REMOTE SENSING IN CANADA

ISSN 0226-479X

VOL. 10, NO. 1 June 1982

A NATIONAL PROGRAMME IN REMOTE SENSING IS COORDINATED BY THE DEPARTMENT OF ENERGY, MINES AND RESOURCES IN CO-OPERATION WITH OTHER AGENCIES OF THE GOVERNMENT OF CANADA, PROVINCIAL GOVERNMENTS, INDUSTRY AND CANADIAN UNIVERSITIES

FOR FURTHER INFORMATION CONTACT:
THE CANADA CENTRE FOR REMOTE SENSING
DEPARTMENT OF ENERGY, MINES & RESOURCES
2464 Sheffield Road, Ottawa, Canada K1A 0Y7
Telephone (613) 993-0121

NOTES FOR AN ADDRESS
BY A.E. COLLIN
ASSOCIATE DEPUTY MINISTER
ON BEHALF OF
THE HONOURABLE JUDY EROLA
MINISTER OF STATE FOR MINES
TO THE
CANADIAN ADVISORY COMMITTEE
ON REMOTE SENSING
ARNPRIOR, ONTARIO
MARCH 29, 1982

The Honourable Judy Erola, acknowledges the continuing sound advice given to the Department by the Canadian Advisory Committee on Remote Sensing, as well as the value of its working groups and sub-committees for the effective exchange of ideas and experiences in the field of remote sensing. Clearly, from my Minister's point of view, the Canadian remote sensing program would not have reached the degree of international esteem it has achieved without the breadth of vision and the cohesiveness of approach which you have helped provide.

Canadians have a very large landmass and vast expanses of oceans to manage. Both the federal government and the provincial governments of Canada are well aware of the importance of natural resources to the economic well-being of the country. However, we cannot afford to let our wealth in resources lull us into a sense of security so deep that we let the technology evolution pass us by. Another consideration in the success of the Canadian remote sensing program has been the development, in Canada, of an industrial sector capable of rapidly and effectively responding to Canadian needs. In so doing, this private initiative has found itself well attuned to the needs of other countries and has been able to obtain an impressive share of the technology export market. This has provided the industry with the ability to meet the next round of Canadian needs as they arise.

It is particularly noticeable that all sectors of Canadian life - the government sector (federal and provincial), industry and indeed the universities, have risen to the challenge of using space to achieve great Canadian benefits. The budget document, "Economic Development for Canada in the 80's" expresses a specific commitment to the effective management of our natural resources in the next decade. In this document, the federal government recognizes the importance of an accurate assessment of our natural resources to support continued development in such major economic sectors as mining, forestry and agriculture. The same document makes a commitment to industrial development with emphasis on high technology areas of particular applicability to the economic life of Canada.

Along these lines, we have all recognized the value of space technology to gain a broad view of our inventory of renewable resources, to monitor the process of both exploiting our resources in a responsible manner and the replenishment of these resources, to make sure they are responsibly managed for sustained productivity and reasonable growth.

The federal government has thus committed the Canadian Space Program to the upgrading of the Canadian ground segment to receive data from LANDSAT-D, the next satellite in the United States series, to be launched this summer. Together with its twin, LANDSAT-D prime, this satellite is expected to provide the continuity of data so important to all of us, well into the eighties.

Although obviously critical, the continued availability of data alone is not sufficient.

This immense store of information must be reduced to a format readily usable by resource managers. For this reason, governments are now focussing on turning this data into images directly compatible with the maps of the National Topographic Series, in attempting to meet the ever growing demand for this product. The Department of Energy, Mines and Resources has further committed funding to the research required to develop new tools for the user, namely analysis systems capable of handling the large amounts of additional information provided by LANDSAT-D. These systems will be able to merge LANDSAT information automatically with other sources of data, such as the Canadian Geographical Information System or the Canada Soils Information System, or indeed any other geocoded data base. In addition to these programs, a strong airborne remote sensing capability will be maintained which will continue to serve users with its complement of advanced radar, optical and laser sensors.

We have also taken steps to organize a Technology Transfer Program, in an effort to provide, through the provincial remote sensing coordinators, scientific and technical assistance to resource managers. This program will begin modestly. It is the hope of the government that it will grow on the basis of the demonstrated success of the initial steps.

