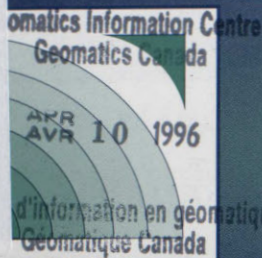


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Federal Geomatics Bulletin

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No. 8, Spring 1996

MERCATOR: *A Canadian Initiative*

Similar to Gerardus Mercator, the foremost geographer of the 16th century, the Canadian geomatics community is poised to push today's technology to the limit. Perhaps it is fitting that on Mercator's 400th anniversary, geomatics is experiencing a major paradigm shift in not just technology, but in how geospatial information is perceived and utilized. Hopefully, no geomaticians will be arrested and detained for seven months for religious heresy as Mercator was in 1554.

It was in Duisburg, now in Germany, that in 1569 Mercator developed the map projection for which he is famous. He preferred the 'straight-line' map because it enabled sailors to steer a course over long distances without frequent changes in compass readings. A parallel to this is the work being done today in geospatial data storage, access and display. This effort we believe will be similarly revolutionary not evolutionary in nature as it was in Mercator's time.

Mercator's dream was to publish a volume of maps, which would provide a history of the world since creation. Called the 'Atlas', the first edition was published in 1569. This important pioneering effort remains with us today. Our interpretation of Mercator's dream in the context of the 20th century is an on-line 'Atlas', a geospatial data warehouse linked up to digital gateways. This electronic 'Atlas' will allow tomorrow's user unlimited flexibility to exploit geospatial data through the information superhighway.

This vision is not a dream. A number of R&D projects and development efforts exist today that are developing the building blocks to realize the MERCATOR Initiative. As an example, a Canadian military user will be able to acquire standard geospatial data over any global

operational area from a network of data warehouses. Similarly, civilian users will have access to a multitude of applications in fields such as environmental impact assessments, or land use. The military or civilian user will require access to the same 'core' geospatial data. This data may then be manipulated or value added utilizing standard, certified, public domain software tools in order to optimize the decision making process and maximise the use of resources.

The MERCATOR Initiative embodies three major thrusts, geospatial information standards, data warehousing and related software tools development. Across Canada there are a number of similar activities ongoing that share common elements such as exploiting new Relational Data Base Management Systems technology. A key strategic relationship between the Department of National Defence's Directorate of Geomatics; the Canadian Hydrographic Service; and the BC Ministry of Environment Lands and Parks has been initiated. Recently, a MERCATOR Alliance has been formed comprised of a cross section of the Canadian geomatics community. An initial MERCATOR Project has been defined and an announcement made by the Canadian Network for the Advancement of Research, Industry and Education (CANARIE). The MERCATOR Project will use HHCode technology developed cooperatively between the Canadian Hydrographic Service and Oracle Canada (*see Federal Awards Program p.8*).

continued on page 10



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Geomatics Canada

Ressources naturelles
Canada

Géomatique Canada

Canada

► IACG Activities

Federal Geomatics Bulletin

IMPORTANT NOTICE

LAST PRINTED ISSUE OF THE FEDERAL GEOMATICS BULLETIN

The Inter-Agency Committee on Geomatics announces that the Federal Geomatics Bulletin will no longer be published in its current form. However this issue and back issues will be available on the IACG World Wide Web site at <http://www.geocan.nrcan.gc.ca/iacg/>.

This newsletter, intended as a vehicle for the communication of information on geomatics activities within the Canadian federal government, has been the official publication of the IACG since 1989. 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*, David Stafford, *Geomatics Canada* and Cécile Wong, *Statistics Canada*. Editorial and production support is provided by Geomatics Canada's employees Diane Blondin, Barbara McAulay, and Julie Allard. Queries and comments on IACG activities should be sent to: Dave Carney, IACG Chairman, Earth Sciences Sector, NRCan, 615 Booth Street, 5th Floor, Ottawa, Ontario, K1A 0E9. Fax: (613) 995-8737 ; e-mail: DCarney@emr.ca.

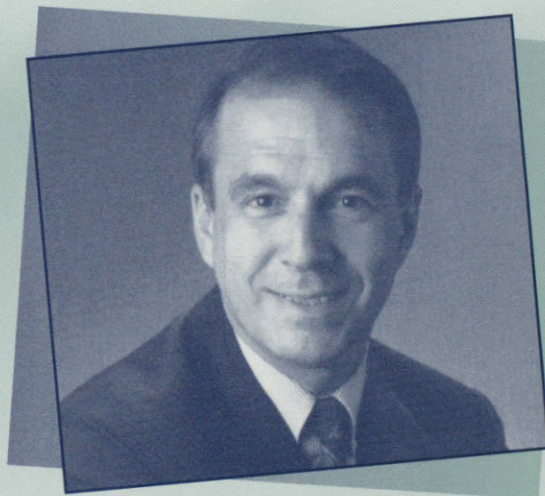
Marc Denis Everell, new IACG Steering Committee Chairman

Mr. J. Hugh O'Donnell, former Chairman of the Steering Committee of the Inter-Agency Committee on Geomatics (IACG) and Assistant Deputy Minister of Geomatics Canada, recently left the Public Service to pursue a career with SHL Vision* Solutions, a business unit of SHL Systemhouse. As Managing Director, Geomatics, he will remain active in the geomatics community, to continue supporting a premier position for Canadian geomatics worldwide. Mr. O'Donnell plans to bring to SHL's information technology and telecommunications groups the broad perspective of geomatics, especially in the area of land information systems.

Mr. O'Donnell was instrumental in the creation of the IACG in 1989. The need for cooperation among government agencies involved in geomatics had been recognized for some time. Mr. O'Donnell was successful in launching the IACG as a multi-level organization that would meet this need. His contribution in chairing the Steering Committee and setting a direction for the IACG is greatly appreciated.

Dr. Marc Denis Everell, ADM of the new Earth Sciences Sector of Natural Resources Canada, will now chair the IACG Steering Committee. A mining engineer by training, Dr. Everell began his career at the Canada Centre for Mineral and Energy Technology, Department of Energy, Mines and Resources (EMR). He then became a Professor at Laval University, before taking a position with the Quebec government's Department of Energy and Resources. He rejoined EMR in 1987 as Assistant Deputy Minister of the Mineral and Energy Technology Sector.

