



Surveys, Mapping and
Remote Sensing Sector

Secteur des levés, de la
cartographie et de la télédétection

NATIONAL ATLAS INFORMATION SERVICE

OPPORTUNITIES SEMINAR

PROCEEDINGS

JANUARY 31, 1990



SERVICE D'INFORMATION DE L'ATLAS NATIONAL

COLLOQUE SUR LES PERSPECTIVES D'AFFAIRES

COMPTE RENDU

LE 31 JANVIER 1990

Ce document est le produit d'une
numérisation par balayage
de la publication originale.

This document was produced
by scanning the original publication.

TN
26
.E53
N37
1990

Mines and
Resources Canada

Énergie, Mines et
Ressources Canada

THE ENERGY OF OUR RESOURCES - THE POWER OF OUR IDEAS

L'ÉNERGIE DE NOS RESSOURCES - NOTRE FORCE CRÉATRICE

Canada

omgre



TN
26
E53
N37
1990
maie

NATIONAL ATLAS INFORMATION SERVICE

OPPORTUNITIES SEMINAR



**Geomatics Information Centre
Centre d'information en géomatique**

SERVICE D'INFORMATION DE L'ATLAS NATIONAL

COLLOQUE SUR LES PERSPECTIVES D'AFFAIRES

TABLE OF CONTENTS / TABLE DES MATIÈRES

	PAGE
Agenda	5
Ordre du jour	6
Preface - J. Hugh O'Donnell	7
Avant-propos - J. Hugh O'Donnell.....	8
Keynote address / Discours-thème - John MacDougall	9
The Significance of National Geographic Information to Canada / L'importance au Canada d'informations géographiques nationales - Professor Thomas H.B. Symons	13
NAIS Inventory Report Presentation / Rapport sur les produits du SIAN - Peter Jordan	17
Remarks from Mark Corey on the distribution of electronic information / Remarques par Mark Corey sur la diffusion de l'information numérique	23
The Library Market for National Geographical Information / Besoins d'information géographique dans le marché des cartothèques - Joan Winearls	27
Un atlas multimédia / A Multimedia Atlas - Louise Guay.....	35
Educational Market Opportunities for Geographical Information Products / Perspectives des produits d'information géographique dans le monde de l'enseignement - James E. Page	43
Summary / Résumé - Richard Groot	51
Questions and Answers / Questions et réponses	53
Biographical Sketches / Résumés biographiques	67
Company Profiles / Profils des entreprises	81
List of Participants / Liste des participants.....	97

**SURVEYS, MAPPING AND REMOTE SENSING SECTOR
GEOGRAPHICAL SERVICES DIVISION
NATIONAL ATLAS INFORMATION SERVICE**

OPPORTUNITIES SEMINAR

Chaired by Professor T.H.B. Symons, Vanier Professor, Trent University
Chairman, National Advisory Committee on the National Atlas of Canada

DATE	January 31, 1990
PLACE	Camsell Hall, Ottawa
08:30-09:00	Coffee (Meet and Greet)
09:00-09:05	Welcome and Introductions - J.H. O'Donnell, Assistant Deputy Minister, Surveys, Mapping and Remote Sensing Sector, Energy, Mines and Resources
09:05-09:30	Keynote Address, John MacDougall, M.P., Parliamentary Secretary to the Minister, Energy, Mines and Resources
09:30-10:00	The significance of national geographic information to Canada Professor T.H.B. Symons, Trent University and Chairman, National Advisory Committee on the National Atlas of Canada
10:00-10:30	NAIS Inventory Report - Peter Jordan, Microstar Limited, Ottawa
10:30-10:50	Coffee
10:50-11:30	Opportunities for distributing geographic information products using new technology - Louise Guay, YYIATS Productions
11:30-12:00	Library Market Assessment of Geographic Information Needs - Joan Winearls, University of Toronto
12:00-13:30	Lunch
13:30-14:10	Educational Market Opportunities for Geographical Information Products - James Page, Acting Director General, Education Support Branch, Secretary of State
14:10-15:00	Discussion, comments, recommendations led by Professor Symons
15:00-15:10	Summary - Richard Groot, Director, Geographical Services Division, Energy, Mines and Resources
15:10-15:15	Closing Remarks - Professor Symons
15:15-17:30	Demonstrations and Business Discussion

Refreshments will be served.

**SECTEUR DES LEVÉS, DE LA CARTOGRAPHIE ET DE LA
TÉLÉDÉTECTION
DIVISION DES SERVICES DE GÉOGRAPHIE
SERVICE D'INFORMATION DE L'ATLAS NATIONAL (SIAN)**

COLLOQUE SUR LES PERSPECTIVES D'AFFAIRES

Présidé par le professeur T.H.B. Symons, Chaire Vanier, Université Trent
Président, Comité consultatif de l'Atlas national du Canada

DATE	Le 31 janvier 1990
LIEU	Salle Camsell, Ottawa
08h30 - 09h00	Café (rencontre informelle)
09h00 - 09h05	Mot de bienvenue et introductions - M. J.H. O'Donnell, sous-ministre adjoint, Secteur des levés, de la cartographie et de la télédétection, ministère de l'Énergie, des Mines et des Ressources
09h05-09h30	Discours-thème, M. John MacDougall, député secrétaire parlementaire au Ministre, Énergie, Mines et Ressources
09h30 - 10h00	L'importance au Canada d'informations géographiques nationales M. T.H.B. Symons, professeur à l'Université Trent et président du Comité consultatif de l'Atlas national du Canada
10h00 - 10h30	Rapport sur les produits du SIAN - M. Peter Jordan, Microstar Limitée, Ottawa
10h30 - 10h50	Pause café
10h50 - 11h30	Possibilités d'utilisation de nouvelles technologies pour la diffusion de produits d'information géographique - M ^{me} Louise Guay, YIATS Productions Inc.
11h30 - 12h00	Évaluation des besoins d'information géographique dans le marché des cartothèques - M ^{me} Joan Winearls, Université de Toronto
12h00 - 13h30	Déjeuner
13h30 - 14h10	Perspectives des produits d'information géographique dans le monde de l'enseignement - M. James Page, directeur général par intérim, Direction de l'aide à l'éducation, Secrétariat d'État
14h10 - 15h00	Discussion, commentaires et recommandations dirigés par le professeur Symons
15h00 - 15h10	Résumé - M. Richard Groot, directeur des Services de géographie, ministère de l'Énergie, des Mines et des Ressources
15h10 - 15h15	Remarques de clôture - le professeur Symons
15h15 - 17h30	Démonstrations et discussion d'affaires

Rafraîchissements seront servis

PREFACE

This Opportunities Seminar of the National Atlas Information Service (NAIS) was organized with the basic objective of promoting the broadest possible use of the geographic information about Canada contained in the Atlas.

We see the availability of our information as an opportunity for new products and information services for conventional publishers with their wealth of marketing expertise and the new and growing number of electronic publishers. We want to create a much greater awareness of the availability of this information amongst other government departments.

Another objective of the seminar was to create an opportunity for companies to meet and take note of one another's skills and expertise. We believe that the marketing, editorial, and technological capabilities to fully exploit our information may not necessarily be found in any one company. Companies with different skills may have to form a consortium to undertake such projects.

We intend to invite proposals for the production of a popular thematic atlas of Canada an update of the Canada Gazetteer Atlas (1980) and the production of the second edition of the booklet Facts from Canadian Maps. We hope that the private sector will respond to these imaginatively and take full advantage of the new technology.

The Opportunities Seminar is one in a series of initiatives of the Surveys, Mapping and Remote Sensing Sector to develop cooperative projects with the private sector and to signal that we are open for business to exploit our geographic information in the service of all Canadians.

We were fortunate in the support for this seminar provided by the National Advisory Committee on the National Atlas of Canada, and its Chairman, Professor Thomas H.B. Symons who graciously accepted to chair the Seminar. We were also fortunate that John MacDougall, Parliamentary Secretary to the Minister of Energy, Mines and Resources kindly agreed to give the opening address to the Seminar.

J. Hugh O'Donnell
Assistant Deputy Minister
Surveys, Mapping and Remote Sensing Sector

AVANT-PROPOS

Le Colloque sur les perspectives d'affaires du Service d'information de l'Atlas national (SIAN) a été organisé principalement dans le but de promouvoir l'utilisation la plus vaste possible de l'information géographique que renferme l'Atlas sur le Canada.

Nous croyons que le fait que l'information dont nous disposons soit accessible peut mener à la création de nouveaux produits et services d'information pour les éditeurs de type conventionnel, dont l'expertise en commercialisation est vaste, ainsi que pour ceux, nouveaux-venus mais de plus en plus nombreux, qui mettent à profit la technologie de l'édition électronique. Nous souhaitons aussi que l'accessibilité à l'information du SIAN soit davantage connue des autres ministères.

Ce séminaire poursuit également un autre objectif : celui de fournir aux entreprises du secteur privé l'occasion de se rencontrer et de jauger leurs compétences et leurs aptitudes respectives. Nous pensons que les moyens technologiques, de révision et de commercialisation permettant d'exploiter pleinement notre information ne se retrouvent pas nécessairement chez toutes les entreprises. Certaines d'entre elles devront sans doute conjuguer leurs aptitudes respectives et former un consortium afin de pouvoir entreprendre de tels projets.

Nous comptons inviter les propositions pour la production d'un atlas thématique d'intérêt public du Canada, d'une version mise à jour de «Canada Atlas toponymique (1980)» et de la seconde édition de «Faits tirés de cartes du Canada». Nous espérons que l'entreprise privée saura répondre à ces propositions de façon imaginative et tirer profit de la technologie informatique de pointe.

Le Colloque sur les perspectives d'affaires fait partie d'une série d'initiatives lancées par le Secteur des levés, de la cartographie et de la télédétection pour mettre au point des projets en collaboration avec l'entreprise privée, mais aussi pour indiquer que nous sommes favorables à l'idée de faire des affaires qui nous permettraient d'exploiter l'information géographique dont nous disposons et de la mettre au service de tous les canadiens.

Nous sommes reconnaissants au Comité consultatif de l'Atlas national du Canada et à son président, M. Thomas H.B. Symons, de nous avoir accordé son appui. M. Symons a de plus fort gentiment accepté de présider ce colloque. Nous tenons également à remercier M. John MacDougall, secrétaire parlementaire du ministre de l'Énergie, des Mines et des Ressources, d'avoir bien voulu accepter de présenter le discours inaugural de ce colloque.

J. Hugh O'Donnell
Sous-ministre adjoint
Secteur des levés, de la cartographie et de la télédétection

KEYNOTE ADDRESS

BY

JOHN MACDOUGALL

INTRODUCTION

Good morning, Ladies and Gentlemen, and welcome to the opportunity seminar of the National Atlas Information Service.

Today is yet another occasion when we are undertaking consultations with the private sector, academia and others in government aimed at focusing the delivery of government programs and services. Energy, Mines and Resources Canada believes very strongly in such consultation, and that we can all benefit from such cooperation.

We are at a turning point in the history of geographic information at the national level. We have been moving from a system based on paper maps to the world of maps available through computers. The possibilities are exciting and the required changes are immense. As a part of this, we are in the process of changing both the form and delivery of the National Atlas of Canada.

In this changing world, we continue to see a growing role for the private sector. There will be many new opportunities for the private sector to draw upon the expertise developed within the Government of Canada and our data, and we would like to work with you to develop these opportunities.

The purpose of this introduction is to tell you about the history of the National Atlas, the new direction we have taken and the opportunities that we foresee.

THE HISTORY OF THE NATIONAL ATLAS

The National Atlas of Canada has a long and distinguished history. In 1906, the first Atlas was published to bring together information describing Canada from coast to coast.

By 1915, when the second edition was published, Canada was a nation of some 7 million inhabitants, of which only 30% lived in towns and cities with a population of over 25,000. The economy was based largely on agriculture, minerals and forest products. The first two atlases detailed transportation routes, the developing communications network and population.

After the Second World War, a need was recognized to develop more geographical information. When the third Atlas was published in 1958, Canada was a very different country with 16.5 million people, a transportation system that had been revolutionized with

highways, new resources being developed, and striking progress in urbanization and the concentration of population in cities.

The fourth edition was published in 1974, with an even greater concentration of geographic information.

The fifth edition was released in 1986, not as a bound book, but as a grouping of individual maps of a consistent scale and format. The philosophy was that new maps would be added to the collection as needed, and that the Atlas would be a "living" product and would grow over time. This approach promised to lend more flexibility to the presentation of material and to keep maps up to date. It was also a first step towards organizing the map material in a form suitable for computerization.

While the Atlas in paper form has made an important contribution to our understanding of Canada, we are witnessing a revolution that has the potential to increase dramatically the use of National Scale Geographic Information. The development of geographic information systems and electronic publishing based on increasingly sophisticated and inexpensive computing power has opened up many new possibilities on how this information can be packaged, sold and used.

THE DEVELOPMENT OF GIS AND ELECTRONIC PUBLISHING TECHNOLOGY

EMR has been working on the development of an electronic atlas for some years now. The multitude of separate display elements which are normally combined in the paper map can be made available separately in digital computer form. Each component can thus be selected and combined with other elements of information from other sources according to the user's needs. Animation and modelling of information to show changes and flows of commodities, population or other dynamic factors bring new significance and understanding to traditional geography.

As more and more federal and geographical data collecting agencies store information in digital form, we want to be able to tap these resources and transform their data into meaningful, standardized, accessible geographical information.

In light of these developments, we have developed a new policy for the role we believe government should play in these matters.

THE NEW POLICY FOR THE NATIONAL ATLAS

The new policy has evolved from the thoughtful recommendations made to the Minister in 1988 by the National Advisory Committee on the National Atlas of Canada. We have decided, in essence, that Government should coordinate the National database of geographic information, stored in digital form. It is a logical extension of its traditional responsibility.

The private sector should then be given the opportunity to take the information, develop new uses and applications, and market the resulting new products.

I believe that this allows each of us to do what he or she is best equipped to do.

Government has traditionally taken responsibility for coordinating the development of Geographic Information at the national level.

The private sector has the expertise to develop new markets and sell products. We think that new applications for National Digital Data should also be done in the private sector.

We are still at an early stage of development. For example, the database structure for a consistent, qualified, and integrated set of data describing the geography of Canada is now being functionally defined. However, this should not inhibit the use of existing materials in new media. While it is early in the game, I believe that potential partners should be involved at an early stage to ensure that we are on the right track. I am most interested in your views and recommendations on how we can best cooperate and on what kind of projects.

THE OPPORTUNITIES SEMINAR OBJECTIVES

With this philosophy in mind and in cooperation with the Advisory Committee, EMR has developed this opportunities seminar.

I am very pleased that the Chairman of the Advisory Committee, Professor Tom Symons, has agreed to chair this seminar.

The prime objective is to show you the type of information we have available or plan to make available, to acquaint you with our future plans and to start to develop partnerships with private sector companies. Those who want to work with us and develop their own applications for this information.

A second objective relates to the new composition of private sector companies that are involved in or support electronic publishing. The marketing expertise of the conventional publishing industry needs to be complemented with the companies that have competence in the wide variety of electronic media currently available for delivering new products. We believe it is unlikely that any one company will have the diversity of skills to do this. This seminar has about 60 private sector representatives and it aims to give you an opportunity to get acquainted with each other's expertise.

Our final objective relates to our concern that within government the National Atlas of Canada is probably one of the most under utilized sources of well organized information. We have invited key officials of departments and agencies that use geographic information to make them aware of both the National Atlas Information Service and our new policy thrust and to bring them in contact with private sector publishers or potential clients.

EMR plans to involve the private sector more and more. To make the most effective use of the National Atlas Information Service we are looking for new and innovative partnerships in assuring the broadest possible use of our National Atlas information. As with any partnership, it is important from the outset that we understand one another's responsibilities and what we can do to fine tune our activities to provide you with the most useful

information possible. To this end, I would encourage you to be an active participant in this workshop. Give us your recommendations and work with us.

CONCLUSION

I trust that you will find today's presentations informative. I believe there will be good opportunities to develop new products and services based on our information in the coming years, and I look forward to hearing your suggestions to make the National Atlas Information Service a success.

THE SIGNIFICANCE OF NATIONAL GEOGRAPHIC INFORMATION TO CANADA

BY

PROFESSOR THOMAS H.B. SYMONS

Thank you, Mr. O'Donnell, for your kind introduction, and may I join with you in thanking Mr. MacDougall, the Parliamentary Secretary to the Minister of Energy, Mines and Resources, for his thoughtful remarks opening this seminar.

Ladies and Gentlemen: May I join with both Mr. O'Donnell and Mr. MacDougall in welcoming you to this **Opportunities Seminar**.

I know that the Government of Canada and in particular, of course, the Department of Energy, Mines and Resources attaches great importance to this conference. So, too, does the National Advisory Committee on the National Atlas of Canada which is, in a special sense, its author and co-sponsor.

The National Advisory Committee was established, as its name suggests, to advise the department and the government on geographic information requirements pertaining to issues of regional and national concern. In doing so, it reviewed the current status and accomplishments of the National Atlas programme and offered advice on its future direction. The Committee has been at work for some years now, since 1985. It has completed its review, and made quite extensive recommendations for new directions and for a restructuring of the National Atlas programme.

In broad terms, it has helped, I think, to shift the emphasis of the programme from one that was focussed upon the preparation of a periodic National Atlas to one with the much wider objective of developing a National Atlas Information Service. We hope, and believe, that this broader conception will result in the building of a national geographic database that can be used much more widely and in many different ways. A description of this concept of a National Atlas Information Service, and of its objectives, is provided in your kit, entitled, unromantically, Policy Directive 5-89. I have no idea what the other 5-88 are.

Today's Opportunities Seminar is one of the important steps in implementing this new policy, as recommended by the National Advisory Committee. The Committee is made up of private citizens drawn from a variety of backgrounds and regions of the country. They have put a great deal of time and work and thought into this review and into the reshaping of the National Atlas Information Service, including the planning of this meeting, working with the Director of Geographical Services, Richard Groot.

If I may, I would like to introduce the members of the National Advisory Committee to you: Mrs. Jean Fraser from Calgary, Chairman of the Board of Governors of Mount Royal College; Mr. Frank McGuire, Chairman of the School of Graphic Communications

Management at the Ryerson Polytechnical Institute in Toronto; Mrs. Annie Rasmussen of Stellarton, Nova Scotia, former secretary of the Nova Scotia Business Teachers Association; Mr. Yves Tessier, Head of the Cartographic Library at Laval University; Dr. John Warkentin, Professor of Geography at York University. One other member of the Committee, Mr. Marc-Aimé Guérin, the President of Guérin Publishing, is unable to be here, and another, Dr. Pierre Camu, Vice-President of Lavalin Inc., participated in the work of the Committee for its first three years, but has now undertaken other responsibilities. These people have made a great contribution to re-thinking the national geographic programme and I would like to thank them for doing so.

One of the reasons that the members of the National Advisory Committee have been willing to serve, and to give so much of their time, is their conviction about the significance of national geographic information to Canada, and their concern that this information was being so vastly under-utilized. This is certainly a conviction, and a concern, that I share.

There are said to be, by and large, two poles of opinion as to the purposes of a national atlas. In one opinion, the atlas is seen as a system of objective information whose compilation is justified by its direct contribution to utilitarian decision-making as, for example, in national and local planning. In the other opinion, the atlas is seen as refining and extending the reader's perception of the nation, in which case the atlas contributes to national self-awareness and cultural development. Surely both opinions are valid and neither purpose is necessarily exclusive of the other.

The value of a good national atlas information service for scientific research and for both public policy and private decision-making should be self-evident. That a good national atlas database is a scientific repository is also surely true, and this is reflected in the fact that many of the early national atlases were published by scientific societies - including the great **Atlas of Finland**, published in 1899 by the Geographical Society of Finland, which may be seen as the first of the modern national atlases. It is similarly true that a well-conceived national geographic database can render great service to the state by providing information and insights to guide its actions in such fields as economic planning, resource protection and development, and cultural policy. Governments at every level - whether national, regional, or local - must make the fullest and wisest possible use of the knowledge geographers can place at their disposal. Intelligent use of flood hazard maps, for example, can prevent subsequent damage and loss of life. Permafrost maps should be compulsory reading for those who plan roads and northern development. Cultural maps provide guidance in selecting the sites for language centres, and demographic maps can point to the logical locations for schools, for housing projects, and for community facilities. The corporate world, too, would benefit from a greater knowledge and understanding of the importance of geographic intelligence in its decision-making.

Yet there has been an almost staggering failure on the part of leaders and planners in both the private and the public sectors to make use of the cartographic information which could give to them the knowledge and insights they require to reach well-informed decisions. Map culture should be a part of political culture and of commercial culture, and cartographic information and insights should be at the foundation of public policy and corporate planning. In these areas, the national atlas information service has a great deal to contribute and its job has scarcely been begun.

The educational role of geographic information is one which, perhaps because I am a teacher, I am inclined to think merits much more attention than it has generally been

receiving. The full value of such information as an educational tool is still only dimly perceived outside of such obvious areas as the discipline of geography itself. Even many geographers seem oblivious to the wider educational potential of their subject. Neither cartographic information nor the cartographic approach has yet found its full and proper role in our educational system at any level. Negligible use is made in the elementary and secondary schools of this country of the admirable national and regional atlases which are now available. Few Canadian schools have a copy of the National Atlas of Canada in their library and it is seldom listed as a reference book by school authorities even at the level of province-wide curriculum guidelines.

I would argue that a full range of products drawn from a national geographic database should be available in the libraries of every school in Canada. It is not enough to create such information; it is equally important to see that it is put into the hands of teachers and students across the country. I think it is important to introduce people early to maps, and to cartographic information, in order that they can become familiar with them and with the approach to knowledge they can offer.

This emphasis on the educational function of geographic information has, in turn, implications for our programmes of teacher education. It points, as well, to the importance of developing strong programmes for the training of map librarians and map archivists.

Related to the educational role of maps, atlases, and geographic data is what may be termed their cultural role; that is their capacity to present or to interpret the characteristics and aspirations of a society to itself and to others. This may well be, as some argue, the most important role for a national atlas information service. But it is also the most difficult and the most sensitive function that such a service has to perform. Those who recognize the enormous value of a national geographic database must also recognize the danger that it may be misused to promote a case or a cause or an ideology, or simply to boost the self-image of a national community in a way which is not in line with the facts.

Each of the diverse roles of a national atlas information service, whether as a scientific repository, a research framework, a reference tool, an aid to planning and decision-making, an educational instrument, or a cultural interpreter, will serve to advance knowledge about the community under study. In so doing, it will better enable the population of that community to know themselves and to help themselves. Good maps can often provide an immediate and graphic interpretation of our experience, helping us to understand who we are and why. Slice by slice, theme by theme, the pages of an atlas can enhance our knowledge and understanding of the society to which we belong. In this way, well-researched geographical information can help us to deal constructively with the opportunities and complexities of our modern inheritance.

The question must be asked, however, whether geographic information, in the traditional forms to which we have become accustomed, can fulfil the increasingly numerous and complex demands being made upon it. Certainly it is time to study this question, to re-examine basic concepts, and to make some major experiments with technique and format. Research and new conceptual thinking are required about the communications function of atlases. Maps are indeed a form of language and atlases are a kind of essay in communication. Research into the basic role of maps and atlases as a form of linguistics and communications is badly needed.

Even after all these centuries, the art of map-making is still in its formative stages. There have been profound changes in recent years and more can be anticipated, and should be welcomed, if they enlarge the scope for flexibility and innovation in the cartographer's work. It seems clear that, in this climate, a national geographic database must move from a static to a dynamic role. It must become an information service on constant call, providing up-to-date data, synopses, and interpretations in an on-going service programme for citizens and for their governments, for education, and for enterprise. Rather than being a passive storehouse of information, it should provide, through co-operation with government and the private sector, an expanding opportunity for products that can increase awareness and broaden perspectives on knowledge in general and on Canada in particular.

It is a comment on the need for such knowledge that when geographers visited the island of Axel Heiberg some twenty years ago they discovered that, while the coastline had been well outlined some fifty years before by Norwegian explorers working from dog sleds on the sea ice, there was a minimum of information about the interior details of this very sizable island on the only maps then available. Mountains that were thought to be perhaps 2,000 feet were found to exceed 6,000 feet. Moreover, the entire island was misplaced on the map in terms of its longitude and latitude. In fact, not to put too fine a point on matters, it was tilted the wrong way. Yet Axel Heiberg is in area comparable in size to Nova Scotia and larger, indeed, than the area of many of the countries which belong to the United Nations.

A great deal is waiting to be done in Canada, to ensure that our citizens receive the benefits of a full and highly developed national atlas information service. And this brings us to today's Opportunities Seminar. To achieve these objectives, it is essential to have the co-operation and participation of both the private sector and many aspects of the public service. This conference is, thus, timely on several counts. It is time to make a much wider use of the remarkable resources in our national geographic database. It is time - indeed, past time - to seek a wider public sector and private sector involvement. And it is time, too, to make a well-planned use of the new technologies that are transforming the knowledge industries and the world of communications. We look forward, therefore, greatly to today's presentations and discussions, and we thank you for coming.