As I have been describing these federal government commitments, the topic has steadily progressed from the realm of data collection across the whole country - a responsibility which the federal governement accepts - to the concerns of managers directly responsible for our forests, our mines, our crops. As you well know, the management of these resources is the prerogative of the provincial governments and industry. Therefore, it seems to make sense that provincial governements and industrial users be prepared to make their contribution in support of these government programs.

I believe that this expectation is well justified. For example, we are all aware of the B.C. government's remarkable effort in the use of remote sensing in monitoring its valuable forest industry; we know of the interest of the government of Alberta in managing the rangeland so important for the beef industry, and of Alberta's interest, together with the governments of Saskatchewan and Manitoba, in the potential of remote sensing for the marketing of Prairie wheat and other cereal crops, one of the mainstays of our economy. For its part, the Ontario government has shown us how the Ontario Centre for Remote Sensing could profitably serve a wide variety of provincial users. In Quebec, a brilliant joint project managed by the ministère québecois de l'Energie et des Ressources with the Université Laval and the Laurentide Centre of Environment Canada implemented SCANIQ, a precious tool for the development of remote sensing. Moreover the University of Sherbrooke plays a very important role in its own region.

In the Maritimes, a major effort towards the coordination of regional resources by the governments of New Brunswick, Nova Scotia and Prince Edward Island has just been rewarded with success, with the establishment of the Maritimes Council for Remote Sensing. Activity in Newfoundland has continued in and around centres of excellence for cold ocean science and technology.

Obviously, progress to date has been impressive across the whole country but there are some sobering developments. One of these is the increased cost of data. Another is the uncertainty of the LANDSAT program in the late 80's. To reduce the impact of the new fee structure announced by the U.S. National Oceanic and Atmospheric Administration, the operator of LANDSAT, and to take steps towards diversifying the source of satellite data, Mrs. Erola has asked us to examine ways in which the Canadian ground segment could be rationalized to produce the most cost effective coverage of Canada, including means of supporting the data requirements of users in any part of the country which may be affected. This plan will include the enhancement of Canadian capability to meet the requirements of remote sensing programs at home and world wide, by including the ability to process data from the new generation of sensors which will be put in orbit by future vehicles such as France's SPOT, Japan's MOS-1 or perhaps as a secondary sensor on our own RADARSAT.

Government is well aware that the long term solution to the twin issues of rising data costs and assured supply of data may require that Canada develop her own source of data, thus allowing us to enter into barter or other commercial arrangements with other suppliers, within the framework of a cooperative world system of satellites in complementary orbits. Given the dimensions of Canada's LANDSAT and the potential of our natural resources, it is reasonable and to be expected that Canada will have to take up her fair share of such a system in one way or another. But all this is some way in the future, and although all the possibilities continue to be explored in the search for long range solutions, the shorter term problems of the next few years require immediate attention in a time of economic difficulty and unprecedented technical oportunities.

We are working towards a framework within which the federal government strengthens its competence in remote sensing. This includes:

1. The timely and secure supply of data.
2. Technical assistance in the transfer of technology to user agencies.
3. The development of a highly competent private sector industrial component which can seize opportunities at home and abroad, and
4. Appropriate international cooperation in remote sensing for the benefit of all nations.

This course of action comes at some cost. And in this regard, it is clear that the user community will be called upon to make an important contribution. As a point of departure, a reasonable proportion of the increased costs involved in an assured supply of data will necessarily be borne by the user of that data.

In view of the approach other nations are taking to these questions of government leadership, private sector technical opportunities and cost sharing, we will want to have our own course of action clearly in mind. Government is now giving increasing attention to these matters.

Forest Change Detection and Update

- Dr. A.N. Rencz

A project between CCRS and the Nova Scotia Department of Lands and Forests was initiated in 1981 to develop procedures for identifying one year-old forest cutovers in Nova Scotia using digital Landsat data. A second objective was to transfer the cutover results in digital form into the Canadian Geographic Information System for updating the forest inventory data base.