The IACG currently comprises 17 government agencies interested in geomatics. IACG member agencies cooperate in various ways such as information sharing and data collection. The IACG operates at several levels, as outlined below. The IACG Steering Committee is composed of Assistant



Marc Denis Everell, Assistant Deputy Minister of the Earth Sciences Sector, Natural Resources Canada

Deputy Ministers of IACG member agencies. This Committee meets once a year, in the spring, to approve the IACG's work plan and budget.

Mr. Dave Carney, Director of Business Development in the Earth Sciences Sector, chairs the main IACG Committee. This Committee meets several times a year to share information, prepare project proposals and make recommendations to the Steering Committee. A synopsis of the activities of the four working groups is given in the 1995 summary report that follows.

For more information on the IACG, please consult previous editions of the Federal Geomatics Bulletin, the IACG official publication, or contact Dave Carney, IACG Chairman, 615 Booth Street, Ottawa, Ontario K1A 0E9, Canada. Fax: (613) 995-8737; e-mail: DCarney@emr.ca

IACG Working Group Activities

The following article summarizes the activities of the four IACG Working Groups, during the past year.

Coordination and Cooperation

This working group has produced a report entitled: *Barriers to the Use of Geomatics Data* which is available on the IACG WWW site. The document describes both the policy related problems and the technical problems faced by users of spatial data, and proposed methods for resolving some of these issues. Comments on the paper are welcome, either by E-mail to IACG@gisd.emr.ca, by surface mail to the IACG Secretariat at 615 Booth St., Ottawa, Ont. K1A 0E9 or by fax at (613) 952-0916.

In the Spring of 1995, the subcommittee published the *Canadian GIS Source Book* in cooperation with the Geomatics Industry Association of Canada (GIAC). This publication contains profiles of Canadian companies and organizations working in Geomatics; summary information on government GIS-related activities and geo-referenced data sets; and an overview of institutions and organizations offering geomatics training in Canada. Version 1 (1994) is available through the Geomatics Industry Association of Canada (GIAC), 170 Laurier Avenue West, Suite 1204, Ottawa, Ontario K1P 5V5.

Tel: (613) 232-8770; fax: (613) 232-4908.

For further information on current activities of the Working Group, contact the Chairman, Dr. Phyllis Charlesworth, Geological Survey of Canada, Earth Sciences Sector, 601 Booth Street, Room 286, Ottawa, Ontario, K1A 0E8.

Tel: (613) 995-4065; fax: (613) 996-9990

Integration and Standardization

During 1994/95, the Working Group has been working with the Canadian Advisory Committee (CAC) on ISO/TC211 to get the ISO Geomatic Standards Technical Committee established. (see article "World Wide Geomatics Standards" p.4). Working Group #2 has also been working with the Canadian General Standards Board's Committee on Geomatics and several provinces in an attempt to harmonize the DIGEST Feature Attribute Coding Catalogue (FACC) with various Canadian agencies catalogues. Feedback from these efforts are being incorporated into FACC where feasible.

Working Group #2 will continue its work with CAC/ISO/TC211 in order to create useful ISO standards. Resources are very limited but the group will take advantage of any related projects amongst its members and where possible participate in the efforts of the new ISO working groups. One area where the Working Group hopes to contribute is on the development of a broader feature catalogue.

For further information contact the Chairman, Tim Evangelatos, Canadian Hydrographic Service, Fisheries and Oceans Canada, 615 Booth, Room 237, Ottawa, Ontario K1A 0E6. Tel: (613) 995-4540; fax: (613) 996-9053.

Access and Marketing

IACG on the Internet...IACG on the World Wide Web

The Access and Marketing Working Group has recently opened a World Wide Web Site on the Internet at the URL address:

<http://www.geocan.nrcan.gc.ca/iacg/>. You will find a short description of what the IACG is, the list of member agencies and useful IACG contacts. Future plans for the Internet site include: Providing the Federal Geomatics Bulletin, the GIS Source Book and the IACG Database of Federal Geomatics Data Holding directly on-line. It is possible that in the near future, the Federal Geomatics Bulletin and other IACG publication will be transmitted only electronically, in order to keep costs down.

The Working Group is also updating the **IACG Database of Federal Geomatics Data Holding** which was originally published in 1991. To include your data sets in this important meta-database or for further information on the Access and Marketing Working Group activities, you may contact: Gordon Plunkett, Working Group Chairman, Geomatics Canada, Earth Sciences Sector, 615 Booth St., Room 753, Ottawa, Ont. K1A 0E9. Tel: (613) 992-0389 or fax: (613) 952-0916.

Technology and Information Transfer

This Working Group is responsible for organizing workshops, seminars and information sessions on Geomatics. In particular, the workshops and courses offered annually in conjunction with the Geomatics Conference are popular and very well attended (See Federal Geomatics Bulletin no.7 for titles offered at the June 1995 Conference). This Working Group is looking for enthusiastic new members to join their team. To qualify, you need to be a federal employee interested in organizing Geomatics workshops. For more details on the activities of this Working Group, contact the Chairman, Dr. Andrew Rencz, Geological Survey of Canada, 601 Booth St. Room 692, Ottawa, Ontario, K1A 0E8. Tel: (613) 995-4786; fax: (613) 996-3726.

IACG Workshop - Components of the Canadian Spatial Data Infrastructure (CSDI)

There will be a full day workshop to define the components of the CSDI on Wednesday March 27th, 1996. Persons interested in this topic, and working in this field, from various levels of government, universities and the private sector are invited to participate. Registration is free but limited, and will be accepted on a 'first come first served' basis. Please register by sending your name, address, telephone number, organization name and email or fax address to:

email (internet): Charlesworth@GSC.Nrcan.gc.ca
fax: P. Charlesworth at 613-995-2339

The session will be held in Camsell Hall at 580 Booth St., Ottawa, and will begin at 9 am. For those who cannot attend, the results will be summarized and further input sought at an afternoon session on May 28th at Geomatics 96: the 8th International Conference on Geomatics.

► Geomatics Standards

New Information Technology-enabled Metadata Standard

Canadian General Standards Board (CAN/CGSB) 171.3-95 is a National Standard of Canada entitled "Directory Information Describing Digital Geo-Referenced Data Sets". This standard states what information is required to describe such data sets. It consists of a printed form with accompanying instructions. (See *Federal Geomatics Bulletin* Vol. 6 #2, p.4)

Because the standard exists only on paper, there is a distinct possibility that various organizations and individuals would implement it on their own information technology platforms in a manner which would not guarantee (or may even hinder) information sharing, particularly through electronic data interchange. Furthermore, time, effort and costs would be incurred by each user of this standard in the development of individual metadata conventions resulting in a variety of data element definitions and various levels of granularity.