NAIS INVENTORY REPORT PRESENTATION

BY

PETER JORDAN

ABSTRACT: To assist parties interested in exploring commercial applications of National Atlas Information Service (NAIS) data, a series of documents was commissioned. They inventory and review those resources of NAIS which would be the source material for a variety of value added products and services in the private, public and educational sectors. These documents were prepared by Microstar Software Limited, a firm who specializes in technologies in the information dissemination field. This presentation briefly outlines the contents of those documents. Specifically, the product areas are presented in terms of their content, availability, currency and data format. A brief synopsis is presented of past joint ventures which utilized NAIS data.

RÉSUMÉ: Afin de guider les groupes intéressés par les diverses possibilités commerciales offertes par les données émanant du Service d'information de l'Atlas national (S.I.A.N.), une série de documents a été commandée. Les documents susmentionnés, dressent un inventaire et procèdent à l'étude des ressources du S.I.A.N. qui seraient susceptibles de constituer la matière première de divers produits ou services à valeur ajoutée dans les domaines privé, public et de l'éducation. Ces documents ont été préparés par Microstar Software Limited, une firme spécialisée en technologie de distribution de l'information. Cette présentation souligne brièvement les contenus de ces documents. D'une manière spécifique, les domaines de produit sont présentés par rapport à leur contenu, à leur disponibilité, et à leur format de données. De plus, un bref rappel des entreprises conjointes passées ayant porté sur l'utilisation de données du S.I.A.N. sera fait.

"Opportunity" is defined by Websters as

"A favourable combination of circumstance, time and place, a chance for advancement or progress".

The circumstance is this gathering of public and private sector representatives with a common interest in geographical information. The time is the beginning of a new decade in an expanding global market. The place is here in our nations capital.

It is hoped that the bringing of us all together in this forum today will provide the catalyst to the realization of many exciting opportunities.

Last Fall, Microstar spent some time with the NAIS group cataloguing those resources which we felt could be source material for a variety of value added products and services.

Microstar's task was to document pertinent information which would be of value to parties interested in exploring common ventures with NAIS. Three documents each addressing a major resource area were prepared:

NAIS products
 NAIS methods and procedures
 NAIS hardware and software

NAIS PRODUCTS

- A comprehensive inventory and brief review of NAIS geographic, cartographic and toponymic resources.
- These may not be distinct items ready for sale, such as map sheets, but could be collections of data residing in a researchers file, or a potential data extract created by the NAIS computer systems.

NAIS METHODS AND PROCEDURES

- Describes the methodologies and procedures and the personnel structure within NAIS.
- The purpose of this document is to highlight the importance which NAIS places on data quality, the associated cost and time factors.

NAIS HARDWARE AND SOFTWARE

- This document presents in detail the equipment used, file attributes and sizes, software languages, etc.

NAIS PRODUCTS

The remainder of my discussion will deal with the NAIS products documents.

The objective of this document is to assist in identifying the scope of opportunities for private sector product development through information and technology transfer. The product areas were chosen because they seem to form a natural breakdown of the NAIS information. Others are certainly possible.

NATIONAL ATLAS OF CANADA

- Contains 60 thematic maps in 17 subject realms
- Goal is 101 maps in 36 subject realms by 1992
- Also available are:
 - individual sheets
 - transparencies
 - slides
 - topical map packs

- These items are not available in digital format, but it is a future goal of NAIS to provide this.

MAP COMPONENTS

Maps are created with layers, for example, a common road map likely has layers of boundaries, major rivers, cities, roads and text). Some maps can have up to 35 district layers. The actual layers which make up particular maps are identified in the appendix of the products document.

When printing the maps, these layers are further combined into fewer layers based on the same colour. This is to keep the number of passes required when printing to a minimum.

These layers are available as film negatives and positives. Some of the layers are available in a digital format at the 1:7,500,000 scale. These include coastal outlines, major rivers, roads, railways, and cities. NAIS intends to make these layers available in digital format at a scale of 1:2,000,000 by 1992.

GENERAL PURPOSE MAPS

- Grouping of miscellaneous maps of varying scales which don't belong in the National Atlas group.

THERE ARE 3 GROUPINGS

- Maps from the International Map of the World project (scale 1:1,000,000) 74 maps.
- Political geography of Canada prepared after each election.
- General map of Canada used by schools.

There are not available in digital format, only as paper or film.

CANADIAN GAZETTEER ATLAS

This is a hardcover atlas depicting all populated places with selected physical features of Canada. It does not have the thematic information present in the National Atlas.

Originally published in 1980, it has not been updated since. It is currently out-of-print. In 1981 Readers Digest did publish it in a reduced format.

GAZETTEER OF CANADA SERIES

This is a series of soft covered books containing, in alphabetical order, a list of official names of places and physical features within Canada. It also contains the location of each name in terms of latitude and longitude.

NAIS produces a separate volume for each province and territory with the exception of Quebec.

The data, plus associated information, contained within these books is available in digital format from an automated system containing over 450,000 names.

NON PUBLISHED DATA

This category is a vast pool of information which is the result of the many projects researched by NAIS over the years. Not all of which resulted in the production of a map.

The data can take many forms: notes, research papers, publications, computer data, photos, letters, etc.

It was decided to identify it as a product because it is a potential resource which can be tapped should someone wish to do continued research into specific subject areas. Perhaps a good deal of the information gathering for such research would have already been done by NAIS.

That concludes the major NAIS product groupings as catalogued by Microstar.

In today's world, everything we do is affected by computers. When large volumes of data are involved, as with NAIS product data, computers are essential. There are 2 topic areas that I will address with respect to computer usage in NAIS:

NAIS digital data holdings
NAIS computer systems

NAIS DIGITAL DATA HOLDINGS

NAIS can produce any of its digital data on floppy disks, 9 track tape or 1/4" tape cartridges. They have the ability to transmit data over telephone lines, but the volumes involved make this prohibitive.

Digital data is of 2 types: toponymic and cartographic.

TOPONYMIC

This is the data used to create the Gazetteer of Canada series. It is stored in ORACLE data bases and can be selected by various attributes, sorted and output as flat files of data.

CARTOGRAPHIC

This data base contains map images. It is stored as ARC/Info data bases. (ARC/Info is a computer package that I'll talk about in a few minutes).

The current data is at 1:7,500,000 scale and contains no attribute data. Specifically the following are available:

Hydrography
 Graticule
 Selected roads
 Selected railways
 National Parks
 Provincial boundaries
 Ferries
 Polar Ice limits

This data will be available at the 1:2,000,000 scale in the near future.

NAIS COMPUTER SYSTEMS

Before presenting this topic, I must point out that none of the computer systems presented here are offered as NAIS products. However, there may be an opportunity for a joint venture with NAIS regarding the commercial development of them.

The document "NAIS hardware and software" discusses these systems in greater detail than I will here.

All the computer systems operate on a network of SUN workstations.

THERE ARE 3 COMPUTER SYSTEMS:

National geographic names data base
 Electronic Atlas Mark III
 ARC/Info

NATIONAL GEOGRAPHIC NAMES DATA BASE

This is the system which accesses the toponymic data base. It allows for the automatic storage and retrieval of geographical names and associated data. Currently over 450,000 names are managed through this system. It was custom developed for NAIS using the ORACLE data base management system.

It is a series of pre-programmed screens and reports available through various menu screens. Additional ad hoc selection capabilities are provided through the ORACLE SQL retrieval language.

ELECTRONIC ATLAS MARK III

This system is the result of an internally funded research project to computerize the data and capability of the National Atlas. Although still under continued development, it is used to demonstrate advanced capabilities in the manipulation of cartographic data.

It has very advanced technical features including raster and vector image handling, resolution independent zooming, cartographic data selection by attributes, as well as

calculations of area, distance and intersections. It also uses a windows interface involving icons which make it very user friendly.

Although it has unfinished sections and would require some work to make it a viable product, it does demonstrate some state-of-the-art capabilities in the geographic information field.

ARC/INFO

This is a commercially available geographic information system which is used by NAIS in day-to-day work. It is marketed by the environmental systems research institute (ESRI) whose Canadian office is in Toronto.

All digital cartographic data is stored within this system.

This is not a NAIS product. Any joint venture proposals should be directed to ESRI Canada.

In closing, I would like to list some past products which NAIS was involved in producing. I am sure that these will give some ideas to many of you!

- Postcards
- Stamps
- Posters
- Overhead transparencies
- 35MM slides
- ALEX (videotex service)/

I hope you have found this helpful and that this brief overview will stimulate some ideas. There is a lot of valuable information in NAIS, when combined with the proper technology and vigorously marketed, it will result in opportunities for many of us.

Copies of the NAIS products document are available here. The others: methods and procedures and hardware and software are available on request.

Even though I did not personally prepare these reports, I will try to answer any questions.

REMARKS
BY
MARK COREY

Good morning, Ladies and Gentlemen. I'm surprised to be up here this morning. I'd like to thank Joel Yan from Statistics for raising the question which has gotten me up here. What I'd like to do is just very quickly tell you about two different aspects of something we've been working on. One is the pricing of the digital data and the other is the mechanisms that we are going to use to get this out to the private sector.

First I'd like to bring you in to our world so that you can see some of the rules and constraints we operate under so that you can understand some of the ways that our thinking has evolved. For example, if EMR should go out tomorrow and come up with a tremendous program to sell all of our digital data and we doubled and tripled the number of data sets that we sold, we'd probably all be fired. The reason that would happen would be under the current system of government the revenues would all go to the consolidated revenue fund and the cost would all be done by Surveys, Mapping and Remote Sensing Sector of Energy, Mines and Resources. Even though the government as a whole might be making a profit and doing a tremendous job in getting this data out, the department itself would really be in difficult trouble from management's point of view.

When we looked at the situation it kind of drew to mind the remarks that Will Rogers once made when he said that people probably should be pleased that they are not getting all the government that they are paying for.

In the last year we've tried to rationalize the rules and the system that we work under. For example, Roy Marsh is here from the Department of Communications. He's setting up and he's running now and interdepartmental working group which is looking at getting government databases out to the private sector and opening up the access. And a lot of that is ground breaking work because quite honestly government is not really been well-structured to do that in the past.

We've also had discussions with Treasury Board officials (I know there are people here from the Auditor General's office today and I'd encourage you to take note of this). We've had discussions with Treasury Board officials and they now have agreed in principal that maybe we should look at changing the system so if you've got a new product that people are paying for, and the users are in fact contributing to it, it is worthwhile and the department should be able to keep some of that provided it goes into that program. Things are changing. They are changing even now. This is one of the reasons for this meeting - to get this process furthered. Even this morning we received a legal opinion we were really gratified by, saying we had the authority to sell our digital data so long as we called it "maps sold in computer readable form". That's really the state that we're at right now in government.

You can take some comfort in the fact that the provinces aren't really an awful lot further ahead of us. They sell right now to what we've come up with, a category called end users. These are people that will buy the database but it's only for their own use. They can't add value, they can't transform it, they can't add other information and they can't resell it. Our second category, licensees, is probably what will interest you people the most; it's what is taking the most work on our part, and it is what we are moving towards. (I'm obviously way behind cause I still deal with these things, these overheads, I don't have moving pictures so I apologize for being technologically out-of-date here).

The general philosophy we've developed at EMR is that (we've got an analogy we use) EMR should produce the flour and the private sector should be called on to bake the cookies, pies, cakes, doughnuts and all of the other things. What we're saying is we really think government does something best, which is to develop databases in cooperation with the private sector. Our sector, for example, uses contracting out and other things. The national government and the provincial government should be in charge of getting the database. Over and above that, the value added, the cakes and cookies and that really, it's the private sector that's good at developing products that call for a number of different expertises and they're much better at marketing than government really is. We developed a policy. We have two main objectives in this - we want to make our data available to the public so as to foster its use and we want to establish terms and conditions for its sale and use, which basically take into account things like the copyright act which we must work under, but at the same time allow the maximum of flexibility and encourage the use of the data by the private sector.

In terms of pricing, quite honestly a lot of our efforts to date have focused on topographic map data sets, the one to fifty thousand, the one to two hundred and fifty thousand scale, because we have a lot of data in that databank.

Just to give you an idea, there's a lot of discussion and controversy now about the United Kingdom model verses the American model. Our pricing will probably come down somewhere between, but decidedly towards the American example. We, for example, have a proposal right now, and again it's still a proposal, that when we move commercially into selling topographic maps, which technically we still are not doing, we'll probably price a dataset at about five hundred dollars. Now just to give you a comparison, if you were to buy the most comparable product from the provinces who are our direct competitors in this, to buy that from Ontario it would cost you between eight hundred and fifty dollars and thirty-three thousand dollars in Northern Ontario, Alberta would cost seven hundred dollars, and the Maritimes would cost two thousand five hundred dollars, British Columbia would be three thousand six hundred dollars. You can see that for comparable amounts of information there's a tremendous amount of variety in prices and what we're trying to do is to come in basically at the low end so that we can get our information out and get people to use it. That's really the route that we're going to be going on pricing.

Terms and conditions of sale, we're trying to make it as simple and straightforward as possible. We want to be like Sears where we have a product to sell and people can come in and buy it under very basic terms of conditions with minimum restrictions. We'll sell to two categories of people, end users where you agree that you are only buying it for yourself, and we want to then get into the value-added sector which would be under a license. Again, we work under the copyright act, so we have to work with the companies to develop the best system possible to give you the maximum flexibility, but at the same time we are required to protect ground copyright.

We're also going to be moving with the private sector on a number of other things. The Reproduction and Distribution of the material, the databases will be done by the private sector. We've got a request for a proposal right now which is going out to the private sector asking people to come to us with ways that they can reproduce it on tape, on diskette and on compact disk. So we're interested in working closely with the private sector in reproducing the information to get it out to others in the private sector.

I guess that pretty much covers it. I had a nice slide on conclusions, it just says that we've got a whole new set of demands because we're moving into a digital world. It's an area the government has had some experience with and some departments are further ahead than others. It's an area we want to move into and we really want to work with the people in the private sector who are going to be our prime customers to develop the system. Thanks.

THE LIBRARY MARKET FOR NATIONAL GEOGRAPHICAL INFORMATION

BY

JOAN WINEARLS

ABSTRACT: Libraries and their clientele have been major users of editions of the National Atlas of Canada and map librarians particularly have played an important role in advising on the form and contents of new editions. This presentation describes the needs of libraries for national atlas information in terms of content, scales, currency and format. Comprehensive coverage of physical demographic and economic topics to produce nationally based reference maps is necessary in any national atlas and effective scales should be used to display each topic often in terms of varied sheet layouts. The private sector would find a ready market in libraries for a compact reference atlas for Canada on maps available in the 5th edition National Atlas or its database, updating some of these maps, and borrowing maps and data from other government departments particularly to cover the urban component. A smaller bound format atlas is essential for multiple purpose use. Other products of NAIS such as a revised edition of the Canada Gazetteer Atlas and the release of the toponymy database would find good markets in libraries, the latter producing an excellent CD-ROM product. The Electronic atlas is an exciting new development that libraries will need in the future as there is a perceived decline in the publishing of hard-copy maps. A selected but wide-ranging national database will allow us to help users create many more maps than are contained in the national atlas and as fast as the data is released instead of waiting for many years. Major libraries are prepared to spend staff time and money in setting up such a system.

RÉSUMÉ : Les bibliothèques et leur clientèle ont été de grands utilisateurs des éditions de L'Atlas National du Canada. Les cartothécaires ont joué un rôle significatif au niveau des suggestions quant aux formes et contenus des nouvelles éditions. Cette présentation expose les besoins auxquels font face les bibliothèques en matière d'information de l'Atlas national, au point de vue de la forme, du contenu, de l'échelle, du fond. Il s'avère qu'un aperçu global des thèmes de démographie physique et économique, et visant à la production de cartes de référence nationale, est nécessaire dans tout atlas national. Aussi, des échelles efficaces devraient être utilisées afin d'exposer chaque thème, souvent par le biais d'habillages variés. Les bibliothèques constituent de bons marchés pour des atlas compacts de référence canadien produits par le secteur privé et portant sur des cartes figurant dans la cinquième édition de l'Atlas national, ou dans sa base de données. Le secteur privé pourrait mettre à jour certaines de ces cartes, en empruntant certaines de celles-ci et des données provenant d'autres Ministères, particulièrement dans le but de mieux couvrir la composante urbaine. Un plus petit atlas relié à utilisation multiple est également nécessaire. D'autres produits du SIAN, tels qu'une édition révisée du Canada - Répertoire toponymique et la parution d'une base de données toponymique devraient trouver des marchés souhaitables dans les

bibliothèques. Le dernier produit mentionné est d'ailleurs un excellent produit CD-ROM. L'Atlas électronique constitue une passionnante invention dont les bibliothèques auront besoin à l'avenir, étant donné la baisse de demande en ce qui a trait à la publication de cartes sur papier. Une base de données nationale choisie, mais de grande envergure, nous permettra d'aider les usagers à créer un nombre plus élevé de cartes que celui existant au sein de l'Atlas national, et aussitôt que les données sont sorties, au lieu d'attendre un nombre d'années indéterminé. Les bibliothèques les plus importantes sont prêtes à dépenser l'argent, le temps et les ressources humaines dans l'installation d'un tel système.

Libraries and particularly map libraries and archives have been major users of editions of the National Atlas of Canada for over three decades now. Map Librarians themselves have played an important role in commenting on the forms of the various editions of the National Atlas and in helping to shape the future of these. Although often critical of aspects of the national atlas over the years we have nevertheless been strong supporters of the concept of national atlases and the vital role that they play in providing essential geographic and relational information about our country.

Nevertheless libraries are also consumers and serve as an interface to "the real consumer" or the educational community, business and the public who arrive to use the national atlas and possibly even consider it for purchase. All consumers as such are interested in getting the best information in the form that they need and at a reasonable cost. With respect to the general consumer, libraries have served as a conduit in channelling back reactions to the "National Atlas" or demands for different material in different forms to the producers. The opinion of librarians as to what is needed or will sell is based on reactions of many users over the years combined with our own informed point of view and a projection into the future of what will be needed. It is in light of this background that I will make my comments today.

THE NATIONAL ATLAS

The most important product in the National Atlas Information System is the national atlas itself and I will talk about the potential for this product largely in terms of content, sheet layout and scales and format.

CONTENT

First of all we need "content" in our national atlas and we look largely to the federal government to supply this. We expect the government to produce much of the data and to do significant basic thematic mapping from this. We need standard reference maps across the full spectrum of physical, demographic and economic topics - maps which can serve as benchmarks of the status of the country at any one time and hopefully can be compared from one edition of the national atlas to another.

The list of contents may vary from decade to decade as certain topics assume greater prominence but the final list used for the 5th edition generally reflects the range of topics needed. There will always be criticism about topics omitted and others deemed unnecessary but probably a private sector atlas would whittle this list down further

anyway. One important point to be kept in mind is that the physical maps are available to us in libraries in larger formats from the government departments that produce the data such as Atmospheric Environment Service and Environment Canada. What we do need here and what smaller libraries need are often reduced and more generalized versions of some of these physical maps and these we generally cannot acquire from government services. Physical maps remain a problem component in a national atlas as the data may change very little from edition to edition and yet certain crucial physical topics are needed in an atlas as a contextual basis for the use of the changing data.

The subjects however that are really in demand are the human-related topics which often change radically from decade to decade. Such topics as manufacturing, employment, exploitation of resources, demography, ethnography, immigration to name only a few. In many cases we would like dozens of maps showing many different aspects of these topics but we usually have to settle for a basic group. Some of these topics have not yet been produced for the 5th edition atlas but the data is available and may already be in the NAIS system. The private sector could use the maps that have been done together with other data to produce new maps for a reference atlas. The population map for instance could be updated and used with the present 1976 population maps to create maps of population change in recent decades. Sections of the atlas that are complete such as agriculture could be used selectively or reworked to smaller scales and could also be reissued as a separate map pack on agricultural trends.

One problem with the 5th edition atlas is the lack of an urban component to show comparative data within our major cities. This would probably necessitate a sheet layout for the major census metropolitan areas, or insets for the Windsor-Quebec area and other urban regions, or possibly the use of a isodemographic base which plots areas according to the number of people present rather than the area occupied. Statistics Canada has just produced an excellent new Metropolitan Atlas series which maps about 25 different census variables for major Canadian cities. Some of the maps from this Series could be reduced and generalized to form an urban component in a national reference atlas. Once a sheet layout is created and the boundary data is in place these maps could also be used to show other data such as aspects of the retail trade.

We also need some topics mapped that go beyond the plates in the atlas and will only be done for us by the private sector. Such controversial topics as nuclear energy sites, Indian land claims, poverty, transportation and storage of hazardous wastes, incidence of violent crime and the drug scene, and the depletion of natural resources. Some of these topics could be added to a reference atlas or a separate "State of the Nation" style atlas could be prepared separately and would find a good market in libraries.

SCALES

Scales used for atlas maps are a terrific problem in representing a country as large as Canada and in which much of it is only sparsely settled. All we can hope for in libraries is to get the largest scale possible on a single sheet or the enlargement of parts of the country to better portray certain mapped phenomena. The collecting scale of 1:2,000,000 for the database of the 5th edition atlas is good but of course this is seldom produced on a published map sheet. The 1:7,500,000 sheet scale used is usually adequate to show most topics for settled parts of the country and more than adequate for data that is plotted across the whole country such as some of the physical topics. For a smaller reference atlas

however, the private sector would be able to select parts of some plates from the 5th edition sheets and use them as a full page spread. This could be done effectively with plates where most data is in southern Canada for instance the agricultural lands map, manufacturing maps or the population map. Data still shown for other parts of the country could be reworked for an inset map. Fisheries plates could be selected to show coastal areas only. In fact the innovative case-study (or selective) approach that was used so effectively in the **Historical Atlas of Canada** could be employed in conjunction with a good reference base from the National Atlas sheets. However, while the case study approach with texts, graphs, etc. is excellent for educated users, teaching and even for bedside reading it is not always the most useful in libraries since the maps lose their reference component in that data may not be shown for the very area of the country the user wants.

This brings me to another topic: the problem of currency of maps. One problem of a serially produced national atlas is that plates are out of date with respect to each other - and range from 1976 with the production of the first energy map to the present. Although the energy map was recently revised some other plates would also have to be updated. In libraries we always need up to date maps and the public does not understand why many maps do not show the latest information, as they did not understand why the 1974 national atlas had maps from as far back as the 1961 census. Hopefully national atlas maps could be updated reasonably easily from data in the system. I would particularly like to make a plea for up-to-date population maps. With the five year cycle of the census in Canada any population maps in a reference atlas should be dated from the last census i.e. population maps in any atlas published before 1996 should be from 1991 census data.

FORMAT

The format of any "national atlas" is also of great importance to libraries. Map librarians were very critical of the large folded sheet/boxed style of the 5th edition. Indeed we are not sure how our colleagues in general libraries handle it - to have to unfold sheet after sheet to use the atlas not only is aggravating but it is unlikely the sheets would stand up to any considerable use. In addition sheets get lost, stolen or misplaced more easily. Most map libraries catalogue a second copy of the loose sheets separately and file these with other maps on the same topic and the atlas box remains little used. A bound atlas is the best for general reference use and despite the fact that the format and scale has to be considerably smaller than the 5th edition sheets. In reviewing sizes of atlases that we have received over the years at the University of Toronto I realize that the 1974 National Atlas of Canada of approximately 15" x 11" was a good handy format. It allowed for a double page spread of about 20 inches and sometimes the use of the 1:7,500,000 scale in 2 maps for eastern and western Canada. Other maps were at 1:15,000,000 which is getting a little small but may have to be accepted in a general reference atlas.

In fact because of the lack of a bound atlas for the 5th edition at present it is unlikely that more than the major libraries actually have this atlas now or if they do are taking care to acquire the newly issued sheets.

To sum up my comments on the national atlas then, the private sector would find a ready market in libraries for a compact reference atlas for Canada based on the maps available in the 5th edition or its database and the borrowing of maps and data from other government departments particularly to cover the urban component.

The cost of a national reference atlas will be an issue for smaller libraries and the general public and should be as low as possible perhaps from \$75 to \$100.

CANADA GAZETTEER ATLAS

In thinking about the concept of a national atlas over the years I have to say that I have changed my mind on one issue - that is whether or not an atlas which is designed to show themes or subjects for a country should or should not include general reference maps for the location of places. The traditionalists of the national atlas concept have always said that these should not be included, however, reference maps have been included very successfully in some national atlases such as the U.S. National Atlas of 1969. I have decided now that I am in favour of them partly because I have often heard members of the public indicate that they don't understand why they are not included with the thematic atlas. However the problem would be one of size - quite a few maps would be needed and the number of thematic maps would have to be reduced. This leads into the topic of the **Canada Gazetteer Atlas** - basically an excellent reference and location atlas published first in 1980. **Readers Digest** took those maps and turned them into a very successful general location and thematic **Atlas of Canada** with an added component of their own thematic maps in 1981.