The study was conducted on two sites in Nova Scotia characteristic of softwood-dominated forests and a mixed forest. Landsat geocoded imagery with a 50 metre pixel size (DICS) was acquired for both sites from 1980 and 1981 to permit multi-temporal analysis. During the data analysis, Band 5 data from two years were first overlayed so that all pixels representing forest change were displayed in red. The pixels representing cutovers were then isolated by computer 'training' on known cutovers and classifying the entire image using a parallelepiped classifier. The resulting map was further improved by applying a filtering routine.

The project was successful in identifying cutover sites and quantifying their areal extent. In the softwood-dominated area, results illustate that cutovers as small as 1.5 acres could be discriminated and the total area estimated from Landsat data differed by less than 10% from that obtained using IR photography (1:31,000). Landsat estimates were lower than IR results, probably due to the exclusion of boundary pixels in Landsat-classified data. Results in the mixed forest showed less than a 5% difference in total area estimates between published maps and Landsat derived estimates, with Landsat results being lower. The change detection procedure was also successful in detecting regions of selective cutover activity; however Landsat underestimated the total extent of this cutting practise.

The final results addressing the first objective of the project are to be available by May 31, 1982. The second stage, concerned with data transfer is in progress and results are expected this summer.

MAP REVISION USING DICS PRODUCTS

Due to increased resource development activities that are occurring in recent years, the landscape of wilderness areas in Canada is undergoing significant change. New roads and hydro-electric dams are being built; new cut-lines and clearings are resulting from logging and mineral explorations operations. Therefore, maps of these regions require continuous revision. Although man-made changes to the natural landscape in wilderness area of Canada are detectable on LANDSAT-MSS standard images, these images possess geometric and resolution properties which would normally make them unsuitable for map revision requirements at scales larger than 1:500,000.

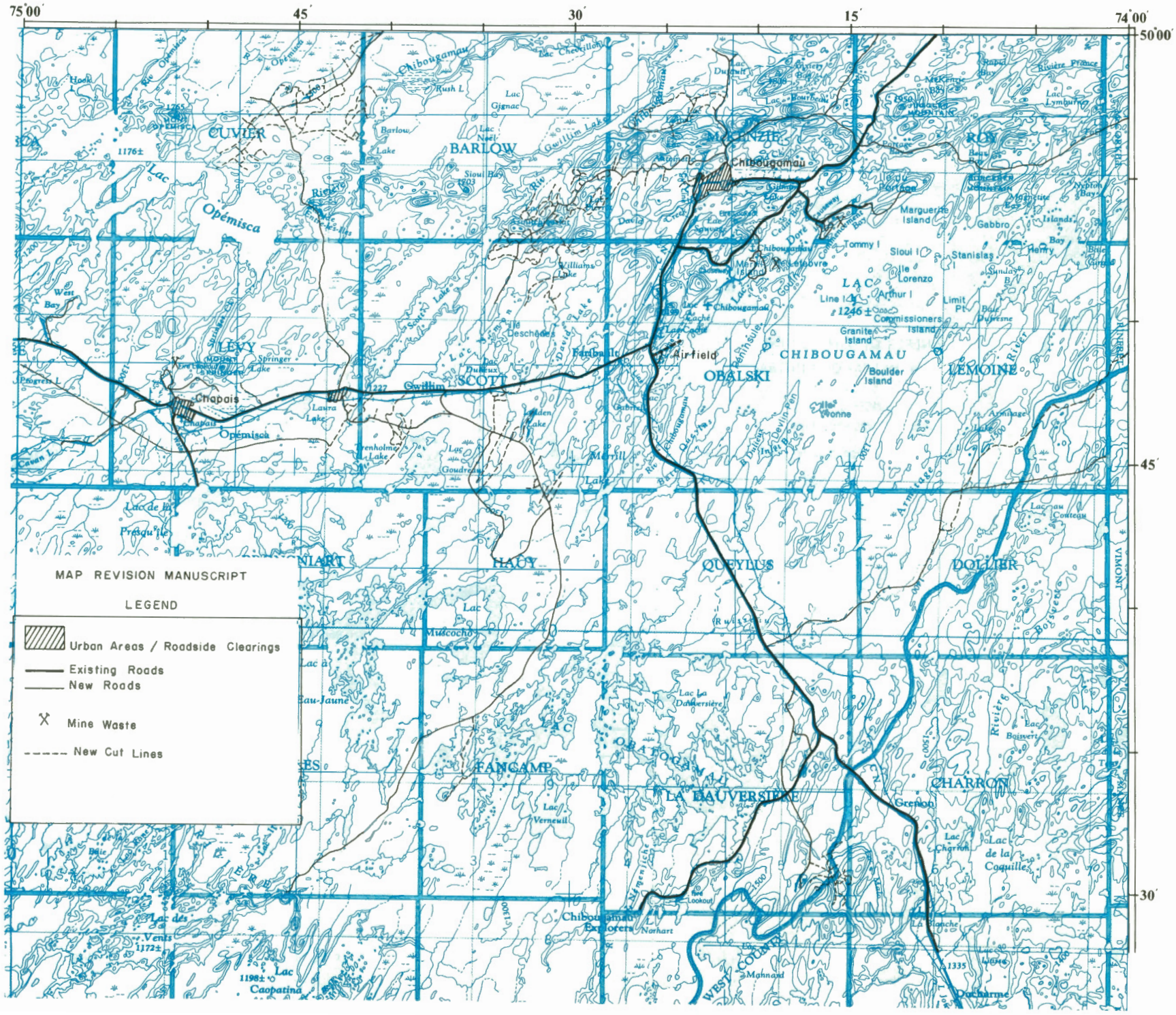
Because in Canada there is a requirement to revise topographic maps at the scale of 1:250,000, a test was conducted by Geostudio Consultants to ascertain if a geometrically corrected LANDSAT-MSS image, also known as DICS product, could be used to generate a map revision manuscript that in terms of completeness and accuracy would satisfy revision requirements for such maps. DICS products (see also Remote Sensing in Canada Vol. 8, No. 2, April 1981, page 8) are made using a resampling algorithm that not only corrects the geometric distortions but also enhances the definition of linear features, such as roads.

