Lighthouse

JOURNAL OF THE CANADIAN HYDROGRAPHIC ASSOCIATION
REVUE DE L'ASSOCIATION CANADIENNE D'HYDROGRAPHIE
A Digital Processing and Data Acquisition System

- The ISAH-S suite of algorithms offers robust, real-time bottom tracking and sea bottom classification.
- User selectable bottom tracking and classification algorithms.
- Entire digitized acoustic waveform may be logged for post-processing.
- Configurations currently available for 1 to 32 analogue channels.
- Compatible with most single and dual frequency profiling echo sounders and multi-channel sweep systems.
- Fully integrated with ISAH-HYDAS hydrographic data acquisition system and ISAH-HYPS hydrographic processing system.
Contents / Contenu

Le système d’information SINECO
The COWLIS Information System

B. Tessier, S. de Margerie, D. Hains, P. Hally

Royal Navy Hydrographers Honoured

R. W. Sandlands

A Quantitative Comparison of the
Towed In-Flight Bathymetry System
with Launch-Borne Acoustic Soundings
near Coppermine, NWT

J. S. Holladay, D. Wright, M. R. Crutchlow, A. Koudys

The Acoustic Scintillation Flowmeter:
Applications for a New Environmental Tool

T. Curran, D. Lemon, Z. Ye

Regular Features / Chroniques

CHA Academic Award / Bourse d’étude de l’ACH

Message from the National President / Mot du
Président national

Index of Advertisers / Index des annonceurs

Lighthouse Abstracts / Résumés pour Lighthouse

Lighthouse Puzzler / Casse-tête du Lighthouse

Coming Events / Événements à venir

Sustaining Members / Membres de soutien

CHA News / Nouvelles de l’ACH

News from Industry / Nouvelles de l’industrie

Printed by / Imprimerie par The Sinclair-Smith Press
Message from the National President / Mot du Président national

Things always seem to happen in bunches: CHA Atlantic Branch is now being housed in Fredericton; the Central Branch Heritage Launch "Surveyor" continues its living heritage adventure into the future; CHA nationally, will have the opportunity to assist the Canadian Hydrographic Service in their leading edge CHS HYDROCOMM '95 business television symposia; and Branches are having, their annual summer social events.

Everyone is going somewhere and doing something!

The CHA Student Awards manager Barry Lusk has informed me and is pleased to announce that Ms. Heather J. Langill, a student at the College of Geographic Sciences (COGS), in Lawrencetown, Nova Scotia, is the winner and second recipient of our CHA Student Award. Heather, who will be receiving the $2000.00 cash award and a handsomely framed certificate, has submitted a note of appreciation, in this issue of Lighthouse (see below). She is currently enrolled in the Survey Technology program at the college and working for the summer in the Northwest Territories as a surveyor assistant. While this is the second award going to COGS Barry reports that the applications reviewed from other Canadian universities and colleges were extremely close and caused great consternation for the Student Awards Committee.

I would like to extend not only my congratulations to Heather but also my appreciation to Barry and his Student Awards Committee.

Review committee (Tony Mortimer and Rob Hare) for their excellent and timely efforts in this worthy CHA initiative.

CHA continues to be active in Malaysia as Tom McCulloch has been notified by the Management for Change Program of CIDA that the third and final phase of the assistance training program to Malaysia has been approved. Included in this phase is the training of Malaysian instructors in Canada, the provision of Canadian instructors and equipment to the Technical University of Malaysia (UTM) to establish a regional center for education and training in hydrography, and the providing of Canadian advice in the process of UTM applying to the IHO/FIG Standards of Competence Advisory Board to attain a Category A accreditation.

On a closing note, I would ask that you start to consider nominations for the enjoyable position of President of CHA as I will be establishing a Nomination Committee in the fall for elections late in 1995.

It seems that wherever you turn in our association people, our people, are doing things that benefit hydrography — gives you a good feeling doesn’t it.

Have a safe and fun summer.

Dave

1994 CHA Academic Award

Heather Langill
Yellowknife, Northwest Territories

Canadian Hydrographic Association

I would like to thank the Canadian Hydrographic Association for selecting me as the second annual recipient of the CHA Award.

It is a great honour to receive this award. It will assist me very much in my second year at the College of Geographic Sciences.

It is nice knowing that this Association is willing to help out the future members. Thank-you.

Sincerely,
Heather Langill

1993 Lighthouse Awards

Best Technical Paper:

George Schlagintweit
CHA Pacific Branch

"Real-Time Acoustic Bottom Classification for Hydrography: A Field Evaluation of RoxAnn"
(Spring 1993)

Best Non-Technical Paper:

Nicholas Doe
White Rock, British Columbia

"Where was Nootka in 1792? An Explanation of Captain Vancouver's Longitudinal Error"
(Spring 1993)
Rules for eligibility:

1. The applicant must be a full-time student registered in an accredited program related to Hydrography (these programs include, Geomatics, Geography, Cartography or Survey Sciences) in a university or technological college in Canada. The CHA Academic Award administrators reserve the right to determine applicability of the program.

2. The award will be available only to students who have completed at least one year of instruction in the program.

3. The applicant will be required to write a 500 word paper on the relationship of their academic work to hydrography.

4. The applicant will be required to write a short paragraph explaining how this financial award will assist them in their academic career.

5. The awards applications must be submitted to the CHA Academic Awards Manager by the end of June of the applicable year. The award will be given by September 15th of the same year. All officials from the academic institutes of students submitting applications will be notified by mail of the results.

6. The value of the award will be $2000.00.

7. The successful candidate will receive a special Canadian Hydrographic Association certificate.

8. The successful candidate will be requested to write a letter of appreciation to the CHA for publication in "Lighthouse".

9. The award will be presented to an individual only once.

10. At the time of application, the applicant will be required to submit an official transcript from their academic institute indicating their previous year grades.

11. The applicant must submit one letter of reference from an official of the university or college at which the applicant spent the previous year. The letter of reference must include the address and phone number of the official.

12. Applications must be made on forms supplied by, and submitted to:

Barry Lusk,
Academic Awards Manager,
CHA Academic Awards Program,
9860 West Saanich Road,
Sidney, B.C.
V8L 4B2.

Critères d'admissibilité:

1. Le postulant doit être un étudiant à plein temps, inscrit à un programme reconnu dans le domaine de l'hydrographie (comme géomatics, géographie, cartographie ou sciences des levés) à responsables de la bourse d'étude seront des professionnels de l'hydrographie.

2. La bourse ne sera disponible qu'aux étudiants ayant complété au moins une année de formation dans un programme avec diplôme ou licence relié à l'hydrographie.

3. Le candidat devra présenter un travail de 500 mots portant sur la relation entre sa formation scolaire et l'hydrographie.

4. Le candidat devra présenter un court paragraphe expliquant comment cette bourse aidera à son état d'étudiant.

5. Les formulaires d'inscription pour une bourse doivent être soumis au directeur aux bourses d'études de l'ACH d'ici la fin juin de l'année concernée. La bourse sera versée avant le 15 septembre de la même année. Les responsables du corps enseignant d'un établissement dont des membres ont postulé recevront les résultats par la poste.


7. Le candidat sélectionné recevra un certificat spécial de l'ACH.

8. L'étudiant qui reçoit la bourse devra remercier l'ACH par lettre, lettre qui sera publiée dans « Lighthouse », revue de l'ACH.

9. La bourse n'est remise qu'une seule fois à une personne.

10. Le postulant devra fournir au moment de la demande, une copie officielle provenant de l'établissement d'enseignement des notes obtenues lors des années précédentes.

11. Le postulant doit présenter une lettre de référence d'un représentant de l'université ou du collège où il a passé la dernière année. Cette lettre doit porter l'adresse et le numéro de téléphone du représentant.

12. On doit utiliser les formulaires fournis et les faire parvenir à:

Barry Lusk,
Directeur aux bourses d'études,
Programme de bourses d'étude de l'ACH,
9860 West Saanich Road,
Sidney (C.-B.)
V8L 4B2.
Application for Membership / Formule d'adhésion

I hereby make application for membership in the Canadian Hydrographic Association and if accepted agree to abide by the constitution and by-laws of the association.

Je désire devenir membre de l'Association canadienne d'hydrographie en tant que et si ma demande est acceptée je m'engage à respecter la constitution et les règlements de cette association.

Member / membre
$30.00

Sustaining Member / membre de soutien
$150.00

International Member / membre international
$30.00

(for most branches/pour la plupart des sections)

Name/Nom ____________________________

Address / Adresse ____________________________

Telephone / Téléphone ____________________________ (Home / Résidence) ____________________________ (Business / Bureau)

Employed by / Employeur ____________________________ Present Position / Post Occupé ____________________________

Citizenship / Citoyenneté ____________________________ Date ____________________________

Index of Advertisers / Index des annonceurs

Quester Tangent Corporation ................................................. inside front cover
Canadian Hydrographic Association - Academic Award ...................... 3
SIMRAD Mesotech Systems Ltd. ............................................ 6
SeaBeam ................................................................. 14
International Hydrographic Bureau ...................................... 24
McQuest Marine Sciences Ltd. ............................................ 34
McQuest Marine Sciences Ltd. ............................................ 43
AERODAT Ltd. ............................................................. 49
The Hydrographic Society .................................................. 52
Knudsen Engineering Ltd. .................................................. inside back cover
Canadian Hydrographic Conference ..................................... outside back cover
The COWLIS Information System:
Enhancing Competitiveness and Safety in Commercial Shipping on the St Lawrence River
by
B. Tessier, S. de Margerie, D. Hains and P. Hally

On May 29, 1993, the Canadian Hydrographic Service, Quebec Region, received from the Quebec Information Technology Association, the 1993 TECHNOLOGY OCTAS award for organizations with over 200 employees. This article was used to enter COWLIS in the award competition.

Royal Navy Hydrographers Honoured
by
R. W. Sandilands

This article relates the history of HMS Egeria and several of her masters. This ship and her commanders played a major part in the hydrographic surveys of the west coast of Canada during the years 1898 to 1910.

A Quantitative Comparison of the Towed In-Flight Bathymetry System with Launch-Borne Acoustic Soundings near Coppermine, NWT
by
J. S. Holladay, D. Wright, M. R. Crutchlow and A. Koudys

The electromagnetic Towed In-flight Bathymetry System (TIBS™) has emerged as a vital tool in the hydrographic mapping of the Northwest Passage. The helicopter deployed sensor acquires continuous depth profiles at a speed of 100 km/hr, operates through sea ice and turbid water to a depth of 50 m. Over 19,000 line km of data were obtained during the first phase of this survey in 1993, some of which overlapped with conventional, launch-borne acoustic soundings. In order to estimate the accuracy of the system, two conventional and TIBS datasets from this survey, obtained near Coppermine and in Victoria Strait, in Canada's Northwest Territories, were compared. These datasets covered the same areas, but were acquired along different tracks at different speeds. A straightforward, graphically-oriented methodology was devised to isolate the effects of positional differences and positioning errors from the TIBS noise estimates being sought. The principal factor governing TIBS noise levels in this case appeared to be sea ice conditions, which ranged from undeformed near Coppermine to very rough and rubbed in Victoria Strait: rough ice generated larger errors.

The Acoustic Scintillation Flowmeter: Applications For A New Environmental Tool
by
T. Curran, D. Lemon, and Z. Ye

This paper describes a non-intrusive acoustic instrument which measures water flow speeds and offers a method of counting migrating adult salmon. The equipment operates unattended and can be interrogated by remote cellular phone.

Le système d'information SINECO
L'Assurance "Compétitivité et Sécurité" pour la navigation commerciale sur le fleuve Saint-Laurent
par
B. Tessier, S. de Margerie, D. Hains and P. Hally

Le 29 mai 1993, la Service hydrographique du Canada de la région du Québec s'est vu décerner par la Fédération de l'Informatique du Québec l'OCTAS DE LA TECHNOLOGIE 1993 pour un organisme de plus de 200 employés. Nous vous présentons le texte ayant servi à appuyer sa mise en candidature.

En l'honneur des hydrographes de la Royal Navy
par
R. W. Sandilands

Cet article relate l'histoire du HMS Egeria et de plusieurs de ses officiers. Ce navire et ses commandants ont joué un rôle majeur dans les levés hydrographiques de la côte ouest du Canada durant les années 1898 à 1910.

Une comparaison quantitative du système de bathymétrie aéroporté avec le sondage acoustique d'une vedette près de Coppermine, T.N.O.
by
J. S. Holladay, D. Wright, M. R. Crutchlow et A. Koudys

Le système de bathymétrie aéroporté (TIBS™) est ressorti comme un outil indispensable pour cartographier le Passage Nord-Ouest. Le sensor monté sur l'hélicoptère acquiert en continu le profil du fond à une vitesse de 100 km/h, il pénètre la glace et l'eau turbe jusqu'à une profondeur de 50 m. Durant la première phase de ce levé en 1993, des données ont été obtenues sur plus de 19 000 km dont certaines lignes ont chevauché les sondages conventionnels faits par une vedette. Afin d'estimer la précision du système, on a comparé les données conventionnelles et TIBS recueillies près de Coppermine et du détroit de Victoria dans les Territoires du Nord-Ouest. Ces données couvrent la même région mais pour des tracts différents à des vitesses différentes. Une méthode graphique simple a été conçue pour isoler l'effet des différences de position et des erreurs de positionnement afin d'estimer le bruit du TIBS. Le principal facteur gouvernant les niveaux de bruit du TIBS dans ce cas est apparu comme étant les conditions de glace de la mer, celles-ci ont varié de lisse près de Coppermine à très accidenté et fragmenté dans le détroit de Victoria: la glace accidentée a donné les plus grandes erreurs.

Le débitmètre à scintillation acoustique: Un nouvel outil environnemental
par
T. Curran, D. Lemon et Z. Ye

Cet article décrit un instrument acoustique non perturbant qui mesure les courants et qui permet le comptage des saumons adultes en migration. L'équipement est autonome et peut être interrogé par téléphone cellulaire.
SIMRAD MULTI-BEAMS

- EM950 - 95 kHz. Depth capabilities to 300 meters. Portable. 190° swath width.
- EM1000 - 95 kHz. Depth capabilities to 800 meters. Side scan imagery. 150° swath width.
- EM380 - 38 kHz. Depth capabilities to 2500 meters. Side scan imagery. 150° swath width.
- EM12 - 13 kHz. Full ocean depth capable. Side scan imagery. 90° or 150° swath width.

Precision hardware and software for every application. Shallow water portable to full ocean depth mapping.

Simrad Mesotech Systems Ltd.
(Maritime Department)
202 Brownlow Avenue
Dartmouth, Nova Scotia B3B 1T5
Tel: 902-468-2268
Fax: 902-468-2217
Le système d'information SINECO
The COWLIS Information System

L'Assurance "Compétitivité et Sécurité" pour la navigation commerciale sur le fleuve Saint-Laurent

Enhancing Competitiveness and Safety in Commercial Shipping on the St. Lawrence River

par / by

Bernard Tessier, Sylvain de Margerie, Denis Hains et/and Patrick Hally

Le ministère des Pêches et des Océans de la région du Québec, via le Service hydrographique du Canada (SHC), a le mandat d'acquérir, de valider, de gérer, de diffuser au public et de mettre à jour des données, des cartes et des publications nautiques pour la sécurité et l'efficacité de la navigation maritime au Québec. Situé à l'Institut Maurice-Lamontagne de Mont-Joli, à quelques kilomètres de Rimouski, le Service hydrographique du Canada est présent au Québec depuis 15 ans et possède actuellement un effectif de 40 personnes à qui se joignent du personnel temporaire et étudiant(s) selon les périodes.

La description du projet SINECO
Depuis novembre 1990, le SHC de la région du Québec et l'entreprise privée, en concertation avec des utilisateurs/clients majeurs de la voie navigable du fleuve Saint-Laurent, tels les armateurs, les entreprises portuaires sous l'égide de la Société canadienne des ports, et la Garde côtière canadienne (GCC), ont uni leurs efforts pour déployer un système d'information permettant aux usagers/clients un accès rapide et fiable à une base de données de niveaux d'eau vérifiés. Connue sous le nom de SINECO (Système d'information des niveaux d'eaux côtières et océaniques), le projet utilise le potentiel des technologies de l'Information pour répondre aux besoins exprimés par l'clientèle avide de données en temps réel et apporte une solution efficace aux problèmes toujours croissants de compétitivité et de sécurité relativement au transport maritime.

Opérationnel depuis janvier 1993, SINECO a rapidement généré des retombées économiques pour le Port de Montréal et pour les armateurs suite à la possibilité d'optimiser le volume de chargement des navires. De plus, il a permis d'établir le plan d'actions et de minimiser les coûts d'intervention de la GCC lors de l'embâcle survenu en février au Lac St-Pierre, limitant d'autant la période d'inactivité du transport maritime sur le Saint-Laurent.

Les objectifs de la réalisation
Les entreprises portuaires québécoises et les armateurs font face à une compétitivité de plus en plus féroce des ports de la côte est des États-Unis. Le contexte économique difficile et l'utilisation de bateaux commerciaux plus gros pour le transport de conteneurs rendent problématique l'utilisation du Saint-Laurent. Cependant, la connaissance immédiate des niveaux d'eau observés et prévus sur le Saint-Laurent pâle au problème en permettant d'optimiser le chargement et le transit des navires tout en assurant leur sécurité.

The Quebec Region of the Canadian Hydrographic Service (CHS), within the Department of Fisheries and Oceans, has a mandate to obtain, validate, manage, disseminate to the public and update data, charts and other nautical publications to ensure safe and efficient marine navigation in Quebec. Headquartered in Mont Joli, a few kilometres from Rimouski, the Canadian Hydrographic Service has been in operation in Quebec for 15 years and has a staff of 40 people to which temporary personnel and students (depending on the time period) are added.

Description of the COWLIS Project
Since November 1990, the CHS in Quebec Region and the private sector, in co-operation with the main users of the St. Lawrence River, such as shipowners and port authorities under the aegis of the Canada Ports Corporation, as well as the Canadian Coast Guard (CCG), have been working together to set up an information system to provide users/clients with fast, reliable access to a database of verified water levels. This system, the Coastal and Ocean Water Level Information System (COWLIS), capitalizes on the potential offered by information technologies to meet the needs of clients eager to obtain real-time data. It also represents an effective solution to the ever-greater challenges of competitiveness and safety in marine transportation.

COWLIS, up and running since January 1993, has already begun generating economic spinoffs for the Port of Montreal and shipowners by optimizing ships cargo volumes. In addition, the system was used in establishing an action plan and minimizing the CCG’s intervention costs at the time of the February ice jam in Lake St. Pierre, thereby reducing the downtime for shipping on the St. Lawrence River.

Objectives
Quebec port agencies and shippers face increasingly fierce competition from ports on the Eastern Seaboard of the United States. In view of the difficult economic context and the use of larger commercial ships for container transport, certain problems are associated with navigation on the St. Lawrence. However, immediate access to predicted and observed water-level data on the River overcomes these problems by permitting optimum cargo volumes and ship movement while also ensuring safe navigation.
À la lumière de cette problématique, le SHC de la région du Québec a perçu un besoin urgent de mutation du service d’enregistrement permanent des niveaux d’eau afin de mieux répondre aux besoins ÉCONOMIQUE et de SÉCURITÉ de la navigation commerciale sur le fleuve Saint-Laurent. Cette mutation devait permettre aux utilisateurs d’obtenir des informations sur les niveaux d’eau en temps réel. Les ports du Saint-Laurent profiteraient ainsi davantage de leur situation géographique pour compter avec nos voisins du sud dans le transit national et international des marchandises. Quant aux armateurs, ils pourraient maxi miser leur volume de chargement tout en profitant d’un enregistrement permanent des niveaux d’eau afin de mieux varier les variations spatiales-temporelles via le réseau de télécommunication numérique DATAPAC, permettant aux intervenants du projet de gérer les informations sur les niveaux d’eau en temps réel. Cette modernisation devait permettre aux armateurs de mieux répondre aux besoins de sécurité.

En conséquence, les objectifs recherchés par l’ensemble des intervenants du projet ont été de:
- garantir la protection des vies humaines et de l’environnement marin;
- optimiser le rendement économique de la navigation commerciale pour le bénéfice du Québec et du Canada;
- contribuer à maintenir et à augmenter la compétitivité du secteur maritime québécois et canadien vis-à-vis nos voisins du sud;
- répondre aux demandes des usagers/clients en augmentant le niveau et la qualité de service;
- redistribuer les revenus d’utilisation dans le développement de produits à “valeur ajoutée”;
- développer l’expertise et l’implication de l’industrie québécoise et canadienne en offrant des opportunités d’exportation d’une technologie d’avant-garde.

Pour atteindre ces objectifs, le SHC, région du Québec, et l’entreprise privée ont développé et mis en place le système d’information SINECO permettant aux intéressés d’obtenir aisément, à demander ou de façon continue, l’ensemble des niveaux d’eau observés, prédits et prêts, ainsi que leurs variations spatiales-temporelles allant des futures 48 heures jusqu’aux deux derniers mois.

