

SCHEDULE OF EVENTS

Wednesday – November 28, 2001

2:30 – 2:40 OPENING REMARKS

SESSION 1 GIS/LIM – Chair – Tomas Beran

- 2:40 – 2:55 William Clarke – Supervisor: S. Nichols
The Creation of a National Land Information Agency: Would a Framework Solution Work?
- 3:00 – 3:15 Patrick Marshall – Supervisor: D.Coleman
University of New Brunswick Web-Based Mapping
- 3:20 – 3:35 Geoff Scott – Supervisor: P. Dare
Evaluation of GIS Updating Procedures of the Department of Transportation
- 3:40 – 3:55 Sara Cockburn – Supervisor: S. Nichols
Intertwined Uncertainties, Policy and Technology on the Juridical Continental Shelf

4:00 – 4:30 Coffee Break

SESSION 2 OCEAN MAPPING/GPS - Chair – Sara Cockburn

- 4:30 – 4:45 Jonathan Beaudoin – Supervisor: J. Hughes Clarke
Radiometric Correction of Acoustic Backscatter from Reson 8101 Multibeam Systems
- 4:50 – 5:05 Charles Lapointe – Supervisor: D.J. Coleman
Integrating Sea Ice Information into an Electronic Chart Display and Information System (ECDIS)
- 5:10 – 5:25 Enrique Silva – Supervisor: D. Wells
Latin American Hydrographic Offices as Nautical Chart Makers
- 5:30 – 5:45 Rocky Annett – Supervisor: M. Santos
The Integration of Global Satellite Positioning Systems

5:50 – 6:00 CLOSING REMARKS

6:00 Reception

THE CREATION OF A NATIONAL LAND INFORMATION AGENCY: WOULD A FRAMEWORK SOLUTION WORK?

William Clarke

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Improvements to public administration and information systems take many forms. Specifically, land administration and information agencies have, for many decades, undergone change and been continuously “re-engineered”, essentially reinventing the way in which they operate to meet changing and new demands. These include legal reforms (e.g., consolidating legislation and simplifying legal requirements), judicial reforms (e.g., simplifying the judicial process), administrative reforms (e.g., improving procedures for receiving, examining, indexing, and storing documents), and technical reforms (e.g., introducing appropriate computer technology). For example, registration systems have been integrated more closely with other property-related functions in an effort to give more effective service to the public (for example, through “one-stop shopping”). Attention thus has been more focused on making all government registries more cost-effective and introducing business and risk management principles along with behavioral changes to become more client focussed or oriented.

To a great extent, improving land information systems is an exercise in change management. It has required jurisdictions to gain a clearer understanding of the mission of land information and registration agencies, who their clients are or should be, what types of services are required, and how those services should be provided. Governments then face the task of developing a transition strategy, taking the systems from where they are to where they should be. Piecemeal reforms to systems usually do not result in significantly increased efficiencies. Instead, comprehensive reforms that address the entire process and other government agency linkages are required. Such reforms cover legislation and operational processes, institutional aspects (including organizational design, staffing, training and linkages to other departments and users), and system requirements.

These transformations are evolutionary, never revolutionary. But where do they begin and where do they end? The design and implementation of a National Land Information Agency (NLIA) is a regional initiative, but as to just how regional, the jury’s still out.

Can a regional framework evolve for the design and implementation of an NLIA?

GRADUATE ABSTRACTS

INTERTWINED UNCERTAINTIES: POLICY AND TECHNOLOGY ON THE JURIDICAL CONTINENTAL SHELF

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Traditionally, law and policy have been controlling factors in technological use and development. Patents and licenses, for example, have played a role in the regulation of technology. However, as the pace of technological development escalates, the law has had to race to catch up. The quick development of copyright laws, for example, is in direct response to the high-speed growth of Internet and computer-based technologies. In the case of extended continental shelf claims, the technological ability to map the deep ocean has been incorporated into the Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf.

This paper will examine the ways in which technology is driving continental shelf policy and will make use of a specific example (Canada’s Orphan Knoll) to demonstrate how legal and technological uncertainties intertwine to form a complex matrix of questions about the methods for preparing an extended continental shelf claim.

**RADIOMETRIC CORRECTION OF ACOUSTIC
BACKSCATTER FROM RESON 8101 MULTIBEAM
SYSTEMS**

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The purpose of this research project was to develop software tools to determine the feasibility of removing the visual artifacts produced by variable power and gain settings from acoustic backscatter imagery produced by RESON SeaBat 8101 multibeam systems. Such a system is installed on two of the survey launches of the U.S. National Oceanic and Atmospheric Administration (NOAA) ship Rainier. The Rainier has amassed an astounding amount of survey data since being outfitted with multibeam systems in 1998 and NOAA has recently made all of these data available to the U.S. Geological Survey for the purpose of acoustic backscatter map production. The RESON 8101 performs little pre-processing of its backscatter data; without proper radiometric reduction, imagery formed from these data suffer from artifacts, the most notable of which are across-track bands associated with power and gain level changes.

Preliminary work involved developing software to: (1) read the binary data files and (2) produce images of the backscatter strength. It was then possible to examine the signal parameters (power, gain, etc) and to correlate their changing values to the banding artifacts in the imagery. Having confirmed this correlation, an attempt was made to remove the effect of said signal parameters from the acoustic backscatter data by converting the data from units of linear pressure to logarithmic intensity and subtracting the power and gain, both in logarithmic units as well.

Initial results were very promising, with the artifacts due to signal parameters being suppressed in the imagery. A residual banding was noticed and was associated with a delay between the analog output power and the digitally recorded value; this problem was solved through the use of an adaptive filter which compensated for the delay.