The possibility also existed for federal agencies using and implementing this standard to do so without ensuring compliance with various government-wide requirements such as those arising from the Official Languages Act and Treasury Board's Management of Government Information Holdings policy.

The Department of Indian Affairs and Northern Development therefore undertook a project to standardize the Northern Information Network (NIN) (see *Federal Geomatics Bulletin* vol. 4 #2 Winter 1993) system by:

1. transforming the national standard, CAN/CGSB 171.3-95 "Directory Information Describing Digital Geo-referenced Data Sets," from its "printed paper" format into an information technology-enabled metadata standard; and
2. identifying and accommodating existing NIN data and information management requirements that were needed in addition to those stated in the CAN/CGSB 171.3-95, that is, as NIN user extensions).

The common objective of the CAN/CGSB standard and NIN was a normalized, systematic, rule-based and automated approach, as well as one that would facilitate information sharing and electronic data interchange.

The work undertaken on CAN/CGSB 171.3-95 had, of necessity, to be generic, and thus be as independent as possible of the various information technology (IT) platforms utilized to implement and support directories of digital geo-referenced data sets by the wide mix of users of this standard. As such, the level of detail and granularity had to be greater and clearer than for IT platform specific applications.

The project was carried out in a number of phases. First there was a review and analysis of the existing source documentation on NIN. This included identification of all NIN Version 1.0 data definition, attributes, structures, etc. to determine any changes required for NIN Version 2.0. At the same time this provided the opportunity to identify the degree to which NIN data definitions and attributes could serve as a basis for the metadata

format and specifications for CAN/CGSB 171.3-95. A concurrent activity was the review and analysis of the CAN/CGSB 171.3-95 standard printed form itself, as well as its associated Appendix A, "Explanations and Instructions", from the perspective of developing an IT-enabled metadata standard. The results of Phase 1 were documented in a series of very detailed needs analysis reports. This phase concluded with the development of sample matrices with associated rules and attributes to be utilized for the development of the detailed metadata requirements for CAN/CGSB 171.3-95 and NIN Version 2.0.

Several concurrent and inter-related activities took place in Phase 2. They included: development of an IT-enabled CAN/CGSB/NIN Version 2.0 questionnaire; identification and development of Look-Up and Authority File (LUAF) tables; development of an entity framework, including business operational rules, relationships between entities and sub-entities, and key management items; and the detailed work required for an information life cycle management approach at the data element level, i.e. a matrix of data element attributes (MADEA).

The resulting report, "Standardization of the Northern Information Network (NIN) System: NIN User Requirements" was prepared for the Department of Indian Affairs and Northern Development by INFOMAN Inc., and its implementation on the NIN IT platform was developed by consultants, Bhasker and Suchita Ravikanti.

Further details are available from the NIN administrator at (819) 997-7281, or through the NIN bulletin board at 994-2557 in the National Capital, and 1-800-567-6935 elsewhere in North America). The electronic version of NIN 2.0 (CAN/CGSB 171.3-95 plus NIN user extensions) now is in use. For on-line access, the number is (819) 997-0840.

World Wide Geomatics Standards Efforts Move Forward

Isolated national and regional thrusts to develop geomatics standards are now being integrated with the formation of a new ISO Technical Committee (TC211) for "Geographic Information / Geomatics".

A second meeting of TC211 was held in Reston Virginia, August 28 and 29th, 1995, and five working groups were formed to deal with a broad range of needs. Twenty-two nations have joined the committees and fourteen nations have requested observer status. These Working Groups and their chairmen are:

- WG 1 Framework and Reference Model- Greg Smith, United States
- WG 2 Geospatial Data Models and Operators - Ken Bullock, Australia
- WG3 Geospatial Data Administration - Les Rackham, United Kingdom
- WG4 Geospatial Services Morten Borrebaek, Norway

WG 5 Profiles and Functional Standards - Dave McKellar, Canada.

Although SAIF and DIGEST (*See Federal Geomatics Bulletin V. 6 no.2, p.4*) have been approved as national standards in Canada and SDTS has been approved in the USA, commitment is slow or non-existent since there is no critical mass in support of these solutions. In Europe the CEN TC287 has been developing standards for the European Economic Community with no input from North America or the rest of the world which also has a growing need for spatial data standards. These activities have, however, established much of the knowledge and expertise needed to create international solutions. The ISO TC211 should act as a catalyst, not only of activities in various countries, but also of certain standards activities in international groups such as FIG, ISPRS, ICA, IAG, IHO, DGIWG, and OGC (see below) all of which have established formal liaisons with TC211.

The ISO methodology for standards development is aggressive and although it won't solve all problems it can tap into talent around the world and should lead to useful solutions fairly soon.

Canadians have made important contributions to geomatics, and to geomatics standards. It is hoped that we will also contribute to international standards. This will depend upon support from various levels of government and private industry, which must volunteer individuals and funding to cover travel costs. Without such support Canada will not be actively involved and its views will not be heard.

Coordination of Canada's input to TC211 is through a Canadian Advisory Committee (CAC) chaired by Dave McKellar, Directorate of Geomatics, National Defence Headquarters, Ottawa, Ontario K1A 0K2, (613) 995-4239, fax (613) 996-3328 and <mckellar@ncs.dnd.ca>.

CEN: Comité Européen de Normalisation
 FIG: Fédération Internationale des Géomètres/(International Federation of Surveyors)
 ISPRS: International Society for Photogrammetry and Remote Sensing
 ICA: International Cartographic Association
 IAG: International Association of Geodesy
 IHO: International Hydrographic Organization
 DGIWG: Digital Geographic Information Working Group
 ISO: International Standard Organization
 OGC: Open GIS Consortium, Inc.

Geomatics 1996


The 8th International Conference on Geomatics will be held at the Ottawa Congress Centre, May 26 to 30, 1996. Workshops will be held from May 26-27 and the Conference, from May 28-30. Planning has begun under the direction of Dr. Bob Ryerson of the Canada Centre for Remote Sensing, Geomatics Canada. Dr. Marc D'Iorio, also of the Canada Centre for Remote Sensing, is chairing the Technical Program Committee, which consists of a strong representation from government, industry and academe. The theme this year is *The Business of Geomatics: Real Solutions for Real Problems*. The Conference will focus on integrated geomatics solutions for commercial applications.