La base de données de SINECO est alimentée par un réseau d’enregistreurs numériques conçus et développés spécifiquement pour les besoins du système. Ainsi, les utilisateurs abonnés à SINECO peuvent exploiter à distance via le réseau de télécommunication numérique DATAPAC, la banque de données en mode client/serveur à l’aide de leur micro-ordinateur et d’un logiciel graphique convivial.

La réussite de ce projet a été assurée par une concertation et une collaboration entre l’entreprise privée québécoise et les organismes publics. Cette concertation des usagers/clients a permis non seulement d’exprimer une demande claire de services au SHC, région du Québec, mais aussi, d’appuyer cette demande par une contribution financière ponctuelle importante pour l’accélération de la modernisation du nouveau réseau.

L’ampleur et le calendrier de la réalisation
La réalisation met à profit l’expertise de plusieurs organismes gouvernementaux et privés. Le projet SINECO a été subdivisé en trois sous-projets: développer et installer les nouveaux enregistreurs numériques de niveaux d’eau; développer les logiciels permettant l’acquisition, la gestion, la vérification et la diffusion des données; mettre en place une entente avec l’entreprise privée pour exploiter ces données.

In light of these problems, the Quebec Region of the CHS recognized the urgent need to upgrade the permanent water-level recording system in order to better meet the ECONOMIC and SAFETY needs of commercial shipping on the St. Lawrence River. The modifications to the system had to allow users to obtain information on water levels in real time. Ports along the St. Lawrence would thus be able to capitalize more on their geographic location to compete with the United States in national and international shipping operations. As for shipowners, they would be able to maximize their cargo volumes while benefiting from enhanced navigation safety.

Consequently, the objectives pursued by all project participants were:
- to protect human life and the marine environment;
- to optimize the economic performance of commercial shipping for the benefit of Quebec and Canada;
- to help to maintain and increase the competitiveness of the marine sector in Quebec and Canada vis-à-vis the United States;
- to meet the requirements of users/clients by increasing the level and quality of service;
- to re-allocate income from the system toward the development of value-added products; and
- to promote the expertise and involvement of the Quebec and Canadian firms by providing opportunities for exporting a leading-edge technology.

To attain these objectives, the CHS, Quebec Region, and private sector companies have developed and installed the COWLIS system which provides easy access to all observed, predicted and forecast water level data, either on request or continuously, and spatio-temporal variations in the levels over the next 48 hours and previous two months.

The COWLIS database is supported by a network of digital recorders designed and developed specifically to meet the needs of the system. Hence, through the DATAPAC digital communication network, COWLIS subscribers can access the database remotely in client/server mode by using their micro-computer and a user-friendly graphic software program.

The success of this project was ensured through the cooperation and concerted efforts of Quebec-based private companies and public sector agencies. This collaboration between users/clients made it possible not only to outline specific requirements for services to the CHS, Quebec Region, but also to support the demand through a major ad hoc financial contribution to accelerate the modernization of the new network.

Project Scope and Schedule
The COWLIS project required the expertise of a number of private and public sector agencies. It was divided into three sub-projects: developing and installing new digital water level recorders; developing software programs for acquiring, managing, verifying and disseminating the data; and concluding an agreement with the private sector for the use of the data.

The first sub-project, completed in 1992, consisted of

Le deuxième sous-projet, terminé également en 1992, consistait à réaliser les logiciels d'acquisition, de vérification, de gestion et de diffusion des données. Ce développement a été confié à ASA Consulting Ltd. de Dartmouth en Nouvelle-Écosse. Un investissement important de la part de cette compagnie en main-d'œuvre et en matériel assurera la réussite de ce sous-projet.

La mise en œuvre du dernier sous-projet a été assurée par le SHC, région du Québec, et le consortium Service maritime INFOMAR Inc. de Sainte-Flavie près de Mont-Joli. Par un processus de courtage privé des données, INFOMAR assure, depuis le 1er janvier 1993, la gestion, l'entretien et l'exploitation du système par la clientèle.

Les bénéfices associés à la réalisation
Un rapport indépendant du Centre de formation et de recherche en transport maritime et intermodal du Québec souligne:

"À la lumière des résultats obtenus par l'analyse du potentiel théorique, on constate que l'industrie maritime n'a pas fait un usage maximal du niveau d'eau disponible à la hauteur de Montréal..."

"L'introduction des nouveaux enregistreurs numériques de niveau d'eau TMS-1000 et du système SINECO devrait répondre au besoin de données en temps réel."

Les retombées prévues de SINECO dépasseront largement ses coûts de réalisation dans les deux prochaines années. En effet, l'efficacité accrue dans la planification des chargements assurera un accroissement de volume de plusieurs centaines de milliers de tonnes de marchandises annuellement, soit l'équivalent de plusieurs millions de dollars. D'ailleurs, Jean-Luc Bédard, capitaine et maître du Port de Montréal, a commenté que:

"Depuis sa mise en opération en janvier, le système SINECO du SHC a déjà rapporté des dividendes. Ce système permettra au Port de Montréal d'améliorer sa compétitivité avec les ports de la côte est américaine dans le domaine du transport par conteneurs."

Par ailleurs, le système SINECO, améliorant les plans d'intervention et permettant une gestion du risque plus appropriée, contribuera à réduire les temps d'attente des navires, synonyme de frais supplémentaires importants pour les armateurs et d'un manque à gagner certain pour les ports, designing and installing the new digital tide gauges. The gauges were designed by the firm SOCOMAR Inc. of Quebec City, which has six electronics experts. The Quebec Region of the CHS and Public Works Canada were in charge of installing and putting the infrastructure into operation. In May 1991, Quebec port agencies, acting through the Canada Ports Corporation, agreed to provide an important financial contribution to accelerate the completion of this sub-project. Investments by CHS' partners and strategic allies in the project were also required for the successful completion of this phase.

The second sub-project, also completed in 1992, involved developing the data acquisition, verification, management and dissemination software. ASA Consulting Ltd. of Dartmouth, Nova Scotia, was commissioned to do this work. An important investment of labour and material by this company was necessary for the success of this phase.

The third sub-project was implemented by the CHS, Quebec Region, and the consortium INFOMAR Marine Service Inc. of Ste Flavie, near Mont Joli. Through a private data brokerage approach, INFOMAR has been managing, maintaining and overseeing the use of the system by clients.

Benefits of the Project
In a report by an independent organization (the Centre for Training and Research in Marine and Intermodal Transportation in Quebec) the following comments are made:

"Based on an analysis of theoretical potential, the maritime industry has not made maximum use of the water level data available for the Montreal area..."

"The new TMS-1000 digital tide gauges and the COWLIS system should respond to the need for near-real-time data."

The anticipated spinoffs from COWLIS will greatly exceed its development costs over the next two years. The greater efficiency in planning loads will ensure an increase in cargo volumes in the order of hundreds of millions of tonnes each year, which is equivalent to several million dollars. Jean-Luc Bédard, Captain and Harbour Master of the Port of Montreal, said that:

"The CHS's COWLIS system has been paying dividends since it came on stream in January. It will enable the Port of Montreal to become more competitive vis-à-vis the Eastern Seaboard ports in the United States in the area of container transport."

In addition, the COWLIS system, by improving intervention plans and permitting more suitable risk management, will help to reduce waiting time for ships, which represents significant additional costs for shipowners and a definite opportunity cost for ports. For example, during the ice jam on Lake St. Pierre in February, for the twenty or so ships stuck in the Port of Montreal, each day spent waiting represented extra costs of $10K to $25K per ship.
Par exemple, lors de l’embâcle du Lac St-Pierre en février, chaque journée d’attente représentait, par navire, des coûts variant de 10 à 25 K$ pour la vingtaine de navires bloqués au Port de Montréal.

Les bénéfices reliés à la sécurité maritime sont également importants. Michel Pouliot, président de l’Association Internationale des Pilotes maritimes de Londres (Angleterre), président de l’Association des Pilotes maritimes du Canada (Ottawa) et de la Corporation des Pilotes du Bas Saint-Laurent, un autre client important rapporte que:

"Le système SINECO du Service hydrographique du Canada permettra aux pilotes du Saint-Laurent de mieux gérer la circulation des navires à fort tirant d’eau en étant un outil des plus utile et fiable sur l’état des marées. De plus, il croit que cet outil permettra d’offrir un soutien certain pour promouvoir davantage l’attrait du Saint-Laurent à des marchés potentiels.

L’approche de courtage privé met à profit le partenariat avec d’autres ministères, l’alliance stratégique avec l’entreprise privée et la liaison avec l’industrie pour le bénéfice du Québec et du Canada. Ce concept permet alors à l’industrie, axée vers les sciences de la mer, de développer des produits à "valeurs ajoutées" tels que les modèles numériques des courants, l’intégration des données sur la carte électronique, qui se grefferaient au système SINECO pour y améliorer son rendement et augmenter ses bénéfices.

Les défis relevés

Les besoins toujours grandissants des utilisateurs de données de niveaux d’eau combinés à des facteurs tels que la désuétude des instruments analogiques utilisés antérieurement, la dégradation des infrastructures abritant ces instruments, la difficulté du contrôle de qualité sur le terrain et la diminution des budgets d’opération ont amené le SMC, région du Québec, à rationaliser son réseau. Les défis relevés lors de la réalisation du système furent donc importants. Soulignons, entre autres, les suivants:

Réponses aux attentes pressantes des clients/utilisateurs

Afin de répondre aux besoins des usagers/clients, le système SINECO devait assurer la régularité, la disponibilité et l’instantanéité de l’information transmise; contrôler adéquatement la qualité des données; faciliter l’interprétation des résultats pour l’utilisateur. Ces besoins ont amené l’équipe de projet à développer une infrastructure costaudes de réseau et une algorithme d’exploitation des données basées sur la convivialité et l’efficacité de l’interprétation.

Le système devait assurer des coûts raisonnables d’abonnement en respectant des délais de transmission des données imposés par les utilisateurs. En conséquence, pour pallier au fait que les données observées ne peuvent être obtenues en temps réel en raison de la structure du réseau, un algorithme de calcul de prévisions basé sur les phénomènes astronomiques et météorologiques a été développé. Ainsi, l’utilisateur accède à des niveaux d’eau instantanés qui correspondent aux niveaux d’eau actuels suivant un intervalle de confiance jugé acceptable.

Développement d’une nouvelle technologie et d’une expertise canadienne

The benefits related to marine safety are also considerable. Michel Pouliot, President of the International Maritime Pilots’ Association in London, England, and President of the Canadian Marine Pilots’ Association in Ottawa and of the Corporation of the Pilots of the Lower St. Lawrence, stated that:

"The Canadian Hydrographic Service’s COWLIS system will enable St. Lawrence pilots to better manage heavy draught ships by providing very useful and reliable data on tide conditions. Furthermore, I believe that this tool will be a true asset in terms of promoting the benefits of the St. Lawrence among potential clients."

The private brokerage system is based on partnership with other departments, strategic alliances with the private sector and liaison with the industry for the benefit of Quebec and Canada. This concept allows marine science-oriented industry members to develop value-added products, such as digital current models and the incorporation of data into electronic charts, which can be integrated into the COWLIS system to improve its performance and enhance its benefits.

The Challenges

The ever-greater needs of water level data users, combined with factors such as the obsolescence of the analog instruments used previously, degradation of the infrastructure housing these instruments, the difficulty of controlling quality in the field and shrinking operating budgets, compelled the CHS, Quebec Region, to rationalize its network. The challenges it faced in establishing the system were major. They included the following:

Responding to the urgent expectations of the users / clients

To meet user/client needs, the COWLIS system had to: ensure the uniformity, availability and near-real-time quality of the information provided; ensure adequate quality control of the data; and facilitate the interpretation of results for users. In view of these needs, the project team developed a solid network infrastructure and an algorithm for the data based on the criteria of user-friendliness and efficient interpretation.

The system had to allow for reasonable subscription costs while respecting the timeframes for data transmission imposed by users. Consequently, to make up for the fact that observed data could not be obtained in real time owing to the network’s structure, an algorithm for calculating forecasts based on astronomical and meteorological phenomena was developed. Hence, the user has access to instant water level data which correspond to actual water levels based on a confidence level deemed acceptable.

Development of a new technology and Canadian expertise

In the absence of an effective Canadian technology for digital water level measurement, the CHS joined with partners to design and manufacture new tide gauges.
En l'absence d'une technologie canadienne efficace en matière de mesure numérique de niveaux d'eau et offrant des possibilités de "valeur ajoutée", le SHC s'est associé à des partenaires pour la conception et la fabrication des nouveaux enregistreurs.

**Exportabilité et rentabilité du système**

Afin de maximiser les bénéfices et de valoriser l'expertise québécoise à l'extérieur du pays, la technologie SINECO devait être vendable et exportable, à des prix concurrentiels.

**Recherche du financement de démarrage et d'opération**

Compte tenu des impacts sur l'économie et des coûts importants de la réalisation du projet, le SHC de la région du Québec a établi du partenariat, des alliances stratégiques dans le domaine de l'économie avec les secteurs privé et public pour accélérer la mise en place du système. La mobilisation de fonds privés a été possible par la démonstration des bénéfices pour chaque partenaire. La participation financière du secteur privé à un projet public était en elle-même un défi.

**Évolution du système assurée par un mode de gestion innovateur**

La mise en place d'un mécanisme innovateur d'exploitation des données basé sur le courtage, assurera sa prise en charge par l'entreprise privée, la rentabilité du système, l'accroissement du réseau et le développement de produits à "valeur ajoutée".

**La technologie utilisée**

Le système SINECO a été développé en fonction de quatre critères principaux: la fiabilité du réseau, la précision des données, l'optimisation des coûts d'accès à ces données et l'exploitation conviviale et efficace des données par les utilisateurs abonnés. La structure actuelle du SINECO permet au système d'évoluer en fonction de nouvelles technologies et de se greffer à différents moyens de communication (radio, satellite). Son utilisation n'est donc pas limitative à une région ou à des technologies particulières.

SINECO comprend actuellement 16 enregistreurs numériques de niveaux d'eau. Le tronçon Montréal/St-François (île d'Orléans) étant considéré prioritaire pour la navigation, 14 enregistreurs y ont été installés. Les sites de Rimouski et de Sept-îles complètent le réseau.

La figure 1 illustre l'organisation physique et opérationnelle des principales composantes du système. Aux enregistreurs sont reliés un ensemble de micro-ordinateurs (ou serveurs) qui effectuent périodiquement l'interrogation des mètres par liaison téléphonique ou radio. Par la suite, chaque serveur transmet ces nouvelles informations à un ordinateur central par le biais du réseau numérique DATAPAC.

Un ordinateur DELL 433SE effectue les processus d'acquisition, de traitement et de diffusion des données. Un générateur de signaux temporels permet une synchronisation de l'ordinateur central avec l'horloge atomique de Colorado Springs. Tous les logiciels sont programmés en langage C++ sous UNIX.

**Exportability and cost-effectiveness of the system**

To maximize the benefits and earn recognition for Quebec's expertise outside Canada, it was vital that the COWLIS technology be marketable and exportable at competitive prices.

**Search for start-up and operating funds**

In view of the economic impact and the significant cost of the project, the CHS in Quebec Region forged economic alliances with the private and public sectors to speed up the process of bringing the system on stream. Private sector funding was secured by showing the benefits of the system for each partner. Obtaining financial support from the private sector for a public sector project was a challenge in itself.

**Continuing development of the system through an innovative management approach**

An innovative mechanism based on a brokerage approach to using the data will ensure private sector participation, the cost-effectiveness of the system, the expansion of the network and the development of value-added products.

**The Technology**

The COWLIS system was developed based on four main criteria: network reliability, data accuracy, optimization of the cost of accessing the data and user-friendly and efficient access to the data by subscribers. Under COWLIS' current structure, the system can evolve by incorporating new technologies and it can be used with various communication links (radio, satellite). Use of the system is therefore not limited to a specific region or specific technologies.

COWLIS currently consists of 16 digital tide gauges. Since the Montreal/St. François sector (Île d'Orléans) is considered a priority for navigation, 14 tide gauges have been installed there. The other sites in the network are Rimouski and Sept-îles.

Figure 1 shows the physical and operational structure of the main system components. A group of micro-computers (or servers), connected to the tide gauges, periodically query the tide gauges through a telephone or radio link-up. Then, each server transmits the new information to a central computer over the DATAPAC network.

A DELL 433SE computer handles data acquisition, processing and distribution. Through a time generator, the central computer is synchronized with the atomic clock in Colorado Springs. All the software programs are programmed in C++ on UNIX.

The network permits the simultaneous access to water level data by a number of users from a number of sites. The data access software for users, known as OCEANUS, was developed in a MS-Windows environment and provides a graphic and digital window environment.
Figure 1. Configuration of COWLIS information system and network
Organisation physique du réseau et du système SINECO
La mise en réseau permet l'accès simultané des données de niveaux d'eau de plusieurs sites et à plusieurs usagers simultanément. Le progiciel de l'utilisateur, développé sous un environnement MS-Windows et connu sous le nom d'OCEANUS, offre un environnement fenêtré graphique et numérique.

Les participants majeurs
Le ministère des Pêches et des Oceans via son Service hydrographique du Canada de la région du Québec, titulaire et gestionnaire du projet;

SOCOMAR Inc. de Québec pour le développement de l'enregistreur numérique de niveaux d'eau TMS-1000;

ASA Consulting Ltd. de Dartmouth (Nouvelle-Écosse) et le consortium Service maritime INFOMAR Inc. de Sainte-Flavie pour le développement des logiciels d'acquisition, de vérification, de gestion et de diffusion des données. Cette entreprise agira comme courtier privé pour l'exploitation du système SINECO;

Les entreprises portuaires québécoises, sous l'égide de la Société canadienne des Ports qui a apporté son soutien financier et assuré la direction du projet en tant que client, en particulier les entreprises suivantes:

Le Port de Montréal;
Le Port de Trois-Rivières;
Le Parc industriel et portuaire de Bécancour;
Le Port de Québec;

Les Associations des Pilotes du Bas Saint-Laurent de Québec et des Pilotes Saint-Laurent Central de Trois-Rivières, en tant que CLIENT et expert de la navigation;

Québec-Téléphone, comme conseiller en matière de télécommunication;

Travaux publics Canada et la firme-conseil Denis Thibault et Associés, pour la conception et l'installation des infrastructures et

La Garde côtière canadienne, région des Laurentides, pour son soutien en matière de contrôle de qualité des enregistreurs.

Tous ces partenaires ont contribué en grande partie à l'économie du Québec et du Canada en y réalisant le système SINECO. L'avenir de SINECO est assuré.

Main Stakeholders
The Department of Fisheries and Oceans via the Canadian Hydrographic Service in Quebec Region, project owner and manager;

SOCOMAR Inc., of Quebec City, which developed the TMS-1000 digital tide gauges;

ASA Consulting Ltd. of Dartmouth (Nova Scotia) and the consortium, INFOMAR Marine Service Inc., of Ste Flavie (Quebec), which developed the data acquisition, validation, management and distribution software. This company will serve as a private broker to operate the COWLIS system;

Quebec-based port agencies, under the aegis of the Canada Ports Corporation, which has provided financial support and assumed the direction of the project as a client, namely the following:

Port of Montreal,
Port of Trois-Rivières,
Industrial and Harbour Park of Bécancour,
Port of Quebec;

The Corporation of the Lower St. Lawrence Pilots of Quebec and the Central St. Lawrence Pilots of Trois-Rivières, as client and navigation expert;

Quebec-Telephone has acted as a telecommunications advisor;

Public Works Canada, Quebec Region, and engineering consultant Denis Thibault et Associés of Rimouski (Quebec) designed and installed the infrastructure; and

The Canadian Coast Guard, Laurentian Region, has provided quality control support for the tide gauges.

By setting up the COWLIS system, all these partners have made a major contribution to the economy of Quebec and Canada. The future of COWLIS is assured.

Bernard Tessier, Denis Hains et Patrick Hally:
Service hydrographique du Canada
Institut Maurice-Lamontagne
C.P. 1000
Mont-Joli, Québec
G5H 3Z4

Sylvain de Margerie:
ASA Consulting Ltd.
P.O. Box 9533, Station T
Ottawa, Ontario
K1G 3V2
New, from the world leader in multi-beam sonar.
A high performance survey system for hydrographic operations.

Introducing the **SEA BEAM 1000™** hydrographic survey system, from SeaBeam Instruments. Technologically-advanced, compact, and competitively priced. This system delivers precision hydrographic data, co-located with geometrically-corrected sidescan imaging. Coverage is continuous at high survey speeds.

**SEA BEAM 1000** generates swath widths of up to 150 degrees and operates in depths of from one to 500 meters.

The system is available with a 75 or 230 kHz operating frequency. Electronics are rack-mounted or packaged in lightweight, portable cases for small launch operations. The array is hull-mounted — or installed in a towfish for ship-of-opportunity applications.

Contact SeaBeam Instruments today to learn more about the **SEA BEAM 1000** hydrographic survey system. Find out what’s new in the world of multi-beam technology.

