 588 Booth Street, Ottawa, Ontario K1A 0E8. Fax: (613) 947-1408; E-mail: fisher@ccrs.emr.ca

1995 Calendar of Events

June 11-15, 1995

Geomatics 1995, 7th International Conference on Geomatics, organized by Geomatics Canada. Ottawa Congress Centre, Ottawa, Ontario, Canada. Contact: Geomatics Canada Conference, 615 Booth Street, Ottawa, Ontario K1A 0E9. Tel: (613) 996-2817, (613) 992-4902; fax: (613) 947-7059

June 13-15, 1995

17th Canadian Symposium on Remote Sensing: Radar Remote Sensing: A Tool for Real-time Land Cover Monitoring and GIS Integration, Saskatoon, Saskatchewan, Contact Jeff Whiting, Saskatchewan Research Council, 15 Innovation Blvd., Saskatoon, Saskatchewan, S7N 2X8. Tel: (306) 933-5423; fax: (306) 933-7817; e-mail: whij@src4330.src.sk.ca

June 14, 1995

88th Canadian Institute of Geomatics Annual General Meeting, Ottawa Congress Centre. Contact: Susan Pugh, Canadian Institute of Geomatics, P.O. Box 5378, Station F, Ottawa, Ontario, K2C 3J1. Tel.: (613) 224-9851, fax: (613) 224-9577.

August 13-17, 1995

URISA '95 Annual Conference
San Antonio, Texas, U.S.A. Contact: Urban & Regional Information Systems Association, 900 Second Street, N.E., Suite 304, Washington, DC 20002, U.S.A. Tel.: (202) 289-1685.

September 3-9, 1995

17th International Cartographic Conference/10th General Assembly - Cartography Crossing Borders
Barcelona, Spain. Contact: ICC, Balmes, 209-211, E-08006, Barcelona, Catalunya, Spain. Tel.: (343) 218 8758; fax: (343) 218 8959.

November 9 - 10, 1995

Geomatics V - The Road to Innovation
Palais des congrès, Montréal, Quebec. Contact: Canadian Institute of Geomatics, P.O. Box 1084 Succ. Desjardins, Montréal, Quebec H5B 1C2. Tel.: (514) 463-2988, fax: (514) 463-2988