The combination of Dr. Ryerson and Dr. D'Iorio and their teams marks a strong commitment from the Earth Sciences Sector to organize another successful Conference in 1996. Topics will revolve around business and resource management as applicable to all the Geomatics arts and sciences, and will include subjects such as products, services, technology transfer, standards, applications, and socio-economic issues. The usual Conference activities can be expected: a wide range of commercial exhibits and the Exhibitors' Icebreaker Reception; presentations devoted to the major theme, as well as to general applications and technology; technical tours and a casual social evening.

This 1996 Conference is being organized by Geomatics Canada, in conjunction with the Canadian Institute of Geomatics, the Geomatics Industry Association of Canada and the Inter-Agency Committee on Geomatics, all holding their annual meetings during Geomatics 1996. The annual meeting of the Association of Canada Lands Surveyors will also take place during the week of the Conference.

Planning is also well underway for the 1997 Geomatics Conference to be held May 24-29, 1997. Several major international remote sensing activities will take place in conjunction with Geomatics 1997, including the 19th Canadian Symposium on Remote Sensing and the final GlobeSAR meeting.

Come to Ottawa and help make this the best Geomatics Conference ever!



Geomatics 1996

the 8th International Conference on Geomatics

Our Theme - *The Business of Geomatics:
Real Solutions for Real Problems*

WORKSHOPS MAY 26 - 27

CONFERENCE May 28 - 30, 1996

at the Ottawa Congress Centre, Ottawa, Ontario, Canada

Organized by:

Geomatics Canada, Earth Sciences Sector, Natural Resources Canada

in conjunction with

the Canadian Institute of Geomatics - 89th Annual General Meeting
 the Geomatics Industry Association of Canada -
 37th Annual General Meeting

and

the Association of Canada Lands Surveyors - 12th Annual Meeting.

Dr. Bob Ryerson • Conference Chairman

For general Conference information contact:
 Rose Barthe, Conference Manager
 615 Booth Street, Room 400
 Ottawa, Ontario, K1A 0E9, Canada
 Tel: (613) 996-2817; Fax: (613) 947-7059



Natural Resources Canada on the Internet

Natural Resources Canada and many of its components have created Internet World Wide Web (WWW) sites as a means of disseminating information about its programs, products and services. The NRCan Home Page may be accessed through <http://www.nrcan.gc.ca/>

Geomatics Canada's Internet home page may be found at <http://www.geocan.nrcan.gc.ca/>

The home page provides a link to the Inter-Agency Committee on Geomatics (IACG) and to other sites of interest in geomatics. Users may access information on Geomatics Canada's products and services, as well as Centres and Divisions, for example:

The Canada Centre for Remote Sensing site gives a comprehensive view of the Canadian remote sensing community, its activities, products, tools, and programs. Users can access an image browser of over 500,000 images, definitions of remote sensing, comprehensive details and photos of Radarsat, and much more.

Contact: <http://www.ccrs.nrcan.gc.ca/>

Browse through the National Atlas Information Service, which won several prizes for their WWW site. (*See Federal Award Program and Schoolnet in this issue*).

(<http://www-naiss.gissd.nrcan.gc.ca/>)

From the Geodetic Survey Division Home page, located at <http://www.geod.nrcan.gc.ca/>, users may access information on GSD's products and services and even calculate transformations from one coordinate system to the other.

A main information desk allows Geomatics Canada's client to inquire about products on-line.

The Geological Survey of Canada's home page links you to information about science programs, partnership programs, educational material, publications and sales, libraries and scientific data bases etc. You may browse a catalogue and order publications. Contact GSC at <http://www.emr.ca/gsc/gschp.html>

The Canadian Forest Service (CFS) information can be

obtained at <http://www.emr.ca/nrcan-cfs.html>. Home pages for several individual CFS components can also be accessed as follows:

CFS-Victoria: <http://www.pfc.forestry.ca/>

CFS-Edmonton: <http://www.nofc.forestry.ca/>

CFS-Newfoundland: <http://www.nefc.forestry.ca/>

Model Forests Network:

<http://ncr157.ncr.forestry.ca/MF.HTM>

State of Forests Report:

<http://mf.ncr.forestry.ca/sof/sof.html>

For more information contact:

Natural Resources Canada, 580 Booth Street, Ottawa, Ontario, Canada K1A 0E4. Telephone (613) 995-0947.

New Access to National Geophysical Data Bases

The Geophysical Data Centre of the Geological Survey of Canada, part of the Department of Natural Resources, stores and distributes the National Aeromagnetic and National Gravity Data Bases. The Centre has just released a new catalogue describing the data bases and detailing the products and services which can be provided from these data.

The catalogue includes maps showing current Canadian coverage, descriptions of the various data sets, listings of available services and output options, and a revised pricing structure reflecting recent price decreases.

The catalogue may be obtained free of charge from: Geophysical Data Centre, 1 Observatory Crescent, Ottawa, Ont. K1A 0Y3. Tel: (613) 995-5326, Fax: (613) 992-2787, internet: infogdc@agg.emr.ca or it may be viewed on the internet at <http://gdcinfo.agg.emr.ca/>

Users may also search interactively for detailed information on specific areas using the online data information system, GDCINFO. Access is by modem or Telnet.

Modem Access:

Modem Line: (613) 947-7940

Modem Settings: 8 data bits,

Baud Rates: to 28,800 bps

no parity, 1 stop bit

Login: gdcinfo

Password: info4me

Internet: [telnet gdcinfo.agg.emr.ca](telnet://gdcinfo.agg.emr.ca)

user name: gdcinfo

password: info4me

The National Atlas on Schoolnet Gets Launched

The National Atlas on Schoolnet, a joint venture between Natural Resources Canada and Industry Canada, was launched in Edmonton on September 22, 1995. The National Atlas on Schoolnet site opens the door to a wide variety of information on Canada's vast social structure and physical features to anyone with access to the Internet's World Wide Web. Through this site the user has access to:

- the Canadian Geographical Names Data Base with over 500 000 place and feature names;
- fun and interesting historical information on a selection of these names;
- an interactive geography quiz that adds up your score;
- Defacto, the fact book about the physical environment;
- maps that you can simply click on to get record highs and lows for climate, parks and the environment and other general facts;
- a tool for creating your own maps from a selection of nearly 40 layers of information on languages, population, earthquakes and wetlands;
- a selection of basic map layers, including boundaries, rivers and lakes, roads, railways, cities and more, that can be used with the information layers or on their own;
- pointers to the hot topics of the day;
- Our Home, an Atlas of Canadian Communities created by school children, and information on how you can make your own community atlas and feed it back onto the site;
- teachers' kits to provide ideas on the use of this WWW site in the classroom.