SeaBeam Instruments, Inc.
A Channel Technologies Company
141 Washington Street • East Walpole, MA 02032-1155 U.S.A.
Tel: (508) 660-6000 / 1-800-SEABEAM • Fax: (508) 660-6061
Royal Navy Hydrographers Honoured

by

R. W. Sandilands

The Admiralty hydrographers who surveyed the coast of British Columbia have been honoured by the erection of a historical marker at Bedwell Harbour on south Pender Island.

The project was initiated by the Gulf Islands Historical Federation and supported by Heritage B.C. and the Pender Harbour Resort.

The site chosen was alongside the primary bench mark at Bedwell Harbour. It is not the usual brass bench mark but a large chiselled arrow on a sheer rock face.

Figure: 1 Egeria Rock

The inscription on the plaque reads:

EGERIA ROCK
After Captain Cook’s explorations, the detailed charting of this coast was done by “Men of the Admiralty,” hydrographers of the Royal Navy. They included Captain Pender, after whom this island is named, and Captains Vancouver and Richards. This rock was established as a survey bench mark by Captain, later Rear Admiral Sir John Parry of H.M.S. Egeria, the last Royal Navy survey ship on this coast (1898-1910). This bench mark gives a vertical reference for surveys of the area. It is 18.42 feet above chart datum.

Figure: 2 Egeria Rock Bench Mark

HMS Egeria was a composite screw sloop, third in a class of six and the second ship of the Royal Navy to bear the name. There have been three later Egerias. Egeria was a prophetic nymph of ancient Rome and one of the sibyls. [Editor’s note: a sibyl was an ancient Greek or Roman fortune teller or sorceress whose prophesies were supposedly inspired by a deity].

Built at Pembroke Dock, she was 160 feet long with a 31 1/2 foot beam. First commissioned in 1874, she served with the fleet until 1881 when she was paid off to reserve. Two years later she was recommissioned as a survey vessel and carried four 20-pounder Armstrong breech loading guns on shock carriages for anti-piracy protection. She had an iron frame and teak shell and was engined by Humphreys and Tennant. Her bunkers had 100 tons capacity giving her a range of 1,300 nm in fine weather at 5 knots and less than 1,000 nm at 10 knots. For surveying duties she carried two 28-foot steam cutters, one ten oar 28-foot cutter, three 27-foot whalers and three 16-foot skiffs. Her complement was 125 officers and men (Figure 3).

In 1886 HMS Egeria sailed to the China station for about an eighteen month period and then carried out surveys in Tasmania and Fiji for six years with a relief crew joining in 1890. She returned to U.K. for refit and new boilers and in 1897 sailed for the Pacific coast. She was on the coast until 1910 when she was sold, all standing, at Esquimalt and was purchased by the Navy League. Nearly forty years after her keel was laid her hull was still in good condition but her engines were worn out. She burned in 1913 and was broken up.

HMS Egeria served five commissions on the coast. Her Captains were Commander Smyth (1898-1900); Commander Simpson (1900-1903); Commander Parry (1903-1905), Parry being promoted to Captain on station; Commander Learmonth (1905-1907) and finally Captain Parry again. A Lieutenant Nares, whom I believe later served with the Canadian Hydrographic Service, brought Egeria back to Esquimalt to decommission.

Smyth’s surveys were mainly in the Strait of Georgia but he also carried out ocean sounding along the proposed route of the trans-Pacific cable. The largest portion of this cable ran 3,450 miles from Barnfield on the west coast of Vancouver Island to Fanning Island and thence to Australia.

Simpson carried out surveys reaching to the north of Vancouver Island through Discovery Passage and Johnstone Strait to Goletas Channel and Nahwitti Bar.

Parry, on his first commission, resurveyed the Gulf Islands including the ports of Ladysmith and Chemainus; these charts
Figure 3: HMS Egeria was at the Esquimalt Naval Base when news of the death of Queen Victoria was received. She is shown here firing the ceremonial minute guns.

Figure 4: HMS Egeria's Officers. Captain Parry is located front and center.
were the base for all of this area until echo sounder surveys replaced them in the 1950's. It was during this commission that the original bench mark at Bedwell Harbour was established as was one of a similar nature cut into a rock face in Active Pass.

Learmonth moved from the populated south coast of B.C. to the relatively unpopulated northwest coast of the Province where surveys were required to give safe navigation for the port of Prince Rupert, the terminal for the proposed trans-Pacific route and the Grand Trunk Railway across Canada. He and Parry, on his second commission, completely charted Dixon Entrance, Chatham Sound and surrounding waters.

Parry (Figure 5) became Hydrographer of the Navy (1914-1919) almost immediately after the outbreak of World War I and it was largely due to his organizational genius that the Hydrographic Office was able to cope with the heavy demands of the Royal Navy for war purposes. He was largely instrumental in the establishment of the International Hydrographic Bureau and was its first Presiding Director. He died in 1926.

Learmonth (Figure 6) succeeded Parry as Hydrographer of the Navy (1919-1924). Having surveyed in the Mediterranean, on the west coast of Africa, the China station and Canada, he brought a wealth of knowledge to the post at a time when the recommencement of Admiralty world-wide surveys after World War I was underway. He died in 1941.

As is noted on the historical marker, Pender Island was named after Captain Daniel Pender, R.N. (Figure 7). He came to the coast as second master of the survey ship HMS Plumper in 1857. He was promoted Master in 1860 and when Plumper was replaced by HMS Hecate in 1861 to carry on with Captain George Richards' surveys of the coast, he transferred to her. At the end of that commission he took command of the charter vessel Beaver (Figure 8), hired from the Hudson's Bay Company, and carried out surveys on the coast until 1870 when the survey program was completed. He returned to the U.K. in 1871 and was attached to the Hydrographic Office, retiring as Assistant Hydrographer.
Figure 8: Pender’s charter vessel - Beaver

<table>
<thead>
<tr>
<th>Place</th>
<th>Bedwell Harbour, B.C.</th>
<th>Lat.</th>
<th>Long.</th>
<th>Station</th>
<th>7350</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID Number</td>
<td>O5C9500</td>
<td>GSC elev.</td>
<td>Chart Datum</td>
<td>5.614</td>
<td></td>
</tr>
<tr>
<td>BM Number</td>
<td>Egeria 1905</td>
<td>IGLD elev.</td>
<td>Last Revision</td>
<td>12/7/89</td>
<td></td>
</tr>
</tbody>
</table>

Situated on South Pender Island at the northern end of Egeria Bay, cut into the rock cliff, an arrow.

Located 1985

Figure 9: Current Bench Mark description for Egeria 1905

Bibliography
5. HMS Egeria file - Maritime Museum of B.C.

About the Author
R. W. (Sandy) Sandilands served with the Admiralty Hydrographic Service before joining the Canadian Hydrographic Service, and on September 8, 1993, had the honour of unveiling this historical marker. "Sandy" retired from the CHS in 1989, and lives in Victoria, B.C.
A Quantitative Comparison of the Towed In-Flight Bathymetry System with Launch-Borne Acoustic Soundings near Coppermine, NWT.

by

J. Scott Holladay, David Wright, Michael R. Crutchlow and Albert Koudys

Introduction
The electromagnetic Towed In-flight Bathymetry System (TIBS™) is a new approach to depth acquisition. It is deployed by helicopter, which means that areas which are remote, hazardous or otherwise inaccessible to surface vessels can be surveyed safely. It can survey through sea ice or turbid seawater to a depth of 50 metres. Finally, because it can acquire data at an average speed of 100 km/hour, the system can obtain over 500 line km/day of sounding data. TIBS is particularly well-suited to work in Arctic conditions, where sea ice and water turbidity are frequent impediments to other survey methods. The system achieved operational status in 1992, with the completion of its first major survey in Pelly Bay, NWT [1]. This survey provided for the Canadian Coast Guard (CCG) icebreaker Sir John Franklin to reach the village of Pelly Bay for the first time in August, 1992. Fuel and other bulk commodities are now supplied to the town by ship, rather than by air.

TIBS is not an acoustic or LIDAR sensor. Instead of using time-of-flight measurements, as these methods do, TIBS measures the electromagnetic reflection coefficient of the seawater at multiple frequencies ranging from 45 Hz to 33 kHz. Analysis of these reflection coefficients as a function of frequency, coupled with laser measurements of the distance of the sensor above the water (or sea ice) surface, yields precise estimates of water depth along the flight path of the system.

The goal of this paper is to evaluate the relative accuracy of TIBS and conventional (acoustic) depth soundings. A practical approach to the comparison of such datasets was developed and tested using survey results from two distinct parts of the Northwest Passage; one near the town of Coppermine, and the other in Victoria Strait. These surveys were carried out as part of a more general mapping of this section of the Northwest Passage to aid in shipping of ore metal concentrates from mines near Coppermine to Europe and to Asia.

The Coppermine and Victoria Strait TIBS surveys were carried out between March and June, 1993 [2], using bases at Coppermine and at Cambridge Bay (see Figure 1). Most of the survey area was covered by thick sea ice, which precluded conventional surveying at this time of year. The sea ice was relatively smooth near Coppermine, but was much rougher in Victoria Strait, where wind and current activity keep the ice in constant motion. The conventional acoustic survey work was carried out during a narrow time window in late summer, using launches operating from the Canadian Hydrographic Service (CHS) vessel John P. Tully and the CCG icebreaker Sir John Franklin. As ice conditions were not ideal, it was not possible to survey all of the areas covered by TIBS. Instead, the conventional survey concentrated on areas which had been shown to be less than 50 m deep by the TIBS data. Ice conditions were especially difficult during the Victoria Strait portion of the survey effort, and resulted in less than complete coverage of the target areas. All airborne and surface data were positioned using real-time differential GPS, for an estimated accuracy of 10 metres (2DRms). All TIBS surveying, as well as the launch-borne portion of the Coppermine survey, used direct telemetry from a GPS base station located at Coppermine, while John E. Chance's STARFIX™ with McElhanney's SATMARK™ were used for the launch-borne portion of the Victoria Strait survey.

Figure 1: Location map for Coppermine and Victoria Strait survey areas

Comparisons of TIBS and Acoustic Datasets
The TIBS data were acquired at a different time from the conventional results, and along different tracks. As a result, there are three principal sources of difference between the datasets:

1. The individual soundings were obtained in different places;
2. Both surveys were subject to positioning error at the time of acquisition; and
3. The two methods have different error levels.

In order to quantify TIBS accuracy relative to that of conventional soundings, it is necessary to evaluate and remove the effects of the first two error sources, sounding positioning and positioning error.
Analytical Approach

The analysis assumes two datasets, which will be labeled 'Conventional' and 'TIBS' for convenience. It was assumed that the conventional depths are essentially error free, while being subject to the same positioning errors as TIBS. The positioning was assumed to have normally distributed errors with a zero mean and a 2D 95% confidence interval of 10 metres. These assumptions (apart from that of zero-mean error) were tested during the analysis.

'Apparent' depth errors generated by positioning error were identified and eliminated through an internal analysis of the conventional dataset, yielding an estimate of the internal consistency of the conventional data. The same approach was then applied to evaluation of TIBS' overall consistency with conventional soundings. Finally, a variation on the technique was used to estimate TIBS error levels relative to conventional soundings as a function of depth. The rest of this section describes the approach in more detail.

The Influence of Positioning Errors on Depth Estimates

Inconsistencies between depth maps prepared from two or more sounding data sets are likely, even when the maps are prepared using error-free soundings, because positional uncertainties can couple into 'apparent' depth error through the slope of the sea bottom. For example, a horizontal positional error of 20 metres, occurring over a sea bottom having a uniform slope of 0.1 m/m, would result in a spurious depth difference of 2 metres. Positioning errors approaching this size are assumed to be present in the Coppermine and Victoria Strait datasets. It should be noted that if more accurate positioning had been used, yielding horizontal errors of less than, say, 1 metre, the depth errors associated with differences in measured position could have essentially eliminated by interpolating the 'true' depth at each TIBS position based upon the nearest conventional sounding and calculated slope information.

'Apparent' depth errors caused by positioning errors interacting with nonzero bottom gradients can be identified by analyzing depth differences between two datasets as a function of bottom gradient. In fact, since the same positioning technique was used for both the TIBS and conventional surveys, internal analysis of the conventional dataset can be used to verify the functional form and estimate scaling parameters for this effect. For the purposes of this paper, this function will be assumed to be linear, i.e. of the form

\[ \Delta D_{\text{total}} = \Delta D_{\text{position}} + \Delta D_{\text{noise}} \]

where:
- \( \Delta D_{\text{total}} \) = meas. depth error (Acoustic TIBS depths);
- \( \Delta D_{\text{position}} \) = rate of change of depth with position (i.e., horizontal gradients of sea bottom); and
- \( \Delta D_{\text{noise}} \) = depth error not due to position.

The meaning of this relationship is very simple: the total depth error is composed of a position-related component, \( \Delta D_{\text{position}} \), and a true depth error, \( \Delta D_{\text{noise}} \). Thus, \( \Delta D_{\text{position}} \) is the ratio of the average sea bottom gradient \( G \) times the lateral displacement \( \Delta X \) between the two sounding sites.

It should be noted that \( \Delta D_{\text{total}} \) and \( \Delta D_{\text{noise}} \) are also functions of depth, although the functional dependence is much weaker. The y-intercept, \( \Delta D_{\text{noise}} \), can be identified as the desired positioning-independent depth error, since a zero bottom gradient eliminates the effect of positioning errors on apparent depth.

Since the positioning error is the same for both the reference and TIBS systems, the Reference and TIBS comparison plots would be expected to have the same slopes. The difference between the \( \Delta D_{\text{noise}} \) values for the two plots would then represent the difference in noise levels between the two systems.

Dependence of Depth Errors on Depth

As a final step the depth errors were sorted by depth to determine the noise levels of the system at given depth ranges. The noise levels \( N_d \) for several depth ranges were then calculated from a rearrangement of Equation 1:

\[ N_d = \Delta D_d - G_d \Delta X \]

where:
- \( N_d \) = Standard Deviation of errors for each depth range;
- \( \Delta D_d \) = Depth difference between TIBS and Reference soundings for a given depth range 'd';
- \( \Delta X \) = Constant derived from \( \Delta D_{\text{total}} \) vs. \( G \) plots for the Reference data;
- \( G_d \) = Average magnitude of \( \Delta D_{\text{total}} \) vs. \( G \) plots for each depth range;

The \( N_d \) values can then be plotted versus 'd' to illustrate the relative errors for each depth range.

Data Analysis Procedure

Separating Positional Errors from True Depth Errors

The first task was to use the conventional data to prepare a 'Reference' Digital Terrain Model (DTM), using a 50 metre grid cell size. The magnitude of the horizontal gradient was then computed and stored as the 'DTM Gradient' grid. The Geosoft mapping package was used to generate and manipulate all DTM's, while statistical manipulation and graphical presentation of extracted data were also performed using Microsoft Excel.

The second task was to establish three databases, labeled 'Reference', 'Raw TIBS', and 'Bias-Corrected TIBS', using the following methodology:

1. Define "coincident" positions as those for which the horizontal positional uncertainties overlap. Since these uncertainties are 10 metres 2 Drms for both surveys, then two soundings identified by the positioning system as 20 metres apart could in fact be from the same physical location. Note that the Bias-Corrected TIBS data has simply had the mean error for each flight removed.

2. Construct each database, using the following steps:
   a) Search for all coincident soundings, (excluding identical soundings for the reference dataset).
   b) Store position, trial depth, total depth error, GPS-estimated distance between the trial and reference soundings, and flight number (for TIBS data).
c) Interpolate magnitude G of DTM gradient (i.e. bottom slope) from Gradient grid at each sounding point, add to Reference and TIBS databases.

3. Sort each database by magnitude of DTM gradient field.

4. Compute the average depth error δD total for successive intervals of DTM gradient, then plot δD total vs. DTM gradient G.

5. Extract intercept and slope: analyze using (1):
   a) The intercept ΔDNoise corresponds to depth error with contribution of positioning error removed.
   b) The slope of the plot, ΔX, is proportional to the average horizontal error.

Note: Before construction of the Bias-Corrected TIBS database, the raw TIBS dataset was corrected for measurement bias, as it was apparent that the depth errors in the TIBS data set consisted of a measurement bias (undoubtedly due to slight variations in calibration), which varied between TIBS flights, together with apparently random measurement noise. Correcting for bias therefore permitted estimation of the error levels which the upgraded version of TIBS, no longer subject to calibration drift, should display. In any case, flight to flight levelling of the TIBS results could be used to remove any bias even with the current version of TIBS. Such flight to flight levelling could be performed, in the absence of a reference dataset, by flying tie lines (deweighting ties where bottom gradient was high) and performing least squares fine tuning of the system calibration, or by performing careful repeated overflights of a short survey line over low-relief sea bottom near the survey base. For this study, bias correction was performed by subtracting the mean error of each flight from the depth differences from that flight's data.

Estimation of TIBS Noise Level as a Function of Depth
The final task was the estimation of TIBS noise levels as a function of depth. The procedure for this was as follows:

1. Re-sort databases, this time for depth ranges.
2. For each depth range d, compute intercept N_d (position independent depth error) as above, using G_d the average slope observed (assuming same positional error and therefore same slope ΔX) and Equation 2.
3. Plot intercept value N_d for each depth range vs. average of depth range d.

Results
Coppermine Dataset
The plot of Depth Difference vs. DTM Gradient for this area (Figure 2) includes graphs of the Reference data set (at bottom of plot), the Raw TIBS dataset (upper plot) and Bias-Corrected TIBS (triangular symbols). A least-squares fit of the Reference data yielded the line running through the Reference points. The slopes of the least-squares fits for the other two datasets are equivalent (within fitting error) to that obtained for the Reference data. The Bias-corrected TIBS fit yielded an intercept value of approximately 1.3 metres. This represents the average noise level of the TIBS system for this area. The corresponding noise level for the Reference datasets is approximately 0.2 metres.

Victoria Strait Dataset
During the analysis of the Victoria Strait data, it was found that the conventional data set was not dense enough to provide an adequate Reference data set, so a value for ΔX derived from the Bias-Corrected TIBS data was used for this analysis. This was necessary because the navigation errors were higher in Victoria Strait (about twice as large as those near Coppermine), owing to the use of a (single) remotely located base station instead of a local base station with direct telemetry of the real-time corrections.

The acoustic and TIBS depth DTM’s are plotted as gray scale maps in Figures 4 and 5. The principal features to note are the shoal areas running from NNW to SSE (some less than 10 metres deep), as well as the two narrow channels running approximately NE to SW. A third, wider zone of deep water (most easily seen in the TIBS data, which covered a wider area) is almost truncated by shoals at bottom center, though a narrow passage does exist which joins the southernmost of the NE to SW trending channels. Ships requiring 30 metres or more of water for safe navigation will be forced to use one of these routes, or to bypass the area entirely.
Figure 4: Launch-Borne Acoustic Depth Digital Terrain Model, plotted as gray scale map. Note shoal areas (light tone) and NE to SW trending deep channels.

Figure 5: TIBS Depth Digital Terrain Model, plotted as gray scale map. Compare to Figure 4.

The depth difference vs. DTM gradient plot (Figure 6) for Victoria Strait yields a larger slope than did the corresponding plots for Coppermine. It is otherwise very similar, however, with an intercept of 1.53 metres for the Bias-corrected TIBS data. The plot of TIBS Noise vs. Depth (Figure 7), which also includes the Coppermine data for comparison, is similar in form but is on average degraded by about 0.3 metres, with the quality of soundings dropping more rapidly at large depths.
Lighthouse: Edition 49, Spring 1994

50

The use of a remotely located base station for the launch
for the

The internal consistency (one standard deviation) of conven­tional data yielded a

Analysis of these results indicated that the positioning error

TIBS DEPTHS ERROR VS. DTM GRADIENT (VICTORIA STRAIT DATA)

Figure 6: Depth Difference vs. DTM Gradient for Victoria Strait dataset

TIBS NOISE VS. DEPTH COPPERMINE AND VICTORIA STRAIT DATA

Figure 7: TIBS One Standard Deviation Noise levels vs. Depth for Victoria Strait dataset. The Coppermine results are included for comparison.

Discussion

The internal consistency (one standard deviation) of conven­tional acoustic depths obtained near Coppermine was 0.22 metres, which was consistent with survey specifications.

The Raw TIBS results showed one standard deviation error

levels in the Coppermine area were less than 0.8 metres for depths up to 15 metres, rising to about 1.4 metres for depths between 25 metres and the system cutoff depth of 50 metres. In Victoria Strait, depths up to 20 metres exhibited similar noise levels. At greater depths, noise levels increased by 0.1 to 0.7 metres over the Coppermine results. This effect is directly attributable to the extensively rubbled sea ice in this area.

Despite adverse weather conditions, 488,336 TIBS soundings along 19,300 line kilometres were obtained during a 100 day field program, for an average rate of 4,860 soundings along 193 line kilometres per day. This should be compared to typical production rates of 41 through-ice acoustic spot soundings per day (using 2 helicopters), with a line density of 1 sounding per km.