The strengths of the **Canada Gazetteer Atlas** lie in the range and size of scales, used to cover unpopulated and populated areas, the attractive relief depiction and the large number of place names and indexes. One major criticism that I hope can be remedied for the next edition is the basis for the choice of place names in the Regional Municipalities. Only incorporated places are listed for these which has meant that many names of communities have been dropped and which makes it look for instance as if Torontonians have done away with most of the population in the York region or the garbage problem has finally eradicated settlement. If the **Gazetteer of Canada** can still list these communities whether incorporated or not then they can certainly be selected by the criteria for population size as they are on other maps. If the problem is the Census data then they should be shown but not classed by size.

Another product that is related to the Gazetteer Atlas is the toponymy database. I am presuming that this is the CPCGN database incorporating the names in the current provincial gazetteers with the references from earlier names and hopefully information on name origin. This product would be excellent in a CD-ROM database and would be an essential national reference tool for all good-sized libraries.

THE ELECTRONIC ATLAS

One of the great problems for map libraries and therefore for the users of maps at all levels is getting enough thematic maps for Canada and getting them fast enough.

Traditionally maps are expensive to produce and take too long to prepare and publish and recently it has been of some concern to us that we are actually seeing a reduction in the publication of certain types of maps by various government departments in Canada. Yet for every map plate in the national atlas, users ask for and would like to consult many more maps on that subject. For instance for population we need more than just distribution and density maps, we need to see all census variables such as age groups, ethnic groups, income, education and correlations between some of these. For manufacturing we need

more than general analyses we need at the very least maps of all types of industries, of employment related to them, production amounts - in fact the capability of accessing maps of whatever geographical data is being collected in Canada. We also need to have maps for these subjects accessible at general scales for Canada and at larger scales to document urban areas e.g. at the census tract level. In the last year or so it has become increasingly clear to me and to some of my colleagues that we will only get this level of mapping through a database - in a maps on-demand setup - in other words in the form of an **electronic atlas** and therefore we are extremely interested in the NAIS development of the Electronic Atlas MK3. Map libraries are on the brink of getting into PC based public access computer assisted mapping services and although non in Canada have these services yet, some map libraries are beginning to buy equipment such as colour monitors and colour plotters. Certainly at the University of Toronto we will go forward with such a service as soon as the easy to use software and comprehensive data sets with a strong Canadian content are available. We are aware that such a service not only involves a capital investment but a considerable investment of staff time in training the users to work with the system so that users can be left alone to do their own mapping. For this reason the service must be solidly based. We cannot proceed with small selected datasets but require comprehensive datasets so that it has the potential for use by a wide range of our users. The basis of the idea of a public access system at present involves the "base map" digitized from a good scale at least 1:1M with rivers, lakes, boundaries, varied projection capability and meshed with statistical data for various census boundary units to produce choropleth maps.

The other aspect that a database approach will remedy is the great time-lag that the ordinary map-user experience between the release of the data and the publication of the map. We feel that we should be able to get **instant maps** as soon as the data is released and loaded into the system. As long as mapping software is already in place these instant maps should be quite possible to produce. There is no reason why the student community or the public should wait for their maps when business or computer oriented academic research have the data producing maps for them a decade before the rest of the world. An offshoot of this is the buildup of even recent comparable historical data so that maps comparing change in various data can be prepared easily. One of the greatest problems in map libraries is good comparable data. We either have only 1 map on a topic in a 30 year period or if 2 maps are available the legends and scales are so different they cannot be compared.

I am aware that NAIS may only have certain types of data in their system at present but would hope that data from other sources such as manufacturing and agriculture and a more detailed base and data to provide a good urban component could be added. Data from earlier atlases would be useful but presumably based on original data sources such as early census material to provide the fullest comparability with later information. Some of the most important data that NAIS could provide might be linework related data such as the road and railroad network at different periods, pipelines, airline routes, etc. and of course the place-name base with towns presumably classed by size so that they could be selected appropriately for different scales.

In terms of format I am not sure that I can comment fully - but a CD-ROM type of product may be the best form from the library point of view initially, in that this would be more selected and simpler than an open-ended system. This would maintain some control over problems related to use, would allow us to keep training to a minimum and to make sure users could be reasonably successful in producing their maps. A recent article on this subject about a service set up at the University of Washington Library emphasized the importance of the following in choosing a system: software/data integration, ease of use

with minimal setup, and widespread application. Clearly software that is easy to use but in which some good cartographic pre-mapping graphic decisions have been made would be of most use in a public access system.

CONCLUSION

Some libraries will be more interested than others in by-products of the NAIS system - for instance smaller libraries might be interested in educational films on video, small academic libraries may be interested in slides. Generally however I would like to emphasize that libraries will be interested in many of these reworked atlas products provided that at least some portion of the material is new or an intelligent reworking of old material. And while the electronic atlas may be the way of the future for academic map libraries the smaller libraries and the public desperately need a new national thematic atlas and a new gazetteer atlas.

UN ATLAS MULTIMÉDIA

PAR

LOUISE GUAY

RÉSUMÉ: Le sujet de la géographie - Quelle place prend la géographie dans l'existence des Canadiens? L'imagerie scientifique en géographie - Les moyens technologiques et conceptuels permettant d'utiliser et de diffuser les informations géographiques ont donc un rôle essentiel à jouer pour notre avenir. Le choix de ces moyens est aussi crucial, comprenant l'image et le graphique comme outil de recherche, moyen de transmission, de mémorisation et de présentation des connaissances. L'image traduit l'état des connaissances du pays, de son savoir sur lui-même et les modes du cheminement de sa pensée sur lui-même. L'évolution d'un pays se mesure aujourd'hui à sa capacité scientifique et en particulier aux sciences de l'image qui influencent la science et tous les modes d'identification et de représentation des connaissances dont celles du pays. L'Atlas est sans doute la plate-forme la plus dynamique pour imaginer les images d'un pays à l'époque de l'image électronique. Nous sommes à l'époque des bases de données- images-intelligentes et des systèmes-experts. Nous allons vous présenter un prototype tout simple où aucune production n'a été engagée. Nous avons utilisé du matériel existant, mais nous proposons un instrument de travail qui permet de passer en revue le matériel multimédia qui existe pour un sujet ou un thème donné et de bâtir une approche, un parcours, un essai à partir de ces média existants. Et éventuellement de greffer du matériel scientifique plus sophistiqué et de travailler avec ce matériel. L'Atlas du Canada; base de données multimédia dynamique - Pour prendre quelques exemples, le peuplement, les langues, les migrations, les communications, la géophysique, la zoogéographie ne nécessiteraient-ils pas des bases de données qui comprendraient des images fixes, des images vidéo en mouvement, du son, des textes et des graphiques? Et, quels seront la nature et le rôle que joueront ces bases de données multimédia? Quelle sorte d'information est alors transmise et par quels types de données? La gestion de ces bases de données est le challenge du multimédia.

ABSTRACT: The subject of geography - what place has it in the life of Canadians? Scientific imagery in geography - the technological and conceptual means of using and distributing geographic information have an essential role to play in our future. The choice of appropriate methods is also crucial, comprising the image and the graphic as a research tool, a means of transmission, of storage and presentation of this knowledge. The image incorporates the state of our understanding of the country, of our knowledge itself and of the ways we think about ourselves. The evolution of a country is measured today by its scientific capacity and particularly to the images of science which influences science and all other methods of identifying and representing the knowledge of the country. The Atlas is without doubt the most dynamic forum for displaying the images of a country in the era of electronic images. We will show you a simple prototype where production has not been started. We have used existing material, but we

propose a work tool which will allow to review the multimedia material which exists for one specific subject or theme and to formulate an approach and a trial run based on the existing media. Eventually, we will extend it to more sophisticated material and be able to work with this material. The Atlas of Canada is a dynamic multimedia data base including, for example, information on population, languages, migration, communication, geophysics, zoogeography. We believe they require a data base which would include fixed images, moving video images, sound, text and graphics. What will be the nature and role these multimedia data bases play in the future? What sort of information is transmitted and using which kinds of data? The management of these data bases is the challenge of multimedia.

Selon M. Tessier, géographe et auteur de l'InterAtlas, on peut définir un atlas multimédia selon cinq termes de référence :

- Les interactions entre les phénomènes
- La dynamique spatiale
- La dynamique temporelle
- Les rapprochements non linéaires
- Les données de référence

Parmi les nombreux concepts opératoires nécessaires pour préciser ces références, vous pourrez trouver dans notre système la visualisation de synthèse, la schématisation, l'examen comparatif, l'ordonnement, l'animation, la modélisation dynamique, la projection, la navigation aléatoire, l'hypertexte, les bases de données, la capacité de traitement et l'interactivité.

Dans ce système l'exploration et l'interprétation (la science et l'art) vont en s'accroissant à cause de l'interactivité. C'est, toujours selon les termes de M. Yves Tessier, la rencontre de l'ingénierie cognitive et l'ingénierie médiatique.

Réaliser un atlas multimédia c'est produire un système qui permet de traiter les données pour en tirer des faits, qui constituent de l'information et deviennent des moyens de connaissance. Les activités prévues pour arriver à cet atlas sont le captage (recherche et collecte de données); l'assemblage (gestion de la base de données); puis la signification (analyse et interprétation); la mise en forme (conditionnement de l'information); et enfin l'apprentissage (assimilation de l'apprentissage).

SCIENCE ET IMAGE

La géographie est donc une science où l'image joue un rôle à plusieurs égards. Le concept même de géographie est très visuel. Dans le mot géographie il y a géo qui veut dire terre et graphie qui veut dire graphe et trace. La géographie ce sont des plans, des cartes, des graphes, des images en relief, des photos bref toute une panoplie d'instruments qui nous font voir le monde, la terre et son histoire naturelle.

Il suffit de jeter un coup d'oeil sur l'évolution de la cartographie qui multiplie ses objets (géologie, pédologie, végétation, occupation du sol). Les évolutions décrites de ces phénomènes et le suivi souhaité crée le besoin de séries diachroniques de cartes

nombreuses et toujours mises à jour (je me réfère à l'ouvrage de Patrice Foin, publié chez Paradigme à Caern en France en 1987).

Sans compter la multiplication des thèmes, l'actualisation continue, et les surfaces cartographiées de plus en plus importantes, et sachant que tout aménagement rationnel du territoire est précédée d'une cartographie de base, on comprendra à quel point la production cartographique augmente.

Les moyens utilisés en géographie sont nombreux et variés, ceux-ci doivent favoriser une modélisation des connaissances. Il convient donc de rechercher les outils qui rendront possible une dynamique visuelle d'une richesse exceptionnelle.

À cette imagerie il faudra aussi ajouter son interprétation, qui doit être la plus précise, la plus exacte et la mieux instrumentée possible tout en étant inventive. Nous reviendrons sur l'importance de l'interprétation et la forme qu'elle peut prendre.

Mais déjà on peut imaginer la nécessité pour une telle discipline d'utiliser plusieurs médias. La géographie est une plate-forme multidisciplinaire et les moyens qui la présentent déterminent son impact et son efficacité.

LES SUPPORTS DE L'IMAGE

Revenons à son image. Revenons à son image et à ses supports. Les supports de l'image en sciences ont toujours eu beaucoup d'importance. Le volumen ou rouleau de papyrus a permis de fixer les images nécessaires pour les sciences de l'observation (l'image servant de support et d'illustration du discours) tel le traité d'Archimède sur les figures géométriques, jusqu'au livre. Le livre a permis de divulguer les fruits de la recherche fondamentale et technique.

La photographie permettra une production de l'image mécanisée et une richesse d'information inégalée et une précision, bien que relative, fort appréciable. Pour l'enregistrement et la diffusion des connaissances ce support constitua une véritable révolution.

Non seulement elle aide la science mais aussi lui permet de faire des découvertes (photo aérienne, photo interprétation qui permet de découvrir des bâtiments ensevelis, des routes antiques, le parcellaire ancien ou des parcellaires superposés). Pensons à la géomorphologie, la climatologie, la géographie des productions ou encore tout simplement des photos anciennes d'une petite ville du début du siècle qui nous dévoilent les systèmes sociaux, économiques et matériels, mentaux même du passé.

NOUVELLES IMAGES, NOUVELLES CONNAISSANCES

Aujourd'hui les images peuvent aussi être créées par le calcul, les diagrammes, histogrammes, stéréogrammes, qui interprètent le résultat d'études statistiques toutes les figures qui se créent et se transforment sur les écrans de l'informatique. Images qui peuvent rester virtuelles dans une mémoire accompagnées de documents stockés sur des mémoires optiques. Notre civilisation est celle de l'image et si on désire parler de science géographique avancée, l'image y joue un immense rôle.

Les mots continuent d'être essentiels car les mots représentent les concepts, les concepts sont le fruit de raisonnement et s'ajoute à cela l'expérience qui fondent la pensée scientifique et son histoire. **Les mots sont les véhicules de l'interprétation qui fondent le réel pouvoir des images.** Je me suis inspirée pour le début de cette conférence d'un article de René Ginouvès, article paru dans le Courrier du CNRS sur l'imagerie scientifique en 1988.

DE L'EXPÉRIENCE DE STATISTIQUES CANADA À L'ATLAS DU CANADA

Revenons donc à l'interprétation, qui confère aux images leurs sens et leurs plénitudes. Prenons comme exemple l'expérience menée à Richmond High School où la base de données de Statistiques Canada fut utilisée en ligne ainsi qu'une base de données CDROM pour l'enseignement de la gestion en affaires internationales, en comptabilité, en géographie, en mathématiques, etc. Les étudiants et les professeurs avaient accès aux données en tout temps et pouvaient les utiliser sous des formes et à des fins inattendues.

La richesse de ces données a permis d'ajouter à l'enseignement des matières la dimension d'informations fraîches, actuelles et correspondant à la réalité du monde d'aujourd'hui.

L'avantage de ce type d'expérience est de favoriser à la fois l'acquisition de nouvelles méthodes d'information, (l'accès à des moyens technologiques et à cette nouvelle culture et son langage) et de développer des capacités d'analyse des statistiques en profondeur.

LE SUJET DE LA GÉOGRAPHIE

Quelle image nous faisons-nous de notre pays? Le Canada est-il davantage le produit d'un discours historique plus que de tout autre discipline? Quelle place prend la géographie dans l'existence des Canadiens? Peut-être nous suffirait-il de visiter notre pays comme s'il était un pays étranger pour le découvrir à nouveau.

Et s'apercevoir qu'il évolue, qu'il est le fruit d'une production industrielle, économique, politique, sociale et culturelle et qu'à l'heure de la conscience écologique active, le Canada doit se poser de sérieuses questions comme tous les autres pays de la planète.

L'IMAGERIE SCIENTIFIQUE EN GÉOGRAPHIE

Les moyens technologiques et conceptuels permettant d'utiliser et de diffuser les informations géographiques ont donc un rôle essentiel à jouer pour notre avenir.

Le choix de ces moyens est aussi crucial. Un pays doit se présenter sous ses multiples aspects. Son image doit être la plus universelle possible et présenter des capacités de synthèse prodigieuses. Son image est son moyen de communication, d'information et de suggestion le plus puissant. Et, ce qui frappe l'imaginaire contemporain c'est l'histoire de la terre, nous ressentons tous davantage un sentiment géographique plus qu'un sentiment historique. C'est comme si nous devions très vite régler nos vieilles querelles, abattre nos murs honteux et s'occuper au plus vite des dégâts causés par nos entreprises industrielles parfois absurdes.

Il nous est donc possible de re-cr  er l'image de notre pays, de la fabriquer, de la transmettre et de la diffuser, gr  ce aux syst  mes de fabrication et de conception d'images. En comprenant l'image et le graphique comme outil de recherche, moyen de transmission, de m  morisation et de pr  sentation des connaissances.

L'image traduit l'  tat des connaissances du pays, de son savoir sur lui-m  me et les modes du cheminement de sa pens  e sur lui-m  me. Il s'agit non seulement de ce que repr  sente l'image mais aussi de la mani  re dont elle a   t  e con  ue    travers des techniques utilis  es et la nature des mat  riaux utilis  s pour la r  aliser. L'  volution d'un pays se mesure aujourd'hui    sa capacit   scientifique et en particulier aux sciences de l'image qui influence la science et tous les modes d'identification et de repr  sentation des connaissances dont celles du pays. L'image est le lieu d'acquisition et de traitement des donn  es, un domaine extr  mement vaste et source de d  couvertes nombreuses. L'Atlas est sans doute la plateforme la plus dynamique pour imaginer les images d'un pays    l'  poque de l'image   lectronique qui raconte des histoires vivantes de l'holographie, aux logiciels 3D en passant par les mod  les math  matiques.

L'image et le graphique se c  toient puis se superposent. Il nous faut donc des images pour lire le monde, le comprendre et le d  finir. Un Atlas ne peut pas   tre   lectronique et multim  dia, s'il est atlas de notre monde pr  sent. Car dans notre monde les machines enregistrent des images, les lisent, les interpr  tent et les utilisent. Comment montrer notre pays et utiliser les donn  es qu'ils g  n  rent si nous n'utilisons pas le langage de la science moderne.

Les machines   changent entre elles des images et n  cessitent des r  seaux qui pourront transporter ces informations-images d'o   la n  cessit   de d  velopper les r  seaux de fibre optique. Les syst  mes actuels d'imagerie scientifique font voir l'invisible et fournissent une vision multipli  e du monde.

L'Atlas tend    cette pr  sentation. L'Atlas est    la recherche de mod  les dynamiques qui permettent de r  fl  chir sur l'  volution du monde naturel et par suite des soci  t  s qui occupent ces espaces naturels, de mettre en pr  sence divers ph  nom  nes et de simuler leur interaction, de mani  re interactive. Il s'agit de trouver des moyens efficaces, rapides et synth  tiques de pr  senter et de comparer des r  sultats. Les outils d'observation et de reconnaissance sont primordiaux pour un atlas. Interactivit  , interpr  tation automatique d'images, jeu avec les variables espace-temps, outil de simulation et de pr  diction dans la visualisation des mod  les. Nous sommes    l'  poque des bases de donn  es images intelligentes et des syst  mes-experts.

Nous allons vous pr  senter un prototype tout simple o   aucune production n'a   t  e engag  e, nous avons utilis   du mat  riel existant, mais nous proposons un instrument de travail qui permet de passer en revue le mat  riel multim  dia qui existe pour un sujet ou un th  me donn   et de b  tir une approche, un parcours, un essai    partir de ces m  dia existants. Et   ventuellement de greffer du mat  riel scientifique plus sophistiqu   et de travailler avec.

La g  ographie re-devient un sujet hot, passionnant et actuel.    notre tr  s grande surprise l'exploration de notre propre plan  te n'est pas encore termin  e. M  me au simple niveau de notre pays, le d  velopper et le conna  tre est encore un but. Les th  mes et les sujets au niveau national, r  gional, provincial abondent. Cependant les moyens de ma  triser cette complexit   riche ne sont pas toujours mis en oeuvre. La communication dont nous Canadiens nous avons fait notre sp  cialit   demeure une n  cessit  , pays vaste, immense,

encore inpeuplé, la création de liens, de ponts, de passerelles, est toujours une exigence vitale. Nous avons du mal avec l'image de notre identité mais maîtrisons-nous l'identité de notre image? Comment nous voyons-nous? Savons-nous intégrer les multiples visages du nord-américain, au passé européen, établi en territoire amérindien qui à son tour pourrait retracer ses origines asiatiques? Et de même le sol où nous vivons a diverses appartenances.

L'ATLAS DU CANADA; BASE DE DONNÉES MULTIMÉDIA DYNAMIQUE

L'Atlas du Canada possède un contenu qui présente l'information géographique en 44 domaines qui englobent tous les aspects de l'histoire, de l'environnement, et de l'évolution socio-économique du Canada. Ceci représente un volume d'information considérable, d'où l'utilisation de l'informatique pour gérer de grandes bases de données et les rendre accessibles sur l'immense territoire canadien. Comment se présentent ces bases de données à l'heure actuelle? Pour prendre quelques exemples, le peuplement, les langues, les migrations, les communications, la géophysique, la zoogéographie ne nécessiteraient-ils pas des bases de données qui comprendraient des images fixes, des images vidéo en mouvement, du son, des textes et des graphiques?

Et, quels seront la nature et le rôle que joueront ces bases de données multimédia. Quelle sorte d'information est alors transmise et par quels types de données? La gestion de ces bases de données est le challenge du multimédia. Mais l'enjeu devient d'accéder aussi aux données multimédia que l'on peut manipuler et en quelque sorte éditer et créer. La consultation devra dans tous les cas être rapide, le stockage devra offrir des capacités illimitées (ce qui dans les cas des média images et sons est loin d'être démontré), l'interrogation devrait pouvoir se faire le plus naturellement du monde en croisant des requêtes et en étant assisté intelligemment par le système utilisé. L'utilisation des archives pour re-crée le passé aura recours au pouvoir pédagogique de ces systèmes qui feront appel aux sens humains (vue, ouïe, goût, odorat, toucher).

ÉCOLOGIE ET INTERACTIVITÉ

Les climats, les températures, la flore, la faune et la population humaine sont affectées par les changements dramatiques causés par une production industrielle négligente et exploitant outrageusement les ressources naturelles. Une connaissance dynamique et appliquée de la géographie physique et humaine apportera des points de vue absolument nécessaires sur le plan géographique, bouleversant les perspectives du passé, du présent et de l'avenir. On parle d'atlas dynamiques, de cartes intelligentes où la dimension relationnelle et associative fonctionne à plein.

MODÉLISATION DE L'ESPACE

Dans le cas de la géographie tout le monde devient un peu plus géographe et l'utilisateur peut choisir n'importe quelle composante d'une carte et la combiner avec d'autres

composantes ou avec des renseignements tirés d'autres cartes. Si ces cartes sont dynamiques il faut donc prévoir des stations de travail d'où l'on peut piloter des vidéodisques, des cdroms, des cdaudio. De là on peut imaginer au futur la consultation à distance de bibliothèques multimédia.

INSTRUMENTER LE DISCOURS GÉOGRAPHIQUE

Les notions d'animation et de modélisation de l'information rejoignent les visions des conférenciers réunis au Japon en décembre dernier qui présentaient les diverses versions du multimédia.

On s'interroge beaucoup sur les façons de communiquer l'information, on insiste sur le fait que de nombreux systèmes ont été désignés par des ingénieurs mais que ceux-ci doivent maintenant connaître d'autres approches et par là même d'autres applications.

Si on se tourne vers les artistes c'est pour y trouver de nouveaux sens. Dans le transfert de supports que le projet de Service d'information public de l'Atlas du Canada projette, la place et le rôle que jouent les cartes et les plans sont des plus importants. Modèles opérationnels en informatique, on peut aussi leur appliquer le concept de navigation.

Autrefois les cartes ont été les instruments par excellence de la navigation, de l'exploration et de la découverte, aujourd'hui elles sont l'objet de navigation au sens informatique et interactif. Modèles du monde, elles deviennent les mondes du modèle. La carte qui comprend dans son système l'architecture de l'espace comprend non seulement son organisation mais aussi notre manière de vivre cet espace, de se le représenter et de le simuler. Plus que de manipuler les cartes il s'agira de naviguer dans les cartes. N'est-il pas de plus en plus question de naviguer dans les connaissances? La carte a fourni un mode de connaissance exemplaire, dynamique et fantastique.

Les systèmes multimédia utilisent la cartographie, les plans, les graphiques et font usage d'interfaces multiples d'un médium à un autre, la notion de légende, de translation est partout présente. La métaphore du voyage, de l'exploration géographique hante les systèmes multimédia car nous abordons les nouveaux continents de langages plurisensoriels.

Le monde nous est d'abord apparu traduit par l'écrit et le visuel et l'auditif entièrement catégorisé. Il sera transmis et communiqué par des systèmes qui s'apparentent davantage à la communication humaine de tous les sens.

ATLAS ET HYPERTEXTE

L'Atlas est par définition un hypertexte où l'association au sens du mode associatif côtoie le raisonnement linéaire.

Il apparaît donc logique et naturel que l'Atlas soit un sujet idéal pour un système multimédia et vice-versa. Le professeur Symons nous disait que les systèmes multimédia vont supporter de manière plus efficace l'Atlas mais nous pouvons de la même manière dire que l'Atlas comme concept est aussi un support paradigmatique pour le multimédia.