Schoolnet is an initiative of Industry Canada, and one of the main objectives is to see all 16 000 Canadian schools connected



The Hon. A. Anne McLellan, Minister of Natural Resources Canada, watches as Kim Gillespie from the Good Shepherd Elementary School in Edmonton Alberta shows her through the National Atlas on Schoolnet site.

to the Internet by 1997. The National Atlas Information Service was contracted to provide the content for the geography portion of schoolnet. The launch marks the end of the first phase of the project. The next six months will be spent getting feedback from teachers and students, modifying the site and adding new information.

Please have a look at the site yourself and use the feedback forms to let us know what you think.

Dial: <http://www-nais.gissd.nrcan.gc.ca/schoolnet>

For further information contact: Donna Williams, National Atlas Information Service, Natural Resources Canada, Room 650, 615 Booth Street, Ottawa, Ontario K1A 0E9, Canada. Tel: (613) 992-4339; fax: (613) 943-8282.



Environment Canada's Green Lane on the Information Highway

The Green Lane on the Information Highway is Environment Canada's award winning World Wide Web site on the Internet. The Green Lane provides interactive access to the electronic environmental information of the Department and its partners, across Canada and throughout the world. It is a roadmap to a greener society, where Canadians are given the tools and information they need to make environmentally responsible decisions, and take individual action.

Visitors to the Green Lane are introduced to key environmental issues such as climate change, biodiversity, toxics, and weather, as well as related information on environmental science, technology, policy and regulations. Information products such as publications, databases and services can be found in a variety of formats from text to multimedia.

This information is made available by Environment Canada, and through partnerships with other government and non-government organizations. A recent example of this is the National Pollutant Release Inventory, the result of an effective collaboration between Environment Canada and Natural Resources Canada.

The Green Lane is located at "<http://www.doe.ca/>". For further information, contact: Jenifer Graves, Electronic Communications Manager, Communications and Consultations Directorate, Environment Canada, 10 Wellington Street, Hull, Quebec K1A 0H3. Tel: (819) 953-6296; Fax: (819) 953-1599, E-mail: gravesj@cpgs.v1.am.doe.ca

AWARDS

1995 Federal Awards in Geomatics

On September 11, 1995, a gala awards ceremony was held at the Canadian Museum of Civilization in Hull, Québec to

honour outstanding technical projects completed by Federal Government departments during the past year. The Annual Federal Awards Program celebrates excellence in the management of information and technology.

One hundred and sixty-four projects were nominated but only nineteen medals were awarded in six categories. Projects were judged by a panel representing private industry and government. In fact, the entire ceremony was sponsored by private industry to foster closer communication between industry and government innovators. The awards mentioned here rewarded successful developments in Geomatics.

The National Atlas World Wide Web Team (Natural Resources Canada, Geomatics Canada) received a gold medal in the category entitled "Investing Strategically". This category recognized significant work which had been accomplished within a very limited budget — successful because it filled a unique niche. The Atlas niche involved developing an Internet site which features customized maps generated from national databases and thematic data layers.

Interest in seeing for yourself? Try the following address on the World Wide Web: <http://www-nais.gissd.nrcan.gc.ca/schoolnet/>. For complementary information, see the article on Schoolnet on p.7 of this issue.

Dr. Herman Varma, Head of Cartographic Research at the Canadian Hydrographic Service, Department of Fisheries and Oceans, Bedford Institute of Oceanography, received the silver medal in the category "Building Partnerships". Dr. Varma's research centered on the development of a new multidimensional datatype called Helical Hyperspatial Code or HHcode. This datatype is pending patent by Oracle Corp. in Redwood, California. The research broke new ground in managing very large multidimensional datasets in a relational environment. This new generic datatype extended SQL functionality and provided an elegant methodology to operate and maintain very large multidimensional data sets in the order of terabytes. This technology solved two critical problems, in how to efficiently store, access and manage multidimensional data and how to improve performance and archival for very large spatio-temporal databases holding terabytes of information which are monotonically increasing with every update. This technology was developed and prototyped at the Bedford Institute of Oceanography in Nova Scotia and was transferred to a multinational company "ORACLE". The result was the opening of an ORACLE Research Development Centre in Hull, Québec in 1992 based on this technology. The Oracle MultiDimension product was released in April 1995. A variety of prominent GIS's including ArcInfo and CARIS are basing their applications on it. This research has contributed substantially to Canada's

reputation as world leader in geomatics. The Department of Fisheries and Oceans received over 3 million dollars from the private sector in return for this technology transfer. For more information contact Dr. Herman Varma, Canadian Hydrographic Service, P.O. Box 1006, Dartmouth, NS B2Y 4A2, Fax: (902) 426-1893.

Dr. Thierry Toutin, a Research Scientist at the Canada Centre for Remote Sensing (Natural Resources Canada, Geomatics Canada) received the Bronze Medal Award in the category "Building Partnerships". Dr. Toutin's unique research in high precision numerical cartography has made possible the use of remote sensing optical and radar data for the development of new products called image-maps and the generation of topographic and thematic databases. By merging multi-source data, cartographic products can be generated more quickly and at lower costs. The technologies developed by Dr. Toutin have been licensed to industry, universities and operational users, and have contributed to the sale of Canadian products and expertise abroad. For more information, contact Dr. Thierry Toutin, Canada Centre for Remote Sensing, 588 Booth Street, Ottawa, ON K1A 0Y7; Fax: (613) 947-1385.

International Award for Delta-X and MetaView/GIS



The Geographic Information Systems and Services Division (GISSD) of Geomatics Canada, part of Natural Resources Canada, recently won an award presented by the Urban and Regional Information Systems Association (URISA) for the Division's Delta-X and MetaView/GIS software developments (see *Federal Geomatics Bulletin* Vol. 6, No. 2, Winter 1995).