Conclusions

1. This paper has demonstrated a qualitative way to compare bathymetric datasets while taking positioning error into account.

2. It was confirmed that using a local GPS base station with direct telemetry of real-time differential corrections yields positions roughly twice as reliable as those obtained using the Wide Area Network approach.

3. TIBS yielded noise levels of 2.01 metres (Raw) and 1.33 metres (Bias-Corrected) relative to conventional acoustic sounding, while an internal assessment of the conventional data yielded a 0.22 metre noise level. The Bias-Corrected results should be representative of the new, fully-digital TIBS system.

The immediate aims of current development efforts are to:

1. Eliminate bias generated by changes in system calibration (this has already been achieved); and

2. Reduce depth noise levels, particularly in the 20–50 metre range. This is primarily a matter of reducing electromagnetic sensor noise levels.

The long-term goal is to reach IHO standards for depth accuracy over the depth range 1 to 50 metres.

References


About the Authors

Geonex Aerodat Inc. (Mississauga, Ontario)
J. Scott Holladay, Research and Development
David Wright, Field Operations.

Canadian Hydrographic Service (Burlington, Ontario)
Michael R. Crutchlow, Development Officer
Albert Koudys, Hydrographer
INTERNATIONAL HYDROGRAPHIC BUREAU
B.P. 445
7, Avenue Président J.F. Kennedy, MC 98011 MONACO CEDEX
publishes
twice a year, in March and September
an English and a French edition of

THE INTERNATIONAL HYDROGRAPHIC REVIEW

This publication contains articles of topical interest on hydrography, oceanography, cartography, navigation, photogrammetry, geodesy and allied subjects, radio aids, automation, new instruments and techniques. The September issue is also devoted to specific topics.

Approx. 165 pages, 18 x 27 cm; numerous illustrations
Original articles for publication are welcome

The Bureau also published monthly the

INTERNATIONAL HYDROGRAPHIC BULLETIN

which contains topical news, reports the work undertaken by the I.H. Bureau and the world hydrographic community, covers recent developments in hydrographic instrumentation and training programmes, describes new survey vessels, etc. Charts and publications issued by Hydrographic Offices are listed each month, and there is a comprehensive monthly bibliography on hydrography and related subjects.

The Catalogue of the IHO 1993
can be obtained gratis by writing to the

INTERNATIONAL HYDROGRAPHIC BUREAU
B.P. 445
7, avenue President J.F. Kennedy
MC 98011 MONACO CEDEX
Telefax : +33 93 25.20.03
The Acoustic Scintillation Flowmeter: Applications for a New Environmental Tool

by

Terry Curran, David Lemon, and Zhen Ye

Introduction

Pacific Region of the Canadian Hydrographic Service (CHS) was directed to investigate techniques which could assist in the management of the West Coast fisheries. A brief review concluded that the simplest situation would be to count adult salmon migrating upstream in the Fraser River.

An acoustic instrument to measure water flow speeds (the 'flowmeter') had been jointly developed by the Ocean Physics and the CHS Tidal groups at the Institute of Ocean Sciences, and the contractor ASL Environmental Sciences Limited, during the 1980s. [1, 2]

When the instrument was operationally deployed as a water speed indicator in the Fraser River at Annacis Island in 1991, anomalous but reasonably consistent upstream speeds were noticed. This led to a suspicion that the instrument was detecting migrating salmon. A report using a very small segment of data concluded that this might be occurring, but more data were needed [3]. The instrument was redeployed in 1993, to collect the more extensive dataset required.

The information has now been analyzed. As well as reliably determining water flow speeds to high accuracy, the instrument simultaneously detects episodes of anomalous material in the water, and appears to detect upstream-migrating adult salmon.

Scintillation Flowmeter Principle

The flowmeter is based upon the forward-scattering-of-sound principle. Forward scattering means that a separate acoustic transmitter and receiver are used, and sound pulses are reflected off objects in the path between the transmitter and receiver. This can be thought of as two halves of a conventional echo sounder. Unlike an echo sounder, time-of-flight information is normally lost, so the principle cannot be used to measure ranges.

The flowmeter can, however, be used to measure speeds accurately. Any turbulence or object in the path from transmitter to receiver would cause a change in the amplitude of the received sound. If a pair of transmitters and a corresponding pair of receivers are arranged in a horizontal plane, any object moving perpendicular to the path would disturb first one beam, then the other. The separation of the transmit pair is known, the time between the amplitude fluctuations is measured, and the speed and upstream/downstream direction of the interrupting object can be easily determined.

In practice, very short bursts of sound from two acoustic projectors are successively transmitted in parallel across the river, roughly perpendicular to the flow, to hydrophones on the opposite bank approximately 400 metres distant. The receivers detect the maximum amplitude of the pulse burst and store the time history to tape. From the peak amplitude history (say, over two to five minutes), the pattern of amplitude variations between two parallel acoustic paths across the river can be matched, and the best-fit time shift computed. This process is known as cross correlation.

Instrument orientation which is not orthogonal to the flow is corrected by a cosine function.

Site Description

The flowmeter is located near the upstream end of Annacis Island, in the south arm of the Fraser River (see Figure 1). The location was chosen for ease of access and a relatively uniform flow of water.

With the present interest in monitoring fish migration, the site has also acquired strategic interest. The Fraser River salmon runs are of enormous domestic and international value.

The transmitter site is located on the southern shore of the Fraser River, on top of a piling breakwater at the Surrey wharves. The receiver site is on the northern side of the south arm, immediately downstream of Annacis Auto Terminals.

At that location, water depth is twelve metres at lowest normal tides, tidal range is two metres and, in fact, the water flow reverses at certain times of the year and tidal cycle.

Figure 1: Location of Flowmeter, near mouth of South Arm of Fraser River.

Equipment Installation

There are two pairs of acoustic projectors and receivers. One pair is six metres above the mid-channel bottom, and a second set is eight metres above the mid-channel bottom (see Figure 2).
The receive hydrophones, on the north side of the river, are connected via cable to a hut housing receiver electronics, a computer, and a cellular telephone for data telemetry.

---

10.67 (from Rx tide gauge datum)
9.98
7.28
5.19
3.06
0.97

Rx Transducer Track

---

Tx Transducer Track

---

Figure 2: Transmit and Receive Array Transducers

Water Speed Indicator

Motivation

The acoustic scintillation concept offered several attractive advantages over more conventional instrumentation. No hardware, other than acoustic transducers, was placed in the channel, so the instrumentation presented no hazard to navigation. Also, water speeds computed were a true average across the channel, thus accommodating eddies and other confusing flow structures. Speeds can be computed at any time interval desired, but frequently two and five minute averages were found to be useful. The instrument was not watched, so operational costs were low.

---

Figure 3: Tidal Effect on River Currents
(Thin Graph = Tidal Height, Dots = Computed Currents)

Operation as a Current Meter

There is a strong tidal effect at the chosen location. Compare the flow speed graph (thin line) with the tidal amplitude graph in Figure 3. The horizontal scale is Pacific Standard Time (P.S.T.), with intervals of six hours between tick marks. At low tide, the river slope is greatest and the flow is greatest. At high tide, the river slope is reduced, and the flow is slower.

---

Figure 4: Comparison Between Scintillation Flowmeter and RDI ADCP [4]

Habitat Information

Data Acquisition

In 1991, only two-minute average flow measurements were computed in real time.

In 1993, two-minute average amplitude and flow speed measurements were recorded (see Figure 5), motivated by a belief that fish passage information was contained in the amplitude of the acoustic signal. This occurred from April 14 until July 17, when the transmitter platform was damaged, presumably by a large ship travelling upstream. The instrument was out of service until re-activated on August 6.

While repairs to the transmitter platform were in progress, a number of changes to the flowmeter were made. The instrument had a faster computer and a DAT tape storage system.
added, permitting storage of amplitude information from every transmission (at a rate of ten pings per second, for each of four receivers). Real-time computation of currents was removed, since these could be calculated at any subsequent time from the now-recorded amplitude information. The real time amplitude averaging was changed to five minutes.

![Figure 5: Peak Acoustic Amplitude and Corresponding Current](image)

Since August 6, the raw amplitude data were recovered approximately monthly. In the intervening times, the instrument was interrogated remotely via cellular telephone to confirm instrument health and to download sample data.

**Industrial Component**

A surprising finding, illustrated in Figure 6, was that the times of increased variability of the received amplitude signal during the summer almost always showed an onset on Sunday at 2300 (0000 Daylight Standard Time Monday), and peak variability at 1400. The signal variability usually abruptly ended on Friday at 2300 (2400 Daylight). On statutory holidays, there was reduced variability. Occasionally, such as on May 31, the variable signal became evident at other times. The amplitude variability was minimal from August 13 at 2300 until Tuesday, September 7 at 1300. The signal was seen equally at both depth levels. Finally, the current computations were unaffected.

![Figure 6: Weekly Pattern in Amplitude](image)

From September to mid-November (see Figure 7), the nature of the signal attenuation changed. Instead of an almost continuous Monday to Friday signal, with a daily pattern, it became apparent in a brief burst at a random time during the day. Frequently, this random burst was at 1600, suggesting perhaps activity at an industrial shift change.

Finally, since mid-November, the signal attenuation has greatly increased and no longer appears related to the Monday to Friday sequence.

![Figure 7: Amplitude Variability During Fall 1993](image)

The lack of indication in the water current analysis suggests that the cause of the increased scattering was moving with the flow, and perhaps even enhancing the forward-scattering correlation calculation. The signal appeared at both levels, indicating that the scattering cause was distributed throughout the water column.

Dredging was eliminated as a possible cause after checking with Public Works Canada, and with the Fraser River Harbour Commission. Also, nighttime dredging would be somewhat extraordinary.

The inevitable conclusion was that it is an upstream industrial process. There was no apparent offset from midnight, which suggested that the process must be very near to the flowmeter itself. The exact cause remains under investigation.

**Fish Passage Information**

The forward-scattering correlation principle can detect multiple independent motions. This means that water flow, upstream or downstream, can generally be separated from upstream salmon migration. The technique fails when the downstream water flow occurs when the salmon are migrating and at the same speed. Generally, this is not the case.

For other times, the speed at which fish pass is detected by fitting Gaussian distributions to the cross correlation function for both the water speed and the fish passage information. The measured time shifts yield independent estimates of the speed of the water flow and of fish passage, if fish are present.

![Figure 8: Cross-Correlation Curve for Water Turbulence and Fish](image)
A typical cross-correlation plot is displayed in Figure 8. The first peak, at negative lag of -0.4 second, can be related to fish swimming upstream. The larger and broader second peak at +1.0 second corresponds to downstream water flow. The height of the fitted function, corresponding to fish passage, can be associated with total scattering caused by the fish. If the approximate scattering loss for a single salmon is known, and this is reasonably well understood, then the number of fish can be determined.

A pattern comparison (Figure 9), with daily net catch estimates approximately nine kilometres downstream at Cottonwood over 30 days indicates a correlation coefficient of 0.82. With minor filtering, this rises to 0.91.

The actual net count estimates have been reduced by 50 to agree with the acoustic counts. This results because only a tenth of the water column is in view of the acoustic system, and the fish population is not uniformly distributed.

![Figure 9: Comparison of Daily Counts By Flowmeter and By Net Catch at Cottonwood](image)

**Conclusions**

An acoustic instrument has been developed which economically and non-intrusively measures water flow, monitors industrial activity on habitat, and appears to count migrating adult salmon. Operation is unattended, and can be interrogated remotely via cellular telephone.

Development will continue to refine the fish counting algorithm, and to apply the technique to other suitable sites.

**References**


**About The Authors**


Terry joined the Canadian Hydrographic Service in 1973. He is presently Chief of Engineering Services in CHS Pacific, and Industrial Liaison Officer for the Institute of Ocean Sciences (IOS), Sidney, B. C. In the first capacity, he coordinates internal engineering developments in ocean acoustics, ocean optics, and geomatics technology (computers, communications, and positioning). In the latter capacity, he encourages the dialogue between workers at IOS and those in the private sector.


David joined ASL Environmental Sciences Limited (formerly Arctic Sciences Limited) in 1978, after 2½ years with the Defence Research Board in Halifax. He worked on Arctic Oceanographic problems until 1982, where he became interested in applications of underwater acoustics to physical oceanographic problems, working in conjunction with IOS Acoustical Oceanography group. His interests now include the study of underwater ambient noise, and for the last eight years he has been chiefly concerned with applications of acoustic scintillation techniques to flow measurement.

**Zhen Ye**: Education: B.Sc. (Biology), Peking (Beijing) University, 1984; Ph.D. (Theoretical Physics - Condensed Matter), University of Alberta, 1991; Post Doc, Canadian Centre of Excellence in Molecular and Interfacial Dynamics, U. of Ottawa, 1991-92.

Since 1993, Zhen Ye has been associated with the Institute of Ocean Sciences, where his primary work is directed towards fisheries acoustics. He has been active in a number of fields such as superconductivity, electron transport theory, surface dynamics, fisheries acoustics, and ocean physics.
Lighthouse Puzzler / Casse-tête du Lighthouse

by
Beth Weller

Lighthouse Puzzler # 10

The Scotia-Fundy, Quebec, Central, and Pacific Regions have each reported an item for Notices to Mariners. Each Region fielded a different type of survey run by a different senior hydrographer.

The Dominion Hydrographer's secretary is on holiday but a Very Distinguished Person took notes for you over the telephone. From these notes, can you draft an item for the Annual Report saying who reported the removal of the church steeple and where it was?

The clues:
1. Fred is not the hydrographer from Quebec Region, nor did he report the demolished church steeple.
2. Craig is not with Central Region.
3. Helen, the Pacific Region party, the Shore Survey, and the one that discovered the new grain elevator all complained about the long field season.
4. Peter, who is not from Central Region, was on the ship but was not the one to spot the casino on the wharf.
5. Neither Revisory nor the Ship Survey came across the new marina.
6. The Scotia-Fundy party, not led by Helen, was neither the Revisory Survey nor the one that noticed the missing steeple.
7. Fred, on the Launch Survey, did not report the new marina.
8. Helen, not with Central Region, won $50 playing blackjack when she was checking out the new casino.

<table>
<thead>
<tr>
<th></th>
<th>Pacific</th>
<th>Central</th>
<th>Scotia-Fundy</th>
<th>Revisory</th>
<th>Launch</th>
<th>Ship</th>
<th>Shore</th>
<th>Casino</th>
<th>Steeple</th>
<th>Elevator</th>
<th>Marina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Craig</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casino</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steeple</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revisory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Launch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shore</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solution to Fall Puzzler (#9)

By Clue 3, Louise must be married to Jon, and Paola to Brad. Les must be married to Jennifer (Clue 4) so Heimo is married to Terese.

By Clues 1, 2, and 3, Helen and Terese went fishing but [Clue 4] not in St. Maarten. By Clue 4, which mentions all the couples, Paola must be the woman that went on the rum cruise. So Paola and Brad went on the Rum Cruise in St. Barts, and Louise and Jon must be the couple who went to St. Maarten.

By Clue 1, Les and Jennifer did not go fishing or limbo dancing, nor did they go on the rum cruise [Clue 4] so they must have enjoyed the steel band, but not at St. Kitts [Clue 5] so they must have been at St. Lucia. By elimination, Heimo and Terese were at St. Kitts, and Louise and Jon liked the limbo dancers.
The Canadian Hydrographic Association (CHA) is a non-profit, scientific and technical group of about 500 members with the objectives of:

- advancing the development of hydrography, marine cartography and associated activities in Canada;
- furthering the knowledge and professional development of its members;
- enhancing and demonstrating the public need for hydrography;
- assisting in the development of hydrographic sciences in the developing countries.

It is the only national hydrographic organization in Canada. It embraces the disciplines of:

- hydrographic surveying;
- marine cartography;
- marine geodesy;
- offshore exploration;
- tidal and tidal current studies.

The Canadian Hydrographic Association is formally affiliated with the Canadian Institute of Geomatics. It is informally associated with the Geomatics Society.

**What the CHA Can Do For You**

- advance your knowledge of hydrography, cartography and associated disciplines, and keep you abreast of the latest development in these disciplines;
- enable you to develop and maintain contacts with others involved with hydrography, nationally and internationally.

These benefits are provided through the publication of LIGHTHOUSE (one of only three journals in the world devoted exclusively to hydrography), through the sponsorship of seminars, colloquiums, training programs, national conferences, and branch and national meetings.

**Lighthouse**

The journal of the Canadian Hydrographic Association, LIGHTHOUSE, is published twice yearly and distributed free to its members. Timely scientific, technical and non-technical papers and articles appear in the journal with authors from national and international academia, industry and government. Present circulation of LIGHTHOUSE is approximately 900.

**Membership**

Membership is open to all hydrographers, those working in associated disciplines, and those interested in hydrography and marine cartography.

**Branch & Regional Activities**

The Canadian Hydrographic Association has eight (8) branches located across Canada. National headquarters is located in Ottawa.

For further information write to:

National President
Canadian Hydrographic Association
P.O. Box 5578, Station F
Ottawa, Ontario
Canada
K2C 3J1

L'Association canadienne d'hydrographie (ACH) est un organisme sans but lucratif réunissant un groupe scientifique et technique de plus de 500 membres ayant des objectifs communs, comme:

- faire progresser le développement de l'hydrographie, de la cartographie marine et de leurs sphères d'activités au Canada;
- permettre les échanges d'idées et le développement professionnel de ses membres;
- rehausser et démontrer l'importance de l'hydrographie auprès de public;
- assister au développement des sciences de l'hydrographie dans les pays en voie de développement.

Au Canada, l'Association est la seule organisation hydrographique qui embrasse les disciplines suivantes:

- levé hydrographique
- cartographie marine
- géodésie marine
- exploration extra-coâtière
- étude des marées et courants

L'Association canadienne d'hydrographie est affiliée à l'Association canadienne des sciences géomatiques, et non-officiellement liée à la Société de l'hydrographie.

**Ce qu'elle peut faire pour vous**

L'ACH vous offre des avantages tels que:

- parfaire vos connaissances de l'hydrographie, de la cartographie et des disciplines connexes, tout en vous tenant au courant des nouvelles techniques et des derniers développements réalisés dans ces domaines;
- établir et maintenir des contacts avec ceux qui œuvrent en hydrographie, au niveau national et international.

Ces avantages sont transmis par l'entremise de LIGHTHOUSE (une des trois revues au monde traitant exclusivement d'hydrographie) et par la tenue de séminaires, de colloques, de programmes de formation et d'assemblées régionales et nationales.

**Lighthouse**

La revue de l'Association canadienne d'hydrographie, LIGHTHOUSE, est publiée deux fois l'an et distribuée gratuitement aux membres. Des articles scientifiques, techniques et non techniques, provenant du milieu des industries ou du gouvernement autant national qu'international, apparaissent dans cette revue. Le tirage actuel de la revue est d'environ 900 copies.

**Comment devenir membre**

Le statut de membre est offert aux hydrographes et à tout ceux oeuvrant ou ayant un intérêt dans des disciplines associées à hydrographie ou à la cartographie marine.

**Sections et activités régionales**

L'Association canadienne d'hydrographie possède huit (8) sections à travers le Canada. L'administration centrale se trouve à Ottawa.

Pour plus d'informations, s'adresser au:

Président national
Association canadienne d'hydrographie
C.P. 5378, station F
Ottawa, Ontario
Canada
K2C 3J1
Coming Events / Événements à venir

Coastal Zone Canada '94
Coastal Zone Canada '94 is a major international coastal zone management conference. It will be held at the World Trade and Convention Centre in Halifax, Nova Scotia, September 20 to 23, 1994. The theme of this conference is "Cooperation in the Coastal Zone".

For further information please contact:
Coastal Zone Canada '94, Conference Secretariat
Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia
Canada
B2Y 4A2
Telephone: (902) 429-9497
Fax: (902) 429-9491

HYDROCOMM '95
The Canadian Hydrographic Service's HYDROCOMM '95 will be held February 15th, 1995 at various locations throughout Canada and the United States.

Satellite technology will be used to broadcast the presentations to a number of sites simultaneously and participants at each site will have a real-time communications link to both speakers and participants at other sites. This is an opportunity for employers to involve more staff for the same cost as sending one person to a distant symposium.

The 'origination' site will be in Ottawa, Canada with tentative 'downlink' sites in Victoria, Vancouver, Calgary, Burlington, Montreal, Quebec, Rimouski, Fredericton, Halifax and St. John's in Canada, and Washington, D.C, USA.

HYDROCOMM '95 will foster widespread discussion, exchange of viewpoints and active participation. Topics for papers includes: Technology Integration in Marine Transportation; Electronic Chart - The Course to Go; Technology and the Quality Issue; and Standards for Data, Systems, Processes and Integration.

For more information contact:
HYDROCOMM '95
Canadian Hydrographic Service
615 Booth Street
Ottawa, Ontario,
Canada
K1A 0E6

Symposium Chairman: J. Richard MacDougall
Telephone: (613) 995-4554
Fax: (613) 996-9053

17th International Cartographic Conference
Barcelona '95
The 17th International Cartographic Conference and 10th General Assembly of ICA will be held in Barcelona, Spain, September 3-9, 1995. The theme of this conference is "Cartography Crossing Borders".