The accompanying map shows the final results of the revision procedure. It shows as an overprint the revisions made to the map. To provide registration, existing roads were used. The area represented is the N-E quarter of the National Topographic System map sheet 32-G Chibougamau, located in Central Quebec. As can be seen, this area is densely covered by lakes. This provides a good check for geometric accuracy. Imprecision would result in having new roads and cut-lines to appear overlapping the boundaries of the lakes. The results of this test seem to indicate that DICS products provide an adequate means for revising maps of inaccessible areas at a scale of 1:250,000.

For more information contact:

Dr. R. Steffensen,
Geostudio Consultants Limited,
525 St. Laurent, Suite 24,
Ottawa K1K 2Z9 - Tel. 746-2950

CHIBOUGAMAU



A GUIDE TO ENVIRONMENTAL SATELLITE DATA

Author: Peter Cornillon (1982)
Price: $20.00 469 pages

A Guide to Environmental Satellite Data is a reference document designed particularly for scientists wishing to use satellite remote sensing as a tool for studying the coastal and ocean environment. Although the satellites and sensors described in this guide are those having potential marine applications, the guide's use is not restricted to this purpose alone.

The guide begins with three chapters that deal in a general way with the availability of environmental satellite data in the United States, a description and classification of satellite-borne sensors, and a historical overview of environmental satellites in this country.

The extensive tab-indexed reference section provides detailed information on individual satellites (1975 to the present), their sensors and their periods of operation. The appendix contains a listing of archived data, which gives location of the data and specific ordering information.

Make checks payable to University of Rhode Island. Mail requests to URI, Marine Advisory Service, Publications Unit, Narragansett Bay Campus, Narragansett, RI02882. Quote publications no. p. 894.

Timesharing Service for Geological Application of LANDSAT Data

Control Data Canada Ltd. (CDC) has announced a new timesharing service for exploration geologists. Based on the "CCRS Geology LANDSAT/Analysis Aid Package," CDC has developed a Bedrock Structures Mapping Application package that is available through their Canada-wide Cybernet Services network. A User's Guide is available describing the three output products that are possible: (1) linears map (2) textural features map, and (3) enhanced colour image product. For more information please contact Ms. Louise Shergold or Mr. J. Carr at:

Control Data Canada Ltd.
130 Albert Street
Suite 1105
Ottawa, Ontario K1P 5G4
Telephone: (613) 238-2325

Remote Sensing for Resource Management

Special Prepublication Price offer $35.00 or $32.50 per book on bulk quantities of 10 or more copies. 688 pages 200 illustrations over 100 in full color.