Under the 1995 Exemplary Systems in Government Program, URISA reviews, assesses and recognizes innovation in the effective application of information technology to improve service delivery and client access in government agencies. Delta-X and MetaView/GIS won an Honorable Mention in the National Spatial Data Infrastructure category, which recognizes GISSD's strategic and "exemplary contribution to the National Spatial Data Infrastructure initiative."

The award was presented during the 33rd Annual URISA Conference held in San Antonio, Texas from July 16 - 20, 1995. Other categories for awards included Corporate Systems, Operations Automation Systems, and Small Municipalities Systems.

For further information on the Delta-X and MetaView/GIS, please contact: Dr. Mosaad Allam, Geographic Information Systems and Services Division, Geomatics Canada, 615 Booth Street, Ottawa, Ontario K1A 0E9, Canada. Telephone: (613) 996-2812 or Fax: (613) 952-0916.

ELADA-21

"Agenda 21" is the action plan developed by the United Nations Conference on Environment and Development at its 1992 Earth Summit in Rio de Janeiro. It includes a statement of goals and objectives for sustainable development and a list of strategies and actions to be undertaken to achieve those goals. In many respects, Agenda 21 is a springboard for a continuous and dynamic information building and exchange.

Unfortunately reading Agenda 21 — analyzing its text and extracting relevant material for a particular program or action — is a very arduous task. ELADA 21 (Electronic Atlas of Agenda 21) is a software program that was developed as an inexpensive approach for accessing the information in Agenda 21. A project of the International Development Research Centre (IDRC), the Canadian Centre for Remote Sensing (CCRS), and private industry (LMSoft and the Canadian Biodiversity Informatics Consortium), ELADA 21 uses multimedia and geomatics technology to process information in Agenda 21 at regional, national, and global scales, and will make possible the assessment of environmental changes.

The long-term objective of this project is to cover all the chapters of Agenda 21. It will facilitate the worldwide exchange of information generated by the Agenda 21 guidelines and support the implementation of reporting processes on sustainable development policies.

Six countries (the Bahamas, Costa Rica, Canada, Kenya, Poland, and Thailand), the International Plant Genetic Resources Institute in Italy, and the World Conservation Monitoring Centre in the United Kingdom assisted IDRC and CCRS in developing a prototype for ELADA 21's biodiversity chapter. The prototype focuses on the selection, collection, and integration of biodiversity data, and on the production of interactive scenarios linking biodiversity with socio-economic issues. One of the key objectives of the project is to enable participating countries to meet their own biodiversity information needs through technology transfer and infrastructure development.

The CD-ROM package will be highly interactive. It is being developed as a follow-up to GEOSCOPE, an interactive global change encyclopedia produced by CCRS for the International Space Year in 1992 (see Federal Geomatics Bulletin, vol. 4, no. 1, p. 8). The complete ELADA 21 package is scheduled to be released in 1996. For more information, please contact: Marc Beaudoin, ELADA 21 Project Manager, Applications Division, CCRS, 588 Booth Street, Ottawa, Ontario, K1A 0Y7.
Tel.: (613) 947-1257; fax: (613) 947-1408;
e-mail: marc.beaudoin@geocan.nrcan.gc.ca



1995 International Cartographic Association Conference Barcelona, Spain

Canada has scored high marks for its participation at the General Assembly of the International Cartographic Association (ICA) and 17th International Cartographic Conference held in September 1995 in Barcelona, Spain. The International Cartographic Exhibit was one of the most significant events of the Conference, consisting of the most recent works from 60 countries and affiliated institutions.

The Canadian Cartographic Exhibit Committee for ICA'95 consisted of members from Geomatics Canada, the National Archives of Canada, *Canadian Geographic*, McGill University, the University of Victoria, and the University of Winnipeg. The Canadian Cartographic Exhibit for ICA 1995 may be viewed through the World Wide Web site at <http://www.GeoCan.NRCan.gc.ca/>.

The Historical Atlas of Canada was granted an Award of High Commendation by the ICA for its consistent style and successful communication of its theme in the Thematic Map Category. The official presentation of the ICA Award was made at the closing ceremonies and was accepted by Professor Norman Drummond on behalf of Canada.

Another highlight for Canada was the successful bid for the honour of hosting the General Assembly of ICA and the 19th International Cartographic Conference in Ottawa in 1999. The Conference theme is *Touch the Past and Visualize the Future*. Dave Carney of the Earth Sciences Sector was appointed Chairman for the 1999 Conference. For more information about the Ottawa 1999 ICA Conference, please contact: ICA Ottawa 1999, 615 Booth Street, Ottawa, Ontario K1A 0E9, Canada. Tel.: (613) 992-4332; fax: (613) 995-8737.

First North American Testing of 3-D Seismic Imaging to take place in Sudbury

Recent studies conducted under the Industrial Partners Program of the Geological Survey of Canada (GSC) have demonstrated that three-dimensional (3-D) seismic imaging, a technique similar to medical ultrasound imaging and originally developed for hydrocarbon exploration in sedimentary basin, can be adapted to the hard rock environment of the Canadian Shield. A research consortium consisting of the GSC (Natural Resources Canada), Inco Exploration and Technical Services Inc., and Falconbridge Ltd., will evaluate the use of this innovative technology for deep mineral exploration in the Sudbury Basin, one of Canada's most important mining regions.

Under the Canadian LITHOPROBE program, researchers from industry and government have conducted a series of high resolution seismic surveys across the Sudbury Basin since 1990. In the process, an extensive database of geological mapping information, existing drill holes to great depths, and core samples for physical rock property studies was assembled. The surveys were followed by detailed 3-D forward modelling studies that address the technological challenges of detecting and delineating ore in a complex geological setting at depths of 1 to 3 km.

Using this comprehensive information base, the concept of deep-probing, high-resolution 3-D seismic exploration technology will leave the drawing board and will be applied to an area of approximately 15-20 km² in the Sudbury Basin. It will be the first 3-D seismic experiment for mineral exploration in North America. If successful, this project could lead to improved exploration methods in existing base metal mining camps in Canada, resulting in prolonged life for mines in these areas.

This program is part of a broad initiative to foster technology transfer from the Geological Survey of Canada to the Canadian mining industry.

For more information, please contact Bernd Milkereit, Geological Survey of Canada. Telephone: (613) 995-5490, Fax: (613) 992-8836, internet: bernd@cg.emr.ca.



Mercator: A Canadian Initiative (continued from p.1)

The MERCATOR Project will implement, for example, the various data models from SAIF, DIGEST and S-57 into Oracle 7 Spatial Data Option, formerly Oracle 7 MultiDimension.