RÉSEAUX ET MULTIMÉDIA

L'étude de phénomènes se fait à plusieurs niveaux dans plusieurs dimensions. Manipuler rapidement toutes sortes de cartes, de graphiques, les comparer, discuter avec un collègue, un spécialiste, de tel aspect ou de telles autres questions sont des choses faisables en réseaux multimédia interactifs. Imaginez le système qu'on vous présentera en vidéo conférence et cela vous donnera une idée actuelle de ce qui est possible. La miniaturisation des appareils et leur connectivité les rendent portatifs et les conduisent dans nos vies privées. De la carte routière omniprésente dans toutes les voitures comment arriver à la consultation d'un atlas électronique et à l'utilisation d'un atlas multimédia interactif. L'Atlas est une autorité en matière d'information géographique, l'Atlas deviendra une sommité en matière de communication grâce au multimédia.

EDUCATIONAL MARKET OPPORTUNITIES FOR GEOGRAPHICAL INFORMATION PRODUCTS

BY

JAMES E. PAGE

ABSTRACT: The Jean Talon Project proposes to create and distribute, during the 1990's, a series of electronic products on Canada in the 20th Century, and to help develop an environment conducive to the electronic publishing of information. The project would be an important contribution to the advancement of Canadian Studies by increasing Canadians' sense of citizenship and awareness of their country. The Jean Talon products would have particular significance in the Canadian educational sector, where they would assist educators to provide a greater range of Canadian content in both official languages. Beyond their intrinsic value, Jean Talon products would pioneer a set of practical arrangements for the electronic publication of multiple forms of governmental information (e.g. alphabetic and numeric data, images, and sound). The presentation itself will focus on the project and cover the results of the "User Needs and Current Trends Study" carried out by Abt Associates of Canada.

RÉSUMÉ: Le projet Jean Talon se propose de créer et de distribuer dans les années 1990 une série de produits électroniques portant sur le Canada du vingtième siècle. Le projet doit contribuer à la mise en place d'un environnement favorable à la publication électronique d'informations. Il constituerait aussi un apport significatif à l'avancement des connaissances dans le domaine des Études canadiennes par un accroissement de la sensibilisation des Canadiens à leur pays. Les produits Jean Talon auraient une grande incidence dans le secteur de l'enseignement au Canada, où ils apporteraient une aide considérable aux enseignants en leur fournissant un plus grand choix d'informations sur le Canada dans les deux langues officielles. Leur valeur intrinsèque mise à part, les produits Jean Talon seraient les premiers à utiliser des arrangements pratiques dans le cadre de la publication électronique de formes multiples d'informations gouvernementales (par exemple les données alphabétiques et numériques, images et son). La présentation proprement dite portera sur le projet et présentera les résultats de "l'étude des besoins des utilisateurs et tendance actuelle" préparé par la firme Abt Associates of Canada.

Thank you very much, Professor Symons, for your kind introduction. I was delighted to be asked to speak to you today, because I think that the work that Energy, Mines and Resources is doing on the Electronic Atlas project and on the National Atlas Information Services idea, is very important for Canada and for the study of Canada.

I would like to present three things of pertinence to this "Opportunities Seminar". The first is to describe an initiative a number of departments and agencies are exploring which we

think will have significant implications for the development of Canadian studies. This initiative is called the Jean Talon Project and it contains a very important component directly related to the subject of this meeting. Secondly, I will show you a brief film, roughly seventeen minutes long, made by the National Film Board of Canada to illustrate some of the objectives we hope to achieve with the Jean Talon Project. It also indicates the importance of this idea to a number of other departments and agencies of government including, of course, the Department of Energy, Mines and Resources. Finally in the last 15 or 20 minutes allotted to me, I would like to speak to you about the educational marketplace for products using "new" information technologies and computers. In developing the Jean Talon concept, with the cooperation of quite a number of others, we have done a considerable amount of research on the possible use of new technologies for education purposes, and I would like to share with you some of that information.

First of all, the Jean Talon Project derives from a number of sources of inspiration, perhaps the most fundamental for me is the Report of the Commission on Canadian Studies entitled "To Know Ourselves". Tom Symons as you know, was Chairman of the Commission on Canadian Studies, sponsored by The Association of Universities and Colleges of Canada, and the Commission's essential message was and remains, that it is vital for Canada to ensure its educational systems present opportunities for young Canadians to know and understand their country, not as a narrow, nationalistic endeavour, but rather as the foundation of self knowledge, a platform for broader knowledge, not only of Canada, but of the world. The Canadian Studies Directorate that I have had the pleasure to work in for a number of years, really was based on the spirit of the Report of the Commission of Canadian Studies, and the mandate of the Directorate is to provide funding for the development of learning materials of a print nature, of a computer-based nature, of films and audiovisual materials, to help Canadians to know and to understand this country.

In addition to the Canadian studies orientation of the Jean Talon idea, another source of inspiration is the fact that the federal government itself, and provincial governments as well, have invested a considerable amount of money and expertise in the development of information about this country, and we feel that it is vitally important for Canadians to have access to that information. I refer to the cartographic resources that we have been looking at today, as well as a variety of data and image banks held by government departments, both federal and provincial.

Another inspiration for the Jean Talon idea is a desire to address the impediments to the development of appropriate and well-marketed educational software for the schools, colleges and universities of Canada. There are many reasons why there have been impediments to the development of a strong industry in this country, and I would like to mention very briefly just a few. Earlier today in one of the questions, a speaker asserted that education is a market that is a poverty-stricken market. I agree, there is a lack of money in Canada for the acquisition of good materials. In addition, there is the problem faced by the software industry in this country as a result of curriculum fragmentation. The development of curriculum standards and curriculum policies is in the hands of twelve different jurisdictions, the two territories and ten provinces. This makes it very difficult, in fact virtually impossible, for people to market a single product across the country. The implication clearly is that we deal with small markets, we try to develop products for those markets and in most instances the markets are not sufficiently large to make the products economically viable. Another impediment faced by the industry is the diversity of hardware platforms. Not only are there differences between jurisdictions, but also within

particular jurisdictions. For example, in Ontario, one can find a variety of computer platforms used by various school-boards across the province.

A fourth inspiration for the Jean Talon Project is the willingness on the part of a number of departments and agencies of both federal and provincial governments, to work with us to try to find solutions to the market problems I have alluded to, in order to help Canadians develop good quality materials. In developing the Jean Talon idea, we have had the cooperation of roughly 29 provincial departments, the Council of Ministers of Education, and roughly 20 federal departments and agencies. This has meant not just cooperation with individual departments but also various networks between and amongst departments, for example, the Interdepartmental Working Group on Database Industry Support.

Well, what then is the Jean Talon idea? We are proposing the development of series of modular electronic products, on a variety of subjects and themes of importance to the evolution of Canada in the 20th Century. I use the term modular because we have looked at a number of products that have been developed around the world and we believe this is the best approach for the education market.

The notion of modularity is an important one for several reasons. First of all it is important because of the diversity of curriculum interests that exist across the country. It is also important, I think, because a modular approach makes it easier for us to conceptualize and to realize definitive products. In terms of modularity we have essentially four streams of products in mind. These are not intended to be exclusive, but simply indicative of what might be done. The first stream, not surprisingly given the reason we are all here, is a series of geographically-based products. We are interested in the creation of cartographic template that will allow us to develop specific educational products on topics like ecology, environment, agriculture, demography, urbanization, industrialization, and so on. If you look at curriculum patterns in the various jurisdictions of Canada, there is a need for information and materials on these topics. In the User Needs Study we commissioned as part of our work on this project, the idea of geographically-oriented products was very high on the list of preferences in response to the surveys conducted.

A second stream of products would present the visual heritage of the country. We are thinking essentially of two ways in which that stream of products might be developed. In the film presentation you will see a segment on the Domesday Gallery, drawn from the British Broadcasting Corporation's Domesday Project. I need not say anything more about it at this point, you will see it in the film. Flowing from the Gallery idea we propose a series of modular products on the major cultural institutions of the country. Imagine, for a moment, a product on the new National Gallery of Canada. We could electronically model the architecture of that institution and provide interface and navigational software to allow people to move through that Gallery as if they were actually in the building with access to the images of Canadian works, and artifacts stored in that collection. In addition to the images in a particular exhibition or series of exhibitions, the module could contain the whole of the collection, not simply what can be physically displayed. We also propose to provide text on major Canadian artistic movements, on major Canadian artists, perhaps information on the evolution of the institution, its curatorial policies and so on. One could foresee a series of products: the Art Gallery of Ontario, the Glenbow in Alberta, and the Museum of Anthropology at U.B.C., and so on. In the same stream we also could develop projects which, rather than looking at specific collections, would draw from a variety of institutions to create modules on particular Canadian artistic movements. That

too, I think, would be a very rich and textured way in which Canadians could have access to elements of their visual heritage.

A third stream of products might best be described as National, that is, products with national scope. One can think of a variety of possibilities. For example, the development of a module on the various federal and provincial elections that have taken place in Canada since the turn of the century; one on the history of innovation and design in the country; another on the evolution of various architectural styles in the country; and so on, with accompanying text. The notion here is that, drawing on a variety of national resources we could package discrete modules addressing a variety of curriculum needs.

The fourth stream of products that we think possible, and we have mentioned this to our provincial colleagues who seem interested in this notion, would be a series of modules developed by the provinces and the regions themselves. For example, the province of Alberta might wish to publish a module that would explain the history and experiences of Alberta in Canada in the 20th Century, for use by Albertan students, but also accessible to students and teachers in other parts of the country. This underscores, I think, the importance of seeing an idea like the Jean Talon Project, not as a project of one or other department of the federal government, or of the federal government itself, but as an attempt to use a variety of resources from the federal government, the provinces and the private sector.

We know from previous market studies and from our own User Needs Study that the market situation in this country is extraordinarily fragmented. We know from other attempts to move into the multimedia sphere that often people will develop products that are elegant and fascinating in and of themselves, but many of those products never reach the marketplace because of the peculiarities of their hardware platforms or configurations. What we are proposing, rather than diving into multimedia, or into new technologies like CDI or DVI or the rest of the alphabet soup, is a gradualist approach to the development of this project. To this end we are suggesting a multiple media approach to first products. By that I mean production of modules in several formats. One format could be described as magnetically-based, that is on floppy disk, perhaps for use with HyperCard-like programs. We propose to create initial modules that suit the hardware platforms currently in Canadian schools. We have done research on what those platforms are, and our feeling is that by doing products in a magnetic environment, perhaps suited to three or four major existing platforms, we could service the school systems with the equipment they have already. But in parallel to that, we propose to develop the same modules, with expanded content, expanded navigational and interface capabilities, in an optical environment. The optical standard we would use is yet to be determined, and I can come back to that in questions if you wish. We would use an optical environment, in addition to the magnetic, in order to encourage the educational marketplace to buy into that new technology. In order for that to be realized of course, in terms of product development, we would have to instigate simultaneously a program of teacher in-service and pre-service education appropriate to preparing the education marketplace for the kinds of optical products that we have in mind.

Another element implicit in the idea is the development of an industrial strategy for the educational software industry. As I have indicated, Canadian producers face the problem of a fragmented curriculum situation. We know through work that the Department of Communications has done that if a particular piece of education software is developed for one range of computers and is produced for another range, the revision costs roughly 80 to 100% of the original. That is not economical. One of the things that we have to develop in

this country is some way to create and deal with a coherent national market rather than a fragmented market for educational software. So we are trying to work toward that goal. The multiplicity of platforms issue in consultation we believe can be grappled with in the next generation of hardware acquisitions by our educational institutions. By providing an array of high quality software, hardware decisions can be made more obvious and more coherent.

The industrial strategy also means that the products we develop, particularly those in an optical environment, should be designed to be used in two fundamental ways. The first use, of course, would be that of random search. This would give people the opportunity to wander through the databases, image banks, and textual materials in any way that they see fit. By providing downloading capacities, people could download whatever information they wish from, for example, a disk on ecology and environment, to create their own courseware and lessonware from it. In the consultations we have with provinces, this, too, is perceived as an attractive idea. The concept is to create a fairly broad product and to provide an appropriate downloading capacity so courseware and lessonware can be created.

A second way of addressing the marketplace would be to have that same optical product accompanied by guidance systems for the techno-peasants in this world, like myself, who are not computer literate. Each optical disk could be accompanied by guidance systems on floppy disks so that you could have a national product with a specific guidance system for Ontario, a specific one for Alberta, another specifically for Quebec. The same generic product with a special add-on could suit the curriculum needs of each educational jurisdiction. This would provide another way for the provinces and the territories to participate in this project, not only in the development of specific products on provinces and regions, but in the development of the guidance systems which suit their specific curriculum needs. These two approaches should make it possible to market modular products developed under the umbrella of Jean Talon across the country, and to allow them to be used in the various jurisdictions in flexible ways.

The Jean Talon concept, we believe, has value. This conviction is attested to by the interest expressed by various Canadians and by organizations outside of Canada. We have been examining a variety of products developed outside of the country and we are dealing with a number of government departments and agencies abroad, including, for example, the Commission of European Communities. The Commission has expressed interest in our concept because it faces problems similar to our own. It is trying to develop various types of products for the European marketplace. It deals with 12 national communities, we deal with 12 curriculum jurisdictions. Its problems, of course, are immensely more complicated than ours, in that, for example, there are 8 major language groups in Europe. However, there are sufficient similarities to prompt the Commission to share with us a great deal of information, which it has done, and to have access to the research that we are doing. One of the things that we are exploring together is the possibility of an agreement on some standards and functionalities to help provide access to Jean Talon products to those involved in Canadian studies outside Canada. We would not in any way create a new standard or a new set of specifications, but attempt to make the same sorts of choices as we move down the road toward the development of these types of ideas. We believe, and they do as well, that there is something in this of real significance for producers: Canadians wishing to market materials abroad; and Europeans who would be interested in marketing materials here.

I should open a parenthesis, I suppose, and explain that Canadian studies is a large and growing enterprise in Europe. There are in Europe a variety of associations and organizations devoted to the study of this country. There are several thousand academics, for example, who are doing research and teaching on Canada. For example, forty of forty-four German Universities present Canadian studies offerings. There are institutes for Canadian studies of growing size and importance in Europe. In short, there is a market developing there, and that is just at the university level.

In 1984 and again in 1986, the Council of Europe held European-wide conferences on "teaching about Canada in the secondary schools of Western Europe", and those conferences were very heavily subscribed to and very well attended. There has been a growth of interest in European schools ever since. Another indication of interest is a program run by the Ontario government which is a series of Summer Seminars in Canadian Studies for European Educators. Traditionally Ontario receives anywhere from 10 to 12 applicants for each seminar position available. These are seminars for which participants must pay a fee and they must pay their airfares from Europe to get here. Despite this interest, however, one of the impediments to the development of Canadian studies in Europe has been the difficulty Europeans have, gaining access to Canadian materials. We hear complaints from European academics who say it takes anywhere from six to eight months to get books from Canada. That is unacceptable both from their point of view, and from ours, especially those of us interested in seeing Canadian studies advanced abroad. We want to reach some fundamental agreements, not only with the European Commission but with others, so that educational products, particularly using optical-disk technologies, are developed in a basically compatible fashion to open markets for Canadian firms.

This has been a very brief overview of what the Jean Talon Project is about. After the film, I will talk about the research we have done and which is available to you on request. The film is available in French as well. Copies are obtainable on a loan basis from the Jean Talon Secretariat.

Now that you have seen the idea presented visually I must tell you that it is wonderful to dream dreams, it is lovely to have visions, but it is also important to try to root these in reality. In addition to talking about what might be possible, we have been trying to test our ideas. As a consequence we have undertaken a number of studies. These are available on request from our office.

First of all, a feasibility study was done about a year and a half ago, funded by ten organizations from three provinces and the federal government. While slightly out of date, given subsequent work, this study provides a useful view of the early basic thinking done on the concept. In addition we have done a "User Needs Study". It has two components, essentially a fairly extensive literature review, and a survey of people in ministries of education and school boards, teachers and archivists, librarians and people in the education software industry. It was done to determine appropriate content, problems in terms of software development, problems from the point of view of hardware, and price sensitivities in the education marketplace. As well, we currently have underway a series of case studies on electronic publishing. This is being done in cooperation with the Canadian Workplace Automation Research Centre and the Interdepartmental Working Group on Database Industry Support. These case studies look at issues like copyright, licensing, and cost recovery, which will inevitably arise from the realization of the Project. It is important for

us to draw attention to, and to contribute to solutions to as many of those problems as we can. Obviously the future will reveal what is feasible in this respect.

Another study which could be described as a Workplan Study is also currently underway. It takes into account the research and the consultations done to date and will describe how the Jean Talon will unfold over the course of the next decade. Obviously it will address the appropriate starting point for the project, how marketing ought to be done, how to come to grips with the diversity of platforms that exist at the moment, when in the evolution of the market we can move completely over to the optical environment, what the costs of modules will be, and what some of the copyright implications of access to specific content are.

A further study underway is testing multimedia products currently available. It includes products from Canada, from the United States and from Europe. We are examining the sophistication of interface software, various types of navigational software that have been developed, the strength of the platforms used, and the diversity of platforms chosen. In short, we are attempting, through all this research, to be able to say at the end of the day that what we propose is grounded firmly in a realistic view of what can be accomplished. It is nice to dream dreams, but the challenge is to ensure that what we ultimately propose to the government and to the private sector, is viable.

In conclusion, I will highlight a few points made in the literature review portion of our user needs survey. The literature review looked at a number of issues: the use of non-broadcast educational media in Canada; the adoption of computer technology in education in Canada, in the United States and in Europe; multimedia in education today; the kinds of projects that have been undertaken and realized; multimedia technology trends; and considerations for multimedia productions in Canada. Some conclusions which can be drawn from the study, particularly in terms of Canadian education, are as follows: there is a strongly expressed need for high quality Canadian film and video material in most curriculum areas, but especially in social studies, science and language arts; acquisition budgets have not kept pace with inflation or with the needs of the educational system; there is often a lack of expertise amongst personnel responsible for decision-making in AV acquisition areas; the fragmentation of the Canadian market means that most products do not recover their production costs (this is especially true of French language productions and those geared to curriculum needs in smaller school markets); public subsidy appears to be necessary in most cases, in order for AV materials to be produced in Canada; video, especially VHS, appears to be the format of choice (but our user survey shows that there is an openness to the notion of moving into the next generation of technologies); the length and presentation of materials has to correspond to classroom requirements for various age levels; and so on. These are things I am sure you suspect, but we have attempted to confirm them.

The User Needs Study was also an attempt to get feedback from the marketplace, and it is a very important document for our purposes. I will just extract a few notes from the executive summary which I think are pertinent for this seminar. Geography-based information, and products describing science and technology, were the highest rated among the topics specified in the interview protocol. Sixty-five percent of interviewees indicated that their organizations would use these potential products. They noted as well, that well-designed quality products, on specific topics and themes, of the sort identified in our protocol, should find a receptive market among Canadian educators. Respondents strongly supported products that offer broad coverage of topic areas, coverage of provincial or regional content especially emerges a strong market consideration. In our view this does not suggest separate products for each jurisdiction, rather it indicates that the data provided

in each product should provide ample coverage of alternative viewpoints and regional concerns. The nature of the Jean Talon proposal also suggests that the data should cover and extend far beyond the curricula of Canada's elementary and secondary school systems. Respondents in all jurisdictions clearly expect the Jean Talon idea should be tailored to curriculum; they expect the product to be designed so that users can easily train themselves to access and manipulate the data. These expectations point to markets for complementary products which exploit the Jean Talon information bases for the development of courseware and lessonware by downloading, as earlier noted.

Software design is extremely important we have been told. Users should be able to access data easily, so the interface should be sufficiently straightforward that users can quickly become proficient in the use of the product. That aspect is particularly noteworthy because of the very high importance attached by respondents to the use of the Jean Talon products by individual students. Jean Talon products would be heavily used in terms of individualized instruction, according to our survey. One of the things that heartened us was the consultant's conclusion that respondents strongly support the concept advanced by the Jean Talon Project. Evidence for this is found not only in the summary of discussions presented in the report, but also in the willingness of people to participate in the study itself. The interview meetings lasted, typically, several hours, so it was a commitment of people's time. As well material was sent in advance for them to read. While the largest market may exist in education, support for Jean Talon was strong among representatives of other key markets as well: librarians, curators and archivists.

For this seminar, one key conclusion from our research is that there is a receptivity to products using new technologies in Canadian education, and in other related markets. Secondly, geographically-focussed products were very high on the preference list. Price sensitivities were not as daunting as we had suspected. Respondents were saying that if the content is rich and solid, if the pedagogic strategies underpinning the products are appropriate, then people will make the investments necessary to access Jean Talon products. Another important point for us, and I suspect for all of you, is that people said very clearly that Jean Talon would only be viable if there was a long-term commitment to it, that is if the provincial and the federal governments were willing to sustain the effort. The common view is that all too often people come up with wonderful initiatives and announce them with great panache, then let them die several years later. A sustained effort is critical. To have that sustained effort we have to establish good strong working relationships, not only with departments and agencies of both federal and provincial governments, but with industry. We believe that we are on to something here, but we can only make Jean Talon a reality if visionary ideas are translated into practical and concrete strategies. And those strategies must involve a very close working relationship between the private sector and government. Thank you very much for your time.

SUMMARY

BY

RICHARD GROOT

Ladies and Gentlemen, before we get to the next very important agenda item, namely to listen to you, to your reactions, to your comments, and your recommendations, I would like to take a few minutes of your time to say something about what our position is. First of all, we've been in the national atlas business for a long time and atlas information has found its way into numerous publications such as encyclopedias, and hosts of school atlases, commercial atlases nationally as well internationally. It is also being used within the government for all sorts of policy and operational purposes, so you might ask "why this seminar?" Well in essence, this seminar is about what we can do and what needs to be done to promote the broadest possible use of the information we hold. Why this seminar at this time? We believe that this broad objective can probably be helped enormously by exploiting the new technologies, as well as the entrepreneurial competence of the conventional and emerging electronic publishers. We have seen examples of this today, we have seen it in the way we present our seminar papers using various media, we have seen it in the very exciting presentation by Louise Guay with the multi-media model produced with the National Atlas.

Secondly, we believe that there is a changing attitude in Government, the phenomenal concern that we are sitting on a wealth of information that is quite underutilized, which should be used through the entrepreneurial capacity of the private sector, to create new markets, to exploit them using our information. And we will do whatever we can to help you have access to the information and to give you advice on the quality of the information and so on. So we are looking to you, the private sector, for ideas. This is what this seminar is about.

The seminar is really an exploration. This is the time to raise the issues as you see them. What you see as the barriers. We probably will not have answers to all of them but we will certainly take note of the issues you raise, we will take your recommendations to heart and I assure you that within a very short time, together with the record of this meeting, which we hope will be published in the two languages of Canada in March, can come back to you with some answers to the issues that you raised and certainly with some action as to how we want to go about involving you through the process of invitations for proposals for some of the products that have been identified. Joan Winearls specifically confirmed what the National Advisory Committee had also identified, that there is a real need for a reasonably compact, up-to-date atlas of Canada of broad public appeal. I would like to leave it with that, Professor Symons, and invite you all to comment and come forth with your suggestions. Thank you.

QUESTIONS AND ANSWERS

Question: Mr. Carl Sonnen

My name is Carl Sonnen and I'm with a company called Informetrica. We're in the economic research business, and we have an interest in what you're doing because we have to look through you I think to get the spatial geographical context of what we try to do. So that is my interest. I'm tempted to talk about the policy issue of government information as a public good, but instead I want to approach you with some important questions in the spirit of the question: "okay private sector can you get involved in this?" I have two classes of questions: At this point it seems to me that there's a strategic question on both your side and my side, in that we have to have some idea of where you're going to be four or five or six or seven years down the road. I don't think you can answer today in full detail where you think you are going to be, but you can treat this as a recommendation or you can treat it as a question - Is the government guided by its own requirements for automating data? If not, what kind of institutional environment is being set up to provide the guides for where you're going, what information you are going to put in. You provided us kindly a piece of information that said here's what's in the system right now, and there were some asterisks that said this is what's there, but there were a lot of empty boxes in there. For me to decide from the point of view of my firm whether I get a little bit closer to this, I need to know when the boxes fill up so to speak and what kind of institutional environment is going to be set up to guide it. I suppose this comes close to a public policy comment, but if the government is guided by its own requirements for automating data then it seems to me, that the price issue will in a sense be a false issue, the real issue is control. Or it's a question of cost, and if this is being done anyway by the government of Canada for its own interest, then it seems to me, it should be fully funded by general tax revenues as is the case for everything else that I know of, except information. Or are there new rules of the game here. So that's the question. Given some decision about how costs are covered, than what are the rules for relations between the federal government, and private sectors and I want to emphasize the word sectors when I talk about the private side?

In the policy directive you talk about joint ventures. Now I don't know what your sense of joint ventures is but I look at that and I say, does that joint venture mean that there are exclusive arrangements between the government of Canada and its private associates? If so, how are you going to handle the question of monopolies and monopolization on the market? On the second point, copyright, I think it's not enough to say that you're going to follow copyright principles, you're going to have to get down to some very nitty-gritty questions. The newspaper each day reports data that's produced by Statistics Canada and they don't have to pay anything to the government of Canada for the reproduction of that. It's adding some value. If I have a database that I've picked up from Statistics Canada, or I've picked up from you, and I put it out and I put a very minor piece of value added on it, what happens with respect to copyright reinforcement? Where are the lines on value added? More generally, I guess the question is: What are the property rules? But you're going to have to be very careful with that question because I can see people coming through the NAIS system if it's in machine readable form to get data at a very different price than

you'd get it from Statistics Canada when it disseminates it. And a lot of information I see and hear you have comes from Statistics Canada.