The book is an outgrowth of a national conference of the same name held in October 1980 by the Soil Conservation Society of America. The book is not a proceedings of that conference, but a compilation and updating of the best papers presented at the meeting. Edited by Chris J. Johannsens, director of the Geographic Resources Center at the University of Missouri-Columbia, the book contains how-to-do-it chapters to assist resource managers in better understanding the procedures and methodologies involved in remote sensing.

Make checks payable and send form to:
Soil Conservation Society of America
7515 N.E. Ankeny Road, Ankeny, Iowa 50021-9764
U.S.A

CERTIFICATE PROGRAMME IN REMOTE SENSING

The Department of Geography, University of Waterloo, in Co-operation with the Ontario Centre for Remote Sensing will offer a certificate programme in Remote Sensing for people in Industry, Government and Education who wish to learn how to analyze remote sensing products using current techniques.

The first certificate, offered by the Faculty of Environmental Studies at the University of Waterloo, will be given upon successful completion of a two week course offered from 22 November to 3 December 1982. Instructors will be from the Departments of Geography at the University of Waterloo and McMaster and from the Ontario Centre for Remote Sensing.

Content will include discussions of the principles and application of aerial photography satellite imagery, and thermal and radar products. The second week of the course will be devoted to projects emphasizing "hands-on" experience with digital analysis of Landsat imagery on the DIPIX system at O.C.R.S.

A second Certificate will be offered for advanced Landsat analysis and is scheduled for 1983.

For further information please contact Dr. Ellsworth LeDrew, Department of Geography, University of Waterloo, N2L 3G1.

WHO's ON FIRST?

As a result of a recent reorganization at the Canada Centre for Remote Sensing, Dr. W. Murray Strome has been named Director of Digital Methods Division, which encompasses all Sections of the former Data Processing Division, and the Methodology Section of the former Applications Division. At the same time, Mr. Jean Claude Henein was named Director of the Applications Technology Division, which becomes responsible for Applications Development Section, Scientific Information Section, User Assistance and Marketing Section and Technology Transfer.

Meanwhile, back at 717 Belfast, there was a severe problem of overcrowding, which was resolved by moving the Scientific Information Section and RESORS to 240 Bank Street, and the Methodology Section to 1790 Woodward Drive.

Now a review to see who's been paying attention:

Dr. W.M. Strome, Director
Digital Methods Division
Canada Centre for Remote Sensing
2464 Sheffield Rd.
Ottawa, Ontario
K1A 0Y7 (613) 993-0121

Mr. J.C. Henein, Director
Applications Technology Division
Canada Centre for Remote Sensing
717 Belfast Road
Ottawa, Ontario
K1A 0Y7 (613) 995-1210

Mr. P. Hession, Head
User Assistance and Marketing Section
Canada Centre for Remote Sensing
717 Belfast Rd.
Ottawa, Ontario
K1A 0Y7 (613) 995-1210

Mr. B. McGurrin, Head
Scientific Information Section
Canada Centre for Remote Sensing
240 Bank Street
Ottawa, Ontario
K1A 0Y7 (613) 995-5645

Dr. D.G. Goodenough, Head
Methodology Section
Digital Methods Division
Canada Centre for Remote Sensing
1790 Woodward Drive
Ottawa, Ontario
K1A 0Y7 (613) _____

CIAS COST RECOVERY

In March, 1981, CCRS announced that cost recovery would be implemented for the CIAS. At that time prices and policy were outlined. In March 1982, the starting date was announced as May 1, 1982. All projects not previously approved which use the system after May 1, 1982 will be subject to the new policy. In effect, CCRS will only accept research projects or those operational projects turned down by industry. For further information, contact Committee for Image Equipment Utilisation, Applications Development Section, CCRS.