Future research must be done to reduce the signal closer to an absolute measure of the backscatter strength by normalizing by the ensonified area and the grazing angle as well as compensating for irregular attenuation of the signal based on local water mass properties. In addition, the bathymetric profile provided by the multi beam could be used to geographically register the data (in lieu of the flat seafloor assumption) as it provides a much more realistic depiction of the seafloor topology.

**UNIVERSITY OF NEW BRUNSWICK WEB-BASED
MAPPING**

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Every person who has ever attended a university has asked the questions: "Where is that building?" or "Where is that classroom?" This is a problem that all new and even upper-year students at university face at least once throughout their university lives. It is not only a problem for students, it can also be a problem for professors and visitors. This report will provide, with the aid of Internet technology, the answers to the above questions. The solution will use database files and graphic images to solve the problem. The user will be able to view the results of their queries as graphic images. I recommended that the University of New Brunswick implement this program on its Web site to allow students, professors, and visitors to become familiar with the campus. Before this can be done, however, some problems concerning the state of the graphical and database data will have to be addressed.

THE INTEGRATION OF GLOBAL SATELLITE POSITIONING SYSTEMS

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The simultaneous use of two global satellite positioning systems to provide position solutions can improve productivity, flexibility, accuracy, and precision, when compared to results obtainable by a single satellite positioning system. When working in areas where satellite visibility is reduced the combined use of GPS and GLONASS provides a solution to the limitations that are imposed by the natural and man-made environment. The GLONASS constellation currently consists of only six satellites from which measurements can be made. The question then becomes, is it still justifiable to be purchasing these system with the limited availability of GLONASS satellites?

This report evaluates the combined use of GPS and GLONASS using a current data set. To evaluate the integration of GPS and GLONASS, short-term repeatability is used which is a measure of the consistency or dispersion of a sample compared to a known or mean value. Furthermore, the proven benefits of integration may accrue from combining GPS with Galileo, which is intended to be operational in 2008.

EVALUATION OF GIS UPDATING PROCEDURES OF THE DEPARTMENT OF TRANSPORTATION

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The updating process is a critical component of any GIS system. The ability of the database to generate accurate and up to date information enables the user to make the best decisions from the information available.

The Department of Transportation (DOT) in the province of New Brunswick is presently implementing a GIS of its inventory items. Implementation of the system will provide DOT with better decision-making abilities that relates to the highway infrastructure of the province.

This report looks at the systems available to DOT in the process of updating this information. The evaluation is based on the requirements of DOT from which conclusions are drawn as to the system that would be most effective in enhancing data management.

**INTEGRATING SEA ICE INFORMATION INTO AN
ELECTRONIC CHART DISPLAY AND INFORMATION
SYSTEM (ECDIS)**

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The purpose of this research is to convert Ice Charts from their native E00 file formats to an S-57 format. This research is part of a larger project that will incorporate the complete ice information within ECDIS. Such a project will have immediate benefits including increased navigation safety, economic savings, and a cleaner environment

**LATIN AMERICAN HYDROGRAPHIC OFFICES
AS NAUTICAL CHART MAKERS**

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Hydrography and nautical chart production have benefited from the technological advances in geomatics evident at the end of the last century. The computational and communications advances in data acquisition and software analysis have streamlined traditional chart production. Cartographers formerly constrained by a tedious stipping process are now using mapping programs that can output chart image files as film positives or negatives used for platemaking. To better manage geospatial information globally, organizations such as the International Hydrographic Organization are looking at ways to increase the coordination of activities among their cartographic organizations and among themselves and the private sector at the national and international levels. Under this view Latin American Hydrographic Offices are looking for integrated solutions. They are looking to their participation with other government cartographic agencies and the private sector for support in terms of technology development.

In this report the author intends to show the present status of Latin American Hydrographic Offices as chart makers including their nature, the current technological systems involved in their cartographic work flow, and the new global trends affecting their future chart production activities. How these offices could offer to the community a fuller cartographic service will be shown.

The Organizing Committee would like to welcome you to the Semi-Annual Student Technical Conference!

**Where: Dineen Auditorium
Room C13 – Head Hall**
When: November 28, 2001

The Organizing Committee

The November 2001 Semi-Annual Graduate Seminar Committee:

Richard Chan and Garret Duffy

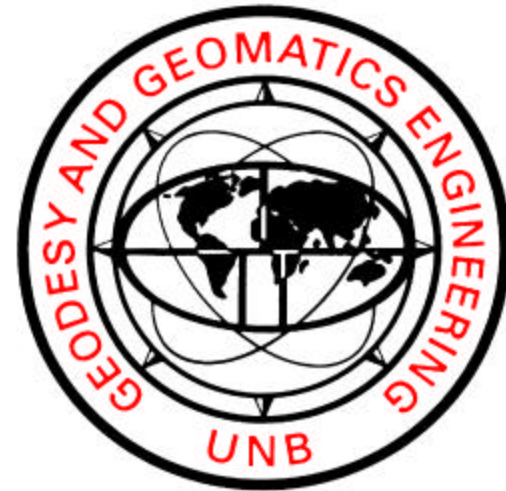
The November 2001 Undergraduate Technical Report presentations were organized by:

Kevin Pegler

Please join us for refreshments after the Conference in the Faculty Lounge, Head Hall – Room C 26

Richard and Garret

GEODESY AND GEOMATICS ENGINEERING



**Semi-Annual
Student Technical Conference**

November 2001