ICC '95 is organized for the International Cartographic Association by Sociedad Española de Cartografía, Fotogrametría y Teledetección.

Papers will be presented on a variety of topics including GIS, Digital Cartography, Thematic Cartography, Remote Sensing, Spatial Data Handling, Hydrographic Mapping and Navigation Systems.

For more information contact:
Jaume Miranda i Canals, Chairman
Institut Cartogràfic de Catalunya
Balmes, 209-211 - E-08006
Barcelona, Catalonia,
Spain
Telephone: (343) 218-8758
Fax: (343) 218-8959

GIS '95 Symposium
The Ninth Annual Symposium on Geographic Information Systems - GIS '95 - will be held in Vancouver, British Columbia, Canada, March 27-30, 1995.

GIS '95 and GISExpo at the Vancouver Trade and Convention Centre will be an event for users, corporate decision-makers, and suppliers of GIS systems and services.

Subjects for papers include: data generation; data interchange; distributed computing; emerging technologies; environmental assessment; expert systems; global databases; information management; object-oriented strategies; and open systems.

For more information contact:
GIS '95 Symposium
207-1102 Homer Street,
Vancouver, BC
Canada
V6B 2X6
Telephone: (604) 688-0188
Fax: (604) 688-1573
E-Mail - InterNet: gis@unixg.ubc.ca
## 1994 CHA Directors and Appointments

<table>
<thead>
<tr>
<th>National President</th>
<th>Captain Vancouver Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Dave Pugh</td>
<td>Mr. Paul Sawyer</td>
</tr>
<tr>
<td>Director CHA</td>
<td>Director CHA</td>
</tr>
<tr>
<td>615 Booth Street</td>
<td>Sandwell Inc.</td>
</tr>
<tr>
<td>Ottawa, Ontario</td>
<td>Suite 700, 1190 Hornby St.</td>
</tr>
<tr>
<td>K1A OE6</td>
<td>Vancouver, B.C. V6Z 2H6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Newfoundland Branch</th>
<th>Pacific Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Frank Hall</td>
<td>Mr. Rob Hare</td>
</tr>
<tr>
<td>Director CHA</td>
<td>Director CHA</td>
</tr>
<tr>
<td>Cabot College,</td>
<td></td>
</tr>
<tr>
<td>Ridge Road Campus</td>
<td>P.O. Box 6000</td>
</tr>
<tr>
<td>St. John's, Newfoundland</td>
<td>9860 West Sannich Road</td>
</tr>
<tr>
<td>A1C 5P7</td>
<td>Sidney, B.C.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Atlantic Branch</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Charlie O'Reilly</td>
<td>Bus: 709-758-7104</td>
</tr>
<tr>
<td>Director CHA</td>
<td></td>
</tr>
<tr>
<td>Box 1006</td>
<td></td>
</tr>
<tr>
<td>Dartmouth, Nova Scotia</td>
<td>B2Y 4A2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section du Québec</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Bernard Labrecque</td>
<td>Bus: 418-775-6600</td>
</tr>
<tr>
<td>Director CHA</td>
<td></td>
</tr>
<tr>
<td>Institut Maurice-Lamontagne</td>
<td>C.P. 1000, 850, Rue de la Mer</td>
</tr>
<tr>
<td>Mont-Joli, Quebec</td>
<td></td>
</tr>
<tr>
<td>G5H 3Z4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ottawa Branch</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mrs. Ilona Monahan</td>
<td>Bus: 613-995-4516</td>
</tr>
<tr>
<td>Director CHA</td>
<td></td>
</tr>
<tr>
<td>615 Booth Street</td>
<td></td>
</tr>
<tr>
<td>Ottawa, Ontario</td>
<td>K1A OE6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Central Branch</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms. Terese Herron</td>
<td>Bus: 905-336-4846</td>
</tr>
<tr>
<td>Director CHA</td>
<td></td>
</tr>
<tr>
<td>867 Lakeshore Road</td>
<td></td>
</tr>
<tr>
<td>Burlington, Ontario</td>
<td>L7R 4A6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prairie Schooner Branch</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Bruce Calderbank</td>
<td>Bus: 403-278-0419</td>
</tr>
<tr>
<td>Director CHA</td>
<td></td>
</tr>
<tr>
<td>Hydrographic Surveys Consultants Intl. Ltd.</td>
<td>74 Granlea Place</td>
</tr>
<tr>
<td>Calgary, Alberta</td>
<td>T3E 4K2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>National Secretary</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Rick Mehlman</td>
<td>Bus: 613-995-4584</td>
</tr>
<tr>
<td>615 Booth Street</td>
<td></td>
</tr>
<tr>
<td>Ottawa, Ontario</td>
<td>K1A OE6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>National Treasurer</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Ray Chapeskie</td>
<td>Bus: 613-995-4283</td>
</tr>
<tr>
<td>615 Booth Street</td>
<td></td>
</tr>
<tr>
<td>Ottawa, Ontario</td>
<td>K1A OE6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Editor, Lighthouse</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Bruce Richards</td>
<td>Bus: 905-336-4549</td>
</tr>
<tr>
<td>867 Lakeshore Road</td>
<td></td>
</tr>
<tr>
<td>Burlington, Ontario</td>
<td>L7R 4A6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Awards Co-ordinator</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Barry Lusk</td>
<td>604-658-1836</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHA/CIDA Project Managers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Tom McCulloch</td>
<td>604-721-3541</td>
</tr>
<tr>
<td>Mr. Willie Rapatz</td>
<td></td>
</tr>
</tbody>
</table>
Sustaining Members / Membres de soutien

Sustaining membership allows companies, closely linked with the hydrographic field, to become more involved with the activities of the CHA and to maintain closer contact with users of their products. Through LIGHTHOUSE these Sustaining Members are also able to reach a world-wide hydrographic audience. The benefits of Sustaining Membership include:

- a certificate suitable for framing;
- three copies of each issue of Lighthouse;
- copies of the local Branch newsletters, where available;
- an invitation to participate in CHA seminars;
- an annual listing in Lighthouse;
- an annual 250 word description in Lighthouse; and
- discounted advertising rates in Lighthouse.

Annual dues for CHA Sustaining Membership are $150.00 (Canadian).

Current Sustaining Members are listed below.

Aanderaa Instruments Ltd.
100 - 4243 Glenford Avenue,
Victoria, British Columbia, V8Z 4B9
Fax: (604) 479-6588
contact: Gail Gabel (affiliation - CHA Pacific Branch)

Atlas Elektronik
Atlas Elektronik of America,
90 Myrtle Street, Cranford, NJ
USA 07016
Fax: 908-276-3822
contact: Karl Kieninger (affiliation - CHA Central Branch)

C-MAP / USA
P.O. Box 1609,
Sandwich, Massachusetts,
USA 02563
Fax: (508) 833-2480
contact: Kenneth J. Cirillo (affiliation - CHA Central Branch)

Datasonics Inc.
P.O. Box 8,
1400 Route 28A,
Cataumet, Massachusetts,
USA 02534
Fax: (508) 563-9312
contact: Paul Igo (affiliation - CHA Central Branch)

EG&G Marine Instruments
P.O. Box 498,
1140 Route 28A,
Cataumet, MA,
USA 02534 (affiliation - CHA Central Branch)

Garde Côtière canadienne
104 rue Dalhousie, Suite 311,
Québec, Québec, G1K 4B8
Fax: (418) 648-4236
contact: Claude Duval (affiliation - ACH Section du Québec)

Simrad Mesotech Systems Ltd.
202 Brownlow Avenue
Dartmouth, Nova Scotia,
Canada B3B 1T5
Fax: (902) 468-2217
contact John Gillis (affiliation - CHA Central Branch)

terra surveys ltd.
1962 Mills Road,
Sidney, British Columbia,
Canada V8L 3S1
Fax: (604) 656-4604
contact: Rick Quinn (affiliation - CHA Pacific Branch)

Quester Tangent Corporation
9665 West Saanich Road,
Sidney, British Columbia,
Canada V8L 3S3
Fax: (604) 655-4696
contact: John Watt (affiliation - CHA Pacific Branch)

Racal Positioning Systems Ltd.
118 Burlington Rd.,
New Malden, Surrey,
United Kingdom KT3 4NR
Fax: 44 81 942-6630
contact: Paul Deslandes (affiliation - CHA Central Branch)

Sea Beam Instruments Inc.
141 Washington Street,
East Walpole, Massachusetts,
USA 02032-1155
Fax: (508) 660-6061
contact: Steve Withrow (affiliation CHA Central Branch)

l'Institut maritime du Québec

C'est en présence de nombreux invités œuvrant dans la communauté bass-coverte, représentants des milieux maritime et de l'éducation, partenaires, collaborateurs dévoués, membres de son personnel que l'institut maritime du Québec soulignait son cinquantième anniversaire de fondation, le mercredi 26 janvier dernier, à Rimouski, à son siège social et principal centre de formation au Québec.

Pour marquer cet événement, l'institut maritime du Québec

Lighthouse: Edition 49, Spring 1994
Une cuvée spéciale du cinquantenaire était aussi présentée aux invités. À la même occasion, la Direction de la station radiophonique CJBR Radio-Canada Bas Saint-Laurent annonçait un projet de production spéciale sur l'histoire de l'Institut maritime du Québec qui serait diffusée à l'automne 1994, dans le cadre des Séries de la 11e heure.

Après avoir appelé les hauts faits ayant marqué l'évolution de cette institution unique au Québec, entre autres, les nombreuses luttes livrées par la communauté rimoise pour conserver dans sa région l'enseignement maritime, monsieur Raymond Giguère, directeur de l'Institut, a souligné le développement exceptionnel que connait cette institution depuis quelques années et remercié toutes les personnes et tous les organismes qui collaborèrent à ce succès.

Monsieur Ghislain Bouchard, président du Conseil d'administration du Cégep de Rimouski de qui relève l'Institut maritime du Québec, déclara être fier de cet établissement d'enseignement hautement spécialisé, fondé en région, qui a su bâtir une réputation enviable non seulement sur le plan national mais aussi international. Pour sa part, monsieur Alcide Daigle, directeur général du Cégep de Rimouski, s'est dit confiant de voir l'Institut reléver les défis et surmonter les obstacles qui se dresseront sur sa route au cours des prochains décennies.

Le cinquantenaire de l'Institut maritime du Québec sera souligné tout au long de l'année à l'occasion de différentes activités telles les Salons nautiques de Montréal et de Québec, les assemblées générales annuelles de l'Association des armateurs du Saint-Laurent et de l'Association des armateurs et des gradés de l'Institut maritime du Québec, le banquet annuel du Grunt Club, une importante association d'armateurs canadiens, à l'occasion également des inaugurations, à Rimouski, du Centre de formation en plongée professionnelle de l'Institut maritime du Québec et du nouveau simulateur de salle des machines et de l'inauguration du nouveau simulateur de navigation au radar qui sera installé au Centre permanent de formation des adultes de l'Institut, à Québec.

---

**Quester Tangent Corporation**

Quester Tangent is a wholly British Columbia-owned and operated business, incorporated federally in 1983. The company is a manufacturer of proprietary data acquisition and processing equipment as well as related peripherals and offers system integration services.

Quester Tangent manufactures and delivers proprietary, ruggedized, integrated navigation and data acquisition systems sub-sea search integration systems, purpose-designed shipboard displays and customized operator interface peripherals. The company's core product is a proven data acquisition and processing system. In the company's ten year history, one hundred of these integrated systems were delivered to clients worldwide. Currently, over forty different marine sensors are supported.

The Quester Tangent ISAH was selected as the standard integrated system by the Canadian Hydrographic Service and several other international hydrographic agencies. The ISAH is also used operationally as the integrated navigation and data acquisition system for offshore, multi-disciplinary and seismic survey operations. For military applications, Quester Tangent has supplied integrated sub-sea search systems, positioning, and navigation systems and special purpose interfaces, controllers and displays to the Canadian and international navies.

Quester Tangent Corporation is well positioned to address the requirements of a broad range of high reliability, electronic systems projects with a qualified staff of professionals.

Offering combined expertise in electronics, computer engineering, surveying, mathematics and marine science disciplines, the professionals at Quester Tangent provide technical solutions in fields such as hydrography, mine surveillance and general mine-counter measures operations, marine and sub-sea search and survey, oceanography, integrated shipboard marine systems and marine geophysics and seismic systems.
Obituaries

GORDON MURRAY
This March saw the saddened loss of our dear friend, Gordon Herold Murray. Gordon was a friend and professional colleague for many in the hydrographic community and was a breath of fresh air in the cut and thrust of the marine consulting business. He was of the old school, which believed that a professional’s responsibility was to do the best he could for his client and give advice that was completely honest even when the advice would not necessarily be favourable to oneself. Gordon never lost his cool and he always treated everyone he worked with as a valuable member of the team with something important to say. It was once written of Gordon that he was regarded by all across the country as a true professional and Gentleman.

This was a gentleman who could also get things done. At his retirement he took on two major projects – one to found the Captain George Vancouver Branch of the Canadian Hydrographic Association and the other to organize the successful Canadian Hydrographic Conference in 1989 at the Pan Pacific Hotel in Vancouver. Gordon put together a team of Committee members for this conference by pure force of his low key personality. Although at times the team despaired of ever making the Conference work and imagined having to chip in to make it solvent, Gordon planned and encouraged and worked far harder than anyone to make it a success. And successful it was with people from 20 countries, excellent papers, great social events and a profit as well. This was an achievement of which Gordon was justly proud and it gave many people fond and lasting memories of their time spent with him.

Gordon lead from behind. In fact, he never accepted the title Conference Chairman until the committee (without letting him know) changed the conference proceedings to recognize him as the Conference Chairman, which in fact he was. People who attended the previous 1987 conference in Burlington, Ontario, will remember Gordon dressed up as Captain George Vancouver cajoling everyone to come to Vancouver two years later, and come they did.

Gordon will be missed very much, but he continues as a model to all as a professional with a big heart. Our deepest sympathy is extended to his wife, Charlotte and family. A donation has been made by the Captain Vancouver Branch of the Canadian Hydrographic Association, in Gordon’s name, to the British Columbia Association for Parkinson’s Disease.

W.S. CROWTHER 1933 - 1994 (by A.D.O’Connor)
The CHA lost a good friend on 16 June 1994 when W.S. (Sev) Crowther passed away after a lengthy battle with cancer.

Sev was most recently the Manager of Nautical Publications and Distribution in the Canadian Hydrographic Service, Pacific Region. He retired on 31 March 1994, after almost 42 years of service to CHS.

Sev started a long and distinguished career with the Federal Government as a student draughtsman on 11 August 1952 and after completing a training course joined CHS as a draftsman/inker. For the first few years he worked on field surveys in that capacity during the field season and when not in the field worked in the drafting section with Els Walsh and Bill Covey. Once he came ashore, Sev rose through positions of increasing responsibility to the position of Head of the Cartographic Section and was instrumental in implementing the first drafting course in 1969. He was a great proponent of combining the duties of chart compilers and draughtsmen. Sev was also very active in the Public Service Alliance of Canada during the time the union was becoming the bargaining agent for many Federal employees. He was president of the Environment Component of PSAC when he met Dianne Proulx who would become his wife.

In September 1974, Sev became Head, Geoscience Mapping, and was responsible for GEBCO charts and Nural Resource Maps. In May 1977, he moved to Pacific Region as Chief of Chart Production and in November 1978 he became Regional Chart Superintendent (changed to Manager, Nautical Publications and Distribution in 1991). Among his many achievements was the introduction of the first CHS Cruising Atlas designed for recreational boaters, which was introduced in 1986.

Outside of work Sev’s interests included gardening, travel, sports, and in particular children. When employed in Ottawa, Sev played Santa Claus at staff functions and delivered gifts to children of CHS employees at home on Christmas Eve. He continued that tradition when he moved to Pacific Region and over the last fifteen years, hundreds of children have sat on his knee at the Annual IOS Children’s Christmas Party and in various homes around town.

Sev Crowther set high standards, he worked hard, he enjoyed life and he never quit; he was admired by us all. Our condolences go to Dianne and family. Sev will be missed by his family, colleagues and friends across the country, and by all the children who will not learn of his passing.
Prairie Schooner Branch

Our branch is alive and well with our members active at home and abroad.

Andrew Brebner has been conducting GPS legal surveys in Rankin Inlet and some of the islands in Hudson Bay.

John Brigden has been carrying out QC work in Gabon, Norway and Vietnam. John is taking the summer off this year.

Bruce Calderbank has been carrying out QC work in the North Sea and the Irish Sea. Bruce is also taking the summer off.

Elizabeth Cannon has been working on GPS application in agriculture and aerial mapping. Elizabeth has also been the co-organizer of the KIS94 Conference.

Frank Colton has been developing his company’s expertise in information technology. Frank was also able to attend the CHA conference in Victoria.

Glen Harvey has been continuously carrying out land surveys for mapping in north west British Columbia.

Alex Hittel had been managing several land claim surveys in the NWT.

Lorraine Hortness continues to provide office support and calculation expertise for her company. Lorraine had a great cruise through the Panama Canal in March.

Hal Jans has been carrying out GPS surveys for land and engineering works, on a Canada wide basis.

Gerard Lachapelle has been working on GPS applications for attitude determination in hydrography and water level monitoring. Gerard has also been the co-organizer of the KIS94 Conference.

Ken Simpson has continued marketing his company and providing project management services in Argentina, Cuba, Canada and USA. Ken has also been supporting the company’s activities in Alaska, Malaysia, Oman and Yemen.

David Thomson has continued to manage his company which provides survey services in Canada and overseas.

Frank Wisker has successfully sold a number of Ashtech sub-metre DGPS systems to Public Works Canada and the St. Lawrence Seaway Commission. As well, Geodetic Survey of Canada are using Ashtech equipment for first order surveys.

Answers to Pacific Branch Quiz (from page 40): 1-Thomhill; 2-Hare; 3-Rapatz; 4-LaCroix; 5-Woods; 6-Woodward; 7-Gale Gabel; 8-Sandflands; 9-Jim Voeborg; 10-Quester Tangent; 11-Hinds; 12-Nowak, Halcro 13-Galloway; 14-Popejoy; 15-Pfluger; 16-Holman.

Newfoundland Branch

Greetings from the Rock!

The members of the Newfoundland Branch of the CHA who have been conspicuously quiet in the past wish to let all the other branches know that we are alive and well and about to come into our own.

Although formal activities in the past year have been minimal, the recent interest in the association from employees of N.D.I. and other related industries have been very encouraging and our membership has started to swell.

No summer activities have been planned but we hope will be a well attended general meeting is planned for late September following which we hope to report that an ambitious fall and winter program of activities has begun.

Ottawa Branch

At the branch Annual General meeting held in April the following executive members were elected:

Vice President: Ilona Monahan
Secretary/Treasurer: Joel Box
Executive: Denis Pigeon
Past Vice President: Gunther Schuetzenmeiler

Meetings

The branch membership had a busy and successful year in 1993, and more events are planned for the 1994 year. To start off the informal lunch time seminars this year Lt. Cdr. Steve Jakes talked about Ocean Mapping and 3-D techniques developed for visualizing large volume data sets. Our next seminar was entitled “Determining Bathymetry from Satellite measurements”, our speaker was Dr. Walter Smith from N.O.A.A. Also this year as the annual membership drive closed, we had a draw for wine. The lucky winners of the bottles of vino were Richard Horrigan (from the renewing members) and Bob Farmer (from the new members). A video entitled “Mission Northwest Passage” was also viewed by the membership at lunch time that day.

Social Notes

Congratulations go out to Ralph Renaud and Jake Kean on winning the Canada 125 medals. These are given out to public servants for continuous outstanding contributions over their years of service.

Several CHS employees retired this year. Art Read from reprographics, Ron Haas from cartographic standards, Doug Wilson from Notice to Mariners, and Bev Aubin from administration. All were wished a fond farewell in May, and we hope they all thoroughly enjoy their retirement.
Congratulations go out to Joel Box on the purchase of his new home in Russell, Ontario earlier this year. Now he is stuck with the same problems the rest of us face, fixing the plumbing, gardening, cutting grass, mortgages, welcome to the club Joel and Michelle, but seriously, we do hope you enjoy your new home.

Dave Monahan turned 50 (yes that’s right the big five-O) this year, and got a surprise birthday party to celebrate the big event.

Russ McColl and Dave Gray are in the field this year. We hope they have a great season, and come back safe and sound.

Central Branch

Meetings

Central Branch has had three meetings so far this year. The first one held Wednesday January 19, hosted by Terese Herron, featured Lorne Joyce from the Mississauga Historical Society, as the guest speaker. Lorne’s topic: “Early Ships on the Great Lakes” complete with a slide show which contained some wonderful pictures. Mr. Joyce has a wealth of knowledge of the time, the people and the ships.