CAN-MEX SAR PROJECT

Bill Bruce from our Applications Development Section has recently returned from a Canadian High Technology Mission to Mexico. One of the objectives of the brief mission was a familiarization with remote sensing in Mexico and to Explore Mexican interest in a joint SAR-580 Tropical Forest Project. The resulting reports indicate that remote sensing activities and expertise are developing rapidly in Mexico. There was enthusiastic interest in a joint project to evaluate C-Band radar applicability in tropical forest management. Over the next few weeks it is anticipated that an agreement will be formalized which will see the CCRS convair 580 in Mexico for approximately one week later this year.

Any readers with interest in remote sensing activities and commercial opportunities in Mexico are invited to contact Bill Bruce (613-995-1210) for further information.

SYMPOSIUM

A symposium will be held on July 7-9, 1982 at Purdue in West Lafayette, Indiana, (U.S.A). Emphasis will be brought on Crop Inventory and Monitoring. After the symposium, a workshop will be held during the weekend and a short course will follow during the week.

For more information please contact
Douglas B. Morrison
Symposium Coordinator/LARS
1220 Plotter Drive
West Lafayette, Indiana 47906-1339
Tel: (317) 494-6305

VIIIth CANADIAN SYMPOSIUM ON REMOTE SENSING
IVth CONGRESS OF THE ASSOCIATION QUEBECOISE DE TELEDETECTION

UNIVERSITE DU QUEBEC A MONTREAL
MONTREAL, QUEBEC, CANADA
3 - 6 MAY 1983

CALL FOR PAPERS

General theme: Integration of remote sensing in resources management, by opening disciplin barriers and by using multisource geographic information systems.

Specific topics:

- Instrumentation and methodology
- Environmental information systems as integration tools
- Cartography
- Atmosphere, climate and meteorology
- Water, ice, oceans
- Agriculture and land use
- Forests, rangelands and wilderness areas
- Geology and geophysics
- Education and technology transfer.

A special session will be devoted to simulation of data from future satellite programs such as Landsat-D, SPOT or Radarsat.

Deadline:

Authors of contributed papers are asked to send a 600 word abstract by November 15th., 1982, to the following address:

Dr. Ferdinand J. Bonn
Laboratoire de Télédétection
Département de géographie
Université de Sherbrooke
Tel: (819) 565-4523

Co-Chairmen of the technical committee: Dr. K.P.B. Thomson (CCRS, Ottawa) and Dr. Ferdinand J. Bonn (Université de Sherbrooke) Organizing committee in Montreal: Robert Desjardins, Département de géographie, U.Q.A.M., B.P. 8888, Succ. A, Montreal, H3C. Tel: (514) 282-4107.

Science Council

W.M. Strome
R. Ryerson
CCRS

J. Beaubien
Centre de recherche forestières des Laurentides

K. O'Neill
Geoterrex Ltd.

T.H.F. Reinchen
Pegasus Earth Sensing Corp.

P.G. Howarth
University McMasters

G. Schaefer
AES

R. Woodhams
University of British Columbia

L.E. Milton
Ontario Hydro

G.D. Lodwick
University of Calgary

H. Zwick
Moniteq Laboratories

H. Audet
Centre Québécois de la Télédétion

G. Tomlins
B.C. Research

R. Lowry
Intera

P. Crown
University of Alberta

R. Worsfold
Remotec Applications

Guy Rochon
Laval University

P. Murtha
University of British Columbia

P. Chagarlamudi
Bercha Associates

J.-M. Dubois
University of Sherbrooke

EDITORS NOTE

M. A. Barcados joined the ranks of CCRS and is now editing this newsletter. He is a physical geographer with a background in Remote Sensing.

At this time it would be useful to explain the issue numbering. The volume corresponds to the fiscal year and the number to the order that the issues are published during that fiscal year. List of latest publications:

v. 6, no. 2	SEPT 78
v. 6, no. 3	JAN 79
v. 7, no. 1	MAY 79
v. 7, no. 2	SEPT 79
v. 7, no. 3	MAR 80
v. 8, no. 1	NOV 80
v. 8, no. 2	APR 81
v. 9 no. 1	DEC 81

A remote sensing dictionary (French/English) has been published. The reference is
Airborne Spaceborne Remote Sensing Dictionary
Author: Serge Paul
Laffont, Paris, 1982
ISBN: 2-225-75889-1
120 St-Germain 75280 Paris
Cedex 06

A list of meetings, conferences, courses, etc. in the areas of remote sensing, pattern recognition, computers and computer applications, space surveying and mapping and other related topics.