Also I want to understand the rules of the game about how you expect to treat the different user classes. By which I mean, "do you treat them differently", for example: as between Academia, Not For Profit organizations, and For Private Organizations. I think probably the issue must be pretty clear to you, but there are people in Academia who, working through institutes, compete with For Profit people. Now there may be a reason to provide information to Academia so that we get our identity sorted out, so that we get all those things that are dear to the Chairman sorted out, but how do you put those walls in place, and there are a lot of Not For Profit organizations that pay their people a lot and getting closer to where you're going to go. I want to thank you for the opportunity, and I especially want to thank you for the fact that I find out that on the 28th of February we're going to get to some of these issues at the public policy level. Thank you.

Remark: Professor Thomas Symons

Thank you Carl. Those are some very pithy comments, and some very searching questions. Richard, do you care to comment on them, (laughter) ... strange. I don't think you would be expected to have answers on all of them, but you can do what you can.

Answer: Mr. Richard Groot

Carl and I have worked four months very intensively together, and we've batted around some of these issues, when we were on the same side on the Nielson Task Force. Now we're on opposite sides. Let me first try to answer the question, where do you expect to be, let us say in 1995? As I said earlier, we have been in business for a long time, there is a lot of information available, the fifth edition contains now in the order of sixty subjects, maps that is, in both official languages. There is a lot of open file material available, and this is reflected in the inventory. Most of it is hard copy, but it doesn't preclude the use of electronic technology because hard copy things can be scanned, can be digitized, and can be done many things with. Thus, the application of new technology is not inhibited, it's not the most efficient way of doing it, but certainly it is not inhibiting the user of this material in a modern environment. That's the first point.

It leads me to the second point: when will we have a database? The question really is: When will we have the information complete to put in a database? And that leads me back to the completion of the fifth edition which is scheduled for 1992. So, by the Fall of 1992 we will have a little over a hundred subjects that will be ready to be put in a database. Subsequent mapping of national scale and in digital form will be done in cooperation with other departments according to policy issue priorities, and things like that. So the mapping will go on and it will add to the database. Our timing horizon is therefore going to be somewhat beyond 1992 in digital form for the content of the fifth edition of the National Atlas. Until that time, you'll have to work with the hard copy material, with the exception of the one to seven and a half million base and the one to two million base, which contains a lot of good information which will be available much sooner and are enormously useful for many value added applications. I hope that by 1995 the technology really is mature and that we are completely in a database building and database maintenance mode. Meaning that the classification standards for these will be in place, that the digital standards for these will be in place, that our relationships with other departments will have matured to take account of and exploit the digital environment. So this is how we see the longer term and

what the scheduling roughly is going to be if we maintain the staff, and the funding that we have now.

To your second question, about copyright principles, where are these lines of value added use that are subject to royalty arrangements. That is a very difficult area which we try to keep as uncomplicated as possible in practice. I do not know how to do that in all cases. I recently heard a comment on this which said that enforcing copyright in a digital environment is like enforcing copyright on word of mouth communication. Yet we presently have to do it. It is an issue that we will have to study very carefully, that we will have to monitor as we go along while keeping the prime objectives in mind, i.e. how do we bring the information out, and how do we avoid creating information monopolies. I believe these are two key principles that we have to keep in mind. Within those principles we can work and evolve.

Exclusive arrangements have always been made. We published the Canada Gazetteer Atlas in 1980, and we published the fourth edition of the National Atlas in 1974. Readers Digest came with a proposal to us to publish a popular atlas of Canada which indeed has been enormously successful. They used our material from the Canada Gazetteer Atlas somewhat modified. They also used thematic information from the fourth edition and thus an atlas of broad public appeal for forty dollars, selling well over a hundred thousand copies was created out of our information. We had an arrangement with Reader's Digest for that to take place. Reader's Digest had to make a large investment in it which we had to respect for a certain period of time and this was reflected in exclusive use of the information until their atlas was on the market. There were also royalties, for the government of Canada in respect of its copyright. If you want to call that an exclusive arrangement well that is what an exclusive arrangement is, and I fully expect that this will happen in the future as well. But by and large, our information is, within the constraints of the copyright act, in the public domain.

The third point with respect to the user classes I understand the position you take. I am very sympathetic to it, and I am not sure really how to respond to it. Whether it is fair to a company such as yours which is in the value added business, that a university for its research, which is also a form of value added, should get an advantage in the acquisition of the information over a company that contributes to the economy of Canada. I feel that these are complicated questions of principle that we certainly in a digital environment, have not addressed yet. But I am very pleased that you have raised them. I assure you that we will pay serious attention to them and try to come to some conclusion, so that we can be clear about our position. I hope that I have answered your questions, Carl.

Remark: Professor Thomas Symons

Thank you. I wonder Mark, if you might add some comments. I think this is an area in which you have some helpful knowledge, would you.

Comment: Mr. Mark Corey

We've just spent the last 6 months dealing with our lawyer here at Energy, Mines and Resources over a lot of questions regarding copyright and digital data, what actually the copyright allows, what we are allowed to do and what we are not allowed to do. It is a very complex area but I think that there are some general guidelines that are starting to come down across the government right now. If I could tell you just a bit about our own

emerging philosophy. First of all, well, we will always want to do projects that will require us to work very closely with companies. It's been pointed out to us that we are going to get into a lot of trouble if we allow either the exclusive or sole rights to any data set with a certain company, in terms of competition, particularly in an area where we have an awful lot of small companies in the digital data business. I think the philosophy you are going to find in general, and particularly where we've done a lot of detailed work with the topographic map series, most of the sales will be non-exclusive, although we will be wanting to work with companies to develop specific projects requiring large and continuous databases. That keeps an open market and everybody has the same opportunity to participate in it. In dealing with special cases like universities, again I think we recognize that there are a lot of problems if you start giving major discounts to a university who then uses the information to compete with a private sector company. At the same time, universities do have certain training needs, and we would like to promote the use of our data with people coming through the university system. So what we've decided we'd do is set up a special demonstration tapes, a number of demonstration tapes, for example, where we would say, O.K. this is a particular data set, to be made available at the cost of reproduction, and we'll give you this tape, and you can work with it, you can see the general principles, you can train your people in it, over and above that, if you want to go out and get a whole bunch of other data covering other areas, that will be made available to you but at the same price that everybody else pays, so that everyone is on an equal footing. I think that would be another general principle that we would want to put in. In terms of the conditions of sale, again we see ourselves trying to keep it as simple as we can, and simplifying it down to two types of people that we'd sell to. One would be the end user, that's the easiest one to handle under the Copyright Act, because they're not going to be reproducing it in digital or computer readable form to give it to anybody else, so that's easy, and we will be able to move into that very, very quickly. We're already doing that, to a certain extent on what we call a research and development basis, which is basically test marketing the data, for example, of the national topographical database. The part that's more difficult is when you get into value added, applications which is really important to us, to get industry to work with us on this stuff. What we're saying is under the Copyright Act we will try to simplify this, we'll act in good faith and we will set up terms and conditions where we will work with a company so that they can sell to their own end users. Now if their end users then take the information and the package they've got, they start reproducing it and reselling it, wholesale, at half of what your selling it for, that's not in your best interests, that's not in our best interests, that's the point at which you and we can both look at enforcing the provisions of the Copyright Act. Quite honestly, we really don't intend to do an awful lot of enforcing, we think would be a mistake, we want to keep it as simple as we can, enforcement should be minimal and it should be aimed only at those few very blatant cases, where people come in and say, I'm going to take your data, I'm going to set up a company over here on Carling Avenue and I'm going to start reproducing your files, and selling them as your files at half the price of what you people are selling them for. I think it's only in a very blatant case like that, that you'd ever look at enforcing copyright. Over and above that, very good points on the actual details, that's the kind of stuff we've been working with our lawyers with, over six months now and I think we will continue to work closely. We want minimal administration and maximal use of the information. We just deal in good faith with these things under the Copyright Act.

Remark: Professor Thomas Symons

Thank you Mark.

Question: Mr. Bob Madill

Thanks, my name is Bob Madill and I'm with Tydac Technologies. Those of you who don't know us, a brief word that we're a supplier of a geographic information system package called SPANS. First I'd like to express our strong support for the program, the National Atlas Program. Dick, I think your people do a good job and it's a very valuable contribution to Canada. Learning about Canada I think is singularly important these days. I also express our appreciation for the work that's gone into this seminar. It is one of the few times that I can remember having an opportunity to actually work and talk together about some pretty difficult and complicated issues, so congratulations on that. There are really two issues that I think are important, that warrant some discussion or at least a response. I think one of the issues is this integrated issue of data cost and data dissemination, and the second on our part deals with the future on the Mark III Electronic Atlas package which has been developed for internal purposes in EMR.

Our company is part of a growing industry, the geographic information system industry and to a large degree the economic viability and growth of our industry is dependent upon the availability of data and the ability for us to provide both the data and software to third party entrepreneurs, who will in their own turn, sell data and their own applications to end users. So Mark, here's a situation where I'm not terribly interested in suing the fellow who's going on making money off what I'm providing him, and it may be that in fact what's happening here in terms of dealing with the realities of an on-going operation that you faced, Dick, within your group, that we have National Atlas data being treated essentially as fiscal, or of budgetary importance, other than as a substantial economic good in it's own right. And I wonder if the government truly understands the substantial repressive economic impact of limiting our ability to reproduce and price data. I really don't think so and I suspect that with all due respect to Treasury Board, it's fiscal issues that may preoccupy them around the economic long-term issues to an industry. I think that merits some further attention. Our suggestion would be quite frankly that data be made available by the government at the marginal cost or some reasonable proximity thereof, of reproduction, and from then on allow the purchaser to treat the data as its own good, and to conduct its business as it sees fit. Now in making so bold a suggestion, I realize that I don't fully understand all of the business of the publishing industry and so forth, so as I say, this is an area for discussion.

The second issue for us involves the future of the, and I'm using my own words here, the GIS prototype software known as the Electronic Atlas Mark III; that's been developed internally within the National Atlas program. And if I understand correctly EMR is interested in some sort of a joint venture to commercialize this particular software package. Now if that means an eventual tender, for example, the purpose of which is to pick one company that will be exclusively funded to improve or enhance this particular package to make it operational, than I think we have some very severe reservations. And if I can, Mark I was really attracted to your analogy of the flour and baking, I thought that was really quite appropriate. It seems to me that the government would be then essentially financing and establishing a new baker that would then compete as a subsidized member with an existing successful baking community. That really doesn't appeal to us a whole lot. So I think you probably get the point there. And the other aspect of that issue in dealing with prototypes is very simple, and we would hope that senior members of government fully understand that. Really, in the absence of off-the-shelf private sector offers, the purposes of these development prototype exercise, in fact, is to show proof of concept.

Remark: Professor Thomas Symons

Thank you sir. Richard, a quick comment, and perhaps would you, Mark too?

Answer: Mr. Richard Groot

Well, Bob let me start by thanking you for your very kind words of appreciation for the work that we are doing. And, certainly I appreciate your support for the program, and what you have said about this seminar. I think I'll limit myself to the comments you have made on the Mark III package, and then I believe it would be up to Mark Corey to address some of the other issues dealing with the data dissemination and the data availability. You are quite correct - Mark III or Mark I, the predecessor of Mark III, was a pilot project which was designed and created to serve our purposes at the time when there were no commercial packages available that fulfilled our requirements. And also, at the time, there were a number of companies around who focussed primarily on the GIS side whereas we wanted to focus more on the electronic cartography side, which provides a functionality that supports the cognitive interaction of a reader with maps.

So we designed the prototype with three objectives in mind, first of all to demonstrate to our department what the technology can do, in the context of using out National Atlas information in an electronic environment, and secondly, and thirdly to serve as a training tool and to help us formulate better what the functional requirements of the future would be. The system was completed in its elementary state and met those objectives in 1981 and 1982 and we learned a lot from that. Much to our chagrin, however, we felt that the private sector continued on the track of the quantitative analytical GIS side and paid very little attention to the cartographic side, so we decided to move on with our research, to continue developing this package. So here we are, 1990, and in March we expect to reach a benchmark. At that time we will have also formulated our future expectations of systems of this kind. We will indeed invite private sector companies to have a look at it, to see what they want to pick up, but we are not going to fund anybody. If anything they'll have to buy it from us. So, there will be no exclusive funding of any company to further develop it. We also are not prepared to deal with a company if they do not want to develop it to meet our future specifications. This is where the situation rests. So, with that I would like to ask Mark to address some of the issues that Bob raised on data availability, and data dissemination.

Comment: Mr. Mark Corey

I know for example, Bob, that Julio Maffini has done a paper dealing with whether you treat data as a fiscal or whether you deal with it as an economic matter. There's been an awful lot of debate on this. I guess in the last few years not just specifically to this, but across government regarding user pay, the general concept being that if you can introduce at least a small element of user pay it helps people to sharpen the focus of what they really need from government. If you'll allow me, this just reminds me of the story of the economics professor who went into Mac's Milk to buy some milk and, in all due respect Professor Symons, he was an economics professor, and he saw one of his young economics students working behind the counter and, he said to the young fellow behind the counter, now I've got this milk, I'm going to prove to you that it would be economically irrational of you to charge me for this milk, not to allow me to leave with it. The student said, now how does that work? Well, he said, milk makes you healthy, it increases your

health and improves your health, and it's in the public good that you give me this because I can take this milk home, give it to my family and we'll all be much healthier, as a result, if everyone did this, health care costs would decline, taxes would decline, your employer would then have much greater profit margin, he'd have more money, and he'd probably give you a raise. It would be irrational of you not to give me this milk, and he said, you should know all this by the way because over the past month I've been lecturing on the public good - you should understand these concepts. The student thought for a minute, and said, well, if you walk out the door with the milk without paying I'll just simply phone the police. I think you'll find their strict adherence to the user-pay principle which you taught last month. So, it's interesting while the debates do go on I think we have to be very pragmatic about it. Basically, government is saying that if you're selling services, you have to recover increasing amounts of the cost of providing this service. Now I don't think anybody would say that the cost of reproducing a tape, it's basically a tiny fraction of what it cost to produce that data. On the other hand, I'm sure that we will never go anywhere further than recovering but a fraction of what it cost to produce that data. We have no intention of doing that. I think what the government is telling us to do is to make sure that we have an economic indicator from the users that this is an important service, basically by making sure that people are, at least contributing marginally to it, and I that's all we intend to do. Other than that, as I say, I think we'll come down much more on the American side of the thing. We will try to keep the cost as low as we can. It is our intent to generate the maximum sales possible. I think that's really the principle.

Remark: Professor Thomas Symons

Thank you Mark. Your anecdote reminds me of the notion that the term, professor of economics, is really a contradiction in terms. Would you be kind enough to speak and to introduce yourselves.

Question: Professor Fraser Taylor

Thank you Professor Symons. I'm Fraser Taylor, Carleton University, I'm wearing two hats here today. One hat is a Canadian interest in this field, the other is I have the honour to be president of the International Cartographic Association and I see what all sixty-three of our competitors world-wide are doing in this field on an on-going basis. I found the seminar so far extremely interesting and very valuable. It raises a number of questions in my mind, some of which relate to where we stand internationally in this business. I'm interested in knowing as far as NAIS is concerned the relative balance between the provision of a geographic database from which products can be built and the maintenance and creation of on-going new products by the federal government of Canada. For example the National Atlas of Canada up until now has been a product. It is a product which would not have been produced by the private sector because when you cost it out in terms of straight costs and direct returns in an economic sense, it wouldn't make a great deal of fiscal sense for any company to produce it because the company would have gone broke a long time ago. Now as we move into the electronic era, I think it is important that we provide a database which allows a variety of value added products to be made, but I think it's also important for Canada as a nation to continue to think about the production of an electronic atlas in new formats to complement and supplement the work we've been doing in published form. So that's a question in terms of policy directions.

My second concern lies in looking at what happens on the international front. The Canadian market is fragmented, Canadian industry is fragmented, Canadian academia is fragmented, our political system is fragmented. These are the realities. Now, as we move into thinking about value added products by the private sector, if we have too many players in the game then the reality I think is that the unit price of what we do is going to be driven up by definition of our realities and our own markets, and we will find that when we try to begin to sell Canadian products in the international market, as inevitably we will have to do as, our own market is too small, then we may begin to suffer from a situation where some excellent Canadian ideas price themselves out of the market because our competitors seem to be a great deal more organized than we are in terms of consortia, in terms of that lovely word 'offsets'. In order to arrive at a contract in the geographic information process field I find many foreign governments offering as offsets things like railway tracks, scholarships and a variety of other packages. If in my view we are to make a go of all this business and to compete internationally, then we will somehow have to find new mechanisms of cooperation, not just between the federal government, the provincial government and private industry, but also involving the Canadian academic sector and the major challenge in this field may well not be technological at all, but organizational and functional in terms of how we bring this about. I don't know how we'll achieve that, but I firmly believe if we do not achieve it that we'll go through exactly what happened the last time we became enamoured of geographic information processing. I'm old enough to remember the first generation of geographic information processing in Canada in the 1970s and I get a terrible sense of déjà vu. Technology is different, the arguments are the same. Thank you.

Remark: Professor Thomas Symons

Thank you very much Mr. Taylor. I wonder if I could simply suggest that we receive those comments, they're immensely helpful. I don't think I want to impose on you to respond Dick. They're important points to be noted and pondered. Yes Sir?

Comment: Mr. Grafton Ross

I'm Grafton Ross from the Geography Division of Statistics Canada. First of all, I'd like to thank Mark Corey for his kind acknowledgement of our plan regarding demonstration data sets and tape files which we do provide, not only to the academic sector, but also to vendors who are interested in proving systems, and demonstrating systems to end users. We provide those at the cost of processing the file and no cost for the data themselves. It has been our policy within our division to avoid exclusive contracts with vendors and I think that this issue will come to the fore with our new initiative that we are taking called Castor which is a system of distributed street network file updates where again we will be going to private industry to develop software for that.

There are couple of other issues, one which was touched on which was acquiring Statistics Canada data through the NAIS system, at vastly different costs than it would be from Statistics Canada directly. I think this is a key issue of speaking with one voice, not only between departments, but even within divisions in the same department, and this is an issue I think we really must address.

Another question which was brought to my attention over lunch was how do we treat people equally when we are faced with a situation where you have an industry with very few large players and many small players. To treat those players equally in terms of setting one equal price to all means that only the big players can enter and the smaller players are

shut out. I don't really have an answer for any of those issues, but I'd like to put them on the table.

Remark: Professor Thomas Symons

Thank you Mr. Ross. Again, if we may simply take on board your concerns. Yes Sir?

Comment: Mr. Victor Glickman

I'm Victor Glickman, I'm Director of the Geography Division of Statistics Canada. I'd like to make a little introduction from where my comments come. Before I had this job, for several years I was responsible for the Ontario Region's Statistics Canada and as Jim Page mentioned earlier, it was in my early days that I thought geographic information was broadly cast, and very important to the future of the country, that I got involved with the idea about Jean Talon project. And so I'd like to throw some ideas onto the table. One of the challenges I saw in the Jean Talon project, one of the challenges I saw in the Province of Ontario, was the need for a network, not service alone, and I'm very impressed with today's symposium on the basis that the Jean Talon project, the National Atlas Information Service are on the same stage and the different presentations that have gone on during the day represent something that I've had a small impression of. We have a wonderful, fruitful, creative country doing all kinds of marvellous things in the area of cartography, geo-cartography, information systems, and the interdepartmental committee that Mr. Marsh chairs, and private sector interactions that we have. The opportunity for us in this country is to marshall that network of people. One of the ideas that Jim Page posed in his description was under the umbrella of modular, and I think it's very important for us in the evolution of our national and provincial products to understand the word modular to mean partnerships. The word modular to mean that all people can opt into national systems. Now clearly the technology is a wall and a bridge, but we really have to look at how Statistics Canada or Energy, Mines and Resources, or the educational authority in Alberta, when they're producing their products can look for added value together with modular concepts in a network in Canada. These are difficult things because the divisions in this country are known from every aspect, and one doesn't have to repeat it, but they also provide the opportunity by challenging each other to look for the networks.

Dans les deux langues nous avons les occasions aussi, dans le contexte de la profession d'enseignement.

One idea that I've seen in my other experiences - there is a limited number of teacher's colleges in this country. In the next ten or fifteen years, thirty or forty percent of the teachers in Canada are going to be trained. One of the priorities I think we have to consider and debate in the public and private sector is how we're going to introduce the 21st century's world of information in geographic information in a broadly cast fashion into that part of our society. It's not just a question of platforms and it's not just a question of material, we have to get educators up to speed to be able to deal with the products and ideas we've talked about today and in the future. Jim in his comments talked about the pedagogic process. We've got to empower teachers to have confidence in the kind of tools we're offering them. The average teacher in my anecdotal world thinks they are too busy, have too much material, they're in a competitive situation, and our ideas and products are just one more competing for their attention. And, I think that to have a multiplier effect in our society, we have to reach in to those colleges of education across this country and find out how we're going to deal with them.

In many ways I've heard today in the Jean Talon project, in the National Atlas, Mr. Sonnen, and other speakers about value added. I think the whole nature of the opportunity that attracted me to geographic information, what attracted me to the Doomsday project, which has attracted me to the National Atlas and the Jean Talon project is that added value is the key. I mean my personal experience, is that no one wants any one product in the 1990s. They want to integrate products and have added value. The economic forces of the information industry are value added. The interdepartmental committee is looking at databases, are looking at it from a value added perspective. And I think it's very important for us to be able to step back and work with the private sector and other sectors to look at the value added concept.

I have one final small plea. In the material that existed in the Doomsday project, one of the issues that was very important to them which I think should be very important to Canadians is access by people in remote areas of this country to the wealth of our information databases. And what was attractive, when Jim Page and I stood on the stage in Vancouver about a year and a half ago was that we had people from remote communities in British Columbia saying that because they were attracted to the ideas like the National Atlas or like the Jean Talon project Canadians could get access to information and feel part of the country cause they couldn't afford to have a library, they couldn't afford to have the telephone line cost to get information. And in the English experience one of the claims that the producer of the Doomsday system put forward was, that this may be the first time that information was ever accessible to people in the United Kingdom in open public fashion. And I think that's also a challenge within the world of geographic information as we're getting better at it, the technology opens doors, we've got to ensure that it's a democratic opening and that people that don't have the skills and the technology have access to these national resources. Thank you.

Remark: Professor Thomas Symons

Thank you very much Mr. Glickman. I'm particularly going to treasure and reflect on your exhortation that we must get academics up to speed, I'm sure you're correct. Mr. Groot would like just a very brief comment and then Sir, to you.

Comment: Mr. Richard Groot

I'd like to comment on the question: How do we pull all these wonderful ideas in Canada together? What can be done to focus the marketplace? Well, government is not going to do that. We can't, we are not good at focusing on any marketplace. We are looking to the private sector. But what is this private sector, can we be a bit more specific about this? We started with the conventional publishing companies. Do you know how many conventional publishing companies are here? I think three. Who are all these other people? Well, I can tell you who they are. They are representing small and large companies that have a very particular competence in a part of the technology. Some have a competence to pull it together. Louise Guay's company, you have seen it, they have a competence to put it together similarly Rachel McAfee's. My suggestion is that if we come out in early March with the request for a proposal for an atlas of Canada, that you must form up consortia. There is no way around it. I do not believe for a moment that in this room there is one company that can deal with a complex project like that on its own in the electronic environment. You will need a combination of the technology, you need marketing expertise and you have to pull it together in that way. That is how I believe you can focus

on the market. And then, from that I think many other market niches will evolve. But I firmly believe that in government we are absolutely no good in focusing on markets and that it's got to be the private sector.

Remark: Professor Thomas Symons

Thank you Richard. Yes Sir, please.