Our second meeting of the year, hosted by Keith Weaver, featured Keith Clifford, Port Meteorological Officer with the Atmospheric Environment Service, Environment Canada, Ontario Region. Keith’s slide show was most informative in detailing Environment Canada’s Great Lakes ship-board and land-based meteorological monitoring stations.

Our third meeting of 1994 was held at Sam and Beth Weller’s home where Andrew Leyzack presented the video “Around Cape Horn”, a trip around the ‘Horn’ aboard the four-masted bark “Peking”, filmed and narrated by Capt. Irving Johnson in 1929 and 1980 respectively. We then watched a video on the RCMP schooner “St. Roch” and her epic 1941-42 voyage through Canada’s Northwest Passage.

Internet

CHA is now on Internet via CHA InfoServer on the World-Wide Web (WWW). This information network is made available through the Canada Centre for Inland Waters here in Burlington Ontario. This means that people all over the world can browse through this WWW site if they have Internet access.

General CHA information and the Central Branch NewsLetters will be posted as well as a few documents on the Heritage Launch. The URL (Uniform Resource Locator) to access CCIW is http://www.cciw.ca/ and the CHA information is presented deep under the Canada Centre for Inland Waters (home-page); Organizational Components at CCIW; Canadian Hydrographic Service; CHA (Professional Affiliates).

Any browsers, who would like to contact the CHA please send e-mail with your comments to WEAVER@burdfo.bur.dfo.ca, or to Keith.Weaver@cciw.ca. All Executive members of Central Branch except Ken McMillan can be reached via Internet by addressing mail to SURNAME@burdfo.bur.dfo.ca (for example HERRON@burdfo.bur.dfo.ca). Give it a try!

Centennial Award

Peter Knight was presented with the Centennial Award at Erindale College in October. This award, offered by the Educational Foundation of the Ontario Association of Land Surveyors, was presented to Peter in recognition of his graduate work and published papers in the field of survey law. Peter’s paper in the CIG/CHS 1993 Conference Proceedings was recently reprinted by AOLS in the Winter 1994 edition of “The Ontario Land Surveyor”.

Annual Barbecue

The Central Branch Annual Barbecue was on Saturday, July 9. From all accounts it was another successful one.

H2O Bonspiel

March 12, 1994, saw 48 curlers take to the ice at the Dundas Granite Curling Club for the 23rd Annual H2O Bonspiel. There were two draws, each drawing three 6-end games. There were many new curlers as well as a few die hards and 7 CHA members. The winning ‘A’ Trophy team was Bob Coker, John Dixon, Dan Gianfetto, and Paola Travaglini. The ‘B’ Trophy went to Bruce Gray, Karen Gray, Natalie Clarke, and Rob Hewitson. Curlers enjoyed a big Roast Beef dinner before picking from the prize table. There were generous prize donations from the following companies:

Aanderaa Instruments Ltd.
Aerodat Ltd.
Canadian Hydrographic Service
Canadian Hydrographic Association
Geodimeter of Canada Ltd.
J. M. Ellis
Kev-Tech Associates
Questor Tangent Corporation
R. C. Marine Electronics Ltd.
Telecom Computer Products
Terra Surveys Ltd.
Universal Systems Ltd.
Xerox Engineering Systems Canada.

Everyone had a good time – even the last place team!

HEADED BY BOB COVEY! Warm thanks to our sponsors, and to Brad Tinney, Brian Power, and Dave Pyatt for pulling everything together.

‘Surveyor’

The CHA/CB Heritage Launch ‘Surveyor’ is ship shape and ready for another busy season. Hours were spent by CHA members, in the early summer evenings and weekends, cleaning the effects of the winter and applying new coats of pine tar, linseed oil, and paint to ready her for the coming season. The ‘Surveyor’ and her hardy crew have a total of five full weekends scheduled for 1994.

These began with Loyalist Days at Fort Wellington in Prescott, Ontario on July 16 and 17. This event was sponsored by the Canadian War Museum and was a great two day event.

The next weekend, July 24 and 25, was Aquealest in Hamilton, Ontario. This annual event featured an 1812 encampment in which the ‘Surveyor’ played an important role. Heritage hydrography demonstrations took place each morning with battle re-enactments in the afternoons.

The main events of the summer will take place in
Penetanguishene during the Tall Ships event July 29-August 1 and the Atlantic Challenge event August 6-7. During both these events the launch 'Surveyor' will be available for public viewing and will be performing heritage hydrography demonstrations.

The final event of the season will take place in Collingwood, Ontario, on August 14 where the 'Surveyor' will be alongside a current CHS survey launch equipped with all the modern equipment such as DGPS and will again be emphasizing the contrasts between the old and the new modes of chartmaking.

The 'Surveyor' will be housed in the Marine Museum of the Great Lakes at Kingston, Ontario, from September until April 1995 as part of a hydrography display co-sponsored by the Canadian Hydrographic Service.

Funding for the launch is an ongoing operation to cover operations and maintenance costs range from $2,000 to $3,000/year.

As you can see, our 'Surveyor' is well and gaining a reputation as a well crewed and very authentic heritage launch. Congratulations to all the volunteers for keeping our heritage alive.

Personal Notes
Belated congratulations to Peter and Valarie Knight on the birth of their third child. Hollis James was born at home on November 17, 1993, weighing in at 10 lb., 2 oz.

Two of our members retired March 31 of this year. We wish Bruce Wright and Jim Elliott all the best in their retirement years.

Captain Vancouver Branch

General
The branch has a renewed optimism for a successful continu­ation of operation following a changeover to a new executive and an interesting and informative March meeting.

Almost all of our members work within the hydrographic community but with private companies not Government services (Warren Williams being the exception at Public Works Canada). Hans Grey, formally with McElhanney, is now employed with Simrad Mesotech.

At our March meeting Simrad's Mark Atherton (formally with Can Dive) presented a discussion on sonar imaging drawing on his interesting and varied background and experience. Mark's talk was both informative and light-hearted with a few anecdotes tossed in.

Branch News
A total of ten members have paid their dues for 1994 and one new sustaining member, Cansel Survey Equipment Ltd., of Burnaby, BC has arrived on the scene. Cansel provides sales and rental services of a large variety of survey equipment and supplies to the local market.

Many members are busy, locally in the lower mainland, working on interesting projects. For instance, Mike Tarbottin of Triton Consultants is working with the Port of Vancouver developing a finite element model of tide and dispersion of the greater Vancouver harbour. A few members have also been overseas. Paul Sawyer, of Sandwell Inc., has recently returned from completing a dredging study in northern Colombia and George Pugach, private consultant, is once again on his way to Siberia to work on a gold mine project. Also Reg Labinsky, another consultant, is planning a project in Venezuela.

Pacific Branch

Jim Parks and Mike Woodward received cheques for their contributions to the design of the portable tide gauge now in use in Pacific Region on field surveys. Their happy faces appear in the photo above.

Rob Hare received a portion of the $300 Terra award, which is presented by Terra Surveys to stimulate authorship in Geomatica on the subject of hydrography. Gérard Lachapelle's winning article, co-authored with Rob and C. Liu, G. Lu, M. Cannon and B. Townsend, is "Precise Marine DGPS Positioning Using P Code and High Performance C/A Code Technologies".

George Schlagintweit won the Lighthouse award for the paper "Real-time Acoustic Bottom Classification for Hydrography: An Evaluation of Roxanne".

Anne Ballantyne and hubby Mike are organizing the Islands Folk Festival in Duncan on July 22-24. Mike performs 19th century English rural folk songs on Saturday morning and Sunday afternoon.

Bonspiel
We held our annual H2O Curling Bonspiel on March 6 at the Glen Meadows Golf Club, followed by dinner and presentation of awards. The winning team of Radim Zizka, Geoff Methuen, Jim and Judy Vosberg, all from Terra Surveys, managed to win without the Vosbergs, who missed the event entirely. Radim and Geoff swept the field by themselves, losing only when loaned a player from another team. Placing second by one-half point was the five-member team of Harvey Pfluger, Al Schofield, George Schlagintweit, Dave Prince and Michael Jennings.
Hydrographic Field Season
George Schlagintweit sailed with the J.P. Tully on the Coastal Safari to Barkley Sound in mid-April. His beaming face appeared on television screens across the continent and in Japan, explaining safe navigation using the electronic chart. Quester Tangent donated an ISAH-S unit. ImagineX provided a sidescan sonar and Offshore Systems sent an electronic chart.

Meanwhile, back at CHS, Terry Curran led a week-long open house for students at the video downlink site at the Institute of Ocean Sciences. Each day of the week, students watched one of three live presentations on the big screen in the auditorium, followed by a one-hour tour of special displays at the Institute. Tides and Currents Section hosted the oil spill that his beach survey will discover some wreckage of the Hydrographic Field.

George Schlagintweit sailed with the J.P. Tully on the Coastal Ocean Safari appeared on television screens across the continent and in Canada. Meanwhile, back at CHS, the auditorium, followed by a one-hour tour of special displays at the Institute. Tides and Currents Section hosted the oil spill that his beach survey will discover some wreckage of the Hydrographic Field.

Instead of an international training course for hydrographers.

Tides and Currents
Fred Stephenson is in the State of Mississippi, teaching part of an international training course for hydrographers.

Vern Crowley and Doug Cartwright have departed for the first CHS survey of Great Slave lake since the 1950s. Peter Milner and Mike Woods are with the Department of Public Works on a GPS control survey on the Mackenzie River. Somewhere west of Bella Bella on the Pender are George Eaton, Ken Halcro, Carol Nowak, Doug Popejoy, Dave Thornhill and Ron Woolley. George Schlagintweit is somewhere west of Klemtu, participating in a geoduck search with the Kitasoo Band.

Tides and Currents
Fred Stephenson is in the State of Mississippi, teaching part of an international training course for hydrographers.

Mike Woodward led the Tides and Currents group of Bodo de Lange Boom, Larry Dorosh, Denny Sinnott, Neil Sutherland and honorary T&C member Doug Popejoy on a three-week mission. They used to be called cruises, to Queen Charlotte Sound in March and April on the Coast Guard Vessel Narwhal. Bodo reports that a drifter launched north of Cape Scott during the cruise is still afloat in Queen Charlotte Sound, three and a half months later. We had suspected a long residence time for surface waters in this Sound in spring, but this is really long.

Chart Production
Last Newsletter reported on the start of the Clipper project. Production work began on the Clipper Cruise Line ENC requirement early in February. This initial requirement called for twenty-seven charts, of which, only eleven were in digital format. These existing files were not up to date nor were they topologically correct. Of the remaining sixteen, fourteen were table-digitized and two were scanned and then vectorized. This project was not without its pitfalls and ensuing downtime. Distortion problems from the scanning process were eventually overcome using 'mosaic' and Institute Electronics again came to the rescue of the equipment utilized in the table-digitizing exercise. Eight charts remained outstanding at year end; however, the scheduled completion date will be achieved.

Still working on this project are Dave Jackson, Patti Dew, Dave Prince and Harvey Pfluger.

Electronics
Al Thomson made significant changes to the Marine VHF antenna systems on the Pender, installing a new coax antenna feed wiring and a new 10dB gain marine VHF antenna. Although difficult to evaluate under field conditions, communications with survey launches have been reported as better than in previous years. None of the survey launches have been able to outrun the "Voice of the Coast" George Eaton from his Hydrographic command centre on the Pender. George is happy, but we haven't had a chance to check with the field hydrographers yet!

Sustaining Member News
Quester Tangent continues to work with CHS to develop and test our products in a real-world environment. Recently, Quester Tangent provided a modified HYPS version capable of processing Reson SeaBat data. Ken Halcro spent many hours in our offices in front of a Sun workstation. The results from the trials will be released by CHS later in July.

We will support CHS in their habitat mapping project off Price Island in August. The Price Island project will culminate in the collection of an extensive data set of bottom signatures generated by ISAH-S with accompanying ground truthing.

Our summer will be spent preparing for the upcoming training courses and further installations in India. The Indian project continues to go well. After extensive harbour and sea trials, we have now received final acceptance of the first three shipsets of equipment delivered last year. In August we will attend the US Corps of Engineers' Training Symposium in New Orleans with our sea bottom classification and bathymetry verification products. After we complete deliveries of ISAH-S equipment to DPW and CHS, we expect the Corps to order equipment in 1995.

Annual CHA Photo Contest
Now is the time to take your photos for our contest. Although the entry deadline is in November, this is the prime season for photos in the following categories:

1. People
2. Wildlife
3. Scenery
4. Things
5. Black and White

The photos need not be work related, but must be taken in 1994. Members may submit photos or slides in any or all categories, but only one per category. This contest is open to all CHA Pacific Branch members. Look for more details and deadline date in the next CHA Newsletter.

25 Years
Congratulations to Art Lyon and Dan Dobson for receiving 25-year certificates from CHS. Another milestone for Art: he will turn 50 this month.
Quiz
Identify the CHA members from the clues below.
1. Small prickly mountain
2. Rabbit
3. Austrian rabbits trading a pea for their bees.
4. French cross
5. Forests
6. Forest talk
7. Windy P.E.I. roof component (2 names)
8. Pulverized rocky area
9. Naked Greek ice lump flower holder reversed (2 names)
10. Backwards searcher for sun-darkened man (2 names)
11. 57 varieties
12. Don't hit IBM-1 bird (2 members)
13. Singular hanging method
14. Happy pontiff turned backwards
15. Foreign handgun
16. Complete non-woman
(Answers to quiz on page 36)

Retirements
By March 31, four Pacific Region CHA members had retired:
Sev Crowther, Barry Lusk, John Larkin and Murray Farmer. A spontaneous retirement party was held at the Golden Bear on March 31 for several of the retirees.

Sev Crowther was the Manager of Nautical Publications and Distribution in Pacific Region. During his years at I.O.S. he pushed hard to serve the recreational boating community, producing a cruising atlas for small craft sailing in Desolation Sound, and a future atlas for the Gulf Islands.

Barry Lusk retired from the position of hydrographer-in-charge for the western Arctic and contract surveys. He began as a hydrographer on the Wm. J. Stewart surveying the west coast of the Queen Charlottes, and completed his career as H-I-C on the J.P. Tully for the survey of the western Arctic in the summer of 1993. Barry served for several years as president of the Canadian Hydrographic Association.

John Larkin moved to Pacific Region after working as a training officer in Ottawa and was the field data processor in CHS. He is well known for his work in training.

Murray Farmer served as navigational information officer for the past several years, after a long career as a cartographer in Pacific Region and in Ottawa. He is a passionate walker, and together with his wife Kay has hoofed his way through several continents.

W.S. Crowther 1933 - 1994
The CHA lost a good friend on 16 June, 1994 when W.S. (Sev) Crowther passed away after a lengthy battle with cancer. Sev was most recently the Manager of Nautical Publications and Distribution in the Canadian Hydrographic Service, Pacific Region. He retired on 31 March 1994, after almost 42 years of service to CHS.

Sev Crowther set high standards, he worked hard, he enjoyed life and he never quit; he was admired by us all. Our condolences go to his wife Dianne and family.

Golden Member News
Pete Browning will be attending a reunion for his elementary school in August, in Duroche, British Columbia.

Stan Huggett and Phyllis have returned from a visit to England.

Laurie Thompson and her wife Myrna are busy with the Commonwealth Games as volunteers. Laurie is working with the transportation committee and Myrna is putting her sewing expertise to work.

The CIG Conference in Victoria was a Rapatz family gathering: Willie and Marg organised the event, while Phillip and Swee-Leng returned to attend, with Swee-Leng presenting a paper.

Mike Bolton and Barb Danbrook visited her family in Halifax and Ottawa, and Mike's grand-daughter Lisa came to visit in Victoria.

Section du Québec
Lors de l'assemblée générale annuelle de la Section du Québec le 5 décembre 1993, un nouveau conseil d'administration a été élu. Il se compose de:

Vice-Président: Bernard Labrecque
Trésorier: Jean Proteau
Secrétaire: Sylvain Guimont
Conseiller: Pierre Pagé
Conseiller: Denis Proulx
Conseiller: Bernard Tessier

Durant ses vacances en Thaïlande, Bernard Labrecque a visité les bureaux du Service hydrographique thaïlandais le 28 décembre 1993. En plus d'échanger sur les différentes technologies hydrographiques utilisées par les deux pays, il en a profité pour faire connaître les buts poursuivis par l'Association canadienne d'hydrographie et la revue LIGHT-HOUSE qu'elle publie.

Au cours de l'hiver, la Section du Québec a réalisé une publicité en commun pour faire connaître le réseau des dépositaires autorisés de publications marines du Service hydrographique du Canada. Celle-ci a paru dans le Programme officiel de l'ExpoNautique de Montréal, le Guide des marinas, L'Escale et le Carnet de bord.

La troisième édition de notre Carnet de bord a paru à la fin janvier juste à temps pour l'ExpoNautique de Montréal. Son contenu a encore été amélioré par l'ajout d'informations sur les bateaux de plongée et les signaux de manoeuvres restreintes.

Le 27 mars 1994, une trentaine de membres et amis(e)s se sont réunis à la cabane à sucre de Charles Thériault autour d'un dîner du temps des sucres et d'une découverte de tire d'erable. Les enfants, petits et grands (en particulier Normand Doucet), s'en sont donnés à cœur joie à glisier dans les valons de la sucrerie.

Pour une 3e année consécutive, la Section du Québec avait un kiosque à l'Expo-Nature de Rimouski qui se tenait du 21 au 24 avril 1994. Expo-Nature est le 2e salon en importance au Québec portant sur les activités de plein air. Cette année encore, au-delà de 25 000 personnes ont visité ce salon. Nous avons encore bénéficié d'une visibilité de choix et elle a pu faire la promotion de l'hydrographie via la vente de documents nautiques et autres publications.
C-Map/USA

C-Map announces the publication of a monthly news brief for electronic chart users: How will an electronic charting system help me catch more fish? What is the advantage of buying an electronic charting system with an LCD monitor? Can I print hard copies of my courses from my electronic charting system?

These are only a few of the questions C-Map/USA has frequently been asked. It appears that as popular as electronic charting has become in recent years, many consumers and members of the trade are still not familiar with many of the applications, unique features and benefits of using electronic charting systems.

That is why C-Map has created The Electronic Charting Report, a monthly news brief written by C-Map/USA specifically for the purpose of educating the public about the ins and outs of electronic charting, feature by feature and issue by issue.

Their premier issue focuses on ways to use an electronic charting system to catch more fish.

Atlas Elektronik of America, GmbH

Atlas Elektronik introduces Atlas Profimap 250, a new rack-mounted integrated hydrographic data logging and processing computer system designed for a wide range of survey applications aboard launches or seagoing vessels.

The Intel 486-driven system, which includes a 102-key slimline keyboard, is available either with an internal 9-inch LCD-VGA colour display or an external colour monitor. Program and data, are stored on an internal 120 Mb hard disk, with data being accessed and other programs loaded via an internal 1.44 Mb floppy disk drive.

In addition to logging depth and position, the system's standard range of interfaces can be extended to acquire data from other sensors such as gyro compasses, sound velocity probes, and tidal monitoring units. Logging and display of data from multibeam sonars, such as Atlas Fansweep, is also possible.

Profimap 250's purpose-designed software for survey preparation, on-line and post-processing operations can be complemented by an optional digital terrain modelling and contouring module. Development of Profimap 250 follows the recent introduction of a portable version for use on small and medium-size vessels, the Profimap 150.

Racal Positioning Systems Ltd., UK

Racal Positioning Systems Ltd. is now incorporating Ashtech's newest and most accurate GPS receivers in its DeltaFix SR differential GPS systems. Customers are offered a choice of either the DNS-12 or the Z-12 high precision GPS receivers from Ashtech to make DeltaFix SR (short range) the most accurate integrated DGPS system available on the market today.

The DeltaFix SR differential GPS system has been developed by Racal to offer users precise positioning at ranges - depending on local radio propagation conditions - of up to 60 km from a shore-based reference station. The system has been developed specifically for hydrographic surveyors, harbour authorities, dredging contractors and other users needing high accuracy DGPS positioning over relatively small areas.

The DeltaFix SR system functions through the use of a shore-based GPS reference receiver located at a precisely known position, which transmits corrections to observed GPS pseudo-ranges over appropriate UHF or VHF channels. The vessel's DeltaFix receiver decodes the corrections and these are applied to the integrated GPS receiver. By incorporating Ashtech's new DNS-12 GPS receivers, DeltaFix SR is now able to use SUPER C/A technology to provide positioning accuracies of better than 1 metre.

DeltaFix SR is also available with Ashtech's new Z-12 dual frequency (L1/L2) receiver, which not only offers both SUPER C/A performance in single frequency real-time differential C/A mode but also dual-frequency geodetic mode operation. The Z-12 receiver-based version is, therefore, capable of offering the ultimate in non-real-time geodetic application accuracy, even in the presence of Anti Spoofing (A/S). The dual function system allows the same equipment to be used in the field both to survey in the reference stations and to operate in the real-time differential mode.

The first batch of these systems using both DNS-12 and Z-12 receivers has been ordered by the Royal Danish Navy for hydrographic work in Denmark and Greenland. A special
Ross Laboratories Inc., USA

Ross Laboratories announces they have broken the price barrier on hydrographic survey systems! The Ross Survey System will dramatically increase hydrographic surveying productivity by simplifying data gathering and increasing data accuracy. It is PC-based and available with integrated DGPS.