The result will be a proof of concept to implement a massive geospatial database on-line - the MERCATOR Warehouse. Existing development activity has contributed significantly, such as the Canadian Hydrographic Service led ChartNet initiative and in British Columbia where LandData BC is being constructed to provide on-line, timely access to a variety of information products using the World Wide Web.

Standards are essential to implement the highest possible level of interoperability. A minimum of standards are necessary along with product specifications, inclusion/exclusion rules and validation software. If these are achieved, data can be extracted and used directly in a plug 'n' play mode without any form of data translation. Paradoxically, it is the adherence to standards that will preserve diversity, freedom of choice and innovation in the future. Standards define what is expected and what is allowed, enabling companies to enter the market and focus their strengths in creating new products and services. Standards for interoperability must give the users the freedom to change vendors and technologies, allowing them to buy the best solutions for their needs with confidence that they will work together. Standards will also accelerate the rate at which organizations adopt new technologies.

Various levels of Canadian government, industry, academia and the general public need to be able to create and access standard geospatial data that can meet the needs of many diverse users. This requires that users must be able to connect with this data effortlessly and exploit it in a transparent manner. Therefore, one must understand the difference between connectivity and interoperability. Having only connectivity is not interoperability. The need to share data and information from multiple environments across different hardware platforms and between organizations has prompted the development of Open Systems and standards for information access and control. Existing strategies for managing geospatial data, however, are inadequate for distributed environments for two reasons. The first reason is the inherent complexity of application specific software. The second is the high variability in spatiotemporal data models that exists

between various standards. An open systems environment requires a standardized core data model within which a variety of data types can be described, stored and accessed coherently, regardless of the application area. While it can be argued that a correctly configured GIS could be an appropriate data management mechanism, few of the present implementations fulfill this role. The core data model must be complemented by a system architecture that supports graphical user interfaces, data integration, document integration, and linkages to software packages. Providing data independence requires a common spatiotemporal modelling language, a modelling tool, a database capable of supporting the structures in the model and finally a mechanism that provides an interface for information exchange. There has never been a greater need to develop a standard for geospatial information that is all inclusive - the MERCATOR Standard.

The MERCATOR Standard must have an open architecture in order to ensure that all forms of geospatial data must be accessible through standard application programming interface in open distributed database environments. In fact, the MERCATOR Standard must lead to the foundation of an integrated database that will allow users to access geospatial data regardless of individual hardware, software, or geographic location. Practically, the MERCATOR Standard must ensure that the existing gap between the GIS and Management Information Systems (MIS) databases disappear. To ensure that the MERCATOR Standard becomes a reality, we will need to incorporate and build on existing standards such as DIGEST, S-57 and on modules of SAIF. This resultant body of work will go a long way in strongly influencing the direction of standards development within the ISO TC 211. A very wide ranging suite of geomatics standards are currently under development in ISO TC 211.

Complementary to the geospatial data warehousing is the development of software tools to exploit this modern day on-line 'Atlas'. Mercator's map projection, which is still in use today, could be taken as a similar analogy as he succeeded in standardizing the visualization of the Earth. This third thrust will provide the means of accessing, displaying and querying through an open system client-server environment using TCP/IP protocols - MERCATOR Software Tools. As an example, today's DIGEST compliant standard geospatial products such as DTED, ADRG, VMap and DNC*, as well as tomorrow's customised user data sets will be interactively accessed from multiple networked servers, merged, updated, down loaded to the client, and displayed with standard symbology. Global data bases of the above standard products are being developed. The Canadian portions of these data bases are being produced in a partnership arrangement with the Canadian Hydrographic Service and Geomatics Canada. Sale of these products in Canada are under negotiation with our partners.

The MERCATOR Initiative provides an opportunity to enable national geomatics standards activities to harmonize and converge thus allowing scarce resources to be focused on improving Canada's global leadership role in Geomatics. Contact David McKellar, Directorate of Geomatics, Department of National Defence (613)995-4239, fax (613) 996-3328, <mckellar@ncs.dnd.ca> and <<http://132.156.33.161/Engineer/mercator/mercator.htm>>.

*Digital Terrain Elevation Data, Arc Digitized Raster Graphics, Vector Smart Map and Digital Nautical Chart

Geomatics Canada Promotional Activities in Asia

Geomatics Canada continues to be active internationally. This article presents a brief on some of its activities in Asia which is among the most important growth markets for Canadian geomatics products and services. The Canadian geomatics community has developed an enviable credibility for its technology and technical expertise, largely generated while working on development assistance projects conducted by the Canadian International Development Agency (CIDA) and other international institutions such as the World Bank. A number of incoming and outgoing visits and technical missions took place during the past year. The Republic of Korea, India and Indonesia are examples of the focus of geomatics promotional activities.

Korea

In June 1995, Geomatics Canada signed a Memorandum of Understanding (MOU) on cooperation in geomatics with the Republic of Korea when a delegation from Korea's Rural Development Administration (RDA) visited Ottawa. RDA and Geomatics Canada are presently discussing collaboration in the application of Geographic Information Systems (GIS) and remote sensing technologies to resource management and related training.

Korea is the world's tenth largest trading nation. In 1994, two-way trade between Canada and Korea stood at \$4.7 billion. Besides RDA, several other government agencies are actively engaged in Korean geomatics. These include the National Geographic Institute, Institute of Science and Technology and the Cadastral Survey Corporation.

India

The Government of Canada's business development strategy for India is known as FOCUS INDIA. It consists of a coordinated strategic approach by federal and provincial governments, in conjunction with Canadian industry to increase Canada's commercial profile in India. FOCUS INDIA encourages Canadian business to consider collaborative arrangements like joint ventures and technology transfer as well as direct investment. This strategy will enable the Canadian private sector to capitalize on the opportunities in the Indian market while contributing to its economic prosperity and sustainable development.

In the spirit of FOCUS INDIA, Geomatics Canada lead a technical mission to India at the end of 1994. The Mission, with the participation of Canadian geomatics firms, was organized in coordination with Foreign Affairs, Industry Canada and the Geomatics Industry Association of Canada (GIAC). The Canadian Geomatics Technical Mission affirmed the existence of a buoyant and potentially huge market for geomatics products and services. Besides projects



J.H. O'Donnell, former Assistant Deputy Minister of Geomatics Canada and Dr Kang-Kwun Kim, Director General, National Agriculture Science and Technology Institute, Republic of Korea, at the signing of the MOU.

consisting of strengthening geomatics facilities and providing natural resources management information, specific opportunities for collaboration also exist in India in infrastructure development and environmental management. Cooperative activities are currently being pursued in urban mapping, remote sensing systems and services, and cadastral information systems.