Comment: Mr. Peter Lowry

It's my pleasure to agree absolutely with what Richard just said. My name is Peter Lowry and I'm in the cookie business. You ain't in the flour business gentlemen. My company is CD-ROM Publishing Service. Basically, I consult for people. A lot of people don't understand what I do because of the very new nature of this business, but I do a lot of consulting. I say, you've got something you want to get from here to there and CD-ROM might be the medium that might help you do it. That's when I get involved. I can't help NAIS with what I've heard today, because you haven't told me anything, I'm sorry. I love what Louise Guay does, I've been watching that for two years. I mean we've got to look at things in terms of 'Hey that's a quality and a direction and a capability that exists'. If I got up and showed you what we're really doing now in CD-ROM, you'd say, 'Kind of boring, fellow', but it sells, it works. You know, I look at the Jean Talon project and you know, I think it's wonderful; everyone should have a hobby, the Canadian government is going to have the Jean Talon project. I sat and listened quietly to the Jean Talon project today, and heard some very interesting comments about the library market and maps. That was important for me to hear it, but it wasn't about the market. It had nothing to do with marketing. Nor did what I heard about the education market have anything to do with marketing to the education market, because there was no marketing information imparted. And I'm sorry ladies and gentlemen, you have to be a marketing person to interpret that type of information once you get it. But now this is reality. You're saying 'let's market this product', okay let's talk pricing. I did a paper last year that upset a few people, Mary Francis can tell you all about it. Interdepartmental Working Group On Database Industry Support - it was the worst thing that ever happened to the database industry in Canada, but you know, they put out a paper on licensing government databases. I gave them a response that was bigger than their paper, and you know what? I'm very happy, Mary Francis, with the result, because what they did, they said Oops, Peter's giving us a hard time again, and so they watered it down, they made it totally innocuous, it's a very good political paper now, how can I complain about it? Except it's immaterial and irrelevant. Because what we've got to do is to say, 'Government, stop interfering in the information market in Canada' because that's the real problem. Your pricing? What does the market price it at, not you! There are some things where exclusivity is necessary. There are other things where exclusivity is absolutely against the needs of the people of Canada. It depends on the nature of the information that you're trying to impart. I mean to give exclusivity to publish a map of Canada, that's ridiculous. But, where there's a lot of value added, there might be exclusivity. It's like the question of crown copyright. Crown copyright's an irrelevant issue, except the words Crown Copyright are separate from the word Copyright. I am one of the greatest advocates of copyright, I am one of the greatest

detractors of crown copyright because crown copyright is layered over normal copyright law, and that is the problem. You've got two layers instead of just one that it should be.

Remark: Professor Thomas Symons

Thank you Mr. Lowry. Did you wish to comment, Mark? No! Are there other comments or questions, they'd be most welcome of course? -- Perhaps what we might do is conclude; there are refreshments. None of the hosts are going to rush off, and I think they'll be very happy to continue to chat with anyone that wishes. Richard, can I ask you if you would offer some summary thoughts and then I'll just say a word of conclusion.

Comment: Mr. Richard Groot

Thank you, Tom. I shall be very short. As I said earlier the overall objective of the seminar is to promote the broadest possible use of NAIS information and to do so legally and fairly. To use the technology in a practical way as a tool to achieve this and to rely on the private sector to use its entrepreneurial capacity to develop products that require our information. Our job will be to make it easy for you and to expedite meeting your information needs. What we have heard is very simply that the information is needed, for libraries, the education system and for many, many other purposes.

The objective included to put you in the picture of the kind of information we have and how you can get it. We gave you a telephone number and you can phone for details of our information holdings. Please write us what specific information you want, what you intend to do with it, and how we can help you, and we'll respond efficiently.

But there was a second part to our objectives. As I said earlier, the electronic publishing industry has to get together with the conventional publishing industry who have a lot of marketing expertise. So the second objective of this seminar was to let the industry get acquainted. There are sixty of you, all with different expertises. I hope you have taken the opportunity to get to know one another, to take note of one another's expertise so that you can form new alliances to meet the markets that we feel are out there for our information and for derived products of our information and particularly for our information in new media.

Our third objective was to educate government officials. The National Atlas is probably the best kept secret in Ottawa. We have invited many officials, about forty percent of the attendance are officials from government departments, to make them aware of our new direction as a National Atlas Information Service. We have given you an idea of our time frame, what we have and that we are here to help you. That is even statutory in some cases.

Have we been successful? Well, time will tell. Certainly some very important issues have been raised in the discussions particularly with respect to the conditions under which information may be made available and used. This is a matter we need to come to grips with. Some of you, have said this has been very useful and that you want to reflect on it and want to receive the report in March and that you will be on the lookout for any RFP's that will go out. So, we'll see what happens. One thing is certain we look really towards the private sector for ideas to the broader use of this information. And I can assure you that we will respond.

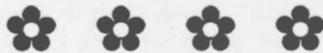
We have listened to very inspiring presentations. Tom Symons has given a wonderful exposé on the importance of National Atlas Information and also put beautifully the opportunities of the new technology. We heard about our inventory which I find a very useful and fine report by Microstar. I hope you will find it too. I have to thank Mark Corey for his impromptu session on pricing of information. Joan Winearls gave a fine, practical, down-to-earth paper on the libraries' need for maps and mapping services, and we are going to listen very carefully to what she had to say. Louise Guay gave a wonderful presentation on what the technology can do. And it should be, I think, an inspiration to explore the opportunities offered by multimedia communications. Jim Page gave his view in the much larger context of the Jean Talon project. Clearly the action is now with us first of all to bring out the record of this seminar and secondly to prepare the requests for proposals for the specific products for which we have conclusive evidence exists a significant market. Meanwhile we are open for business for anyone wanting national atlas information.

So it has been an exciting day. I've had very interesting conversations and I would like to close by thanking first of all Professor Symons for the gracious way in which he has chaired this session. Secondly, I wish to thank the National Atlas Advisory Committee for the support I have received from them and to let them know how pleased I am that they're here. Thirdly, an event like this does not get organized by itself. I have an absolutely wonderful staff: Dan Mackay and Brian Cromie, organized the day. Lloyd Bowler was the man who put the displays together. Bob Medaglia developed the content of our Electronic Atlas and gave his demos. And last but very importantly, Denise Patry as the secretary to this group did yeoman's work. Thank you all, it has been a productive day, and I would like now to hand it back to you Tom to close the session.

Conclusion: Professor Thomas Symons

You will be pleased to know, Ladies and Gentlemen, that I have by way of conclusion a deeply moving forty minute address. Unfortunately I can't read my notes. So let me simply say the few things that one would want to say at the close of an interesting and worthwhile day like this. I want to thank again your speakers, Peter Jordan, Doctor Louise Guay, Joan Winearls, and James Page. And also with them, for their particular contribution, Mr. Hugh O'Donnell, Mr. John MacDougall, and Mark Corey. I want as well to express the thanks that I think all of us feel to Richard Groot for his leadership and care in planning today and for the enthusiasm and commitment with which he comes at a most difficult and challenging task. Thank you. Ladies and Gentlemen, thank you for participating. There are refreshments outside, and good conversation. The meeting is adjourned.

BIOGRAPHICAL SKETCHES



RÉSUMÉS BIOGRAPHIQUES

PROFESSOR THOMAS H.B. SYMONS

Thomas H.B. Symons, the Vanier Professor at Trent University, is a teacher and writer in the field of Canadian studies, contemporary intellectual and cultural issues, and international academic and cultural relations. He is the author of To Know Ourselves, the Report of the Commission on Canadian Studies, and of numerous studies and articles dealing with education, public affairs, human rights, and international relations.

Educated at the University of Toronto and at Oxford and Harvard Universities, Professor Symons was the Founding President of Trent University and served as its president and vice-chancellor from 1961 to 1972. He has served subsequently as Chairman of the Commission on Canadian Studies, Chairman of the Commission on French Language Education in Ontario, and Chairman of the Ontario Human Rights Commission. He mediated the disputes concerning French language school arrangements in Sturgeon Falls, 1971, and in Cornwall, 1973, and was chairman of the Federal-Provincial Task Force on Canadian Ratification of the United Nations Covenants on Human Rights in 1975.

Professor Symons has served as Vice-President of the Social Sciences and Humanities Research Council of Canada and as special adviser to the Secretary of State on post-secondary education. A member of the Applebaum-Hébert Committee to review federal cultural policy, he has long been actively involved with the arts, helping with the work of a wide range of voluntary community and national cultural organizations and serving as a member of both the Canada Council (1976-1979) and the Ontario Arts Council (1974-1976). He is currently Chairman of the Historic Sites and Monuments Board of Canada, of the National Statistics Council, of the National Library Advisory Board, and of the Advisory Committee on the National Atlas of Canada. In 1987-1988, he chaired the Canadian Polar Research Commission Study.

Professor Symons has also taken an active part in international cultural and academic relations. The author of a number of papers on cultural diplomacy and international affairs, he is a past chairman of the Association of Commonwealth Universities and of the International Board of United World Colleges.

In recognition of his work in the fields of education, culture, human rights, and international affairs, Professor Symons has been elected a Fellow of the Royal Society of Canada and awarded honorary degrees by twelve Canadian universities and colleges. He was appointed an officer of the Order of Canada in 1976. In 1985, the University of Colombo conferred on him the degree of Doctor of Letters in recognition of "outstanding service to human rights and higher education throughout the Commonwealth". In 1988, he was elected to an Honorary Fellowship by Oriel College, Oxford University.

In 1982, Professor Symons received the Distinguished Service to Education Award of the Council for the Advancement and Support of Education. The Award, which is intended to recognize service of national and international significance to education, has been made annually since 1941 by the Council, an organization representing 2,300 universities and colleges in the United States, Canada, Europe and South America. Professor Symons is the first Canadian to receive this Award.

PROFESSEUR THOMAS H.B. SYMONS

Thomas H.B. Symons, professeur titulaire de la chaire Vanier de l'Université Trent, est un spécialiste en Études canadiennes et en relations internationales, tant au niveau académique que culturel. Il est l'auteur de To Know Ourselves, le rapport de la Commission des Études canadiennes, et de nombreux articles et études portant sur l'éducation, les affaires publiques, les droits de la personne et les relations internationales.

Diplômé des Universités de Toronto, d'Oxford et d'Harvard, le professeur Symons fut le président fondateur de l'Université Trent, poste qu'il occupa de concert avec celui de vice-chancelier de 1961 à 1972. Nommé successivement président de la Commission des Études canadiennes, président de la Commission ontarienne de l'éducation en langue française, et président de la Commission des droits de la personne, il a arbitré les différends existant à propos des dispositions sur les écoles de langue française à Sturgeon Falls, en 1971, et à Cornwall en 1973. De même, en tant que président du Groupe de travail spécial fédéral/provincial sur la ratification de la convention des Nations Unies des droits de la personne par le Canada en 1975.

Le professeur Symons a été vice-président du Conseil canadien de la recherche en Sciences sociales et en Sciences humaines, et Conseiller particulier auprès du Secrétariat d'État à l'éducation post-secondaire. Membre du comité Applebaum-Hébert chargé du rapport d'enquête sur la politique culturelle fédérale, il s'est beaucoup impliqué dans la vie artistique en apportant une aide multiple au travail de plusieurs communautés et organisations culturelles nationales, et aussi en tant que membre à la fois du Conseil du Canada (1976-1979) et du Conseil ontarien des Arts (1974-1976). Il est à l'heure actuelle président du Conseil des monuments et sites historiques du Canada, du Conseil national de statistiques, du Conseil consultatif de la Bibliothèque nationale et du Comité consultatif de l'Atlas National du Canada. En 1987-1988, il a présidé la Commission d'enquête sur la recherche polaire canadienne.

Le professeur Symons a aussi pris une part active dans les relations internationales culturelles et académiques. Auteur de plusieurs articles sur les affaires internationales, la diplomatie et la culture, il fut l'un des présidents de l'Association des Universités du Commonwealth et du Conseil international des collèges du monde unis.

En reconnaissance de son travail dans les domaines de l'éducation, de la culture, des droits de la personne, et des affaires internationales, le professeur Symons a été élu membre de la Société royale du Canada, et s'est vu décerner des diplômes honorifiques par douze universités et collèges canadiens. Après avoir été nommé Officer de l'Ordre du Canada en 1976, il a reçu de l'Université de Colombo le titre de docteur en lettres en 1985, pour sa "contribution exceptionnelle aux droits de la personne et en faveur d'une meilleure éducation à travers le Commonwealth". En 1988, il a été élu membre honoraire du Collège Oriel de l'Université Oxford.

En 1982, le professeur Symons a reçu le prix du Service distingué pour l'éducation décerné par le Conseil pour l'avancement et le soutien à l'éducation. Ce prix, attribué chaque année depuis 1941 pour récompenser les services rendus à l'éducation nationale et internationale, est offert par le Conseil pour l'avancement et le soutien à l'éducation, une organisation représentant 2300 universités et collèges aux États-Unis, au Canada, en Europe et en Amérique du Sud. Le professeur Symons est le premier Canadien à recevoir ce prix.

PETER G. JORDAN

Peter G. Jordan is the founder and president of Microstar Software Ltd. He graduated from the University of Waterloo in 1968 and holds a B.A. Sc. degree in Chemical Engineering.

His career has been varied and includes both private and public sector experience. In the private sector, Mr. Jordan was an Operations Researcher for Dupont and INCO. In the public sector he was responsible for automating the processing of Canada's largest annual census operation.

Mr. Jordan founded Microstar in 1983. The company initially provided personal computer software for the videotex industry. Currently, Microstar is heavily involved in many aspects of the graphics and communications industries including ISDN.

PETER G. JORDAN

Peter G. Jordan est le fondateur et président de la compagnie de logiciels Microstar Software Ltd. Diplômé de l'Université de Waterloo en 1968, il détient un B.Sc. en Génie chimique.

Sa carrière diversifiée inclut des expériences de travail aussi bien dans le secteur public que privé. Dans le secteur privé, M. Jordan a fait de la recherche opérationnelle chez Dupont et INCO. Dans le secteur public, il a été responsable de l'automatisation du traitement du plus important recensement annuel canadien.

M. Jordan a fondé Microstar en 1983. La compagnie a initialement proposé des logiciels pour ordinateur personnel à l'industrie du vidéotexte. À l'heure actuelle, Microstar est un des participants importants des affaires dans l'industrie de la communication et du graphisme, en particulier au niveau de l'I.S.D.N.

JOAN WINEARLS

Ms. Winearls has a B.A. in Modern History and Master of Library Science from the University of Toronto. She was responsible for setting up the Map Library at the University of Toronto where she has been Map Librarian ever since. She is a founding member of the Association of Canadian Map Libraries and Archives. She has held many positions in the Association and is currently chairing the Canadian Committee on Bibliographic Control for Cartographic Materials which is actively pursuing the creation of a national bibliography of Canadian maps and atlases.

Ms. Winearls taught the first regular course in Map Librarianship in Canada at the Faculty of Library Science, University of Toronto. She is currently completing a major research work on the bibliography of early maps of Ontario 1780-1867 which will be published in about a year.

She has written many articles in the area of map librarianship and in historical cartography.

She is the recipient of a number of awards including the ACMLA Honours Award in 1987, the Toronto Historical Board Award of Merit in 1984 and the Faculty of Library and Information Science Distinguished Graduate Award in 1989.

JOAN WINEARLS

Madame Winearls détient un Baccalauréat en Histoire contemporaine et une Maîtrise en Bibliothéconomie de l'Université de Toronto. Elle a été chargée de la mise en place de la cartotheque de l'Université de Toronto où elle exerce depuis lors la profession de cartothecaire. Membre fondateur de l'Association des bibliothèques et archives cartographiques du Canada, elle a occupé de nombreux postes au sein de l'Association et préside présentement le Comité canadien sur le contrôle bibliographique des matériaux cartographiques, qui est responsable de la création d'une bibliographie nationale des cartes et atlas canadiens.

Mme Winearls a enseigné le premier cours de "cartothéconomie" au Canada donné à la faculté des Sciences bibliothécaires de l'Université de Toronto. À l'heure actuelle, elle est en train de déterminer un travail de recherche significatif à savoir une bibliographie des premières cartes de l'Ontario (1780-1867) devant être publiée dans approximativement une année.

Mme Winearls a rédigé de nombreux articles dans le domaine de la "cartothéconomie" et sur les bibliographies de cartes historiques.

Mme Winearls s'est vue attribuée un grand nombre de récompenses incluant la mention honorifique de l'ABACC en 1987, le Toronto Historical Board Award of Merit en 1984, et le Information Science Distinguished Graduate Award en 1989.

LOUISE GUAY

Madame Louise Guay est la présidente de Productions YYIATS, une firme basée à Montréal qu'elle a créée en 1986 dans le but d'élaborer des systèmes multi et hypermédia. La compagnie s'est déjà taillée une bonne réputation dans les mondes artistique, culturel et scientifique grâce à sa définition d'interfaces, et à ses activités dans la télévision interactive, le vidéotex, la cartographie, la R & D et l'enseignement assisté par ordinateur.

Pendant qu'elle achevait son doctorat en Communications multimédia à l'Université de Paris VI, elle a créé le Musée de poche, un prototype de vidéodisque conçu comme un livre d'histoire interactif dont l'art constitue la matière première. Sa thèse de doctorat, présentée sous la forme d'un vidéodisque, a été la première du genre. Introduit à la Biennale de Venise (1986), le Musée de poche a été exposé depuis lors à de nombreuses occasions en France et au Canada.

Un autre projet, le Musée numérique d'architecture, a été commandé en 1988 par le Centre canadien d'architecture, et sert de guide numérique interactif aux visiteurs conduits à travers le nouveau musée de l'architecture par une simulation. Sa carte CD-ROM Carte Intelligente de la Francophonie, un tour interactif du monde francophone, a été présentée à l'Expotec de 1989. Cette même année, le Dr Guay a lancé le Profil Glenn Gould Profile, un projet bilingue dont l'objectif est de prouver le potentiel des hypertextes/hypermédia dans les domaines de l'art et de la critique, à l'École des Beaux-Arts de Banff. Elle travaille à l'heure actuelle sur l'Atlas national du Canada.

Le Dr. Guay a aussi effectué des études de faisabilité au sein du complexe des arts médiatiques à Banff, qui portent sur l'outil de gestion destiné à conserver des archives provenant du Centre d'art. Cette même étude a été menée pour la Télé-vidéothèque de Montréal, la première télé-vidéothèque commerciale au monde. L'étude susmentionnée a été conçue en vue de renouveler le concept de vidéothèque et de l'incorporer dans le contexte vidéotex canadien (câble, fibres optiques et satellite).

Invitée à prendre la parole au cours de nombreuses conférences, y compris l'Exposition internationale canadienne et la Conférence sur la communication visuelle à Toronto (1988), en 1989, le Dr. Guay a été envoyée par l'A.C.D.I. au Venezuela. Sa mission consistait à faire valoir l'expertise canadienne dans le domaine de technologie avancée.

Considérée comme une experte en la matière, le Dr. Guay est passée à la télévision (réseaux C.B.C et T.V.A.) et sur les ondes de la radio. Elle a aussi enseigné dans différents collèges à travers le Québec, et a été nommée au sein du Comité consultatif du Canada sur les média intégrés.

LOUISE GUAY

Louise Guay is president of YYIATS Productions, a Montréal firm she created in 1986 to develop multi and hyper-media systems. The company has already made a name for itself in artistic, cultural and scientific circles for its design of interfaces, interactive television, videotex, mapping, R & D and computer-assisted education.

While working toward her Ph.D. in multimedia communications at the University of Paris 6, she created the *Musée de poche*, an interactive videodisk designed as a prototype for an interactive book on history, using works of art as the source material. Her doctoral thesis was the first ever to be submitted as a videodisk. Presented at the 1986 Venice Biennial, the *Musée de poche* has been shown extensively in France and Canada as well.

Another project, the *Musée Numérique d'Architecture* was commissioned in 1988 by the Canadian Centre for Architecture as an interactive system-guide to introduce visitors to the new architectural museum through simulation. Her CD-ROM *Carte Intelligente de la Francophonie*, an interactive tour of the French-speaking world, was first presented at Expotec 1989. The same year, Dr. Guay launched her *Profile Glenn Gould Profile*, a bilingual project demonstrating the potential of hypertext/hypermedia in the field of arts and criticism, at the Banff Centre School of Fine Arts. It has since been shown in Montréal, Toronto and Tokyo. She is now working on the *National Atlas of Canada*.

Dr. Guay has also carried out feasibility studies on a management tool for the media arts complex in Banff to store the Arts Centre's archives and for the Télé-vidéothèque de Montréal, the world's first commercial tele-videotheque. This study was designed to renew the videotheque concept and incorporate it in a Canadian videotex context (cable, fibre optics and satellite).

Dr. Guay has been an invited speaker at a number of conferences, including the 1988 Canadian/International Exposition and Conference for Visual Communications in Toronto, and, in 1989, was sent to Venezuela by CIDA in an official capacity to sell Canadian expertise in advanced technologies.

As an authority in the field, she has appeared on the French network of C.B.C. television, TVA, and on radio and has taught in Quebec colleges. In 1989, she was named to the Canada Council's advisory committee on integrated media.

JAMES E. PAGE

JAMES E. PAGE

RICHARD GIBBY

James Page is Acting Director-General, Education Support Branch, Department of the Secretary of State of Canada, and is responsible for the Jean Talon Project. In 1984-89 he was Director of Canadian Studies at the same department. He has worked extensively abroad on education and Canadian studies, in Europe, Africa, India, Australia, and the Far East. In 1977-86 he was a member of the management board of the International Council for Adult Education. In 1973-86 he was a member of the Commission on Canadian Studies. He has been a consultant to the Science Council of Canada, the National Film Board, Ontario Education Communications Authority, and the Ontario Institute for Studies in Education. In 1981-83, he was the founding president of the International Council for Canadian Studies. In 1977-82, he was the president of the Association of Canadian Studies.

He is the author of numerous articles, reviews, and reports. His publications include: "Canadian studies in community colleges", 1973; "Seeing ourselves", 1979; "A Canadian context for science education", 1979; "Seeing Canada", 1980; "Reflections on the Symons Report: the state of Canadian studies in 1980", 1981. He co-authored with Professor T.H.B. Symons "Some questions of balance: human resources, higher education and Canadian studies", 1984. He was a contributor to "To know ourselves: the report of the Commission on Canadian Studies", 1976, authored by Professor Symons.

JAMES E. PAGE

James Page est le directeur-général par intérim en titre de la Division d'aide à l'éducation du Ministère du Secrétariat d'État du Canada, et est le responsable du projet Jean Talon. Entre 1984 et 1989, il fut directeur des Études canadiennes au sein de ce même ministère. Il a travaillé de manière intensive dans l'éducation et les Études canadiennes, en Europe, en Afrique, en Inde, en Australie et au Moyen-orient. De 1977 à 1986, il fut membre du conseil d'administration du Conseil international de l'éducation aux adultes. Membre de la Commission des Études canadiennes de 1973 à 1986, il a été consultant auprès du Conseil canadien de la science, de l'Office national du film, du Bureau ontarien des communications éducatives, et de l'Institut ontarien des études en éducation. De 1981 à 1983, il a été le président fondateur du Conseil international des Études canadiennes. Entre 1977 et 1982, il fut aussi le président de l'Association des Études canadiennes.

Il est l'auteur de nombreux articles, études et rapports. Ses publications comprennent: "Canadian studies in community colleges", 1973; "Seeing ourselves", 1979; "A Canadian context for science education", 1979; "Seeing Canada", 1980; "Reflexions on the Symons Report : the state of Canadian studies in 1980", 1981. Il est le co-auteur avec le professeur T.H.B. Symons "Some questions of balance : human resources, higher education and Canadian studies", 1984. Il fait partie de ceux qui ont contribué à la publication de "To know ourselves : the report of the Commission on Canadian studies", 1976, par le professeur Symons.

RICHARD GROOT

Richard Groot has worked in EMR as Director, Topographical Survey of Canada and as Director, Geographical Services Division since 1977. In 1984, he co-chaired the Major Surveys Study Team of the Ministerial Taskforce on Program Review, and from 1986 to 1988 he was on an executive assignment to the International Institute for Aerospace Surveys and Earth Sciences (ITC). As Chairman of its Department of Aerospace Data Acquisition and Photogrammetry, he initiated the creation of the ITC - Geoinformatics Department. Following his return to Canada in November 1988, he resumed his duties as Director, Geographical Services to formulate and implement the policy on the National Atlas Information Service and the Canadian Aeronautical Charts Information Service. He has a MSc in Geodesy of the Technical University of Delft in the Netherlands and was elected Membre d'honneur de la Société de géographie de Paris in 1983.

PROFILS DES ENTREPRISES

RICHARD R. GROOT

Richard Groot a travaillé à Énergie, Mines et Ressources aux postes de directeur des Levés topographiques du Canada, et de directeur de la Division du service de géographie depuis 1977. En 1984, il a co-présidé l'équipe d'étude des levés du groupe de travail ministériel spécial chargé d'évaluer le programme, et il a été de 1986 à 1988 chargé d'une mission auprès de l'Institut international des relevés aérospatiaux et des sciences de la terre (I.T.C.). En tant que directeur de la Division de l'acquisition aérospatiale des données et photogrammétrie, il fut à l'origine de la création du Département de géoinformatique de l'I.T.C. Après son retour au Canada en novembre 1988, il a repris ses activités en tant que directeur de la Division du service de géographie en formulant et en accomplissant la directive politique du Service d'information de l'Atlas national et de Service canadien d'information des cartes aéronautiques. Il détient une Maîtrise en Géodésie de l'Université technologique de Delft (Hollande), et a été élu Membre d'honneur de la Société de géographie de Paris en 1983.