The Ross Survey System is completely modular. It is the only system available with full complement of hardware and software necessary to provide a complete technical solution. This new flexible approach allows the user to pick any hardware or software package or combine all features to meet their needs.

Ross Survey Systems are currently used in many departments in the U.S. Government, such as the Army Corps of Engineers and Fish and Wildlife.

Scantron, UK.

Scantron announces the first edition of their Newsletter, Scantron Bulletin Board, which will be published on a regular basis to keep you informed of new products and services. Scantron Limited are now into their fourth financial year as an Independent Rental Company, having been formed after a management buyout from the I.R. Group in June 1990. Each successive year has seen growth and increased facilities added. Since entering the offshore rental market in the early 80s, both the I.R. Group and Scantron Limited have been the first to introduce new products at the forefront of technology. Others have followed where Scantron has lead.

In keeping with this philosophy, the first edition of the newsletter contains articles on the Focus 400 Remote Operated TV, the Reson Seabat, a Bathymetric system for small ROV's, news of Elva A/S software products in addition to details of agreements which Scantron Limited has recently entered into with Hyspec and Livingston Hire.

SeaBeam Instruments Inc., U.S.A.

SeaBeam Instruments, Inc., announces they have been competitively selected to produce a multi-beam bathymetric sonar system for installation aboard the R/V Nathaniel B. Palmer. Selection was made by Antarctic Support Associates (ASA), a prime contractor to the funding agency for the R/V Palmer, the National Science Foundation (NSF).

SeaBeam will be delivering their latest full-ocean, multi-beam bathymetric system, the SEA BEAM 2000, Series 2100. This versatile, compact system is capable of operating at multiple frequencies for complete deep and shallow water bathymetric mapping. In addition to wide swath bathymetry, the Series 2100 system is capable of providing co-located and geometrically-corrected side scan in both deep and shallow waters.

The multi-beam system to be installed on the R/V Palmer will feature underhull transducer arrays enclosed within ice hardening acoustic windows. Delivery of the arrays is scheduled for April, 1994, with Series 2100 electronics to be delivered the following month.

The R/V Nathaniel B. Palmer was launched in 1992 and is owned and operated by Edison Chouest Offshore of Galliano, Louisiana. ASA charters the Palmer on behalf of NSF to support a range of scientific research activities in waters off Antarctica.

SeaBeam Instruments specializes in acoustics, acoustic signal processing, beam forming technologies, and the design and development of acoustic transducers and complete bathymetric and hydrographic survey systems.

Sonadyne, UK.

Sonadyne was founded in 1972 and built its reputation on medium frequency underwater positioning systems. The unique feature of these was the self-calibrating seabed mounted "intelligent" transponder called Compa (Computing and Telemetering Transponder). Deploved in an array on the seabed, these units establish wide area underwater navigation networks within which suitably-equipped targets are tracked throughout the water column and positioned in relation to each other, to fixed installations on the seabed, and to the surface.

These systems have played a key role in the development of major offshore oil fields throughout the world, notably Auger, Brent, Casablanca, Claymore, Draugen, Emerald, Forties, Heidrun, Magnus, Hutton, Snorre, Statfjord, Thistle and Troll.

The technology used to develop seabed-mounted navigational arrays was the basis of the SIPS towed array system for which Sonadyne won the Queen's Award for Technological Achievement.

Other developments by Sonadyne include MicroNav, an
autonomous instrumentation system which, during the installation of underwater equipment, enables a 3D "picture" of its position, attitude, depth, height and orientation to be computed and telemetered to the surface and displayed.

Sonardyne's short baseline system (SBL) uses a single seabed transponder to position vessels in water depths of 2,500 metres to accuracies of 12 metres. Combined with a long baseline system (LBL), it achieves positioning accuracies of 1.5 metres in water depths of 6,000m.

The ultra-short baseline system (USBL) is a new product, a key feature of which is its ability to be integrated with Sonardyne's LBL system to form a Long and Ultra Short Baseline Acoustic Reference system (LUSBL) for high accuracy positioning for a range of underwater activities. Typically, accuracy is better than 0.5m in 1,200m depth.

As well as providing high-accuracy positioning for the host vessel, the USBL system is capable of simultaneously tracking a further nine targets.

Sonardyne also makes a range of acoustic releases to enable subsurface-deployed instrumentation to be recovered. These techniques are incorporated in the Offshore Telemetry Tide gauge, six of which have been supplied to the Hydrographer of the Navy, UK. The seabed-mounted instrument logs tidal pressure data which is recovered by acoustic telemetry while the unit is still on the seabed. Acoustically-recovered data may be displayed on board the survey vessel by PC and printed in the form of tidal curves. Data is also stored.

Veripos, UK.

Veripos, the consortium of leading European suppliers of electronic navigation equipment, has introduced a parallel Inmarsat Differential GPS service, Veripos I, to complement its existing proprietary Sercel-based HF high-accuracy DGPS network serving offshore and port users in the North West European Continental Shelf.

Developed by consortium members, SubSea Survey, Osiris BV and Topnav, Veripos I provides complementary RTCM 104 V.2 GPS corrections which are computed at existing reference stations at Den Helder, Utsira and Wick. Correction data are collated at the network's hub station in Aberdeen and then relayed to Inmarsat's Earth station at Goonhilly for subsequent uplink to its Atlantic East satellite.

Multi-referencing is now possible by using combinations of HF and Inmarsat-delivered DGPS corrections. Either set of corrections can be accessed direct by Sercel NR 103 DGPS receivers via a set of simple keystrokes, so that backup via a different delivery system is now an inherent feature of the Veripos DGPS service.

Veripos UK is a joint venture between Veripos Limited and Brown and Root Survey Limited.

The new service can also be used in conjunction with a recently-developed real-time and post-processing quality assurance and control program, a QPS-designed software package which mixes DGPS observables with those of conventional radio navigation for all Veripos operations.
Training
Canadian Hydrographic Service (CHS) staff require specialized knowledge and skills to provide the products required by the marine community. In the past a conventional classroom instruction process was successfully utilized, however this methodology does not currently meet the personal scheduling and rapidly changing technological requirements of CHS staff.

To facilitate the providing of information to CHS staff when and where they require it, CHS is producing computer-based multi-media modules. These modules are instructionally designed to be user centred for the efficient and effective delivery of information. Technology Assisted Learning and Coaching (TALC) provides a 75% decrease in the time required to obtain the necessary information.

CHS Atlantic field hydrographers used this new training technology during the week of Jan. 31 to Feb. 4 to upgrade their knowledge of marine cartography.

CHS Atlantic was host for the Hydrographic Training Module held at BIO from March 7 to March 30, 1994. There were a total of 9 students representing 3 CHS Regions. Günther Schützenmeier, from the Training Section in Ottawa, looked after the course and was responsible for much of the instruction.

CHS Atlantic Electronic Charts
The CHS Atlantic EC team hosted prominent Maritime writer Silver Donald Cameron in early January. A crossing aboard MV Princess of Acadia followed the next day. “Silver Don” authored a story in “Canadian Geographic” magazine on the electronic chart. A photographer, from the magazine, arrived in late February for a few in-house shots.

An EC article published in the “Port of Halifax” magazine in December spurred the interest of Mr. Henry Lackner, who writes for the “Atlantic Transportation Journal”. An article will follow in the forthcoming issue.

CHS Atlantic hosted two writers aboard the MV Princess of Acadia during a reception in Saint John. Mrs. Dorothy Dearborn will submit an article into the “Brunswick Business Journal” and has been invited to contribute to the “Christian Science Monitor”. Esther Crandall, a friend to the Port of Saint John, has submitted a story for printing in the next issue of “Canadian Sailings”.

CHS Atlantic and Marine Atlantic Inc. jointly sponsored a reception aboard the MV Princess of Acadia on February 21 to recognize the successful testing of the Electronic Chart Display and Information System (ECDIS).

This reception hosted about 100 people from the marine community in southern New Brunswick. Ross Douglas, Dominion Hydrographer, gave a keynote address outlining the role of CHS with industry in the development of ECDIS. Steve MacPhee, Regional Science Director, BIO, presented the Senior Master, Capt. D.R. MacPherson, with a plaque thanking him and his crew for their efforts. Bob Pietrzak narrated a video that he and Marie MacDonald prepared from footage taken in late January. Laurie Brean, Executive VP, Marine Atlantic, announced to the invited guests that the OSL ECDIS system had in fact been purchased. The ship's navigating bridge was quite busy following our program.

Steve Grant and Bob Pietrzak made two presentations on ECDIS and Differential GPS in late March. The first was to executives of the Irving Companies in Saint John, NB (Kent Lines, Atlantic Towing Ltd., and Saint John Shipbuilding Ltd.). The second was an open Public seminar at the Nova Scotia Nautical Institute in Port Hawkesbury, NS, which was well attended by students, instructors and the local marine community.

Law of the Sea
The United Nations Convention on the Law of the Sea is intended to give "wide margin states" sovereign rights over the continental shelf beyond the present 200 mile Exclusive Economic Zone for the purpose of exploiting it and exploiting its natural resources. These resources consist of the mineral and non-living resources of the sea-bed and subsoil, and living organisms which are in constant contact with the seabed. It does not include those organisms which live in the water column.

Under the Law of the Sea, the term "continental shelf" takes on a new meaning. The extent of this "continental shelf" is much greater than the traditional definition and is determined by a complex combination of bathymetric and geophysical parameters along with fixed boundaries.

Atlantic Geoscience Centre (AGC) and CHS are preparing a report for the Department of Foreign Affairs outlining the data currently available and what additional data will be required to enable Canada to pursue the maximum claim. This report will include an estimate of the costs of surveys to support this claim and an estimate of potential resources and benefits for Canada.

A workshop to discuss the legal and technical aspects of the Law of the Sea, Article 76, was held on April 14 and 15 in the Wu Centre on the University of New Brunswick Campus. This workshop was sponsored by UNB's Faculty of Law, and Department of Geodesy and Geomatics Engineering; the Canadian Hydrographic Service and the Geological Survey of Canada. Paul Bellemare, Reg Lewis, Gerard Costello and Gary Rockwell represented CHS Atlantic. There were other participants from Canadian and United States government agencies, academia and private industry. Presentations
The United Nations Convention on the Law of the Sea will come into force on November 16, 1994. Article 76 of the LOS defines how the new offshore limits of jurisdiction will be established by coastal states. Unfortunately, Article 76 is ambiguous and open to a variety of interpretations. The Workshop provided an opportunity for legal and technical experts to exchange views on Article 76 and how it will impact coastal states.

**Hydrographic Surveys**

The Saint John River Revisory Survey party commenced operations on May 2, under the direction of Gary Henderson. This is a continuation of the program commenced in 1991 to re-survey the Saint John River from Fredericton to Saint John, and will concentrate on the segment from Evandale to Grand Bay, Chart 4141, Sheet 2, including Long Reach, Kingston Creek, Gorhams Creek, and Tennants Cove.

In addition, Otnabog Lake, Musquash Lake and a portion of Wasahademook Lake will be re-surveyed to complete Chart 4142, Sheet 1. The survey is using Differential GPS for positioning, and a total of five water level gauging sites have been occupied, establishing a new chart datum at three of them.

Progress to date has been steady, and the operation will terminate on June 24, providing modern survey data for the production of a New Edition of the chart. As a matter of interest, the Saint John River has not been completely surveyed since 1931-32.

**Boat Shows/Displays**

The 1994 Halifax International Boat Show was held February 17 to 20 at the exhibition grounds outside Halifax. The booth was manned by CHS Atlantic “volunteers”:

- The Electronic Chart static display created a great deal of interest in this new technology, and CHS staff instantly became the authority on GPS with many questions asked about it.
- The static Electronic Chart Display was loaned out to two other groups for use in trade shows. It was used by the Communications Branch, DFO Gulf Region, for the Fish Canada Exhibition in Moncton, NB, April 15-17. NDV used the display at a manufacturers exhibition over the weekend of May 28-29 in St. John’s, Newfoundland.
- CHS Atlantic teamed up with Conservation and Protection Branch Officers based out of Fredericton, NB, to operate an information booth at the Fredericton Boat Show over the weekend of April 29 - May 1. The show attracted a large number of patrons who use smaller open boats for recreational fishing, over which DFO has jurisdiction in New Brunswick. Visitors to the booth were able to discuss the latest fishing regulations and study the appropriate CHS charts to purchase.

**Atlantic Coastal Zone Information Steering Committee**

The Atlantic Coastal Zone Information Steering Committee met in Fredericton on January 13. This Committee, composed of Provincial and Federal agencies, is committed to harmonizing the implementation of database and information management in the Atlantic Provinces for the benefit of Coastal Zone Management. The Committee has developed a directory of all coastal data bases available in Atlantic Canada and is sponsoring the development of an information infrastructure plan proposed by a consortium of companies. CHS’s commitment to this Committee is driven by the high potential return of its investment in the implementation of the Inland Waters Coastal and Oceans Information Network (ICGIN) concept, for its present and future product development.

Version 2.0 of the Atlantic Coastal Zone Database Directory is now available for general use in the CHS Atlantic HDC. This directory, constructed under the auspices of the Atlantic Coastal Zone Information Steering Committee (ACZISC), lists 812 databases in the Atlantic Region, including Federal, Provincial, Municipal and Private sectors. The directory is a very interesting mix, clearly demonstrating the variety and quality of information available, as well as the potential benefits of shared access.

**General**

A joint project is underway to complete an Implementation Plan for an Ocean Mapping Initiative for Canada (OMIC). The Plan will outline details of several projects geared towards developing comprehensive coastal ocean mapping capabilities and products for the Canadian private and public sectors. This involves several federal departments and the provinces of New Brunswick, Nova Scotia, Newfoundland and several companies.

Dale Nicholson and Alex Hantzis traveled to Charlottetown, PEI on Feb. 18 to attend a meeting concerning the Fixed Link project and its impact on CHS charts.

A meeting of East Coast Charting Advisors of the US/Canada Hydrographic Commission was held March 17, 1994. During this meeting some interesting discussions took place on the following issues: Single Charting agency in boundary waters to reduce costs, a joint FG CREEED multi-beam project on the coast of Massachusetts to be conducted in the fall of 1994, the commitment from CHS to bring the multi-beam technologies in operation on the U.S. West Coast as a NACOM objective and the implementation of ISO 9000 where it was felt that a proper assessment of the cost benefits and experiences from other countries should be addressed before embarking in a full certification program.

A Program Review and Evaluation of the Permanent Water Level Network in Eastern Canada was undertaken at BIO on March 16. This review, chaired by Galo Carrera of Geometrix, was sponsored by CHS Atlantic and CHS Quebec with the participation of private industry, academia and various government departments.

CHS had the pleasure to host a visit of Vice Admiral Sarmento Gouveia, Director-General of the Portuguese Hydrographic Service on April 28. Presentations were given by CHS staff covering areas such as Data Base Development, Ocean Mapping, Electronic Chart and Chart Production.

Dale Nicholson delivered two papers at the US Hydrographic Conference in Norfolk, Virginia on April, one concerning Oracle MD and the other relating to Print-on-Demand charts. He also attended the 17th meeting of the United States-Canada
Hydrographic Commission as well as the Coastal Multibeam Working Group meeting.

A Loran-C/Global Positioning System/Electronic Chart seminar was held at B10 on Saturday 30 April. This was jointly sponsored by the Canadian Hydrographic Service, the Canadian Coast Guard, the Canadian Power and Sail Squadrons, and attracted over 60 boaters from around Nova Scotia. One of the highlights of the day was a draw for a Trimble GPS Receiver that was generously contributed by Trimble Navigation Ltd. CHS contributed 5 charts for another draw while all three sponsors contributed various brochures, booklets, etc. Feedback following the seminar indicated that the participants felt that it was very worthwhile and plans are already underway for a repeat performance next year.

April and May were busy times for speaking engagements. Bob Pietrzak gave talks on ECDIS and GPS to the Nova Scotia Schooner Association on April 9; the Atlantic Regional Committee of Business and Government Representatives on April 23; students, instructors and other guests at the Canadian Coast Guard College in Sydney (held in conjunction with Sydney Harbour Board's Port Days, May 18); and a general presentation on CHS to the graduating class of the CPS boating class in Charlottetown, May 28. During this travel, the many local charts dealers were visited.

Paul Dellemare, Steve Grant and Bob Pietrzak were joined by Denis Hains (CHS Quebec), Mike Casey (CHS HQ) and Julian Goodey (CHS/Oslo) at the Harbour Master's Seminar in Saint John, May 13. The seminar was attended by harbour masters and other port officers throughout Canada. Mike and Julian gave a presentation on electronic charts during an afternoon session. A visit to the Princess of Acadia alongside the Saint John Ferry terminal completed the session.

CHS Atlantic hosted the regular meeting of the Halifax Marine Advisory Committee on May 26, 1994 at B10. This is a committee of business and government representatives who have a direct interest in the various marine activities in Halifax Harbour. These range from yachting, fire prevention and law enforcement to tugs, cargoes and the Halifax-Dartmouth bridges. The meetings, held every second month, are hosted by the various members on a rotating basis. The committee is chaired by Captain C.L. Baillie of the Halifax Port Corporation.

**Personal Notes**

It is with reluctance that we bid a fond farewell to Bert McCorriston and Ernie Comeau on the occasion of their retirement. A dinner was hosted on their behalf attended by approximately 100 people. Guest speakers included Steve MacPhail, Vic Gaudet, Bert Smith, Tom Clarke and Mike O'Rourke.

John Cunningham recently engaged the former Checkers Champion of Maine, USA, in a two game match in Brown's Flat, New Brunswick, before a limited audience. John has since refused to discuss the event or the outcome, but apparently it will not be televised on CBC, TSN or the local cable network.

Congratulations to Steve and Michelle Nunn on the birth of their daughter Emily Rae on January 28, 1994.

**CHS Headquarters (Ottawa, Ont.)**

**General HYDROCOMM 95**

CHS Headquarters is planning HYDROCOMM 1995, a very different type of hydrographic conference. The conference will be conducted using business television and will be simultaneously broadcast from the production site in Ottawa to 10 Canadian cities and Washington D.C. Participants at these sites will interact with the speakers and participants at other sites by telephone links. HYDROCOMM 95 will be held on February 15, 1995.

**DFO Review**

Dave Monahan and Ross Douglas are representing CHS Headquarters on the "DFO Review" project which involves the entire Department across the country and will last for several months.

**Retirements**

There have been more than a few changes in personnel at CHS headquarters. Retirement has claimed a number of CHS staff this year. Four staff members retired at the end of March, 1994; Doug Wilson, Ron Haas, Art Read and Bev Aubin. They were followed in short order by Ron Murphy, who retired in June. They had a combined total of 156 years of public service among them. Their experience will be sorely missed.

**Kudos for HQ Staff**

Ralph Renaud and Jake Kean were each awarded the "Canada 125" Commemorative Medal. Ralph and Jake were nominated for this award in recognition of their years of exemplary service to the CHS and the people of Canada. As the citation on the awards states, the medals were presented to those "who have made a significant contribution to Canada, to their community, or to their fellow Canadians. The decoration is a reminder of the values of service, individual respect, and community effort on which Canada was built and on which its quality of life will always depend."

---

**Jake Kean (left) receives his citation for the Canada 125 Medal from Deputy Minister Bruce Rawson**
Ralph Renaud (left) receives his citation for the Canada 125 Medal from Deputy Minister Bruce Rawson.

Ralph and Jake were among the 31 members from the Department in the National Capital Region who received the Medal, a citation, and a letter from His Excellency The Right Honourable Ramon John Hnatyshyn. Deputy Minister Bruce Rawson made the presentations at a reception on April 19, 1994.

Dave Pugh of CHS Headquarters received a Merit Award Certificate and good wishes from the new Deputy Minister of Department of Fisheries and Oceans, Mr. Bill Rowat at a presentation held June 27, 1994. Dave was a member of the Central and Arctic Region CHS team who in close collaboration with Aerodat, of Mississauga, Ontario, developed the "The Towed In-flight Bathymetric System (TIBS)" which uses electromagnetic methodologies to measure water depth. A similar award presentation ceremony for the other public and private sector team members was held at the Bayfield Institute in Burlington on June 15, 1994.

Marine Geomatics Branch

The first seven ENCs (Electronic Navigation Charts) have been released. These West Coast charts were prepared in Pacific Region, verified in the Headquarters Electronic Chart Unit and then submitted for formal approval and release procedures. Their release has been advertised in Notices to Mariners.

The first Print on Demand patch has been released. The patch of Eskimo Harbour, Chart 5707, was prepared in Central and Arctic Region.

Nautical Publications and Distribution

The Nautical Publications unit has had a very successful year to date. Production of the 1995 Tide and Current Tables is proceeding on schedule. The following Sailing Directions volumes have been released this year: Great Lakes Vol. 2 (English and French), Great Lakes Volume 1 Supplement (English and French) and the Arctic Volumes 1 and 3 (English). The Small Craft Guide for the Saint John River (English and French) has also been released.