Indonesia

An Indonesian delegation interested in forestry applications of radar remote sensing visited Geomatics Canada in May 1995. The delegation, lead by a senior official of the Ministry of Forestry, represented both the public and private sector interests. In addition to demonstrations of, and related discussions on applications of radar remote sensing to forestry, the visit facilitated discussions of opportunities for geomatics firms. A Canadian firm has recently signed a \$2 million contract with a member of the delegation.

Another Indonesian delegation visited the Sector in June 1995. This delegation's interest centered on the application of geomatics technologies to environmental management. The Indonesians are presently establishing Environmental Study Centres throughout the country. Canada's financial contribution to environmental management development in Indonesia since 1978 has been estimated to be nearly \$50 million. With \$500 million in exports, Indonesia is Canada's largest export market in Southeast Asia and offers excellent opportunities for Canadian geomatics and environmental products and services.

For more information on Geomatics Canada international activities contact: Mr. Pak Chagarlamudi, Business Development, Earth Sciences Sector, 615 Booth Street, Ottawa, Ontario K1A 0E9 fax: (613) 943-8838 e-mail: pchagarl@nrcan.gc.ca

DND and the GSC Cooperate to Produce Digital Shaded Relief Air Charts

The Geological Survey of Canada (GSC) and the Department of National Defence (DND) recently cooperated in developing a procedure to digitally generate the shaded relief separates for the DND Joint Operation Graphics (JOG) air charts.

Traditionally, shaded relief is produced by cartographers using airbrush methods. This learned skill is subject to the cartographers' interpretation of the terrain. Variations in grey tones and sun azimuth occur within and between adjoining map sheets, as well, airbrushing a mapsheet is very time consuming, taking between 60 and 120 hours to complete. Unfortunately, the results are not always consistent.

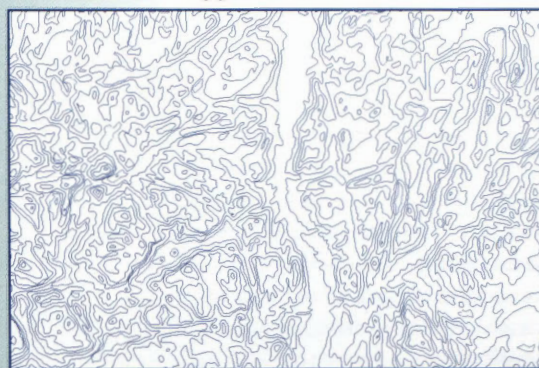
After a feasibility study, a contract was awarded to the GSC for the creation of stable base film plots for fifteen JOG charts throughout Canada. A variety of methods for generating the shaded relief were tested with varying results. All procedural development was completed on UNIX-BASED Arc/Info (beta version 7).

The best results were obtained by generating an Arc/Info's TOPOGRID command with the contours and lakes as input covers, and an output resolution of 45 metres. The SAI (Slope Aspect Index) command in the GRID module was used to first generate a colour map file and secondly, produce a shaded relief view of the surface. To get the desired results, the Z-factor used to exaggerate the relief was set at five.

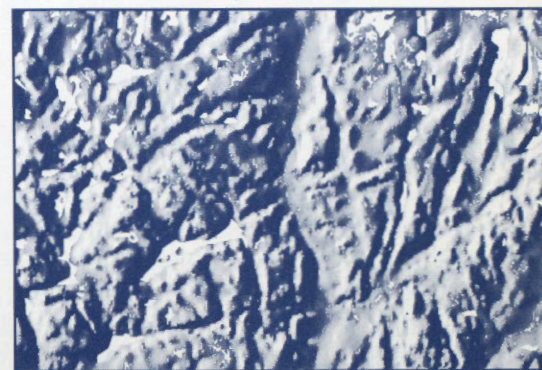
This method for generating shaded relief provides an excellent alternative to the traditional airbrushing techniques; certainly the results are quicker, and more consistent.

For further information, contact Jennifer Hum-Miller, Engineer, Directorate Geographic Operations, Mapping and Charting Establishment, National Defence Headquarters, Ottawa, Ontario K1A 0K2, Tél: (613) 992-7739, fax: (613) 996-3328, e-mail: jmiller@ncs.dnd.ca or Paul Huppé, Senior Systems Consultant, Computer Technology, Geological Survey of Canada, 601 Booth St., Ottawa, Ontario K1A 0E8, Phone: (613) 943-0996, Fax: (613) 995-2339, Email: huppe@gsc.emr.ca.

Contours and tagged lakes



Shaded relief view produced



1996 Calendar of Events

May 26-30, 1996

Geomatics'96 Eighth International Conference on Geomatics.

The business of Geomatics: Real Solutions for Real Problems, Geomatics Canada, Earth Sciences Sector, and The Canadian Institute of Geomatics 89th Annual Meeting, Ottawa Congress Centre, Contact: Rose Barthe, 615 Booth, Room 220, Ottawa, Ontario, K1A 0E9. Tel: (613) 996-2817, Fax: (613) 947-7059.

June 12-16, 1996

Canadian Cartographic Association Annual Meeting, Getting Maps to Work. Toronto, Ontario.

Contact: Byron Moldofsky, Tel: 416-978-3378, Fax: 416-978-6729; e-mail: byron@geog.utoronto.ca

July 9-19, 1996

XVIII International Society for Photogrammetry and Remote Sensing Congress, Spatial Information from Images, Vienna, Austria.

Contact: Prof. Dr. Karl Kraus, Vienna University of Technology, Gusshausstrasse 27-29 / 122, A-1040, Vienna, Austria. Tel: 43-1-58801 3811; fax: 43-1-505-6268; email: isprs96@email.tuwien.ac.at

August 5-10, 1996

The 28th International Geographical Congress: Land, Sea and Human Effort, The Hague.

Contact: Congress Secretariat 28th ICG, Faculteit Ruimtelijke Wetenschappen Universiteit Utrecht, Postbus 80.115, 35508 TC Utrecht, The Netherlands. Tel: 31-30-532044, fax: 31-30-540604; e-mail: r.vanderlinden@frw.ruu.nl