MONROVIA LIMITED
 220 Centre Street West
 Suite 901
 Ottawa, Ontario
 K1P 1Z4
 Telephone: (613) 941-4141
 Fax: (613) 941-4141

The Monrovia Group comprises Monrovia Limited and associated companies and affiliates in Canada, the United States and abroad. The Group's origin dates back to 1907. Today, the group employs about 2,000 people and provides a broad range of engineering and project management services. Annual revenue is approximately \$1.1 billion. Computer services represent about 370 million of this revenue and include the provision of computerized mapping and navigation services to various industries, most notably in the United States.

COMPANY PROFILES

MICROSTAR SOFTWARE LIMITED
 54 Columbia Road N.
 Suite 100
 Nepean, Ontario
 K2B 7J4
 Telephone: (613) 727-5600
 Fax: (613) 727-9451



MICROSTAR is a full service company specializing in microcomputer and video to mainframe solutions for our clients. The company has special expertise in the areas of graphics, communications and data encryption.

The company has extensive consulting and product development experience in applied video technology. As the industry leader in the use of personal computers in video,

PROFILS DES ENTREPRISES

SANETEARBY WYODE INC.
 Box 928, W.S.
 Dominion City
 N2A 1T0
 Telephone: (613) 727-5600
 Fax: (613) 727-9451

MONENCO LIMITED

220 Laurier Avenue West
 Suite 800
 Ottawa, Ontario
 K1P 5Z9
 Telephone: (613) 236-4478
 Fax: (613) 563-9406

The Monenco Group comprises Monenco Limited and associated companies and affiliates in Canada, the United States and abroad. The Group's origin dates back to 1907. Today, the group employs some 2,000 persons and provides a broad range of engineering and project management services. Annual revenue is approximately \$110 million. Computer services generate some \$20 million of this revenue and include the provision of computerized mapping and conversion services to various utilities, most notably in the United States.

MICROSTAR SOFTWARE LIMITED

34 Colonnade Road N.
 Suite 100
 Nepean, Ontario
 K2E 7J6
 Telephone: (613) 727-5696
 Fax: (613) 727-9491

MICROSTAR is a full service company specializing in microcomputer and micro to mainframe solutions for our clients. The company has special expertise in the areas of graphics, communications and data encryption.

The company has extensive consulting and product development experience in applied videotex technology. As the industry leader in the use of personal computers in videotex, Microstar is highly qualified to develop or enhance your communications, public access, host data base or frame creation product.

SANCTUARY WOODS INC.

Box 923, R.R. 2
 Dunrobin, Ontario
 KOA 1T0
 Telephone: (613) 592-9784
 Fax: (613) 592-9724

Sanctuary Woods Inc. is a Certified Apple Developer specializing in Interactive MultiMedia, based on the Macintosh computer platform. The company combines all forms of information, including text, graphics, photographs, video, animation, sound and music, into attractive, user-friendly models. Sanctuary Woods has created a wide range of presentation and training models for clients like Bell-Northern Research, the Canadian Hydrographic Service, Peat Marwick and the National Research Council. In cooperation with the National Atlas Information Service, the company created the "34th Parliament of Canada HyperCard Models" which are now being used by businesses and government agencies to track the affairs of Parliament.

YYIATS PRODUCTIONS INC.

1205, rue Papineau
Bureau 351
Montréal, Quebec
H2K 4R2
Telephone: (514) 599-5710
Fax: (514) 599-5729

YYIATS was founded in 1986 as a production house for multi and hypermedia systems. The systems are called multi because they combine media - audio, video and information processing - and hyper because all the media form a coherent network of interrelated associations and connections.

YYIATS remains a step ahead in publishing with its optical memory. With its interactive audiovisual programs, YYIATS produces data bases linked with image banks. YYIATS is a specialist in "L'imatique et la Visionique" (information processing and images). We have proven our commercial and industrial expertise in feasibility studies on management tools and our Multi Media Expert System (MMES). Although we are still a young company, we are known in artistic, cultural and scientific circles for our design of interfaces, interactive television, videotex, mapping, R&D and CAE (computer-assisted education).

YYIATS is proud of its dynamic team of engineers, ergonomists, computer scientists, designers and cognicians and their fine work. YYIATS has mastered the art and science of software production and is now planning to design operating systems and research software.

MICROMEDIA LIMITED

165 Hôtel de Ville
Hull, Quebec
J8X 3X2
Telephone: (819) 770-9928
Fax: (819) 770-9265

Micromedia Limited is a Canadian company active in a number of areas including Micropublishing, Book and Database Publishing, Online Information Services, Corporate Information and Research Services, and the provision of research and Intellectual Property documentation through our Technical Information Centre. Through our MICROLOG Service we bring Canadian government and research documents to a worldwide body of users. We produce the CANADIAN BUSINESS AND CURRENT AFFAIRS online database and printed indexes as subsets, as well as other key reference materials. We are the exclusive Canadian representatives for Dialog Information Services and the Canadian affiliate for the worldwide SVP network, as well as the official agent for the Ontario Securities Commission and Canadian Patent Office. Our CanCorp services include document delivery of corporate reports, as well as financial and directory database services. Our Ottawa-based Technical Information Centre offers online retrieval, document delivery and research services to the sci-tech community in Canada. Our newest endeavours include the publishing and distribution of Canadian information databases on CD-ROM.

IDON CORPORATION

875 Carling Avenue
 Ottawa, Ontario
 K1S 2E9
 Telephone: (613) 722-8101
 Fax: (613) 722-2991

IDON Corporation is a privately owned Canadian corporation which specializes in research and development, contracted product development, consulting, and information resource services in information technology engineering systems and software.

Current projects include the development of a coding system for electronic maps and charts and of a CD ROM based digital chart of the world, the development of a Blissymbol telephone for the non-speaking, severely disabled, the specification and design of a new videotex information retrieval/transactional service, and the development of a network based groupware software package.

The principals and staff of IDON have over a hundred years collective experience in senior positions in federal and provincial government departments and research and development centres, in educational institutions, and in high-technology private sector R&D and manufacturing companies. IDON was incorporated in Ontario in 1983 and has a staff of twenty.

TERRALOGIC SYSTEMS INC.

One, First Canadian Place
 Suite 5900
 Toronto, Ontario
 M5X 1K2
 Telephone: (416) 368-0384
 Fax: (416) 367-3316

Terralogic Systems Inc. (TSI) is a new Canadian company which has just commenced operation in the areas of:

- preparation and conversion of digital maps, and
- the development of geographic information (terralogic) systems

Its principals have several decades of experience in real estate, planning, mapping, computer and telecommunications systems. Through the application of new technology, TSI expects to be a leader in the delivery of high function, commercial terralogic systems and information utilities.

THE READER'S DIGEST ASSOCIATION (CANADA) LIMITED

215 Redfern
 Montréal, Quebec
 H3Z 2V9
 Telephone: (514) 934-0751
 Fax: (514) 932-3637

Reader's Digest has been a major force in Canadian publishing since the 1940s. Its French-language edition, Sélection du Reader's Digest, began publishing in 1947, followed seven months later by the English-Canadian edition.

Today, the two magazines have a combined circulation of 1,597,942 copies and are the largest paid-circulation publications in their respective languages. Reader's Digest is also a major Canadian publisher and marketer of books, music, videos and other home entertainment products.

Reader's Digest employs 594 people in Canada directly and provides work for a further 1100 indirectly. In addition to its head office and other premises in Montréal, the Digest maintains offices in Toronto and Ottawa, and a warehouse operation in Brampton, Ontario.

OPTIM CORPORATION

338 Somerset Street West
 Ottawa, Ontario
 K2P 0J9
 Telephone: (613) 232-3766
 Fax: (613) 232-8413

A Canadian-controlled company based in Ottawa, and incorporated in May of 1989, OPTIM Corporation is emerging as a leader in the Canadian CD-ROM industry. The company has a three-fold mandate:

1. To acquire, develop and publish intellectual properties on CD-ROM.
2. To provide hardware and software tools that allow clients to bring CD-ROM publishing in-house.
3. To act as a service bureau, providing CD-ROM publishing services to others.

The company is the Canadian distributor for Meridian Data Inc. equipment and Dataware technologies software, and its clients include major government departments and corporations.

MEMEX INFOTECH CORPORATION

81 Metcalfe Street
3rd Floor
Ottawa, Ontario
K1P 6K7
Telephone: (613) 233-9144
Fax: (613) 232-2235

Memex Infotech Corporation offers a full range of systems and services in support of integrated systems for professional use. Our emphasis is on fully-networked supermicro-based workstations: for example, the Macintosh II.

Our business has four mutually-reinforcing components:

- providing multi-vendor system solutions - hardware, software and custom applications;
- providing direct support to clients' use of information technology;
- providing service bureau support in information management and publishing; and,
- providing consulting in system design, implementation and use.

Our systems and services are of interest to organizations who gather, organize and maintain information as a corporate asset, or for sale and distribution. We specialize in the management of loosely-structured information repositories of text, data, images and graphics.

We provide end-to-end service. Memex can design and operate information systems on the client's behalf or we can provide complete service bureau support at Memex.

HORLER INFORMATION INC.

116 Albert Street, Suite 704
Ottawa, Ontario
K1P 5G3
Telephone: (613) 594-5155
Fax: (613) 594-8679

Founded in 1984, Horler Information Inc. is a consulting company specializing in the development and applications of remote sensing and geographic information systems (GIS).

The activities of Horler Information are grouped into four areas: technology management, on-line services, systems consulting and geographic information processing. Our technology management services are designed to facilitate the practical use of remote sensing and GIS, and include technology reviews, feasibility assessments, consulting on the establishment of facilities, equipment specification/procurement, project monitoring and project management. Horler Information's on-line services are centred on the Remote Sensing On-line Retrieval System (RESORS) of the Canada Centre for Remote Sensing for which we provide operation, maintenance and user services. Horler Information carries out systems consulting in the remote sensing and GIS fields through such services as requirements analysis, system design, software engineering, and training. Horler Information also provides value-added products and services by processing remotely sensed images and specializes in the digital transfer of information to GIS.

PIXEL PRODUCTIONS

322 King Street West
Toronto, Ontario
M5V 1J2
Telephone: (416) 591-9046
Fax: (416) 591-7476

Pixel Productions has been creating electronic visual materials for the educational/interactive environment for the past 6 years. Whether the delivery mechanism is a Television signal, a Public Access Terminal, an A/V presentation or an in-house computer system, Pixel provides full service from concept to finished product.

The company is noted for their highly effective training modules and exhibits. Their material is currently on view in Geneva, Switzerland, Australia, the USA and a number of public access locations in Canada.

Originally the company worked with NAPLPS/Telidon technology; Pixel has now developed its own PC based presentation and animation software, which can be seen in two new products:

- the StatsCan Reference Disc on CD ROM available from Statistics Canada;
- the Apprenticeship/Skills Program on diskette available from the Government Ministry of Skills Development.

STANLEY ASSOCIATES ENGINEERING LIMITED

2635-37th Avenue N.E.
Suite 230
Calgary, Alberta
T1Y 5V7
Telephone: (403) 291-2100
Fax: (403) 250-1308

Stanley Associates Engineering Limited was founded in 1954. The firm represents a major cornerstone of the Stanley Technology Group, representing various engineering technological and scientific operating companies whose services are available individually or in a coordinated total-service environment.

Stanley Associates Engineering Ltd. provides a variety of services for clients in industry, institutions and government. Our staff of engineers, scientists and project managers embrace the philosophy and principle of achieving a high level of quality in the services provided, while respecting the client's budgetary and time requirements. This philosophy allows us to deliver services which surpass client expectations. Our numerous awards for technical excellence and export of services, along with many unsolicited client commendations, are concrete evidence of the success of this approach.

RADIO NORD INC.

171, rue Jean-Proulx, C.P. 4010

Hull (Québec)

J8Z 1W5

Téléphone : (819) 770-1040

Télécopieur : (819) 770-0272

Monsieur Gaston Lavoie est Directeur général des opérations de Radio Nord Inc. dans l'Outaouais soit les stations CHOT-TV, CFGS-TV et Les Productions Marc Inc. Les stations CHOT-TV et CFGS-TV sont respectivement affiliées aux Réseaux TVA et Quatre-Saisons tandis que Les Productions Marc Inc. fournit des services de doublage de conception et de production audio et télévisuelle.

UNIVERSITY OF OTTAWA PRESS

University of Ottawa

603 Cumberland

Ottawa, Ontario

K1N 6N5

Telephone: (613) 564-2270

Fax: (613) 564-9100

The University of Ottawa Press was founded in 1936. Its mandate to publish the results of scholarly research in both English and French reflects the bilingual nature of its parent institution. The Press is a user of maps in its publications, and is interested in developing projects that involve geographical information and services.

SHIPTON, McDOUGALL MAUDE ASSOCIATES

Rosemary Shipton

28 Glen Oak Drive

Toronto, Ontario

M4E 1Y5

Telephone: (416) 690-2219

Mary McDougall Maude

44 Beverley Street

Toronto, Ontario

M5T 1X9

Telephone: (416) 977-3526

Fax: (416) 977-3526

Shipton, McDougall Maude Associates of Toronto offer a variety of publishing services including project planning and co-ordination, manuscript evaluation, cultural and historical research, writing and rewriting, structural and copy editing, and design and production. Clients include the federal government, the government of Ontario, scholarly and trade publishers, and individuals. Partners Mary McDougall Maude and Rosemary Shipton have experience with complicated publishing projects, such as the Canadian Encyclopedia and the Historical Atlas of Canada. They are consultants to Joan Winearls on Maps of Upper Canada, 1780-1867: An Annotated Bibliography of Manuscript and Printed Maps. In addition, they are developers and co-ordinators of a new Certificate Program in Publishing at Ryerson Polytechnical Institute.

PRECARN ASSOCIATES INC.

30 Colonnade Road
 Suite 300
 Nepean, Ontario
 K2E 7J6
 Telephone: (613) 727-9576
 Fax: (613) 727-5672

PRECARN is a unique initiative by Canadian industry to collectively address an important area of long-term research. The Corporation was formed three years ago as a consortium aimed at improving industrial competence in the field of "intelligent systems"; artificial intelligence, expert systems and robotics. The current membership of 35 corporations has representation from a broad mix of Canadian industrial activity, with the common thread being their appreciation of the importance of this technology to their future competitive position.

PRECARN's research projects make up a \$52 million research program, which includes a recent federal government award of \$23.8 million for its Institute for Robotics and Intelligent Systems (IRIS).

ACDS INC.

80 Jean-Proulx
 Hull, Quebec
 J8Z 1W2
 Telephone: (819) 770-9631
 Fax: (819) 770-9267

ACDS develops software products for computerized Graphic-based Information Management Systems. Since 1983 ACDS has provided Turnkey Solutions to the Geographic Information, Automated Mapping/Drafting and Facilities Design and Management fields. Sales and support is provided in the Ottawa/Hull, Montréal and Toronto branches. National and International distributorships also exist.

APPLE CANADA INC.

1255 Trans-Canadienne Ouest, #180
 Dorval, Quebec
 H9P 2V4
 Telephone: (514) 685-4210
 Fax: (514) 685-4217

Apple Canada Inc. is headquartered in Markham, Ontario with satellite offices in 10 cities across Canada. The company markets, distributes and services a comprehensive line of Apple products through a national network of 400 resellers and value-added resellers. The Apple product line includes the Apple II family of personal computers; Macintosh Plus, Macintosh SE, and Macintosh II personal computers; ImageWriter, and LaserWriter II family of desktop laser printers; the Apple Personal Modem and a wide variety of peripherals including storage devices, monitors, software, keyboards and networking products like AppleTalk and AppleTalk PC Card.

PRENTICE-HALL CANADA INC.

1870 Birchmount Road
 Scarborough, Ontario
 M1P 2J7
 Telephone: (416) 293-3621
 Fax: (416) 299-2529

Prentice-Hall Canada is an educational publisher, producing indigenous product for the Canadian school and university markets.

Ph.D. ASSOCIATES INC.

107 Fordwich Cr.
 Rexdale, Ontario
 M9W 2T6
 Telephone: (416) 736-5295
 Fax: (416) 665-9473

Ph.D. Associates Inc. has been specializing in scientific applications of computing for software design, instrument control and data analysis for 15 years.

This ranges from microcomputer-controlled data collection systems to the near real-time processing of satellite-sensed data.

Ph.D. currently has two projects underway in cooperation with the Ontario Centre for Excellence, Institute for Space and Terrestrial Science (ISTS). One is the design and implementation of an airborne, 256 channel, radiometer/microcomputer system for monitoring global atmospheric ozone conditions. The second is the Passive Upward-looking Microwave Atmospheric Sensor (PUMAS), a project to develop a ground-based, 10 channel, radiometer/microcomputer to provide profiles of temperature and measures of humidity and liquid water to monitor aircraft icing potential. Ph.D. Associates has supported the Atmospheric Environment Service over the past eight years in the development of the Brewer spectrophotometer, a ground-based device measuring ozone concentrations in a number of narrow spectral regions.

Some 25 Brewers world-wide contribute to the Brewer database maintained by Ph.D. Associates. Handling satellite, airborne and ground-based data led to our creation of the Geographic Analysis and Display System (GADS).

This powerful, Geographical Information System (GIS) is graphics-intensive, giving a user-friendly capability to create base maps for any geographical location, for use in presenting lat./long. tagged data in contoured, graphical format. Data manipulation is carried out through interactive, user-definable algorithms.

As demonstrated by these various projects, Ph.D. Associates' expertise in data processing, analysis and management, file, handling, system programming, software maintenance, operational support and instrumentation control is extensive.

GEOSTAT RESEARCH INC.

6-21 Champlain Avenue
 Ottawa, Ontario
 K1M 1E5
 Telephone: (613) 748-6609
 Fax: (613) 746-5671

Geostat Research Inc. is an Ottawa-based data management consulting and research firm which specializes in Statistical Analysis, Geographical Information Systems and Digital Mapping. We offer expertise in the following areas: Data Entry, Retrieval, and Management • Statistical and Mathematical Analysis • Time Series, Forecasting, and Systems Modelling • Decision Support and Mathematical Programming • Operations Research and Project Management • Statistical Quality Control • Applications Development • Geographical Information Systems • Digital Mapping, Atlases and Maps • Report Writing and Graphics. As a small firm, Geostat Research Inc. provides personalized bilingual advice and practical support services to clients in the private and public sectors.

INTERGRAPH CANADA LIMITED

2580 Matheson Blvd. E.
 Mississauga, Ontario
 L4W 4J1
 Telephone: (416) 625-2081
 Fax: (416) 625-6445

Intergraph Canada Ltd. provides complete hardware and software systems for GIS, Photogrammetry, Imaging, Cartography, Map Scanning, Survey Engineering, Energy Exploration & Production, and Utility AM/FM. As a supplier of integrated systems, we also provide a complete range of customer services including installation, training, project planning, and support for both hardware and software. Intergraph Canada has 275 employees in Canada, with offices from Victoria to Halifax. On a worldwide basis, Intergraph is recognized as the largest GIS vendor with fifty percent of the market including hardware, software and services.

GAGE EDUCATIONAL PUBLISHING COMPANY

164 Commander Blvd.
 Agincourt, Ontario
 M1S 3C7
 Telephone: (416) 293-8141
 Fax: (416) 293-9009

GAGE EDUCATIONAL PUBLISHING COMPANY is a division of CANADA PUBLISHING CORPORATION. Established in 1844, CPC is Canada's oldest publishing company. It is the parent company of Gage Educational Publishing Company and Gage Distribution Company, Macmillan of Canada, Diffulivre Inc., Gordon V. Thompson Music and Thompson Music Publishing, Global Press and L&K International Videotraining. GAGE EDUCATIONAL PUBLISHING COMPANY is a leading publisher of Elementary, High School, College and Professional and Reference books with head office and distribution centre located in Agincourt, Ontario, and representatives located across Canada.

DIGIMAP DATA SERVICES INC.

104 Charlton Blvd.
 Willowdale, Ontario
 M2M 1B9
 Telephone: (416) 250-7173
 Fax: (416) 250-7173

DigiMap Data Services Inc. is a software, data and consulting services company specializing in geographic information systems (GIS) and relational database management systems (RDBMS) for a wide variety of applications in both the private and public sectors. DigiMap products include desktop mapping software, digital map files and GIS application modules. DigiMap currently has over 400 digital map products including city maps for all urban centres across Canada, as well as a variety of topographic maps, boundary maps and point file maps covering such topics as postal codes, census tracts, and geo-political zones.

CD-ROM PUBLISHING SERVICE INC.

200 Consumers Road, Suite 200
 North York, Ontario
 M2J 4R4
 Telephone: (416) 756-4938
 Fax: (416) 491-8782

Peter Lowry is a leading authority on CD-ROM applications. His company provides applications planning and marketing planning for clients wishing to develop CD-ROM systems for internal use or for external sales. He is the former president and then chairman of Reteaco Inc., the company that pioneered compact disc read-only memory (CD-ROM) technology capabilities in Canada. He is chairman of the new Information Technology and Applications Group (Info-TAG) in Ottawa and is active on the Information Industry Council of CADAPSO.

INTERA KENTING

380 Hunt Club Road
 Ottawa, Ontario
 K1G 3N3
 Telephone: (613) 521-1630
 Fax: (613) 521-5913

Intera Kenting is a Division of Intera Corporation which provides engineering and technical services and products for a wide range of applications around the world.

These services include, remote sensing applications, airborne radar mapping, satellite image analysis systems development and use, nuclear and hazardous waste management, hydrology, petroleum exploration and engineering, weather modification programs, and environmental studies and risk analysis.

The Intera Kenting Division specializes in airborne geophysical surveys, geographic information services, remote sensing, resource development consulting and waste management.

Further enquiries may be directed to Garth Lawrence, general manager, Intera Kenting, 380 Hunt Club Road, Ottawa, Ontario.

IST - INDUSTRIAL LIFE-TECHNICAL SERVICES INC.

275 Sparks Street
Suite 800
Ottawa, Ontario
K1R 7X9
Telephone: (613) 238-7886
Fax: (613) 238-3315

INDUSTRIAL LIFE TECHNICAL SERVICES INC (IST) head office is in Montréal. Founded in 1975, its 700 employees specialize in management information systems design, development, installation and operation. The larger share of the client base is found at all levels of government and in large private organizations.

IST is known for storage of Statistics Canada data and distribution of CANSIM data via communications networks to nationwide users. IST is also the largest supplier of turnkey systems for Canadian healthcare institutions.

The Geographic Information Systems (GIS) group at Ottawa specializes in the marrying of all kinds of data into integrated GIS systems. IST has successfully integrated: natural feature maps of Canada, principal road and rail networks, over 26,000 named places, street maps of all major places, postal code boundaries, 1986 census Enumeration Area data for over two hundred demographic variables and the plotting of road networks using Global Positioning Satellites. The basic mapping platform used is MAPINFO, which runs on office PCs and Local Area Networks, thus making it affordable for all users.

THE LSE GROUP

444 Bay Street
Ottawa, Ontario
K1R 6A8
Telephone: (613) 233-2917
Fax: (613) 563-8067

The LSE Group is primarily involved with the marketing and distribution of demographic, census-based software applications. Government and industry clients utilize "PCensus" to conduct social, economic and political research while market research, trade area analysis and other types of consumer studies have become standard industry methods of utilizing our applications.

The LSE Group also provides field-based market research systems and compatible mapping software.

GEOMATICS INDUSTRY ASSOCIATION OF CANADA

66 Queen Street
 Suite 400
 Ottawa, Ontario
 K1P 5C6
 Telephone: (613) 232-8770
 Fax: (613) 235-9694

The business interests of leading Canadian firms offering surveying, mapping, remote sensing and geographical information processing products and services are represented by the Geomatics Industry Association of Canada (GIAC).

The Association was first formed in 1961, to represent the interests of Canadian aerial surveying and mapping firms under the name Canadian Association of Aerial Surveyors. In January 1988, the name was changed to Geomatics Industry Association of Canada, and the mandate was expanded to cover the whole geomatics sector, including the disciplines of aerial photography, cartography, control surveying, engineering surveying, geodesy, geophysical surveying, hydrography, land/geographic information processing, land surveying, mining surveying, photogrammetric mapping and remote sensing. With more than 60 Member Firms, GIAC is the only Canadian business association in this sector.

ON/Q CORPORATION

1405 Bishop
 Suite 101
 Montréal, Quebec
 H3G 2E4
 Telephone: (514) 842-1183
 Fax: (514) 842-1137

On/Q Corporation provides complete design and production services for interactive multimedia:

Consultation

Needs analysis
 Content analysis
 Instructional design
 Systems analysis
 Project management
 Creative services

- Creative concept
- Video production
- Scripting
- Editing
- Computer graphics
- Programming

Evaluation/Testing

On/Q Corporation has developed a highly sophisticated, adaptable interactive environment which can be used as a training or communications tool in a wide variety of organizations,

including large corporations, educational institutions, governments, and military organizations.