The long awaited recategorization of the Chart Correction positions from the CR to the DD group has finally been completed. Congratulations to Richard Horrigan, Farida Jaffer, Sue Greenslade, Vicki Smith, Trevor Hutchinson and Steve Hall.

David Gray presented a paper entitled "Canada's Unresolved Maritime Boundaries" at the 1994 CIG Conference in Victoria, BC. David also published an article on Loran-C and coordinate converters in the Great Lakes Cruising Club newsletter "Lifeline." David has also been very busy working on the hydrography chapter of the next volume of the Men and Meridian series of books. This new chapter will tell the story of Canadian Hydrography during the period from World War II to the present - no small task!

Quality Control and Services

Ray Chapek had the good fortune to attend the 48th Annual Quality Congress sponsored by the American Society for Quality Control. This year it was held in Las Vegas, Nevada, and boasted close to 6000 registrants. A highlight was a keynote address which was given by Dr. Joseph M. Juran, who is presently in his 70th year of working in the field of quality.

Electronic Charting

The Electronic Charting Unit has just published 15312-A, a 1:250,000 bathymetric map of the western end of Lake Erie. This is the first of 31 planned maps to be produced under a joint Canada-USA bathymetry project for the Great Lakes. John Warren presented a poster session on this project at the Thirty-Seventh Annual Conference on Great Lakes Research held in Windsor in June.

Organizational and Industrial Development Branch

The Electronic Chart Demonstration Project is continuing on schedule. To date, there have been 23 ECPINS shipboard installations (including the Canada Steamship Lines ships) and one installation at a marine training institute. Another 7-8 installations are planned, including three training institutes.

Tim Evangelatos presented the CHS Source Data Base Team's paper "A New Tool for Managing Very Large Volumes of Hydrographic Data" at the US Hydrographic Conference, Norfolk, April 1994. Tim hosted a workshop on "MultiDimension Topology."

Peter Kielland attended the January 1994 Institute of Navigation Conference, which just happened to be held in San Diego. He presented his paper (co-authored with Tony Tubman, Nortech Surveys)"On Estimating Map Model Errors and GPS Position Errors: Applying More Science to the Art of Navigation." Peter will be chairing a session at the International Symposium on Kinematic System an Geodesy, Geomatics and Navigation, August 30-September 2, in Banff.

The System Development Unit is busy improving our e-mail system, improving the link to DFO and InterNet, etc. They are installing AOCE, a new form of e-mail that is integrated more formally into the Mac system itself and allows for e-mail without extra e-mail software such as QuickMail.

Mike Casey chaired the Canadian Navigation Symposium; Navigation in Canada in the GPS Era, on May 3, 1994 in Winnipeg.

Günter Schützenmeier spent several weeks in Scotia-Fundy Region teaching and co-ordinating the Hydrography course. René Lepage is now working in the Training Unit where he is busy developing TALC (Technology Assisted Learning and Coaching) cartography modules.
Personal Notes

Congratulations to Richard Dumais and his wife Francine Villeneuve on the birth of their daughter Pascale who was born on June 18.

Yves Bouchard and Denis Chartrand represented the CHS on the DFO headquarters hockey team that played in the departmental hockey tournament held in Moncton in March.

The CHS "Snow Bunnies" took 2nd prize in the Government category for their snow sculpture "Empty Nets" at the annual 1994 Ottawa Winterlude and an honourable mention in the February-March publication 'Pieces'.

---

Central and Arctic Region (Burlington, Ont.)

As part of the Regional Electronic Chart Pilot Program, Brent Beale and Bob Covey went aboard the Canada Steamship Lines 'Halifax' to witness first-hand how the crew uses ECDS and the ENC produced by Central and Arctic Region. The trip covered the Welland Canal, Lake Ontario and the Upper St. Lawrence River.

On November 22nd, the CHS Headquarters team of Ray Chapeskie, Mike Casey, Paul Holroyd and Hussein Rostrum from NGL Consulting visited the Region to present an all-staff seminar on Quality Control and ISO-9000. The general meeting followed by a small meeting to discuss a proposal to use the ENC project as a pilot for implementing new quality management procedures in CHS.

Long-serving electronic technician Trevor Dyas who has recently retired was honoured at a luncheon on November 25. More than 90 friends and associates of Trevor gathered to roast and wish him the best in his retirement.

Rick Sandlands attended the 55th meeting of the Coordinating Committee on Great Lakes Basic Hydrographic and Hydrologic Data in Ann Arbor and a meeting in Detroit, with Canadian Coast Guard and the U.S. Army Corps of Engineers. The second meeting was requested by CCG to discuss the management of the Detroit/Clair Waterway, particularly the real-time access to water level data information to respond to requests from commercial navigation and to monitor for ice jams on the rivers.

On December 21 and 22 Earl Brown attended meetings in Hull and Ottawa where details of the Coronation Gulf 1993 Hydrographic activities were discussed. The December 21 meeting included an update on the mining developments in the area, particularly those by Metall, as well as plans for the area by the Transportation Department of the Northwest Territories Government. The December 22 meeting focused on details of the hydrographic surveys. Data was closely examined and many questions were raised by the two shipping companies who are interested in providing vessels to transport the ore to markets in the Far East and Europe.

All those present at both meetings were very impressed with the quantity and quality of the hydrographic data collected in 1993. All objectives of the proposed surveys, which were carried out to determine if ships with a draft of 12 metres could transit the area, were met. This was possible because of the excellent co-operation and support by the Department of Energy, Mines and Resources (Polar Continental Shelf Project and the Panel of Energy Research and Development), the Department of Transport through the Canadian Coast Guard, the Department of Indian and Northern Affairs, the Government of the Northwest Territories and our own Department of Fisheries and Oceans.

Everyone involved in this very large, complex and technically challenging project have reason to be extremely pleased with their accomplishments in 1993, the first year of a proposed five-year program.

J. Elliott and B. Richards hosted a meeting with Leslie Reading of the Great Lakes Cruising Club (GLCC), to establish a Marine Reporting program with the GLCC for 1994.

The Canadian Hydrographic Service participated in the Toronto International Boat show from January 7th to 16th. The Electronic Chart (EC) was featured and the EC video encouraged a number of discussions with our clients. Several questions about the use of authorized CHS data on electronic charts were referred to Nautical Data Incorporated. Other features of the CHS exhibit included: CHS products published in 1993; the print-on-demand-chart concept with the Port of Churchill chart as an example; and the proposed North Channel Atlas.

Field hydrographers completed an in-house cartography training program in February. This is the final step in the process of integrating the work activities of field surveyors and chart makers which has provided for a more efficient Regional operation. In late January a Macintosh computer Technology Assisted Learning module was made available to all hydrographic staff. It presented self-paced reference material for the tutorial which began on February 1st. René Lepage from CHS Headquarters presented the three day course to nineteen staff. The course was mandatory for eleven EG-05 field surveyors.

In recognition of the years of exemplary service, a farewell retirement luncheon was held for Jim Elliott, Marty Frederick and Bruce Wright on March 30.

Three hydrographers attended the Field Surveys module of the Basic Hydrography course. This four-week course was held in Dartmouth and is part of the CHS Career Development Program. This was the last of three modules necessary to complete the basic training program for Mike Johnston, Andrew Leyzack and Pete Wills.

Ken Hipkin attended a meeting at Penetanguishene Historical Naval Establishment to discuss a CHS exhibit.

Jack Wilson and Mike Bennett spent four days in Ottawa, using DGPS to position two control points for the Canadian Coast Guard. These will be used to monitor the performance of the CCG Differential GPS.

A number of staff completed an eight-day (one day a week) course in GIS at McMaster University.

The Electronic-Chart team of Brent Beale, Steve Bockmester, Jennifer Campbell, Suresh Chander, John Dixon, Barrie Elsdon, Craig Fisher, Brian Power and Pete Wills were
presented with a Regional Merit award for their efforts in producing ENC's for the CHS/CSL Pilot Project.

The 1994 Arctic Survey completed a successful season and returned to Burlington in May. Working out of Cambridge Bay from the end of February to late April, the survey collected 4,916 spot soundings and 534 gravity readings along with over 11,700 line kilometres of TIBS data in Dease Strait. In May, the TIBS operation moved to Spence Bay to collect nearly 5,000 line kilometres of data in James Ross Strait, where a Canadian Coast Guard vessel came within a metre of the bottom last year. Shoals in Dease Strait and James Ross Strait will be examined later this year during a Pacific Region Ship/Launch survey in the area. Funding and support for the Dease Strait project was provided by: the Canadian Hydrographic Service; the Polar Continental Shelf Project of the Department of Energy, Mines and Resources; the Government of the Northwest Territories; and the Department of Indian Affairs and Northern Development.

TIBS is a Towed Inflight Bathymetry System which was developed to collect continuous depth profiles through the ice on CHS Arctic surveys. The TIBS survey in Pelly Bay in the spring of 1992 was instrumental in allowing the first ship to navigate into the Bay that same summer. Since then, it has been used on Arctic surveys in Coronation Gulf, Dease Strait, Victoria Strait and James Ross Strait.

In June, the TIBS Development Team was presented the award to Mike Crutclow, George Fenn, Al Koudys, George Macdonald, John Medendorp, Dave Pugh, Dennis St. Jacques, Geof Thompson and Brad Tinney. The Deputy Minister's Commendation was also awarded to Geotech Limited of Markham and Geonex Aerodat Limited of Mississauga, for their contribution in developing TIBS.

GEONEX AERODAT

HIGH RESOLUTION AIRBORNE GEOPHYSICS
HEM - AIRBORNE BATHYMETRY AND SEA ICE MEASUREMENT
HI SENS MAG - ELECTRONIC NAVIGATION - LASER PROFILING

Custom Data Processing, Colour Plotting and Software

3883 Nashua Dr, Mississauga, Ontario. L4V-1R3
ph (905) 671-2446, fax (905) 671-8160

In June, the TIBS Development Team was presented the DFO Merit Award. Dr. Burton Ayles, Director General of Central and Arctic Region, presented the award to Mike Crutclow, George Fenn, Al Koudys, George Macdonald, John Medendorp, Dave Pugh, Dennis St. Jacques, Geof Thompson and Brad Tinney. The Deputy Minister's Commendation was also awarded to Geotech Limited of Markham and Geonex Aerodat Limited of Mississauga, for their contribution in developing TIBS.

TIBS is a Towed Inflight Bathymetry System which was developed to collect continuous depth profiles through the ice on CHS Arctic surveys. The TIBS survey in Pelly Bay in the spring of 1992 was instrumental in allowing the first ship to navigate into the Bay that same summer. Since then, it has been used on Arctic surveys in Coronation Gulf, Dease Strait, Victoria Strait and James Ross Strait.

On June 11, the Assistant Deputy Minister officially opened the Hydrographic display at the Marine Museum of the Great Lakes, in Kingston. The exhibit depicts Hydrographic surveying and charting activities from its early history in Georgian Bay to modern data collection and processing techniques. A survey launch and CARIS system are an integral part of the display.

In July Central and Arctic Region produced the first Print-On-Demand (POD) Notices to Mariners chart correction patch in Canada. This patch of Eskimo Harbour in Hudson Bay was advertised in a written Notice and will be available upon request. This will result in a very significant savings since 'Patches' for all charts have traditionally been produced through 'Offset' printing technology and included in the mailing of Notices to Mariners. Traditional production, in the example of Eskimo Harbour, would have resulted in the printing of 14,000 copies in order to satisfy a very limited, user-demand.
Originalement à l’hiver 1969, LIGHTHOUSE était le journal de l’Association canadienne des hydrographes (ACH). Il représentait un moyen pour stimuler les discussions entre les Sections de l’ACH. De par les années, LIGHTHOUSE est devenue la revue hydrographique nationale du Canada. Elle reste fidèle à son but original de fournir une source d’information technique, historique et sociale à ceux qui s’intéressent à l’hydrographie au Canada. Son tirage a augmenté pour inclure au-delà de 1000 membres, compagnies et organisations hydrographiques au Canada et dans le monde entier.

**Tarifs publicitaires 1994**

**EMPLACEMENTS**
L’approbation et l’emplacement de l’annonce sont à la discrétion de l’éditeur. Cependant, toute demande d’emplacement spécifique sera considérée si une prime de 25 $ est ajoutée à la demande de parution.

**EXIGENCES MÉCANIQUES**
L’annonce publicitaire doit être un prêt à photographier ou sur film négatif (les couleurs supplémentaires doivent être sur film négatif) et être fournie aux dates de tombée. La préparation de copie couleur, à fond perdu et de photos sera chargée au tarif de l’imprimeur plus 10%. Les épreuves devraient être fournies avec tous les suppléments.

Les inscriptions d’une page seront chargées au tarif d’une pleine page. Le matériel devra être fourni par le client.

**DIMENSIONS DE LA PUBLICITÉ**

<table>
<thead>
<tr>
<th>(Hauteur)</th>
<th>(Largeur)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension de la revue:</td>
<td>8.5” x 11.0”</td>
</tr>
<tr>
<td>Encart libre:</td>
<td>7.0” x 10.0”</td>
</tr>
<tr>
<td>Publicité à fond perdu:</td>
<td>8.75” x 11.25”</td>
</tr>
<tr>
<td>Insertion d’une page:</td>
<td>8.25” x 10.75”</td>
</tr>
</tbody>
</table>

Grandeur standards des suppléments:

- Pleine page: 7.0” x 10.0”
- Demie-page: 6.875” x 4.75”
  ou: 3.375” x 9.75”

**DATE DE TOMBÉE**
LIGHTHOUSE est publiée deux fois par année, au printemps et à l’automne. Les dates de tombée sont le 15 mars et le 15 octobre respectivement.

**IMPRESSION**

Internéga
tif tramé à 133 lignes au pouce.

**TARIFS**

Tous les tarifs sont en devises canadiennes. Les membres de soutien ont droit à un rabais de 10%.

<table>
<thead>
<tr>
<th>N &amp; B</th>
<th>Couleur</th>
<th>Une*</th>
<th>Quatre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couverture arrière</td>
<td>SO</td>
<td>SO</td>
<td>1025</td>
</tr>
<tr>
<td>Couverture intérieure</td>
<td>300</td>
<td>400</td>
<td>825</td>
</tr>
<tr>
<td>Pleine page</td>
<td>275</td>
<td>375</td>
<td>675</td>
</tr>
<tr>
<td>Demie-page</td>
<td>200</td>
<td>300</td>
<td>675</td>
</tr>
<tr>
<td>Insertion d’une page</td>
<td>275</td>
<td>375</td>
<td>675</td>
</tr>
<tr>
<td>Carte d’affaire</td>
<td>125</td>
<td>225</td>
<td>SO</td>
</tr>
</tbody>
</table>

*Une couleur (Orange, rouge ou bleu)

Les tarifs sont assurés aux termes des contrats publicitaires jusqu’à concurrence d’un an. Les annulations ne sont pas acceptées après la date de tombée.

Tout le matériel publicitaire doit être acheminé à:

**Monsieur K. Weaver, Directeur de la publicité**
LIGHTHOUSE
P.O. Box 5050
867 Lakeshore Road
Burlington, Ontario
CANADA L7R 4A6
Téléphone: (905) 336-4538
Télécopieur: (905) 336-8916
LIGHTHOUSE originally began as an internal newsletter of the Canadian Hydrographers' Association (CHA) in the winter of 1969. It was conceived as a means of stimulating discussion between the branches of CHA. Over the years, LIGHTHOUSE has become Canada's national hydrographic journal. It still remains faithful to the original goal of providing a mix of technical, historical and social information of interest to those associated with hydrography in Canada. But its circulation has expanded to include over 1,000 individuals, companies and hydrographic organizations in Canada and around the world!

1994 Advertising Rates

POSITIONING
The acceptance and positioning of advertising material is under the sole jurisdiction of the publisher. However, requests for a specified position will be considered if the position premium of $25 has been included in the insertion order.

MECHANICAL REQUIREMENTS
Advertising material must be supplied by the closing dates as camera-ready copy or film negatives (Colour ads must be film negatives). Copy preparation, including colour, bleed and photos will be charged at the printer's cost plus 10%. Proofs should be furnished with all ads.

Single-page inserts will be charged at a full page body rate. Material must be supplied by the client. Page size must conform to the single page insert trim size (below).

PUBLICATION SIZE
(Width x Length)
Publication Trim Size: 8.5" x 11.0"
Live Copy Area: 7" x 10"
Bleed Size: 8.75" x 11.25"
Single Page Insert Trim Size: 8.25" x 10.75"

Standard Ad Sizes:
Full Page: 7" x 10"
1/2 Page: 6.875" x 4.75" or: 3.375" x 9.75"

CLOSING DATES
LIGHTHOUSE is published twice yearly in Spring and Fall. The closing dates are March 15th and October 15th respectively.

PRINTING
Offset screened at 133 lines per inch.

RATES
All rates are quoted in Canadian Funds. Sustaining members receive a 10% discount.

<table>
<thead>
<tr>
<th>Position</th>
<th>B &amp; W</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside Back Cover</td>
<td>NA</td>
<td>Spot*</td>
</tr>
<tr>
<td>Inside Cover</td>
<td>$300</td>
<td>$400</td>
</tr>
<tr>
<td>Body, Full Page</td>
<td>$275</td>
<td>$375</td>
</tr>
<tr>
<td>Half Page</td>
<td>$200</td>
<td>$300</td>
</tr>
<tr>
<td>Single-page Insert</td>
<td>$275</td>
<td>$375</td>
</tr>
<tr>
<td>Professional Card</td>
<td>$125</td>
<td>$225</td>
</tr>
</tbody>
</table>

*R:Spot Colour (Orange, Red or Blue)

RATE PROTECTION
Advertisers will be protected at their contract rates for the term of their contracts up to one year. Cancellations are not accepted after closing date.

All advertising material should be directed to:

Mr. K. Weaver, Advertising Manager
LIGHTHOUSE
P.O. Box 5050
867 Lakeshore Road
Burlington, Ontario
CANADA L7R 4A6
Telephone: (905) 336-4538
Fax: (905) 336-8916
representing and serving the world hydrographic surveying community with individual and corporate members in sixty countries

The Hydrographic Society

UNIVERSITY OF EAST LONDON - LONGBRIDGE ROAD - DAGENHAM
ESSEX RM8 2AS - ENGLAND - TELEPHONE: 081 597 1946 - FAX: 081 590 9730

AUSTRALASIAN
PO Box 1447
North Sydney
NSW 2059
Tel: +61 2 925 4800
Fax: +61 2 925 4835

BENELUX
RWS - Dir Noordzee
Postbus 8807, 2280HV
Rijswijk (ZH), The Netherlands
Tel: 703 396 000
Fax: 703 96 06 91

DENMARK
Sektorafdelingen
Rentemestervej 8
DK 2400 Copenhagen NV
Tel: +45 35 87 50 89
Fax: +45 35 87 50 57

c/o UEL
Longbridge Road
Dagenham Essex RM8 2AS
Tel: 081 597 1946
Fax: 081 590 9730

UK

USA
PO Box 732
Rockville
Maryland 20848-0732
Tel: 301 400-4768
Fax: 301 400-4768
320M Marine Echosounder

- Simultaneous Dual Frequency
- Digital DSP & 32 Greyscale Thermal Printer
- Built-In Digitizers & LCD Depth Displays
- Hands-Off Automatic Phase & Gain (AGC)
- SCSI & Three RS-232 Ports Standard
- Heave & GPS Interfaces Standard

KNUDSEN ENGINEERING LIMITED
77 Gore St. E. Perth Ont.
Canada K7H 1H8

Specialists in underwater acoustics
TEL: (613) 267-1165  FAX: (613) 267-7085 BBS: (613) 267-5579
February 15, 1995

Satellite technology will be used to broadcast the presentations simultaneously to all sites where participants at each site will have a real-time communications link to both speakers and participants at other sites. This is an opportunity for employers to involve more staff for the same cost as sending one person to a distant symposium.

HYDROCOMM 95 will foster widespread discussion, exchange of view points and active participation.

SYMPOSIUM CHAIRMAN
J. Richard MacDougall
Telephone: 613-995-4554
FAX: 613-996-9053

Le 15 février 1995

Les présentations seront diffusées simultanément en utilisant la technologie par satellite à tous les sites où les participants à chaque site auront un lien de communication en temps réel avec les orateurs et avec les participants aux autres endroits. Ceci présente une opportunité aux employeurs d'impliquer plus de personnel aux mêmes coûts que d'envoyer une personne à un symposium éloigné.

HYDROCOMM 95 provoquera des discussions générales, des échanges de points de vue et une participation active.

PRÉSIDENT DU SYMPOSIUM
J. Richard MacDougall
Téléphone : 613-995-4554
Télécopieur : 613-996-9053

SITES
Victoria, Vancouver, Calgary, Toronto, Ottawa, Montréal, Québec, Rimouski, Fredericton, Halifax & St. John’s (CANADA)
Washington, DC (USA - É-UÁ)