June 1982 - September 1982

1982 International Geoscience and Remote Sensing Symposium (IGARSS '82)
June 1-4, 1982, Munich, Germany

XXIV Plenary Meeting COSPAR, including Symposium on Changes in the Earth's Surface as revealed by a Decade of Observations from Space
June 1-2, 1982, Ottawa, Ontario, Canada

Sixteenth International Symposium on Remote Sensing of Environment
Postponed
ERIM, Buenos Aires, Argentina

Digital Techniques for Land Cover Classification
June 7-11, 1982
EROS Data Center, Sioux Falls, SD. U.S.A.

International Symposium on Materials Used On-Board Satellites and Space Probes
June 8-11, 1982
ESA/CNES/CERT, Toulouse, France

International Symposium on Hydrometeorology
June 13-17, 1982, Denver, CO. U.S.A.

Pattern Recognition and Image Processing
June 13-17, 1982
IEEE Computer Society, Las Vegas, Nev. U.S.A.

Canadian Hydrology Symposium - Hydrological Processes of Forested Areas
June 14-15, 1982
University of New Brunswick
Fredericton, N.B. Canada

11th International Laser Radar Conference
June 21-25, 1982
AMS, Madison, Wis. U.S.A.

Thirteenth International Symposium on Space Technology and Science
June 28 - July 3, 1982
Tokyo, Japan

Eighth International Symposium on Machine Processing of Remotely Sensed Data
July 7-9, 1982
LARS, West Lafayette, IN. U.S.A.

Symposium on Hydraulic Applications of Remote Sensing and Remote Data Transmission
July 19-30, 1982, Exeter, U.K.

Laboratory for Computer Graphics and Spatial Analysis
July 25-30, 1982
Harvard Graduate School of Design
Cambridge, Mass. U.S.A.

Summer School on Remote Sensing Applications in Marine Science and Technology
July 25 - August 14, 1982
European Assoc. of Remote Sensing Labs., Dundee, Scotland, U.K.

Second International Symposium on Solar-Terrestrial Influences on Weather and Climate
August 2-6, 1982
NOAA, Boulder, CO. U.S.A.

Joint Oceanographic Assembly
August 2-13, 1982
IOC-UNESCO, Halifax, N.S. Canada

Fifth International Symposium on Computer-Assisted Cartography and International Society for Photogrammetry and Remote Sensing Commission IV: Cartographic and Data Bank Application of Photogrammetry and Remote Sensing
August 22-28, 1982
Crystal City, VA. U.S.A.

International Symposium: The Stability and Preservation of Photographic Images
August 29 - September 1, 1982
SPSE, Ottawa, Ontario, Canada

Advances in Photogrammetric and Remote Sensing Instrumentation for Processing and Analysis of Data
August 30 - September 3, 1982
ISP, Ottawa, Ontario, Canada

Workshop on Applications in Vegetation Assessment and Land Use Planning
August 30 - October 1, 1982
EROS Data Center
Sioux Falls, SD. U.S.A.

International Conference on Very Large Baseline Interferometry Techniques
August 31 - September 2, 1982
CNES, Toulouse, France

International Symposium on Precision and Speed in Close Range Photogrammetry
September 5-10, 1982
ISP, University of York
Heslington, York, U.K.

National Conference on Energy Resource Management
September 9-12, 1982
Baltimore, MD. U.S.A.

International Society for Photogrammetry and Remote Sensing: Commission VII data interpretation
September 13-17, 1982
GDTA, Toulouse, France

Summer School on Remote Sensing for Land Use Inventories
September 13 - October 1, 1982
Joint Research Centre, CEC
Ispra, Italy

Second Panamerican and Seventh National Congress on Photogrammetry, Photointerpretation and Geodesy
September 29 - October 1, 1982
Sociedad Mexicana de Fotogrametria, Fotointerpretaciòn Y Geodesia
Mexico, Mexico

October 1982 - December 1982

Optical Society of America Annual Meeting
October 18-22, 1982
Tucson, Arizona, U.S.A.