- Production media include:
- Videodisc
 - Videotape
 - Computer graphics
 - Computer software
 - CD-ROM XA
 - CD-1
 - DV1

DVO CORPORATION
1405 Bishop
Suite 101
Blount, Quebec
H3B 2E4
Telephone: (514) 810-1122
Fax: (514) 810-1122

Dvo Corporation provides complete design and production services for interactive multimedia.

Consultation
Needs analysis
Content analysis
Instructional design
Systems analysis
Project management
Quality assurance
Production management
Production control
Production support
Production training
Production evaluation

Dvo Corporation has developed a highly sophisticated, state-of-the-art multimedia production system that can be used as a training or communications tool in a wide variety of applications.

Ms. Sylvia Miron
Staff Manager
Business Development
Bell Canada
170 Laurier Avenue W.
Room 1001
Ottawa, Ontario
K1P 5V3

Mr. Peter Spicely
Admission Consultant
107 Computer Services Company
375 Spauld Street
Suite 200
Ottawa, Ontario
K1R 7X3

Mr. B. Adams
Director
Communications
Bourge Mines
2th Floor
Knox 805
380 Booth Street
Ottawa, Ontario
K1A 0E3

Mr. Robert Armstrong
Manager
Transport Canada
45 Renee Crone Boulevard
Thill, Ottawa
K1X 1C6

LIST OF PARTICIPANTS



Mr. J.R.G. Adams
Terminale Systems Inc.
Ott. First Canadian Place
Suite 5000
Toronto, Ontario
M5X 1K2

Mr. Don Arnold
President
Tri-Va International Inc.
4 Lakeshore Drive
Wilkeson, New York, 12996

LISTE DES PARTICIPANTS

Mr. Douglas G. Alley
Manager
Eastern Region
Integrat Systems
2580 Matheson Blvd
Mississauga, Ontario
L4W 4J1

Mr. Ken Arzenda
Manager
Data and Area Information Service
Computer and Services Division
1000 ...

Mr. N. Ardesian
Director
Learning ...
75 ...
Ottawa ...
K1R ...
Ottawa ...
K1R ...

Ms. Sylvia Abretti
 Staff Manager
 Business Development
 Bell Canada
 170 Laurier Avenue W.
 Room 1001
 Ottawa, Ontario
 K1P 5V5

Ms. B. Adams
 Director
 Communications
 Energy, Mines and Resources
 8th Floor
 Room 805
 580 Booth Street
 Ottawa, Ontario
 K1A 0E3

Mr. J.R.G. Adams
 Terralogic Systems Inc.
 One, First Canadian Place
 Suite 5900
 Toronto, Ontario
 M5X 1K2

Mr. Douglas G. Alley
 Manager
 Eastern Region
 Intergraph Systems Limited
 2580 Matheson Blvd.
 Mississauga, Ontario
 L4W 4J1

Mr. N. Anderson
 Director
 Planning and Development Branch
 Canadian Hydrographic Service
 Fisheries and Oceans Canada
 615 Booth Street
 Ottawa, Ontario
 K1A 0E6

Mr. Tom Appleby
 Advisory Consultant
 IST Computer Services Company
 275 Sparks Street
 Suite 800
 Ottawa, Ontario
 K1R 7X9

Mr. Robert Armstrong
 Manager
 Research and Experimentation Centre
 Air Traffic Services
 Transport Canada
 45 Sacre Coeur Boulevard
 Hull, Quebec
 J8X 1C6

Mr. Bob Arnold
 President
 Tru-Vu International Inc.
 8 Lakeshore Drive
 Willsboro, New York, 12996
 U.S.A.

Mr. Ken Arsenault
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. Dave Baker
 Memex Infotech Corporation
 81 Metcalfe
 3rd Floor
 Ottawa, Ontario
 K1P 6K7

Mr. Tim Barber
 Micromedia
 165 Hôtel de Ville
 Hull, Quebec
 J8X 3X2

Mr. Brian Beninger
 President
 The Sanctuary Woods Inc.
 340 March Road
 Suite 501
 Kanata, Ontario
 K2K 2E4

Mr. Djilali Benmouffok
 Program Officer
 International Development Research
 Centre
 P.O. Box 8500
 Ottawa, Ontario
 K1G 3H9

Mr. Noel Bhumgara
 Director General
 Science and Professional Services
 Directorate
 Supply and Services Canada
 Ottawa, Ontario
 K1A 0S5

Capt. Bilodeau
 Information Services
 Department of National Defense
 101 Colonel By Drive
 Ottawa, Ontario
 K0A 0K2

Mr. Charlie Bohm
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. Andre Bourdon
 Director
 Informatics
 Economic Council of Canada
 P.O. Box 527
 Ottawa, Ontario
 K1P 5V6

Mrs. Barbara Bowler
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. Lloyd Bowler
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Ottawa, Ontario
 K1A 0E9

Mr. Herbert G. Bown
 President and CEO
 IDON Corporation
 875 Carling Avenue
 Ottawa, Ontario
 K1S 2E9

Mr. Shawn P. Brennan
OPTIM Corporation
338 Somerset Street West
Ottawa, Ontario
K2P 0J9

Mr. Chris Brisebois
The Sanctuary Woods Inc.
340 March Road
Suite 501
Kanata, Ontario
K2K 2E4

Mr. Peter Burpee
Senior Sales Representative
Intergraph Systems Limited
#200 - 1525 Carling Avenue
Ottawa, Ontario
K1Z 8R9

Dr. F.H.A. Campbell
Director General
Planning, Coordination and Cartographic
Services
Canada Centre for Mapping
Energy, Mines and Resources
14th Floor
580 Booth Street
Ottawa, Ontario
K1A 0E4

Mr. Jim Capper
Tru Vu International Inc.
8 Lakeshore Drive
Willsboro, New York, 12996
U.S.A.

Mr. Ron J. Carrière
P.Eng.
President
Canadian Databank
#202, 2650 Queensview Drive
Ottawa, Ontario
K2B 8H6

Mr. Michael J. Casey
Chief
Hydrographic Department
Canadian Hydrographic Service
Fisheries and Oceans
615 Booth Street
Ottawa, Ontario
K1A 0E9

Mr. C.A. Cavan
C.A. Caven Associates
53 1/2 Third Avenue
Ottawa, Ontario
K1S 2J7

Ms. Diane Chapman
National Atlas Information Service
Geographical Services Division
Energy, Mines and Resources
615 Booth Street
Room 650
Ottawa, Ontario
K1A 0E9

Mr. Brian Cheney
Vice President
OPTIM Corporation
338 Somerset Street West
Ottawa, Ontario
K2P 0J9

Mr. Ian Christie Clark
 Special Advisor
 Jean Talon Project
 Department of the Secretary of State of Canada
 Ottawa, Ontario
 K1A 0M5

Mr. Peter Clayton
 Administrator
 Trent Institute for the Study of Popular Culture
 Trent University
 Peterborough, Ontario
 K9J 7B8

Mr. Mark Corey
 Acting Director, Strategic Planning
 Energy, Mines and Resources
 580 Booth Street
 Room 1490
 Ottawa, Ontario
 K1A 0E4

Professor Michael Coulson
 Department of Geography
 University of Calgary
 Calgary, Alberta
 T2N 1N4

Mr. Christian Couture
 President
 Geostat Research Inc.
 6-21 Champlain Avenue
 Ottawa, Ontario
 K1M 1E5

Mr. Brian Cromie
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. William A. (Bill) Currie
 Digital Video Services
 560 Rochester Street
 Suite 202
 Ottawa, Ontario
 K1S 4M2

Ms. Judith Dawson
 Social Studies Editor
 Secondary School Division
 Prentice Hall Publishers Inc.
 1870 Birchmount Road
 Scarborough, Ontario
 M1P 2J7

Mr. Stephen Deller
 Managing Director
 The LSE Group
 444 Bay Street
 Ottawa, Ontario
 K1R 6A8

Mr. François Désilets
 Intergovernmental Programs
 National Capital Commission
 13th Floor
 161 Laurier Avenue West
 Ottawa, Ontario
 K1P 6J6

Monsieur Marcel Drouin
 Directeur intérimaire
 Technologies avancées
 Centre canadien de recherche sur l'informatisation
 du travail
 Communications Canada
 1575, boulevard Chomedey
 Laval (Québec)
 H7V 2X2

Mr. Roddy Duchesne
 Technical Advisor, Jean Talon Project
 Department of the Secretary of State of Canada
 15 Eddy Street
 Hull, Quebec
 K1A 0M5

Mr. Brian Edwards
 Production Manager
 Soil Information Systems and Cartography
 Land Resource Research Centre
 Agriculture Canada
 KW Neatby Building, Room B71
 Ottawa, Ontario
 K1A 0C6

Mr. Timothy V. Evangelatos
 Chief, Cartographic Development Division
 Marine, Cartography
 Canadian Hydrographic Service
 Department of Fisheries and Oceans
 615 Booth Street
 Ottawa, Ontario
 K1A 0E6

Mr. Pierre Filiatreault
 On-Q Corporation
 1405 Bishops
 Suite 101
 Montréal, Quebec
 H3G 2E4

Mr. John Fisher
 Director
 DigiMap Data Services Inc.
 104 Charlton Blvd.
 Willowdale, Ontario
 M2M 1B9

Ms. Joanne Frappier
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mrs. Jean Fraser
 1120 Prospect Avenue S.W.
 Calgary, Alberta
 T2T 0W9

Monsieur Louis Garceau
 Centre canadien de gestion
 Campus De La Salle
 373, promenade Sussex
 Ottawa (Ontario)
 K1A 0M7

Monsieur Marc Gendron jr.
 Directeur adjoint
 Mosaic
 2, place Laval
 suite 390
 Laval (Québec)
 H7N 5N6

Ms. Beth Gervais
 Informatics Coordinator
 Informatics Management Branch
 Environment Canada
 Place Vincent Massey
 351 St. Joseph Boulevard
 4th Floor
 Hull, Quebec
 K1A 1C7

Mr. Gary Gibson
 Director of Sales
 Micromedia Limited
 165 Hôtel de Ville
 Hull, Quebec
 J8X 3X2

Ms. Sylvie Gilchrist
 Vice President, Editorial
 Gage Education Publishing Company
 164 Commander Boulevard
 Agincourt, Ontario
 M1S 3C7

Mr. V. Glickman
 Director
 Geography Division
 Statistics Canada
 3rd Floor, Jean Talon Building
 Tunney's Pasture
 Ottawa, Ontario
 K1A 0T6

Mrs. Claire Gosson
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. Ernest J.M. Greco
 Executive Vice President
 Microstar Software Ltd.
 34 Colonnade Road N.
 Suite 100
 Nepean, Ontario
 K2E 7J6

Mr. Frank A. Greif
 Stanley Associates Engineering Ltd.
 2633-37 Avenue N.E.
 Calgary, Alberta
 T1Y 5C7

Mr. Richard Groot
 Director
 Geographical Services Division
 Canada Centre for Mapping
 Energy, Mines and Resources Canada
 615 Booth Street, Room 175
 Ottawa, Ontario
 K1A 0E9

Dr. Louise Guay
 Présidente
 YYIATS Productions Inc.
 1205, rue Papineau
 Bureau 351
 Montréal (Québec)
 H2K 4R2

Mr. Keith Hamilton
 The Sanctuary Woods Inc.
 340 March Road, Suite 501
 Kanata, Ontario
 K2K 2E4

Ms. Marjie Hansen
 The Sanctuary Woods Inc.
 340 March Road, Suite 501
 Kanata, Ontario
 K2K 2E4

Mr. Paul Harker
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. James Hayes
 Editor
 English Special Books
 Book Department
 Readers Digest Association (Canada) Ltd.
 214 Redfern Avenue
 Westmount, Quebec
 H3Z 2V9

Professor Grant Head
 Department of Geography
 Sir Wilfrid Laurier University
 Waterloo, Ontario
 N2L 3C5

Mr. Finn Holm
 Chief
 Mechanical and Energy
 Transport Canada
 Place de Ville
 Tower C, 26th Floor
 ACC (Locator No.)
 Ottawa, Ontario
 K1A 0N5

Dr. David Horler
 President
 Horler Information Inc.
 116 Albert Street
 Suite 704
 Ottawa, Ontario
 K1P 5G3

Ms. Patricia M. Horner
 Director
 Canadian Government Publishing Centre
 Supply and Services Canada
 45 Sacré-Coeur Boulevard
 Room A-2403-N
 Hull, Ontario
 K1A 0S9

Ms. Sandy Hovey
 Major Account Sales Manager
 Megalith Technologies Inc.
 148 Colonnade Road, Unit 1B
 Ottawa, Ontario
 K2E 7R4

Mr. Daniel Jobin
 Vice President
 Nucor Computing Resources Inc.
 P.O. Box 13520
 Kanata, Ontario
 K2K 1X6

Mr. Steve Jodoin
 Information Services
 Department of National Defense
 101 Colonel By Drive
 Ottawa, Ontario
 K0A 0K2

Mr. Marc Jodoin
 Digital Video Services
 560 Rochester Street
 Room 202
 Ottawa, Ontario
 K1S 4M2

Mr. Peter Jordan
 Microstar Software Ltd.
 34 Colonnade Road N.
 Suite 100
 Nepean, Ontario
 K2E 7J6

Mr. Ron Keating
 Director
 IT Strategy Information Technology
 Canada Post Corporation
 1400 Mervile Road
 Station 940
 Ottawa, Ontario
 K1A 1H7

Mr. John Kelly
 Digital Video Services
 560 Rochester Street
 Suite 202
 Ottawa, Ontario
 K1S 4M2

Mrs. Betty Kidd
 Director
 Cartographic and Architectural Archives
 Division
 National Archives of Canada
 395 Wellington Street
 Ottawa, Ontario
 K1A 0N3

Mr. Peter Kielland
 Hydrographic Development Officer
 Canadian Hydrographic Service
 Fisheries and Oceans
 615 Booth Street
 Ottawa, Ontario
 K1A 0E6

Mr. Richard Lalonde
 Senior Advisor
 Information Technologies
 Communications Canada
 1575 Chomedey Blvd.
 Laval, Quebec
 H7V 2X2

Ms. Pauline Lamothe
 Assistant Director
 Research Services
 Information and Technical Services Branch
 Library of Parliament
 Parliament Buildings
 Wellington Street
 Ottawa, Ontario
 K1A 0A9

Madame Anita S. Larose-Demers
 Chargé de projet
 Projet Jean Talon
 Secrétariat d'État du Canada
 Ottawa (Ontario)
 K1A 0M5

Ms. Mary Francis Laughton
 Manager of I.R.M.
 Informatics Applications
 Communications Research Centre
 Department of Communications
 3701 Carling Avenue
 P.O. Box 11490
 Station H
 Ottawa, Ontario
 K2H 8S2

Mr. Jens Laursen
 InfoGen
 613 Duff Crescent
 Gloucester, Ontario
 K1J 7C6

Monsieur Gaston Lavoie
 Directeur général
 CFGS Quatre Saisons et
 CHOT TV
 171 Jean-Proulx
 Hull (Québec)
 J8Z 1W5

Mr. Garth Lawrence
 Vice President
 Intera Kenting
 380 Hunt Club Road
 Ottawa, Ontario
 K1G 3N3

Mr. Larry Lee
 Statistics Canada
 R.H. Coats Building
 Tunney's Pasture
 Ottawa, Ontario
 K1A 0T6

Mr. Patrick Lloyd
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street, Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. Daniel Lortie
 Computerland
 800 Boul. René Lévesque Ouest, Suite 490
 Montréal, Quebec
 H3B 1X9

Mr. J.J. (Joe) Lowe
 Manager, Forest Inventory
 Petawawa National Forestry Institute
 Chalk River, Ontario
 K0J 1J0

Mr. Peter J. Lowry
 CD-ROM Publishing Service Inc.
 Communications/Public Affairs
 200 Consumers Road, Suite 200
 North York, Ontario
 M2J 4R4

Dr. Bruce MacDonald
 Head
 Canada Soil Information System
 Land Resource Research Centre
 Agriculture Canada
 KW Neatby Building, Room 3024
 Ottawa, Ontario
 K1A 0C6

Mr. Dan Mackay
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. Bob Madill
 TYDAC Technologies
 1600 Carling Avenue
 Suite 310
 Ottawa, Ontario
 K1Z 8R7

Mr. G. Maffini
 TYDAC Technologies
 1600 Carling Avenue
 Suite 310
 Ottawa, Ontario
 K1Z 8R7

Mrs. Diane Mann-Weiskopf
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. Michael J. Manore
 Research Scientist
 Applications Development
 Canada Centre for Remote Sensing
 Energy, Mines and Resources Canada
 1547 Merivale Road
 4th Floor
 Ottawa, Ontario
 K1A 0Y7

Mr. Roy Marsh
 Director
 Informatics Applications
 Department of Communications
 Communications Research Centre
 3701 Carling Avenue
 P.O. Box 11490, Station H
 Ottawa, Ontario
 K2H 8S2

Ms. Rachael McAfee
 Producer
 Pixel Productions
 322 King Street West
 Toronto, Ontario
 M5V 1J2

Ms. Mary McDougall Maude
 Shipton, McDougall Maude Associates
 44 Beverly Street
 Toronto, Ontario
 M5T 1X9

Mr. Gordon McElravy
 ACDS
 80 Jean-Proulx Street
 Hull, Quebec
 J8Z 1W2

Mr. John McGuffie
 Deputy Director, Publishing Art Services
 Readers Digest Association (Canada) Ltd.
 214 Redfern Avenue
 Westmount, Ontario
 H3Z 2V9

Mr. Frank McGuire
 Chairman, School of Graphic
 Communications Management
 Ryerson Polytechnical Institute
 350 Victoria Street
 Toronto, Ontario
 M5B 2K3

Mr. Douglas McRae
 DVS Communications
 560 Rochester Street
 Suite 202
 Ottawa, Ontario
 K1S 4M2

Mr. R. Mitchell
 Spatial Delineation and Analysis Section
 Geography Division
 Classification Systems Branch
 Statistics Canada
 Jean Talon Building
 Tunney's Pasture
 Ottawa, Ontario
 K1A 0T6

Mr. David Monahan
 Canadian Hydrographic Service
 Department of Fisheries and Oceans
 615 Booth Street
 Ottawa, Ontario
 K1A 0E6

Mr. Robert Morrow Jr.
 Coordinator, Curriculum Services
 Program Services Centre
 The Wentworth County Board of
 Education
 10 McMaster Avenue
 Dundas, Ontario
 L9H 4M5

Mr. V.P. Neimanis
 A/Chief, EISD
 SD/SOE Branch
 Environment Canada
 10th Floor, Place Vincent Massey
 351 St. Joseph
 Hull, Quebec
 K1A 0H3

Mr. Charles Ogrosky
National Mapping Division
United States Geological Survey
516 National Centre
Reston, Virginia, 22092
U.S.A.

Mr. John W. Orton
Manager Analyst
Corporate Representation
Canada Post Corporation
Sir Alexander Campbell Building
Building C
Station 325
Ottawa, Ontario
K1A 0B1

Mr. James Page
Acting Director General
Education Support Branch
Department of the Secretary of State of Canada
25 Eddy Street
10A11
Hull, Quebec
K1A 0M5

Mr. Peter Paul
National Atlas Information Service
Geographical Services Division
Energy, Mines and Resources
615 Booth Street
Room 650
Ottawa, Ontario
K1A 0E9

Mr. Réal Pedneault
Government Consultant
Apple Canada Inc.
1255 Ouest Transcanadienne
Ste. 180
Dorval, Quebec
H9P 2V4

Mrs. Julie Poore
Ph.D. Associates Inc.
Research, Consulting, Invention
Kinsmen Building
4700 Keele Street, Suite 200
Downsview, Ontario
M3J 1P3

Professor Steve Prashker
Department of Geography
Carleton University
Ottawa, Ontario
K1S 5B6

Mr. Kit Pullen
Business Development
DVS Communications
560 Rochester Street
Suite 202
Ottawa, Ontario
K1S 4M2

Mr. Christian Raquin
Manager
Business Development
Monenco Consultants Limited
220 Laurier Street West, Suite 800
Ottawa, Ontario
K1P 5Z9

Mrs. Annie Rasmussen
64 Cambey Avenue
P.O. Box 753
Stellarton, Nova Scotia
BOK 1S0

Mr. John Rayson
Computerland
800 Boul. René Lévesque Ouest
Suite 490
Montréal, Quebec
H3B 1X9

Mr. David S. Reade
 Head
 National GEOSCAN Centre
 Geological Survey of Canada
 Geoscience Information Division
 Energy, Mines and Resources Canada
 601 Booth Street
 Ottawa, Ontario
 K1A 0E8

Mr. Peter Revie
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. Peter Richards
 A/Chief, Training and Standards
 Canadian Hydrographic Service
 Fisheries and Oceans
 615 Booth Street
 Ottawa, Ontario
 K1A 0E6

Mr. Ross Richards
 Associate
 Oaktree Management Consultants Ltd
 301 Moddie Drive
 Suite 208
 Nepean, Ontario
 K2H 9C4

Mr. Tovia Roht
 Director
 University of Ottawa Press
 603 Cumberland
 Ottawa, Ontario
 K1N 6N5

Mr. Grafton Ross
 A/Head
 Geography Information Services
 Geography Division
 Statistics Canada
 3rd Floor
 Jean Talon Building
 Tunney's Pasture
 Ottawa, Ontario
 K1A 0T6

Mr. Robert Rossignol
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Ms. Sylvie Scantland
 Marketing Representative
 Nucor Computing Resources Inc.
 P.O. Box 13520
 Kanata, Ontario
 K2K 1X6

Mr. Leonard Senglin
 Director
 Marketing/Sales
 Helava Associates Incorporated
 21421 Hilltop Street, 48034
 U.S.A.

Ms. Rosemary Shipton
 Shipton, McDougall Maude Associates
 28 Glen Oak Drive
 Toronto, Ontario
 M4E 1Y5

Mrs. Wendy Simpson-Lewis
 State of Environment Branch
 Environment Canada
 Ottawa, Ontario
 K1A 0H3

Mr. Carl Sonnen
 Vice President
 Informetrical
 30 Slater Street
 11th Floor
 Ottawa, Ontario
 K1P 6E2

Ms. Mary-Ann Spicer
 Senior Regional Director
 Canadian Environmental Advisory
 Council
 FEARP
 Environment Canada
 Fontaine Building
 200 Scare Coeur Blvd.
 Hull, Quebec
 K1A 0H3

Mr. Peter Spurr
 Researcher Two
 Research Division
 Canada Mortgage and Housing
 Corporation
 682 Montreal Road
 Ottawa, Ontario
 K1A 0P7

Dr. Roger Stacey
 Roger A. Stacey Consultants Limited
 96 Grenfell Crescent
 Nepean, Ontario
 K2G 0G4

Mr. J.G. Stinson
 Associate Director
 Electronic Data Dissemination Division
 Statistics Canada
 R.H. Coats Building, 9th Floor
 Tunney's Pasture
 Ottawa, Ontario
 K1A 0T6

Dr. Thomas H.B. Symons
 Vanier Professor
 Trent University
 Peterborough, Ontario
 K9J 7B8

Professor Dr. D.R.F. Taylor
 Department of Geography
 Carleton University
 Ottawa, Ontario
 K1S 5B6

M. Yves Tessier
 Chef, Cartothèque
 Bibliothèque générale
 Pavillon Jean-Charles-Bonenfant
 Université Laval
 Sainte-Foy (Québec)
 G1K 7P4

Mr. John Thompson
 Assistant Director
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street
 Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. Don Vachon
 Cartographic Systems Development
 Canadian Hydrographic Service
 Fisheries and Oceans
 615 Booth Street
 Ottawa, Ontario
 K1A 0E6

Mr. Paul J. Vinet
 On/Q Corporation
 1405 Bishop
 Montréal, Quebec
 H3G 2E4

Ms. Jane Walker
 Digital Video Services
 560 Rochester Street
 Suite 202
 Ottawa, Ontario
 K1S 4M2

Dr. John Warkentin
 Professor of Geography
 York University
 4700 Keele
 North York, Ontario
 M3J 1P3

Ms. Donna Williams
 National Atlas Information Service
 Geographical Services Division
 Energy, Mines and Resources
 615 Booth Street, Room 650
 Ottawa, Ontario
 K1A 0E9

Mr. J.R. Wilson
 Director
 Marine Environmental Data Services
 Branch
 Fisheries and Oceans
 200 Kent Street, Station 1202
 Ottawa, Ontario
 K1A 0E6

Ms. Joan Winearls
 Map Librarian
 University of Toronto Map Library
 John P. Roberts Research Library
 130 St. George Street
 Toronto, Ontario
 M5S 1A5

Mr. Joel Yan
 Statistics Canada
 Tunney's Pasture
 Ottawa, Ontario
 K1A 0T6