3rd International Conference on Reliability and Maintainability
October 18-22, 1982
CNES/CNET/ESA/SEE
Toulouse, France

6th International Conference on Pattern Recognition
October 21-22, 1982, Munich, Germany

SPSE 22nd Annual Fall Symposium: Unconventional Imaging, Science and Technology
November 15-18, 1982
Society of Photographic Scientists and Engineers, Arlington, VA. U.S.A.

Certificate Program in Remote Sensing
22 November - 3 December 1982
University of Waterloo, Ontario, Canada

Annual Technical Conference on Remote Sensing and the Atmosphere
December 15-17, 1982
Remote Sensing Society
Liverpool, England, U.K.

January 1983 -

Optical Techniques for Remote Probing of the Atmosphere
January 10-12, 1983
Optical Society of America
Lake Tahoe, Nev. U.S.A

Meteorological Optics
January 12-14, 1983
Optical Society of America
Lake Tahoe, Nev. U.S.A.

ACSM-ASP Convention
March 13-18, 1983
Washington, DC. U.S.A.

VIIIth Canadian Symposium on Remote Sensing IVth Congress of the Association québécoise de télédétection
May 3 - 6 1983
Montreal, Quebec, Canada

If there are subject areas which you would like to see covered, conferences which have been missed or upcoming conferences which you are aware of or for further information contact:

Canada Centre for Remote Sensing,
TIS (Lidia Taylor),
240 Bank Street,
Ottawa, Ontario. K1A 0Y7
tel. (613) 995-5645

National Conference on Energy Resource Management
9-12 septembre 1982, Baltimore, MD. E.U.

International Society for Photogrammetry and Remote Sensing: Commission VII interprétation des données
13-17 septembre 1982, GDTA Toulouse, France

Cours de télédétection appliquée au recensement de l'utilisation du sol
13 septembre - 1 octobre 1982 Centre de recherche conjoint, CEC - ISPRA Italie

Deuxième Congrés Panamericain et septième Congrés national sur la photogrammétrie, photo-interprétation et géodesie
29 septembre - 1 octobre 1982
Sociedad Mexicana de fotogrametria foto-interpretaciòn, geodesia, Mexico, Mexico

Octobre 1982 - Décembre 1982

3e Colloque international: fiabilité et maintenabilité
18-22 octobre 1982
CNES/CNET/ESA/SEE Toulouse, France

Optical Society of America Annual Meeting
18-22 octobre 1982, Tucson, Arizona E.U.

Sixième Conférence internationale sur la reconnaissance des formes
21-22 octobre 1982, Munich, Allemagne

SPSE 22nd Annual Fall Symposium: Unconventional Imaging, Science and Technology
15-18 novembre 1982 Society of Photographic Scientists and Engineers, Arlington, VA. E.U.

Cours de télédétection
22 Novembre - 3 décembre 1982
Université de Waterloo, Ontario, Canada

Annual Technical Conference on Remote Sensing and the Atmosphere
15-17 décembre 1982
Remote Sensing Society Liverpool, Angleterre

Janvier 1983

Optical Techniques for Remote Probing of the Atmosphere
10-12 janvier 1983,
Optical Society of America
Lake Tahoe, Nev. E.U.

Meteorological Optics
12-14 janvier 1983
Optical Society of America, Lake Tahoe, Nev. E.U.

ACSM-ASP Convention
13-18 mars 1983, Washington, DC E.U.

VIIIeme Symposium canadien de télédétection
IVeme Congrés de l'Association québécoise de télédétection
3-6 mai 1983, Montréal, Québec, Canada

S'il existe des sujets que vous aimeriez voir traités, des conférences que vous avez manquées ou des conférences à venir dont vous avez eu connaissance, ou si vous avez besoin de plus amples renseignements, veuillez vous adresser au:

Centre canadien de télédétection,
Service de renseignements techniques
(Lidia Taylor),
240 Bank Street, 5ème étage,
Ottawa, Ontario. K1A 0Y7
tel. (613) 995-5645